

Sight Reduction Tables

Latitude 0° to 6°

Introduction.

The purpose and scope of these tables is to enable a navigator to establish his or her position at sea, or on land, using the Marc Saint Hilaire, or Intercept, method.

The author produced these tables with the objective of reducing the size of the printed tables to just what is required for his cruising latitude.

The tables cover 7 degrees of Latitude and Declination is limited to between 23°N and 23°S. Tables are provided for GHA and Declination interpolation and Sextant corrections. The Excel spreadsheet, from which this PDF file was generated, allows the navigator to enter the 'middle latitude' of his cruising ground. The tables are then produced using this middle latitude + and - 3°.

The tables have been designed primarily for establishing a Line of Position (LOP) from the altitude of the SUN. Two such LOPs, ideally either side of noon, giving a Sun-run-Sun calculated position.

LHA and Declination = SAME

For LHAs between 0° 360° to 90° 270°, the LHA is printed above and below the relevant table. The tabulated data is in normal text.

Where the LHA is > 90° and < 270°, the LHA is printed below the table while any tabulated Hc on the table is positive.

LHA and Declination = CONTRARY

For LHAs between 90° 270° and 0° 360° the LHA is printed above the table and the tabulated data is in **bold** text. The last contrary value of Hc in the relevant column is also underlined. Below that value the figures are for SAME.

When all the Hc° values are bold, indicating that there are no more SAME Hc° values, the LHA and text displayed at the bottom of the table changes accordingly.

NOTE

There are neither blank entries nor negative values for Hc° in these tables.

Accuracy and Precision

The tables were compiled using Microsoft Excel running under Microsoft Windows XP operating system.

Calculations were carried out to the full 15 decimal places, not precision as displayed.

These tables have been compared to the US National Imagery and Mapping Agency Sight Reduction Tables for Marine Navigation Pub229 with the following results.

No difference for Hc° has been identified by the author.

The difference in d' is occasionally 0.1'.

No difference in Z° has been identified by the author.

Disclaimer

While the author has taken great care with these tables, no warranty is implied or expressed as to their fitness for purpose.

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

0° 360° LHA			Latitude SAME as Declination						0° 360° LHA													
Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	90°00.0'	-60.0'	90.0°	89°00.0'	+60.0'	180.0°	88°00.0'	+60.0'	180.0°	87°00.0'	+60.0'	179.9°	86°00.0'	+60.0'	180.0°	85°00.0'	+60.0'	180.0°	84°00.0'	+60.0'	180.0°	0
1	89°00.0'	-60.0'	0.0°	90°00.0'	-60.0'	90.0°	89°00.0'	+60.0'	180.0°	88°00.0'	+60.0'	180.0°	87°00.0'	+60.0'	179.9°	86°00.0'	+60.0'	180.0°	85°00.0'	+60.0'	180.0°	1
2	88°00.0'	-60.0'	0.0°	89°00.0'	-60.0'	0.0°	90°00.0'	-60.0'	90.0°	89°00.0'	+60.0'	180.0°	88°00.0'	+60.0'	180.0°	87°00.0'	+60.0'	179.9°	86°00.0'	+60.0'	180.0°	2
3	87°00.0'	-60.0'	0.1°	88°00.0'	-60.0'	0.0°	89°00.0'	-60.0'	0.0°	90°00.0'	-60.0'	90.0°	89°00.0'	+60.0'	180.0°	88°00.0'	+60.0'	180.0°	87°00.0'	+60.0'	179.9°	3
4	86°00.0'	-60.0'	0.0°	87°00.0'	-60.0'	0.1°	88°00.0'	-60.0'	0.0°	89°00.0'	-60.0'	0.0°	90°00.0'	-60.0'	90.0°	89°00.0'	+60.0'	180.0°	88°00.0'	+60.0'	180.0°	4
5	85°00.0'	-60.0'	0.0°	86°00.0'	-60.0'	0.0°	87°00.0'	-60.0'	0.1°	88°00.0'	-60.0'	0.0°	89°00.0'	-60.0'	0.0°	90°00.0'	-60.0'	90.0°	89°00.0'	+60.0'	180.0°	5
6	84°00.0'	-60.0'	0.0°	85°00.0'	-60.0'	0.0°	86°00.0'	-60.0'	0.0°	87°00.0'	-60.0'	0.1°	88°00.0'	-60.0'	0.0°	89°00.0'	-60.0'	0.0°	90°00.0'	-60.0'	90.0°	6
7	83°00.0'	-60.0'	0.0°	84°00.0'	-60.0'	0.0°	85°00.0'	-60.0'	0.0°	86°00.0'	-60.0'	0.0°	87°00.0'	-60.0'	0.1°	88°00.0'	-60.0'	0.0°	89°00.0'	-60.0'	0.0°	7
8	82°00.0'	-60.0'	0.0°	83°00.0'	-60.0'	0.0°	84°00.0'	-60.0'	0.0°	85°00.0'	-60.0'	0.0°	86°00.0'	-60.0'	0.0°	87°00.0'	-60.0'	0.1°	88°00.0'	-60.0'	0.0°	8
9	81°00.0'	-60.0'	0.0°	82°00.0'	-60.0'	0.0°	83°00.0'	-60.0'	0.0°	84°00.0'	-60.0'	0.0°	85°00.0'	-60.0'	0.0°	86°00.0'	-60.0'	0.0°	87°00.0'	-60.0'	0.1°	9
10	80°00.0'	-60.0'	0.0°	81°00.0'	-60.0'	0.0°	82°00.0'	-60.0'	0.0°	83°00.0'	-60.0'	0.0°	84°00.0'	-60.0'	0.0°	85°00.0'	-60.0'	0.0°	86°00.0'	-60.0'	0.0°	10
11	79°00.0'	-60.0'	0.0°	80°00.0'	-60.0'	0.0°	81°00.0'	-60.0'	0.0°	82°00.0'	-60.0'	0.0°	83°00.0'	-60.0'	0.0°	84°00.0'	-60.0'	0.0°	85°00.0'	-60.0'	0.0°	11
12	78°00.0'	-60.0'	0.0°	79°00.0'	-60.0'	0.0°	80°00.0'	-60.0'	0.0°	81°00.0'	-60.0'	0.0°	82°00.0'	-60.0'	0.0°	83°00.0'	-60.0'	0.0°	84°00.0'	-60.0'	0.0°	12
13	77°00.0'	-60.0'	0.0°	78°00.0'	-60.0'	0.0°	79°00.0'	-60.0'	0.0°	80°00.0'	-60.0'	0.0°	81°00.0'	-60.0'	0.0°	82°00.0'	-60.0'	0.0°	83°00.0'	-60.0'	0.0°	13
14	76°00.0'	-60.0'	0.0°	77°00.0'	-60.0'	0.0°	78°00.0'	-60.0'	0.0°	79°00.0'	-60.0'	0.0°	80°00.0'	-60.0'	0.0°	81°00.0'	-60.0'	0.0°	82°00.0'	-60.0'	0.0°	14
15	75°00.0'	-60.0'	0.0°	76°00.0'	-60.0'	0.0°	77°00.0'	-60.0'	0.0°	78°00.0'	-60.0'	0.0°	79°00.0'	-60.0'	0.0°	80°00.0'	-60.0'	0.0°	81°00.0'	-60.0'	0.0°	15
16	74°00.0'	-60.0'	0.0°	75°00.0'	-60.0'	0.0°	76°00.0'	-60.0'	0.0°	77°00.0'	-60.0'	0.0°	78°00.0'	-60.0'	0.0°	79°00.0'	-60.0'	0.0°	80°00.0'	-60.0'	0.0°	16
17	73°00.0'	-60.0'	0.0°	74°00.0'	-60.0'	0.0°	75°00.0'	-60.0'	0.0°	76°00.0'	-60.0'	0.0°	77°00.0'	-60.0'	0.0°	78°00.0'	-60.0'	0.0°	79°00.0'	-60.0'	0.0°	17
18	72°00.0'	-60.0'	0.0°	73°00.0'	-60.0'	0.0°	74°00.0'	-60.0'	0.0°	75°00.0'	-60.0'	0.0°	76°00.0'	-60.0'	0.0°	77°00.0'	-60.0'	0.0°	78°00.0'	-60.0'	0.0°	18
19	71°00.0'	-60.0'	0.0°	72°00.0'	-60.0'	0.0°	73°00.0'	-60.0'	0.0°	74°00.0'	-60.0'	0.0°	75°00.0'	-60.0'	0.0°	76°00.0'	-60.0'	0.0°	77°00.0'	-60.0'	0.0°	19
20	70°00.0'	-60.0'	0.0°	71°00.0'	-60.0'	0.0°	72°00.0'	-60.0'	0.0°	73°00.0'	-60.0'	0.0°	74°00.0'	-60.0'	0.0°	75°00.0'	-60.0'	0.0°	76°00.0'	-60.0'	0.0°	20
21	69°00.0'	-60.0'	0.0°	70°00.0'	-60.0'	0.0°	71°00.0'	-60.0'	0.0°	72°00.0'	-60.0'	0.0°	73°00.0'	-60.0'	0.0°	74°00.0'	-60.0'	0.0°	75°00.0'	-60.0'	0.0°	21
22	68°00.0'	-60.0'	0.0°	69°00.0'	-60.0'	0.0°	70°00.0'	-60.0'	0.0°	71°00.0'	-60.0'	0.0°	72°00.0'	-60.0'	0.0°	73°00.0'	-60.0'	0.0°	74°00.0'	-60.0'	0.0°	22
23	67°00.0'	-60.0'	0.0°	68°00.0'	-60.0'	0.0°	69°00.0'	-60.0'	0.0°	70°00.0'	-60.0'	0.0°	71°00.0'	-60.0'	0.0°	72°00.0'	-60.0'	0.0°	73°00.0'	-60.0'	0.0°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

0° 360° LHA

Latitude SAME as Declination

0° 360° LHA

South Lat. LHA > 180° .. Zn = 180-Z LHA < 180° .. Zn= 180+Z

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

1° 359° LHA			Latitude SAME as Declination						1° 359° LHA													
Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	89°00.0'	-24.9'	90.0°	88°35.1'	+24.9'	135.0°	87°45.8'	+49.3'	153.4°	86°50.3'	+55.6'	161.6°	85°52.6'	+57.7'	166.0°	84°54.1'	+58.6'	168.7°	83°55.1'	+59.0'	170.5°	0
1	88°35.1'	-49.3'	45.0°	89°00.0'	-24.8'	90.0°	88°35.2'	+24.9'	135.0°	87°45.9'	+49.3'	153.4°	86°50.3'	+55.6'	161.6°	85°52.6'	+57.7'	166.0°	84°54.1'	+58.6'	168.7°	1
2	87°45.8'	-55.6'	26.6°	88°35.2'	-49.3'	45.0°	89°00.0'	-24.8'	90.0°	88°35.2'	+24.9'	135.0°	87°45.9'	+49.4'	153.4°	86°50.3'	+55.6'	161.6°	85°52.7'	+57.7'	166.0°	2
3	86°50.3'	-57.6'	18.4°	87°45.9'	-55.6'	26.5°	88°35.2'	-49.3'	45.0°	89°00.1'	-24.9'	90.0°	88°35.2'	+24.9'	135.0°	87°45.9'	+49.4'	153.5°	86°50.3'	+55.6'	161.6°	3
4	85°52.6'	-58.6'	14.0°	86°50.3'	-57.6'	18.4°	87°45.9'	-55.6'	26.5°	88°35.2'	-49.3'	44.9°	89°00.1'	-24.9'	90.0°	88°35.3'	+24.9'	135.0°	87°45.9'	+49.4'	153.5°	4
5	84°54.1'	-58.8'	11.3°	85°52.6'	-58.3'	14.0°	86°50.3'	-57.4'	18.4°	87°45.9'	-55.2'	26.5°	88°35.3'	-48.8'	44.9°	89°00.2'	-24.1'	90.0°	88°35.3'	+26.1'	135.1°	5
6	83°55.2'	-59.3'	9.2°	84°54.3'	-59.1'	11.1°	85°52.9'	-58.6'	13.7°	86°50.7'	-57.7'	18.0°	87°46.5'	-55.7'	26.0°	88°36.2'	-49.7'	44.3°	89°01.5'	-25.3'	89.9°	6
7	82°55.9'	-59.5'	7.9°	83°55.3'	-59.3'	9.2°	84°54.3'	-59.1'	11.0°	85°52.9'	-58.6'	13.7°	86°50.7'	-57.7'	18.0°	87°46.5'	-55.7'	25.9°	88°36.2'	-49.7'	44.2°	7
8	81°56.4'	-59.6'	6.9°	82°55.9'	-59.5'	7.9°	83°55.3'	-59.3'	9.2°	84°54.3'	-59.1'	11.0°	85°53.0'	-58.6'	13.7°	86°50.7'	-57.7'	17.9°	87°46.5'	-55.8'	25.9°	8
9	80°56.8'	-59.7'	6.2°	81°56.4'	-59.6'	6.9°	82°55.9'	-59.5'	7.9°	83°55.3'	-59.3'	9.2°	84°54.4'	-59.1'	11.0°	85°53.0'	-58.6'	13.6°	86°50.8'	-57.8'	17.9°	9
10	79°57.2'	-59.7'	5.5°	80°56.8'	-59.7'	6.1°	81°56.5'	-59.6'	6.9°	82°56.0'	-59.5'	7.9°	83°55.3'	-59.3'	9.2°	84°54.4'	-59.1'	10.9°	85°53.0'	-58.6'	13.6°	10
11	78°57.4'	-59.8'	5.0°	79°57.2'	-59.7'	5.5°	80°56.9'	-59.7'	6.1°	81°56.5'	-59.6'	6.9°	82°56.0'	-59.5'	7.8°	83°55.3'	-59.3'	9.1°	84°54.4'	-59.1'	10.9°	11
12	77°57.6'	-59.8'	4.6°	78°57.4'	-59.8'	5.0°	79°57.2'	-59.7'	5.5°	80°56.9'	-59.7'	6.1°	81°56.5'	-59.6'	6.9°	82°56.0'	-59.5'	7.8°	83°55.3'	-59.3'	9.1°	12
13	76°57.8'	-59.8'	4.2°	77°57.6'	-59.8'	4.6°	78°57.4'	-59.8'	5.0°	79°57.2'	-59.7'	5.5°	80°56.9'	-59.7'	6.1°	81°56.5'	-59.6'	6.8°	82°56.0'	-59.5'	7.8°	13
14	75°58.0'	-59.9'	3.9°	76°57.8'	-59.8'	4.2°	77°57.7'	-59.8'	4.6°	78°57.4'	-59.8'	5.0°	79°57.2'	-59.7'	5.5°	80°56.9'	-59.7'	6.1°	81°56.5'	-59.6'	6.8°	14
15	74°58.1'	-59.9'	3.7°	75°58.0'	-59.9'	3.9°	76°57.8'	-59.8'	4.2°	77°57.7'	-59.8'	4.5°	78°57.5'	-59.8'	5.0°	79°57.2'	-59.7'	5.4°	80°56.9'	-59.7'	6.0°	15
16	73°58.2'	-59.9'	3.4°	74°58.1'	-59.9'	3.6°	75°58.0'	-59.9'	3.9°	76°57.9'	-59.8'	4.2°	77°57.7'	-59.8'	4.5°	78°57.5'	-59.8'	4.9°	79°57.2'	-59.7'	5.4°	16
17	72°58.4'	-59.9'	3.2°	73°58.3'	-59.9'	3.4°	74°58.1'	-59.9'	3.6°	75°58.0'	-59.9'	3.9°	76°57.9'	-59.8'	4.2°	77°57.7'	-59.8'	4.5°	78°57.5'	-59.8'	4.9°	17
18	71°58.5'	-59.9'	3.0°	72°58.4'	-59.9'	3.2°	73°58.3'	-59.9'	3.4°	74°58.2'	-59.9'	3.6°	75°58.0'	-59.9'	3.6°	76°57.9'	-59.8'	4.1°	77°57.7'	-59.8'	4.5°	18
19	70°58.5'	-59.9'	2.8°	71°58.5'	-59.9'	3.0°	72°58.4'	-59.9'	3.2°	73°58.3'	-59.9'	3.4°	74°58.2'	-59.9'	3.6°	75°58.0'	-59.9'	3.8°	76°57.9'	-59.8'	4.1°	19
20	69°58.6'	-59.9'	2.7°	70°58.5'	-59.9'	2.8°	71°58.5'	-59.9'	3.0°	72°58.4'	-59.9'	3.1°	73°58.3'	-59.9'	3.3°	74°58.2'	-59.9'	3.6°	75°58.1'	-59.9'	3.8°	20
21	68°58.7'	-59.9'	2.6°	69°58.6'	-59.9'	2.7°	70°58.6'	-59.9'	2.8°	71°58.5'	-59.9'	3.0°	72°58.4'	-59.9'	3.1°	73°58.3'	-59.9'	3.3°	74°58.2'	-59.9'	3.5°	21
22	67°58.8'	-59.9'	2.4°	68°58.7'	-59.9'	2.5°	69°58.6'	-59.9'	2.7°	70°58.6'	-59.9'	2.8°	71°58.5'	-59.9'	2.9°	72°58.4'	-59.9'	3.1°	73°58.3'	-59.9'	3.3°	22
23	66°58.8'	-59.9'	2.3°	67°58.8'	-59.9'	2.4°	68°58.7'	-59.9'	2.5°	69°58.6'	-59.9'	2.6°	70°58.6'	-59.9'								

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

2° 358° LHA			Latitude SAME as Declination						2° 358° LHA													
Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	88°00.0'	-14.2'	90.0°	87°45.8'	+14.2'	116.6°	87°10.3'	+35.6'	135.0°	86°23.7'	+46.7'	146.3°	85°31.7'	+52.0'	153.4°	84°36.9'	+54.8'	158.2°	83°40.6'	+56.4'	161.5°	0
1	87°45.8'	-35.5'	63.4°	88°00.0'	-14.1'	90.0°	87°45.9'	+14.2'	116.5°	87°10.4'	+35.6'	135.0°	86°23.7'	+46.7'	146.3°	85°31.8'	+52.0'	153.4°	84°37.0'	+54.8'	158.2°	1
2	87°10.3'	-46.6'	45.0°	87°45.9'	-35.5'	63.4°	88°00.1'	-14.1'	90.0°	87°45.9'	+14.2'	116.5°	87°10.4'	+35.6'	135.0°	86°23.8'	+46.7'	146.3°	85°31.8'	+52.1'	153.4°	2
3	86°23.7'	-52.0'	33.7°	87°10.4'	-46.6'	45.0°	87°45.9'	-35.5'	63.4°	88°00.2'	-14.1'	89.9°	87°46.0'	+14.3'	116.5°	87°10.5'	+35.7'	135.0°	86°23.9'	+46.7'	146.3°	3
4	85°31.7'	-54.8'	26.5°	86°23.7'	-52.0'	33.6°	87°10.4'	-46.6'	44.9°	87°46.0'	-35.5'	63.3°	88°00.3'	-14.1'	89.9°	87°46.2'	+14.3'	116.6°	87°10.6'	+35.7'	135.0°	4
5	84°36.9'	-41.2'	21.7°	85°31.8'	-36.9'	26.5°	86°23.8'	-30.2'	33.6°	87°10.5'	-18.9'	44.9°	87°46.2'	+01.6'	63.3°	88°00.5'	+37.8'	89.9°	87°46.3'	+78.2'	116.6°	5
6	83°55.7'	-59.4'	8.8°	84°54.9'	-59.2'	10.5°	85°53.6'	-58.7'	13.0°	86°51.6'	-58.0'	17.1°	87°47.8'	-56.1'	24.8°	88°38.3'	-50.5'	42.7°	89°04.6'	-26.2'	90.0°	6
7	82°56.3'	-59.5'	7.5°	83°55.7'	-59.4'	8.8°	84°54.9'	-59.2'	10.5°	85°53.7'	-58.7'	13.0°	86°51.6'	-58.0'	17.1°	87°47.8'	-56.1'	24.7°	88°38.4'	-50.5'	42.7°	7
8	81°56.8'	-59.6'	6.6°	82°56.3'	-59.5'	7.5°	83°55.7'	-59.4'	8.7°	84°54.9'	-59.2'	10.4°	85°53.7'	-58.7'	13.0°	86°51.7'	-58.0'	17.0°	87°47.9'	-56.2'	24.7°	8
9	80°57.2'	-59.7'	5.8°	81°56.8'	-59.6'	6.6°	82°56.4'	-59.5'	7.5°	83°55.8'	-59.4'	8.7°	84°54.9'	-59.2'	10.4°	85°53.7'	-58.8'	12.9°	86°51.7'	-58.0'	17.0°	9
10	79°57.4'	-59.8'	5.3°	80°57.2'	-59.7'	5.8°	81°56.8'	-59.6'	6.5°	82°56.4'	-59.5'	7.5°	83°55.8'	-59.4'	8.7°	84°55.0'	-59.2'	10.4°	85°53.7'	-58.8'	12.9°	10
11	78°57.7'	-59.8'	4.8°	79°57.5'	-59.8'	5.2°	80°57.2'	-59.7'	5.8°	81°56.8'	-59.6'	6.5°	82°56.4'	-59.5'	7.4°	83°55.8'	-59.4'	8.7°	84°55.0'	-59.2'	10.3°	11
12	77°57.9'	-59.8'	4.4°	78°57.7'	-59.8'	4.8°	79°57.5'	-59.8'	5.2°	80°57.2'	-59.7'	5.8°	81°56.8'	-59.6'	6.5°	82°56.4'	-59.5'	7.4°	83°55.8'	-59.4'	8.6°	12
13	76°58.0'	-59.9'	4.0°	77°57.9'	-59.8'	4.3°	78°57.7'	-59.8'	4.7°	79°57.5'	-59.8'	5.2°	80°57.2'	-59.7'	5.8°	81°56.9'	-59.6'	6.5°	82°56.4'	-59.5'	7.4°	13
14	75°58.2'	-59.9'	3.7°	76°58.1'	-59.9'	4.0°	77°57.9'	-59.8'	4.3°	78°57.7'	-59.8'	4.7°	79°57.5'	-59.8'	5.2°	80°57.2'	-59.7'	5.7°	81°56.9'	-59.6'	6.4°	14
15	74°58.3'	-59.9'	3.5°	75°58.2'	-59.9'	3.7°	76°58.1'	-59.9'	4.0°	77°57.9'	-59.8'	4.3°	78°57.7'	-59.8'	4.7°	79°57.5'	-59.8'	5.2°	80°57.2'	-59.7'	5.7°	15
16	73°58.4'	-59.9'	3.2°	74°58.3'	-59.9'	3.4°	75°58.2'	-59.9'	3.7°	76°58.1'	-59.9'	4.0°	77°57.9'	-59.8'	4.3°	78°57.7'	-59.8'	4.7°	79°57.5'	-59.8'	5.1°	16
17	72°58.5'	-59.9'	3.0°	73°58.4'	-59.9'	3.2°	74°58.3'	-59.9'	3.4°	75°58.2'	-59.9'	3.7°	76°58.1'	-59.9'	3.9°	77°57.9'	-59.8'	4.3°	78°57.8'	-59.8'	4.6°	17
18	71°58.6'	-59.9'	2.9°	72°58.5'	-59.9'	3.0°	73°58.4'	-59.9'	3.2°	74°58.3'	-59.9'	3.4°	75°58.2'	-59.9'	3.6°	76°58.1'	-59.9'	3.9°	77°57.9'	-59.8'	4.2°	18
19	70°58.7'	-59.9'	2.7°	71°58.6'	-59.9'	2.8°	72°58.5'	-59.9'	3.0°	73°58.5'	-59.9'	3.2°	74°58.4'	-59.9'	3.4°	75°58.2'	-59.9'	3.6°	76°58.1'	-59.9'	3.9°	19
20	69°58.8'	-59.9'	2.6°	70°58.7'	-59.9'	2.7°	71°58.6'	-59.9'	2.8°	72°58.6'	-59.9'	3.0°	73°58.5'	-59.9'	3.2°	74°58.4'	-59.9'	3.4°	75°58.3'	-59.9'	3.6°	20
21	68°58.8'	-59.9'	2.4°	69°58.8'	-59.9'	2.5°	70°58.7'	-59.9'	2.7°	71°58.6'	-59.9'	2.8°	72°58.6'	-59.9'	3.0°	73°58.5'	-59.9'	3.1°	74°58.4'	-59.9'	3.3°	21
22	67°58.9'	-59.9'	2.3°	68°58.8'	-59.9'	2.4°	69°58.8'	-59.9'	2.5°	70°58.7'	-59.9'	2.6°	71°58.6'	-59.9'	2.8°	72°58.6'	-59.9'	2.9°	73°58.5'	-59.9'	3.1°	22
23	66°58.9'	-60.0'	2.2°	67°58.9'	-59.9'	2.3°	68°58.8'	-59.9'	2.4°	69°58.8'	-59.9'	2.5°	70°58.7'	-59.9'	2.6°	71°58.7'	-59.9'	2.8°	72°58.6'	-59.9'	2.9°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

2° 358° LHA Latitude SAME as Declination 2° 358° LHA
 South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

3° 357° LHA			Latitude SAME as Declination						3° 357° LHA													
Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	87°00.0'	-09.7'	90.0°	86°50.3'	+09.8'	108.4°	86°23.7'	+26.6'	123.7°	85°45.5'	+38.3'	135.0°	85°00.1'	+45.5'	143.1°	84°10.3'	+49.9'	149.0°	83°17.7'	+52.7'	153.4°	0
1	86°50.3'	-26.6'	71.6°	87°00.0'	-09.7'	90.0°	86°50.3'	+09.8'	108.4°	86°23.8'	+26.7'	123.6°	85°45.6'	+38.3'	135.0°	85°00.2'	+45.5'	143.1°	84°10.3'	+49.9'	149.0°	1
2	86°23.7'	-38.2'	56.3°	86°50.3'	-26.6'	71.5°	87°00.1'	-09.7'	89.9°	86°50.4'	+09.8'	108.4°	86°23.9'	+26.7'	123.6°	85°45.7'	+38.3'	135.0°	85°00.3'	+45.6'	143.1°	2
3	85°45.5'	-45.4'	45.0°	86°23.8'	-38.2'	56.2°	86°50.4'	-26.5'	71.5°	87°00.2'	-09.7'	89.9°	86°50.6'	+09.9'	108.4°	86°24.0'	+26.8'	123.6°	85°45.8'	+38.4'	135.0°	3
4	85°00.1'	-49.8'	36.8°	85°45.6'	-45.4'	44.9°	86°23.9'	-38.2'	56.2°	86°50.6'	-26.5'	71.4°	87°00.4'	-09.6'	89.9°	86°50.8'	+09.9'	108.4°	86°24.1'	+26.8'	123.7°	4
5	84°10.3'	-52.6'	30.9°	85°00.2'	-49.8'	36.8°	85°45.7'	-45.4'	44.9°	86°24.0'	-38.2'	56.1°	86°50.8'	-26.5'	71.4°	87°00.7'	-09.6'	89.9°	86°51.1'	+09.9'	108.4°	5
6	83°17.7'	-54.4'	26.5°	84°10.3'	-52.6'	30.8°	84°10.3'	-49.8'	36.8°	85°45.8'	-45.4'	44.8°	86°24.2'	-38.2'	56.1°	86°51.1'	-26.6'	71.3°	87°01.0'	-09.6'	89.8°	6
7	82°23.2'	-55.7'	23.1°	83°17.7'	-54.4'	26.4°	84°10.5'	-52.6'	30.8°	85°00.4'	-49.8'	36.6°	85°46.0'	-45.4'	44.7°	86°24.5'	-38.2'	56.0°	86°51.4'	-26.6'	71.3°	7
8	81°27.6'	-56.5'	20.4°	82°23.3'	-55.7'	23.0°	83°17.9'	-54.4'	26.4°	84°10.6'	-52.6'	30.7°	85°00.6'	-49.8'	36.6°	85°46.3'	-45.4'	44.7°	86°24.8'	-38.2'	55.9°	8
9	80°31.0'	-57.2'	18.3°	81°27.7'	-56.5'	20.4°	82°23.4'	-55.7'	23.0°	83°18.0'	-54.4'	26.3°	84°10.8'	-52.6'	30.6°	85°00.8'	-49.9'	36.5°	85°46.5'	-45.5'	44.6°	9
10	79°33.8'	-57.7'	16.5°	80°31.1'	-57.2'	18.2°	81°27.8'	-56.5'	20.3°	82°23.6'	-55.7'	22.9°	83°18.1'	-54.4'	26.2°	84°11.0'	-52.6'	30.6°	85°01.1'	-49.9'	36.4°	10
11	78°36.2'	-58.0'	15.1°	79°33.9'	-57.7'	16.5°	80°31.2'	-57.2'	18.2°	81°27.9'	-56.5'	20.3°	82°23.7'	-55.7'	22.8°	83°18.3'	-54.5'	26.1°	84°11.2'	-52.7'	30.5°	11
12	77°38.2'	-58.3'	13.8°	78°36.3'	-58.0'	15.0°	79°34.0'	-57.7'	16.4°	80°31.3'	-57.2'	18.1°	81°28.0'	-56.6'	20.2°	82°23.9'	-55.7'	22.8°	83°18.5'	-54.5'	26.1°	12
13	76°39.8'	-58.5'	12.8°	77°38.2'	-58.3'	13.8°	78°36.4'	-58.0'	15.0°	79°34.2'	-57.7'	16.4°	80°31.5'	-57.2'	18.0°	81°28.2'	-56.6'	20.1°	82°24.1'	-55.7'	22.7°	13
14	75°41.3'	-58.7'	11.9°	76°39.9'	-58.5'	12.7°	77°38.3'	-58.3'	13.7°	78°36.5'	-58.0'	14.9°	79°34.3'	-57.7'	16.3°	80°31.6'	-57.2'	18.0°	81°28.4'	-56.6'	20.0°	14
15	74°42.6'	-58.9'	11.1°	75°41.4'	-58.7'	11.8°	76°40.0'	-58.5'	12.7°	77°38.5'	-58.3'	13.7°	78°36.6'	-58.0'	14.8°	79°34.4'	-57.7'	16.2°	80°31.8'	-57.2'	17.9°	15
16	73°43.7'	-59.0'	10.3°	74°42.7'	-58.9'	11.0°	75°41.5'	-58.7'	11.7°	76°40.1'	-58.5'	12.6°	77°38.6'	-58.3'	13.6°	78°36.8'	-58.0'	14.8°	79°34.6'	-57.7'	16.1°	16
17	72°44.7'	-59.1'	9.7°	73°43.8'	-59.0'	10.3°	74°42.8'	-58.9'	10.9°	75°41.6'	-58.7'	11.7°	76°40.3'	-58.5'	12.5°	77°38.7'	-58.3'	13.5°	78°36.9'	-58.0'	14.7°	17
18	71°45.6'	-59.2'	9.2°	72°44.8'	-59.1'	9.7°	73°43.9'	-59.0'	10.2°	74°42.9'	-58.9'	10.9°	75°41.7'	-58.7'	11.6°	76°40.4'	-58.6'	12.5°	77°38.9'	-58.3'	13.5°	18
19	70°46.4'	-59.3'	8.6°	71°45.7'	-59.2'	9.1°	72°44.9'	-59.1'	9.6°	73°44.0'	-59.0'	10.2°	74°43.0'	-58.9'	10.8°	75°41.8'	-58.7'	11.6°	76°40.5'	-58.6'	12.4°	19
20	69°47.1'	-59.3'	8.2°	70°46.5'	-59.3'	8.6°	71°45.8'	-59.2'	9.0°	72°44.0'	-59.1'	9.5°	73°44.1'	-59.0'	10.1°	74°43.1'	-58.9'	10.8°	75°42.0'	-58.7'	11.5°	20
21	68°47.8'	-59.4'	7.8°	69°47.2'	-59.3'	8.1°	70°46.6'	-59.3'	8.5°	71°45.9'	-59.2'	9.0°	72°44.5'	-59.1'	9.5°	73°44.2'	-59.0'	10.0°	74°43.3'	-58.9'	10.7°	21
22	67°48.4'	-59.4'	7.4°	68°47.9'	-59.4'	7.7°	69°47.3'	-59.3'	8.1°	70°46.7'	-59.3'	8.5°	71°46.0'	-59.2'	8.9°	72°45.2'	-59.1'	9.4°	73°44.4'	-59.0'	10.0°	22
23	66°48.9'	-59.5'	7.0°	67°48.5'	-59.4'	7.3°	68°48.0'	-59.4'	7.7°	69°47.4'	-59.3'	8.0°	70°46									

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

4° 356° LHA **Latitude SAME as Declination** **4° 356° LHA**

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	86°00.0'	-07.4'	90.0°	85°52.6'	+07.4'	104.0°	85°31.7'	+21.0'	116.5°	85°00.1'	+31.7'	126.8°	84°20.7'	+39.5'	134.9°	83°36.0'	+44.9'	141.3°	82°47.6'	+48.6'	146.2°	0
1	85°52.6'	-20.9'	76.0°	86°00.0'	-07.3'	90.0°	85°52.7'	+07.4'	104.0°	85°31.8'	+21.0'	116.5°	85°00.2'	+31.8'	126.8°	84°20.9'	+39.5'	134.9°	83°36.1'	+44.9'	141.2°	1
2	85°31.7'	-31.6'	63.4°	85°52.7'	-20.9'	75.9°	86°00.1'	-07.3'	89.9°	85°52.8'	+07.5'	104.0°	85°32.0'	+21.1'	116.5°	85°00.4'	+31.8'	126.8°	84°21.0'	+39.6'	134.9°	2
3	85°00.1'	-39.4'	53.1°	85°31.8'	-31.6'	63.4°	85°52.8'	-20.9'	75.9°	86°00.3'	-07.3'	89.9°	85°53.1'	+07.5'	103.9°	85°32.2'	+21.1'	116.5°	85°00.6'	+31.9'	126.8°	3
4	84°20.7'	-44.7'	44.9°	85°00.2'	-39.3'	53.0°	85°32.0'	-31.6'	63.3°	85°53.1'	-20.8'	75.8°	86°00.6'	-07.3'	89.9°	85°53.3'	+07.6'	103.9°	85°32.5'	+21.2'	116.5°	4
5	83°36.0'	-48.4'	38.6°	84°20.9'	-44.7'	44.9°	85°00.4'	-39.3'	53.0°	85°53.2'	-31.6'	63.2°	85°53.3'	-20.8'	75.8°	86°00.9'	-07.2'	89.8°	85°53.7'	+07.6'	103.9°	5
6	82°47.6'	-51.0'	33.6°	83°36.1'	-48.4'	38.5°	84°21.0'	-44.7'	44.8°	85°00.6'	-39.3'	52.9°	85°32.5'	-31.6'	63.2°	85°53.7'	-20.8'	75.7°	86°01.3'	-07.2'	89.8°	6
7	81°56.6'	-52.9'	29.6°	82°47.7'	-51.0'	33.5°	83°36.3'	-48.4'	38.4°	84°21.3'	-44.7'	44.7°	85°00.9'	-39.4'	52.8°	85°32.9'	-31.6'	63.1°	85°54.1'	-20.8'	75.7°	7
8	81°03.7'	-54.2'	26.4°	81°56.7'	-52.9'	29.5°	82°47.9'	-51.0'	33.4°	83°36.6'	-48.4'	38.4°	84°21.6'	-44.7'	44.7°	85°01.3'	-39.4'	52.7°	85°33.3'	-31.6'	63.0°	8
9	80°09.5'	-55.2'	23.8°	81°03.8'	-54.2'	26.3°	81°56.9'	-52.9'	29.5°	82°48.1'	-51.0'	33.4°	83°36.8'	-48.4'	38.3°	84°21.9'	-44.7'	44.6°	85°01.7'	-39.4'	52.6°	9
10	79°14.2'	-56.0'	21.6°	80°09.6'	-55.2'	23.7°	81°04.0'	-54.2'	26.3°	81°57.1'	-52.9'	29.4°	82°48.4'	-51.0'	33.3°	83°37.1'	-48.5'	38.2°	84°22.3'	-44.8'	44.5°	10
11	78°18.2'	-56.6'	19.7°	79°14.4'	-56.0'	21.5°	80°09.8'	-55.2'	23.6°	81°04.2'	-54.2'	26.2°	81°57.4'	-52.9'	29.3°	82°48.7'	-51.0'	33.2°	83°37.5'	-48.5'	38.1°	11
12	77°21.6'	-57.1'	18.2°	78°18.4'	-56.6'	19.7°	79°14.6'	-56.0'	21.4°	80°10.0'	-55.2'	23.5°	81°04.5'	-54.2'	26.1°	81°57.6'	-52.9'	29.2°	82°49.0'	-51.1'	33.1°	12
13	76°24.5'	-57.5'	16.8°	77°21.8'	-57.1'	18.1°	78°18.5'	-56.6'	19.6°	79°14.8'	-56.0'	21.4°	80°10.2'	-55.2'	23.5°	81°04.8'	-54.2'	26.0°	81°58.0'	-52.9'	29.1°	13
14	75°27.0'	-57.8'	15.6°	76°24.7'	-57.5'	16.7°	77°21.9'	-57.1'	18.0°	78°18.7'	-56.6'	19.5°	79°15.0'	-56.0'	21.3°	80°10.5'	-55.3'	23.4°	81°05.1'	-54.3'	25.9°	14
15	74°29.3'	-58.0'	14.6°	75°27.2'	-57.8'	15.6°	76°24.8'	-57.5'	16.7°	77°22.1'	-57.1'	17.9°	78°19.0'	-56.6'	19.4°	79°15.2'	-56.0'	21.2°	80°10.8'	-55.3'	23.3°	15
16	73°31.2'	-58.3'	13.7°	74°29.4'	-58.0'	14.5°	75°27.4'	-57.8'	15.5°	76°25.0'	-57.5'	16.6°	77°22.3'	-57.1'	17.9°	78°19.2'	-56.6'	19.3°	79°15.5'	-56.0'	21.1°	16
17	72°33.0'	-58.4'	12.9°	73°31.4'	-58.3'	13.6°	74°29.6'	-58.0'	14.4°	75°27.6'	-57.8'	15.4°	76°25.2'	-57.5'	16.5°	77°22.6'	-57.1'	17.8°	78°19.5'	-56.6'	19.2°	17
18	71°34.5'	-58.6'	12.1°	72°33.1'	-58.4'	12.8°	73°31.5'	-58.3'	13.5°	74°29.8'	-58.0'	14.4°	75°27.8'	-57.8'	15.3°	76°25.5'	-57.5'	16.4°	77°22.8'	-57.1'	17.7°	18
19	70°35.9'	-58.7'	11.5°	71°34.7'	-58.6'	12.0°	72°33.3'	-58.4'	12.7°	73°31.7'	-58.3'	13.5°	74°30.0'	-58.1'	14.3°	75°28.0'	-57.8'	15.2°	76°25.7'	-57.5'	16.3°	19
20	69°37.2'	-58.8'	10.8°	70°36.1'	-58.7'	11.4°	71°34.8'	-58.6'	12.0°	72°33.5'	-58.4'	12.6°	73°31.9'	-58.3'	13.4°	74°30.2'	-58.1'	14.2°	75°28.2'	-57.8'	15.1°	20
21	68°38.4'	-58.9'	10.3°	69°37.4'	-58.8'	10.8°	70°36.2'	-58.7'	11.3°	71°35.0'	-58.6'	11.9°	72°33.5'	-58.4'	12.6°	73°32.1'	-58.3'	13.3°	74°30.4'	-58.1'	14.1°	21
22	67°39.4'	-59.0'	9.8°	68°38.5'	-58.9'	10.2°	69°37.5'	-58.8'	10.7°	70°36.4'	-58.7'	11.2°	71°35.2'	-58.6'	11.8°	72°33.9'	-58.4'	12.5°	73°32.4'	-58.3'	13.2°	22
23	66°40.4'	-59.1'	9.3°	67°39.6'	-59.0'	9.7°	68°38.7'	-58.9'	10.2°	69°37.7'	-58.8'	10.6°	70°36.6'	-58.7'	11.2°	71°35.4'	-58.6'	11.7°	72°34.1'	-58.5'	12.4°	23
Dec°	0			1			2			3			4			5			6			Dec°

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

5° 355° LHA **Latitude SAME as Declination** **5° 355° LHA**

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	85°00.0'	-05.9'	90.0°	84°54.1'	+06.0'	101.3°	84°36.9'	+17.2'	111.7°	84°10.3'	+26.8'	120.9°	83°36.0'	+34.4'	128.6°	82°56.0'	+40.2'	134.9°	82°11.7'	+44.5'	140.1°	0
1	84°54.1'	-17.1'	78.7°	85°00.0'	-05.9'	90.0°	84°54.2'	+06.0'	101.2°	84°37.1'	+17.3'	111.7°	84°10.4'	+26.9'	120.9°	83°36.2'	+34.5'	128.5°	82°56.2'	+40.2'	134.9°	1
2	84°36.9'	-26.7'	68.2°	84°54.2'	-17.1'	78.6°	85°00.2'	-05.8'	89.9°	84°54.3'	+06.1'	101.2°	84°37.3'	+17.3'	111.7°	84°10.7'	+26.9'	120.8°	83°36.4'	+34.5'	128.5°	2
3	84°10.3'	-34.3'	59.0°	84°37.1'	-26.7'	68.1°	84°54.3'	-17.1'	78.6°	85°00.4'	-05.8'	89.9°	84°54.6'	+06.1'	101.2°	84°37.6'	+17.4'	111.7°	84°11.0'	+27.0'	120.8°	3
4	83°36.0'	-40.0'	51.3°	84°10.4'	-34.2'	58.9°	84°37.3'	-26.6'	68.1°	84°54.6'	-17.0'	78.5°	85°00.7'	-05.8'	89.8°	84°55.0'	+06.2'	101.1°	84°38.0'	+17.5'	111.6°	4
5	82°56.0'	-44.3'	44.9°	83°36.2'	-40.0'	51.2°	84°10.7'	-34.2'	58.9°	84°37.6'	-26.6'	68.0°	84°55.0'	-17.0'	78.5°	85°01.1'	-05.7'	89.8°	84°55.4'	+06.2'	101.1°	5
6	82°11.7'	-47.4'	39.7°	82°56.2'	-44.3'	44.8°	83°36.4'	-40.0'	51.1°	84°11.0'	-34.2'	58.8°	84°38.0'	-26.6'	67.9°	84°55.4'	-17.0'	78.4°	85°01.6'	-05.7'	89.7°	6
7	81°24.3'	-49.8'	35.4°	82°11.9'	-47.4'	39.6°	82°56.5'	-44.3'	44.7°	83°36.8'	-40.0'	51.0°	84°11.4'	-34.2'	58.7°	84°38.4'	-26.6'	67.8°	84°56.0'	-17.0'	78.3°	7
8	80°34.5'	-51.6'	31.8°	81°24.5'	-49.8'	35.3°	82°12.2'	-47.4'	39.5°	82°56.8'	-44.3'	44.7°	83°37.1'	-40.0'	50.9°	84°11.8'	-34.2'	58.6°	84°39.0'	-26.6'	67.8°	8
9	79°42.9'	-53.0'	28.8°	80°34.7'	-51.6'	31.7°	81°24.8'	-49.8'	35.2°	82°12.5'	-47.4'	39.4°	82°57.2'	-44.3'	44.6°	83°37.6'	-40.0'	50.8°	84°12.4'	-34.2'	58.5°	9
10	78°49.9'	-54.1'	26.3°	79°43.1'	-53.0'	28.7°	80°35.0'	-51.6'	31.6°	81°25.1'	-49.8'	35.1°	82°12.9'	-47.4'	39.3°	82°57.6'	-44.3'	44.5°	83°38.1'	-40.0'	50.7°	10
11	77°55.8'	-54.9'	24.2°	78°50.1'	-54.1'	26.2°	79°43.4'	-53.0'	28.7°	80°35.3'	-51.6'	31.5°	81°25.5'	-49.8'	35.0°	82°13.3'	-47.5'	39.2°	82°58.1'	-44.3'	44.3°	11
12	77°00.8'	-55.6'	22.3°	77°56.0'	-54.9'	24.1°	78°50.4'	-54.1'	26.1°	79°43.7'	-53.0'	28.6°	80°35.6'	-51.6'	31.4°	81°25.9'	-49.8'	34.9°	82°13.8'	-47.5'	39.1°	12
13	76°05.2'	-56.2'	20.7°	77°01.1'	-55.6'	22.2°	77°56.3'	-54.9'	24.0°	78°50.7'	-54.1'	26.0°	79°44.0'	-53.0'	28.5°	80°36.0'	-51.6'	31.3°	81°26.4'	-49.9'	34.8°	13
14	75°09.0'	-56.6'	19.3°	76°05.5'	-56.2'	20.6°	77°01.3'	-55.6'	22.1°	77°56.6'	-54.9'	23.9°	78°51.0'	-54.1'	25.9°	79°44.4'	-53.0'	28.3°	80°36.5'	-51.7'	31.2°	14
15	74°12.4'	-57.0'	18.0°	75°09.3'	-56.6'	19.2°	76°05.7'	-56.2'	20.5°	77°01.6'	-55.6'	22.0°	77°56.9'	-54.9'	23.8°	78°51.4'	-54.1'	25.8°	79°44.8'	-53.0'	28.2°	15
16	73°15.4'	-57.3'	16.9°	74°12.6'	-57.0'	17.9°	75°09.5'	-56.6'	19.1°	76°06.0'	-56.2'	20.4°	77°02.0'	-55.6'	21.9°	77°57.3'	-55.0'	23.7°	78°51.8'	-54.1'	25.7°	16
17	72°18.0'	-57.6'	15.9°	73°15.6'	-57.3'	16.8°	74°12.9'	-57.0'	17.8°	75°09.8'	-56.6'	19.0°	76°06.3'	-56.2'	20.3°	77°02.3'	-55.6'	21.8°	77°57.7'	-55.0'	23.6°	17
18	71°20.4'	-57.8'	15.0°	72°18.3'	-57.6'	15.8°	73°15.9'	-57.3'	16.7°	74°13.2'	-57.0'	17.7°	75°10.1'	-56.6'	18.9°	76°06.7'	-56.2'	20.2°	77°02.7'	-55.7'	21.7°	18
19	70°22.6'	-58.0'	14.2°	71°20.7'	-57.8'	14.9°	72°18.5'	-57.6'	15.7°	73°16.2'	-57.3'	16.6°	74°13.5'	-57.0'	17.6°	75°10.5'	-56.7'	18.8°	76°07.1'	-56.2'	20.1°	19
20	69°24.6'	-58.2'	13.5°	70°22.8'	-58.0'	14.1°	71°20.9'	-57.8'	14.8°	72°18.8'	-57.6'	15.6°	73°16.5'	-57.3'	16.5°	74°13.8'	-57.0'	17.5°	75°10.9'	-56.7'	18.7°	20
21	68°26.3'	-58.4'	12.8°	69°24.8'	-58.2'	13.4°	70°23.1'	-58.0'	14.0°	71°21.2'	-57.8'	14.7°	72°19.1'	-57.6'	15.5°	73°16.8'	-57.4'	16.4°	74°14.2'	-57.0'	17.4°	21
22	67°28.0'	-58.5'	12.2°	68°26.6'	-58.4'	12.7°	69°25.0'	-58.2'	13.3°	70°23.4'	-58.0'	13.9°	71°21.5'	-57.8'	14.6°	72°19.5'	-57.6'	15.4°	73°17.2'	-57.4'	16.3°	22
23	66°29.5'	-58.6'	11.6°	67°28.2'	-58.5'	12.1°	68°26.8'	-58.4'	12.6°	69°25.3'	-58.2'	13.2°	70°23.7'	-58.0'	13.8°	71°21.8'	-57.9'	14.5°	72°19.8'	-57.6'	15.3°	23
Dec°	0			1			2															

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

6° 354° LHA

Latitude SAME as Declination

6° 354° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	84°00.0'	-04.9'	90.0°	83°55.1'	+05.0'	99.4°	83°40.6'	+14.6'	108.4°	83°17.7'	+23.1'	116.5°	82°47.6'	+30.3'	123.6°	82°11.7'	+36.1'	129.7°	81°31.3'	+40.6'	134.8°	0
1	83°55.1'	-14.5'	80.5°	84°00.1'	-04.9'	89.9°	83°55.2'	+05.1'	99.4°	83°40.8'	+14.6'	108.3°	83°17.9'	+23.2'	116.4°	82°47.8'	+30.3'	123.5°	82°12.0'	+36.1'	129.6°	1
2	83°40.6'	-22.9'	71.5°	83°55.2'	-14.4'	80.5°	84°00.2'	-04.8'	89.9°	83°55.4'	+05.1'	99.3°	83°41.0'	+14.7'	108.3°	83°18.1'	+23.2'	116.4°	82°48.1'	+30.4'	123.5°	2
3	83°17.7'	-30.1'	63.4°	83°40.8'	-22.9'	71.5°	83°55.4'	-14.4'	80.4°	84°00.5'	-04.8'	89.8°	83°55.7'	+05.2'	99.3°	83°41.4'	+14.8'	108.3°	83°18.5'	+23.3'	116.4°	3
4	82°47.6'	-35.8'	56.2°	83°17.9'	-30.0'	63.3°	83°41.0'	-22.9'	71.4°	83°55.7'	-14.3'	80.3°	84°00.9'	-04.7'	89.8°	83°56.1'	+05.2'	99.2°	83°41.8'	+14.8'	108.2°	4
5	82°11.7'	-40.4'	50.1°	82°47.8'	-35.8'	56.1°	83°18.1'	-30.0'	63.2°	83°41.4'	-22.8'	71.3°	83°56.1'	-14.3'	80.3°	84°01.4'	-04.7'	89.7°	83°56.7'	+05.3'	99.2°	5
6	81°31.3'	-43.9'	44.8°	82°12.0'	-40.4'	50.0°	82°48.1'	-35.8'	56.1°	83°18.5'	-30.0'	63.2°	83°41.8'	-22.8'	71.3°	83°56.7'	-14.3'	80.2°	84°02.0'	-04.7'	89.7°	6
7	80°47.4'	-46.7'	40.4°	81°31.6'	-43.9'	44.8°	82°12.3'	-40.4'	49.9°	82°48.5'	-35.8'	56.0°	83°19.0'	-30.0'	63.1°	83°42.4'	-22.8'	71.2°	83°57.3'	-14.2'	80.1°	7
8	80°00.7'	-48.9'	36.6°	80°47.7'	-46.7'	40.3°	81°32.0'	-43.9'	44.7°	82°12.7'	-40.4'	49.8°	82°49.0'	-35.8'	55.9°	83°19.6'	-30.0'	63.0°	83°43.1'	-22.8'	71.1°	8
9	79°11.8'	-50.6'	33.4°	80°01.0'	-48.9'	36.6°	80°48.1'	-46.7'	40.2°	81°32.4'	-43.9'	44.6°	82°13.3'	-40.4'	49.7°	82°49.6'	-35.8'	55.8°	83°20.3'	-30.0'	62.9°	9
10	78°21.2'	-52.0'	30.7°	79°12.1'	-50.6'	33.3°	80°01.4'	-48.9'	36.5°	80°48.5'	-46.7'	40.1°	81°32.9'	-43.9'	44.5°	82°13.8'	-40.4'	49.6°	82°50.3'	-35.8'	55.7°	10
11	77°29.3'	-53.1'	28.3°	78°21.5'	-52.0'	30.6°	79°12.5'	-50.6'	33.2°	80°01.8'	-48.9'	36.3°	80°49.0'	-46.7'	40.0°	81°33.5'	-43.9'	44.3°	82°14.5'	-40.4'	49.5°	11
12	76°36.2'	-54.0'	26.2°	77°29.6'	-53.1'	28.2°	78°21.9'	-52.0'	30.5°	79°12.9'	-50.6'	33.1°	80°02.3'	-48.9'	36.2°	80°49.5'	-46.7'	39.9°	81°34.1'	-43.9'	44.2°	12
13	75°42.2'	-54.7'	24.4°	76°36.5'	-54.0'	26.1°	77°29.9'	-53.1'	28.1°	78°22.3'	-52.0'	30.4°	79°13.4'	-50.6'	33.0°	80°02.8'	-48.9'	36.1°	80°50.2'	-46.7'	39.8°	13
14	74°47.5'	-55.3'	22.7°	75°42.6'	-54.7'	24.3°	76°36.9'	-54.0'	26.0°	77°30.4'	-53.1'	28.0°	78°22.8'	-52.0'	30.2°	79°13.9'	-50.6'	32.9°	80°03.5'	-48.9'	36.0°	14
15	73°52.2'	-55.8'	21.3°	74°47.9'	-55.3'	22.6°	75°42.9'	-54.7'	24.2°	76°37.3'	-54.0'	25.9°	77°30.8'	-53.1'	27.8°	78°23.3'	-52.0'	30.1°	79°14.5'	-50.6'	32.7°	15
16	72°56.4'	-56.3'	20.0°	73°52.5'	-55.8'	21.2°	74°48.2'	-55.3'	22.5°	75°43.3'	-54.7'	24.0°	76°37.8'	-54.0'	25.8°	77°31.4'	-53.1'	27.7°	78°23.9'	-52.0'	30.0°	16
17	72°00.1'	-56.6'	18.9°	72°56.7'	-56.3'	19.9°	73°52.9'	-55.8'	21.1°	74°48.6'	-55.3'	22.4°	75°43.8'	-54.7'	23.9°	76°38.3'	-54.0'	25.6°	77°31.9'	-53.1'	27.6°	17
18	71°03.5'	-57.0'	17.8°	72°00.4'	-56.6'	18.8°	72°57.1'	-56.3'	19.8°	73°53.3'	-55.8'	21.0°	74°49.1'	-55.3'	22.3°	75°44.3'	-54.7'	23.8°	76°38.8'	-54.0'	25.5°	18
19	70°06.5'	-57.2'	16.9°	71°03.8'	-57.0'	17.7°	72°00.8'	-56.6'	18.7°	72°57.5'	-56.3'	19.7°	73°53.7'	-55.8'	20.9°	74°49.6'	-55.3'	22.2°	75°44.8'	-54.7'	23.7°	19
20	69°09.3'	-57.5'	16.0°	70°06.8'	-57.2'	16.8°	71°04.2'	-57.0'	17.6°	72°01.2'	-56.6'	18.6°	72°57.9'	-56.3'	19.6°	73°54.2'	-55.8'	20.7°	74°50.1'	-55.3'	22.1°	20
21	68°11.8'	-57.7'	15.2°	69°09.6'	-57.5'	15.9°	70°07.2'	-57.2'	16.7°	71°04.6'	-57.0'	17.5°	72°01.6'	-56.6'	18.4°	72°58.4'	-56.3'	19.5°	73°54.7'	-55.9'	20.6°	21
22	67°14.1'	-57.9'	14.5°	68°12.1'	-57.7'	15.1°	69°10.0'	-57.5'	15.8°	70°07.6'	-57.2'	16.6°	71°05.0'	-57.0'	17.4°	72°02.1'	-56.7'	18.3°	72°58.9'	-56.3'	19.3°	22
23	66°16.3'	-58.0'	13.8°	67°14.5'	-57.9'	14.4°	68°12.5'	-57.7'	15.0°	69°10.4'	-57.5'	15.7°	70°08.0'	-57.2'	16.4°	71°05.4'	-57.0'	17.3°	72°02.6'	-56.7'	18.2°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

6° 354° LHA

Latitude SAME as Declination

6° 354° LHA

South Lat. LHA > 180° .. Zn = 180-Z LHA < 180° .. Zn= 180+Z

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

7° 353° LHA

Latitude SAME as Declination

7° 353° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	83°00.0'	-04.2'	90.0°	82°55.8'	+04.3'	98.1°	82°43.3'	+12.6'	105.9°	82°23.2'	+20.2'	113.1°	81°56.6'	+26.9'	119.6°	81°24.3'	+32.5'	125.4°	80°47.4'	+37.2'	130.4°	0
1	82°55.8'	-12.5'	81.8°	83°00.1'	-04.2'	89.9°	82°55.9'	+04.4'	98.0°	82°43.5'	+12.7'	105.8°	82°23.5'	+20.3'	113.0°	81°56.8'	+27.0'	119.6°	81°24.6'	+32.6'	125.3°	1
2	82°43.3'	-20.0'	74.0°	82°55.9'	-12.4'	81.8°	83°00.3'	-04.1'	89.9°	82°56.1'	+04.4'	98.0°	82°43.8'	+12.7'	105.8°	82°23.8'	+20.4'	113.0°	81°57.2'	+27.1'	119.5°	2
3	82°23.2'	-26.7'	66.7°	82°43.5'	-20.0'	73.9°	82°56.1'	-12.4'	81.7°	83°00.6'	-04.1'	89.8°	82°56.5'	+04.5'	97.9°	82°44.2'	+12.8'	105.7°	82°24.3'	+20.5'	113.0°	3
4	81°56.6'	-32.3'	60.2°	82°23.5'	-26.6'	66.7°	82°43.8'	-19.9'	73.9°	82°56.5'	-12.3'	81.7°	83°01.0'	-04.0'	89.8°	82°57.0'	+04.6'	97.9°	82°44.8'	+12.9'	105.7°	4
5	81°24.3'	-36.9'	54.3°	81°56.8'	-32.2'	60.1°	82°23.8'	-26.6'	66.6°	82°44.2'	-19.9'	73.8°	82°57.0'	-12.3'	81.6°	83°01.6'	-03.9'	89.7°	82°57.7'	+04.6'	97.8°	5
6	80°47.4'	-40.6'	49.2°	81°24.6'	-36.9'	54.2°	81°57.2'	-32.2'	60.0°	82°24.3'	-26.6'	66.5°	82°44.8'	-19.9'	73.7°	82°57.7'	-12.2'	81.5°	83°02.3'	-03.9'	89.6°	6
7	80°06.8'	-43.7'	44.8°	80°47.8'	-40.6'	49.1°	81°25.0'	-36.8'	54.1°	81°57.7'	-32.2'	59.9°	82°24.9'	-26.5'	66.4°	82°45.4'	-19.8'	73.6°	82°58.4'	-12.2'	81.4°	7
8	79°23.1'	-46.1'	40.9°	80°07.1'	-43.7'	44.7°	80°48.2'	-40.6'	49.0°	81°25.5'	-36.8'	54.0°	81°58.3'	-32.2'	59.8°	82°25.6'	-26.5'	66.3°	82°46.2'	-19.8'	73.5°	8
9	78°37.0'	-48.1'	37.6°	79°23.5'	-46.1'	40.8°	80°07.6'	-43.7'	44.6°	80°48.7'	-40.6'	48.9°	81°26.2'	-36.8'	53.9°	81°59.1'	-32.2'	59.7°	82°26.4'	-26.5'	66.2°	9
10	77°48.8'	-49.7'	34.7°	78°37.4'	-48.1'	37.5°	79°23.9'	-46.1'	40.7°	80°08.1'	-43.6'	44.5°	80°49.4'	-40.6'	48.8°	81°26.9'	-36.8'	53.8°	81°59.9'	-32.2'	59.6°	10
11	76°59.1'	-51.1'	32.1°	77°49.2'	-49.7'	34.5°	78°37.8'	-48.1'	37.4°	79°24.5'	-46.1'	40.6°	80°08.8'	-43.6'	44.3°	80°50.1'	-40.6'	48.7°	81°27.7'	-36.8'	53.7°	11
12	76°08.0'	-52.2'	29.8°	76°59.5'	-51.1'	32.0°	77°49.7'	-49.7'	34.4°	78°38.4'	-48.1'	37.2°	79°25.1'	-46.1'	40.5°	80°09.5'	-43.7'	44.2°	80°50.9'	-40.6'	48.5°	12
13	75°15.8'	-53.1'	27.8°	76°08.4'	-52.2'	29.7°	77°00.0'	-51.1'	31.9°	77°50.3'	-49.7'	34.3°	78°39.0'	-48.1'	37.1°	79°25.8'	-46.1'	40.3°	80°10.3'	-43.7'	44.1°	13
14	74°22.7'	-53.9'	26.0°	75°16.3'	-53.1'	27.7°	76°08.9'	-52.2'	29.6°	77°00.5'	-51.1'	31.7°	77°50.9'	-49.7'	34.2°	78°39.7'	-48.1'	37.0°	79°26.6'	-46.1'	40.2°	14
15	73°28.9'	-54.5'	24.5°	74°23.2'	-53.9'	25.9°	75°16.7'	-53.1'	27.6°	76°09.5'	-52.2'	29.5°	77°01.1'	-51.1'	31.6°	77°51.6'	-49.8'	34.0°	78°40.5'	-48.1'	36.8°	15
16	72°34.3'	-55.1'	23.0°	73°29.3'	-54.5'	24.3°	74°23.6'	-53.9'	25.8°	75°17.3'	-53.1'	27.5°	76°10.1'	-52.2'	29.3°	77°01.8'	-51.1'	31.5°	77°52.3'	-49.8'	33.9°	16
17	71°39.3'	-55.5'	21.7°	72°34.8'	-55.1'	22.9°	73°29.8'	-54.5'	24.2°	74°24.2'	-53.9'	25.7°	75°17.9'	-53.1'	27.3°	76°10.7'	-52.2'	29.2°	77°02.6'	-51.1'	31.3°	17
18	70°43.7'	-56.0'	20.6°	71°39.7'	-55.5'	21.6°	72°35.3'	-55.1'	22.8°	73°30.3'	-54.5'	24.1°	74°24.8'	-53.9'	25.6°	75°18.5'	-53.1'	27.2°	76°11.5'	-52.2'	29.1°	18
19	69°47.8'	-56.3'	19.5°	70°44.2'	-56.0'	20.4°	71°40.2'	-55.5'	21.5°	72°35.8'	-55.1'	22.7°	73°30.9'	-54.5'	24.0°	74°25.4'	-53.9'	25.4°	75°19.3'	-53.1'	27.0°	19
20	68°51.5'	-56.6'	18.5°	69°48.2'	-56.3'	19.4°	70°44.7'	-56.0'	20.3°	71°40.7'	-55.5'	21.4°	72°36.4'	-55.1'	22.5°	73°31.6'	-54.5'	23.8°	74°26.1'	-53.9'	25.3°	20
21	67°54.9'	-56.9'	17.6°	68°51.9'	-56.6'	18.4°	69°48.7'	-56.3'	19.2°	70°45.2'	-56.0'	20.2°	71°41.3'	-55.6'	21.2°	72°37.0'	-55.1'	22.4°	73°32.2'	-54.5'	23.7°	21
22	66°58.0'	-57.1'	16.																			

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

8° 352° LHA				Latitude SAME as Declination												8° 352° LHA						
Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	82°00.0'	-03.7'	90.0°	81°56.3'	+03.8'	97.1°	81°45.3'	+11.1'	103.9°	81°27.6'	+18.0'	110.4°	81°03.7'	+24.1'	116.4°	80°34.5'	+29.5'	121.8°	80°00.7'	+34.1'	126.6°	0
1	81°56.3'	-11.0'	82.9°	82°00.1'	-03.6'	89.9°	81°56.4'	+03.9'	97.0°	81°45.5'	+11.2'	103.9°	81°27.8'	+18.1'	110.4°	81°04.0'	+24.2'	116.3°	80°34.9'	+29.6'	121.8°	1
2	81°45.3'	-17.8'	75.9°	81°56.4'	-10.9'	82.8°	82°00.3'	-03.6'	89.9°	81°56.7'	+03.9'	96.9°	81°45.9'	+11.3'	103.8°	81°28.3'	+18.1'	110.3°	81°04.5'	+24.3'	116.3°	2
3	81°27.6'	-23.9'	69.4°	81°45.5'	-17.7'	75.8°	81°56.7'	-10.8'	82.7°	82°00.7'	-03.5'	89.8°	81°57.2'	+04.0'	96.9°	81°46.4'	+11.4'	103.8°	81°28.8'	+18.2'	110.3°	3
4	81°03.7'	-29.2'	63.3°	81°27.8'	-23.8'	69.3°	81°45.9'	-17.6'	75.8°	81°57.2'	-10.8'	82.6°	82°01.2'	-03.4'	89.7°	81°57.7'	+04.1'	96.8°	81°47.0'	+11.4'	103.7°	4
5	80°34.5'	-33.8'	57.8°	81°04.0'	-29.2'	63.2°	81°28.3'	-23.8'	69.2°	81°46.4'	-17.6'	75.7°	81°57.7'	-10.7'	82.6°	82°01.8'	-03.4'	89.7°	81°58.5'	+04.2'	96.8°	5
6	80°00.7'	-37.6'	52.9°	80°34.9'	-33.7'	57.8°	81°04.5'	-29.1'	63.1°	81°28.8'	-23.7'	69.1°	81°47.0'	-17.5'	75.6°	81°58.5'	-10.7'	82.5°	82°02.6'	-03.3'	89.6°	6
7	79°23.1'	-40.8'	48.6°	80°01.1'	-37.6'	52.8°	80°35.3'	-33.7'	57.7°	81°05.1'	-29.1'	63.0°	81°29.5'	-17.3'	69.0°	81°47.8'	-17.5'	75.5°	81°59.3'	-10.6'	82.4°	7
8	78°42.3'	-43.5'	44.7°	79°23.5'	-40.8'	48.5°	80°01.6'	-37.6'	52.7°	80°36.0'	-33.7'	57.5°	81°05.8'	-29.1'	62.9°	81°30.3'	-23.7'	68.9°	81°48.7'	-17.5'	75.4°	8
9	77°58.8'	-45.7'	41.3°	78°42.8'	-43.4'	44.6°	79°24.1'	-40.8'	48.4°	80°02.3'	-37.5'	52.6°	80°36.7'	-33.7'	57.4°	81°06.6'	-29.1'	62.8°	81°31.3'	-23.6'	68.8°	9
10	77°13.2'	-47.5'	38.3°	77°59.3'	-45.7'	41.2°	78°43.3'	-43.4'	44.5°	79°24.7'	-40.8'	48.2°	80°03.0'	-37.5'	52.5°	80°37.6'	-33.7'	57.3°	81°07.6'	-29.0'	62.7°	10
11	76°25.7'	-49.0'	35.6°	77°13.7'	-47.5'	38.2°	77°59.9'	-45.6'	41.1°	78°44.0'	-43.4'	44.4°	79°25.5'	-40.7'	48.1°	80°03.9'	-37.5'	52.4°	80°38.6'	-33.7'	57.2°	11
12	75°36.6'	-50.3'	33.2°	76°26.2'	-49.0'	35.5°	77°14.3'	-47.5'	38.0°	78°00.6'	-45.6'	40.9°	78°44.8'	-43.4'	44.2°	79°26.4'	-40.8'	48.0°	80°04.9'	-37.5'	52.2°	12
13	74°46.3'	-51.4'	31.1°	75°37.2'	-50.3'	33.1°	76°26.8'	-49.0'	35.4°	77°14.9'	-47.5'	37.9°	78°01.3'	-45.6'	40.8°	78°45.6'	-43.4'	44.1°	79°27.4'	-40.8'	47.8°	13
14	73°54.9'	-52.3'	29.2°	74°46.8'	-51.4'	31.0°	75°37.8'	-50.3'	33.0°	76°27.5'	-49.0'	35.2°	77°15.7'	-47.5'	37.8°	78°02.2'	-45.6'	40.7°	78°46.6'	-43.4'	43.9°	14
15	73°02.6'	-53.1'	27.4°	73°55.5'	-52.3'	29.0°	74°47.5'	-51.4'	30.8°	75°38.5'	-50.3'	32.8°	76°28.2'	-49.0'	35.1°	77°16.6'	-47.5'	37.6°	78°03.2'	-45.7'	40.5°	15
16	72°09.5'	-53.8'	25.9°	73°03.2'	-53.1'	27.3°	73°56.1'	-52.3'	28.9°	74°48.2'	-51.4'	30.7°	75°39.2'	-50.3'	32.7°	76°29.1'	-49.0'	34.9°	77°17.5'	-47.5'	37.5°	16
17	71°15.7'	-54.4'	24.5°	72°10.1'	-53.8'	25.8°	73°03.8'	-53.1'	27.2°	73°56.8'	-52.3'	28.8°	74°48.9'	-51.4'	30.5°	75°40.1'	-50.3'	32.5°	76°30.0'	-49.0'	34.8°	17
18	70°21.4'	-54.9'	23.2°	71°16.3'	-54.3'	24.3°	72°10.7'	-53.8'	25.6°	73°04.5'	-53.1'	27.0°	73°57.5'	-52.3'	28.6°	74°49.7'	-51.4'	30.4°	75°41.0'	-50.3'	32.4°	18
19	69°26.5'	-55.3'	22.0°	70°21.9'	-54.9'	23.1°	71°16.9'	-54.3'	24.2°	72°11.4'	-53.8'	25.5°	73°05.2'	-53.1'	26.9°	73°58.3'	-52.3'	28.5°	74°50.7'	-51.4'	30.2°	19
20	68°31.2'	-55.7'	20.9°	69°27.1'	-55.3'	21.9°	70°22.6'	-54.9'	22.9°	71°17.6'	-54.4'	24.1°	72°12.1'	-53.8'	25.3°	73°06.0'	-53.1'	26.7°	73°59.2'	-52.3'	28.3°	20
21	67°35.5'	-56.0'	19.9°	68°31.8'	-55.7'	20.8°	69°27.7'	-55.3'	21.7°	70°23.2'	-54.9'	22.8°	71°18.3'	-54.4'	23.9°	72°12.9'	-53.8'	25.2°	73°06.9'	-53.1'	26.6°	21
22	66°39.5'	-56.3'	19.0°	67°36.1'	-56.0'	19.8°	68°32.4'	-55.7'	20.7°	69°28.4'	-55.3'	21.6°	70°24.0'	-54.9'	22.6°	71°19.1'	-54.4'	23.8°	72°13.8'	-53.8'	25.0°	22
23	65°43.2'	-56.6'	18.2°	66°40.1'	-56.3'	18.9°	67°36.7'	-56.0'	19.7°	68°33.1'	-55.7'	20.5°	69°29.1'	-55.3'	21.4°	70°24.8'	-54.9'	22.5°	71°20.0'	-54.4'	23.6°	23
Dec°	0			1			2			3			4			5			6			Dec°

8° 352° LHA Latitude SAME as Declination 8° 352° LHA
South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

9° 351° LHA				Latitude SAME as Declination												9° 351° LHA						
Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	81°00.0'	-03.3'	90.0°	80°56.7'	+03.4'	96.3°	80°46.9'	+09.9'	102.4°	80°31.0'	+16.2'	108.3°	80°09.5'	+21.9'	113.8°	79°42.9'	+27.0'	118.8°	79°11.8'	+31.5'	123.4°	0
1	80°56.7'	-09.8'	83.6°	81°00.1'	-03.2'	89.9°	80°56.9'	+03.5'	96.2°	80°47.2'	+10.0'	102.4°	80°31.3'	+16.2'	108.2°	80°09.8'	+22.0'	113.7°	79°43.3'	+27.1'	118.8°	1
2	80°46.9'	-15.9'	77.4°	80°56.9'	-09.7'	83.6°	81°00.3'	-03.1'	89.8°	80°57.2'	+03.5'	96.1°	80°47.6'	+10.1'	102.3°	80°31.8'	+16.3'	108.2°	80°10.4'	+22.1'	113.7°	2
3	80°31.0'	-21.6'	71.5°	80°47.2'	-15.8'	77.3°	80°57.2'	-09.6'	83.5°	81°00.7'	-03.1'	89.8°	80°57.7'	+03.6'	96.1°	80°48.1'	+10.2'	102.2°	80°32.4'	+16.4'	108.1°	3
4	80°09.5'	-26.6'	65.9°	80°31.3'	-21.5'	71.4°	80°47.6'	-15.8'	77.2°	80°57.7'	-09.5'	83.4°	81°01.3'	-03.0'	89.7°	80°58.3'	+03.7'	96.0°	80°48.9'	+10.3'	102.2°	4
5	79°42.9'	-31.0'	60.8°	80°09.8'	-26.6'	65.8°	80°31.8'	-21.4'	71.3°	80°48.1'	-15.7'	77.2°	80°58.3'	-09.5'	83.3°	81°02.1'	-02.9'	89.6°	80°59.2'	+03.8'	95.9°	5
6	79°11.8'	-34.9'	56.1°	79°43.3'	-31.0'	60.7°	80°10.4'	-26.5'	65.7°	80°32.4'	-21.4'	71.2°	80°48.9'	-15.7'	77.1°	80°59.2'	-09.4'	83.2°	81°03.0'	-02.8'	89.5°	6
7	78°37.0'	-38.1'	51.9°	78°37.0'	-34.8'	56.0°	79°12.3'	-34.8'	60.6°	80°11.1'	-26.5'	65.6°	80°33.2'	-21.3'	71.1°	80°49.7'	-15.6'	77.0°	81°00.1'	-09.3'	83.1°	7
8	77°58.8'	-40.9'	48.1°	78°37.5'	-38.1'	51.8°	79°12.9'	-34.8'	55.9°	79°44.6'	-30.9'	60.5°	80°11.9'	-26.4'	65.5°	80°34.1'	-21.3'	71.0°	80°50.8'	-15.6'	76.9°	8
9	77°17.9'	-43.3'	44.6°	77°59.4'	-40.9'	47.9°	78°38.1'	-38.1'	51.6°	79°13.7'	-34.8'	55.8°	79°45.5'	-30.9'	60.3°	80°12.9'	-26.4'	65.4°	80°35.2'	-21.3'	70.9°	9
10	76°34.6'	-45.3'	41.6°	77°18.5'	-43.3'	44.5°	78°00.1'	-40.9'	47.8°	78°38.9'	-38.1'	51.5°	79°14.6'	-34.7'	55.6°	79°46.5'	-30.9'	60.2°	80°14.0'	-26.4'	65.2°	10
11	75°49.4'	-47.0'	38.8°	76°35.2'	-45.3'	41.5°	77°19.2'	-43.2'	44.4°	78°00.9'	-40.9'	47.7°	78°39.8'	-38.0'	51.4°	79°15.6'	-34.7'	55.5°	79°47.6'	-30.9'	60.1°	11
12	75°02.4'	-48.4'	36.4°	75°50.0'	-47.0'	38.7°	76°35.9'	-45.2'	41.3°	77°20.0'	-43.2'	44.3°	78°01.8'	-40.8'	47.5°	78°40.9'	-38.0'	51.2°	79°16.8'	-34.7'	55.3°	12
13	74°14.0'	-49.6'	34.1°	75°03.0'	-48.4'	36.2°	75°50.7'	-46.9'	38.6°	76°36.8'	-45.2'	41.2°	77°20.9'	-43.2'	44.1°	78°02.8'	-40.8'	47.4°	78°42.0'	-38.0'	51.1°	13
14	73°24.3'	-50.7'	32.1°	74°14.6'	-49.6'	34.0°	75°03.8'	-48.4'	36.1°	75°51.5'	-46.9'	38.4°	76°37.7'	-45.2'	41.0°	77°22.0'	-43.2'	43.9°	78°04.0'	-40.9'	47.2°	14
15	72°33.6'	-51.6'	30.3°	73°25.0'	-50.7'	32.0°	74°15.4'	-49.6'	33.8°	75°04.6'	-48.4'	35.9°	75°52.5'	-46.9'	38.3°	76°38.7'	-45.2'	40.9°	77°23.1'	-43.2'	43.8°	15
16	71°42.0'	-52.4'	28.6°	72°34.3'	-51.6'	30.1°	73°25.8'	-50.7'	31.8°	74°16.2'	-49.6'	33.7°	75°05.5'	-48.4'	35.8°	75°53.5'	-46.9'	38.1°	76°39.9'	-45.2'	40.7°	16
17	70°49.6'	-53.1'	27.1°	71°42.7'	-52.4'	28.5°	72°35.1'	-51.6'	30.0°	73°26.6'	-50.7'	31.7°	74°17.2'	-49.6'	33.5°	75°06.6'	-48.4'	35.6°	75°54.6'	-47.0'	37.9°	17
18	69°56.5'	-53.7'	25.7°	70°50.3'	-53.1'	27.0°	71°43.5'	-52.4'	28.3°	72°35.9'	-51.6'	29.8°	73°27.5'	-50.7'	31.5°	74°18.2'	-49.6'	33.4°	75°07.7'	-48.4'	35.4°	18
19	69°02.9'	-54.2'	24.4°	69°57.2'	-53.7'	25.6°	70°51.1'	-53.1'	26.8°	71°44.3'	-52.4'	28.2°	72°36.8'	-51.6'	29.7°	73°28.5'	-50.7'	31.3°	74°19.3'	-49.6'	33.2°	19
20	68°08.6'	-54.7'	23.3°	69°03.6'	-54.2'	24.3°	69°58.0'	-53.7'	25.4°	70°51.9'	-53.1'	26.6°	71°45.2'	-52.4'	28.0°	72°37.8'	-51.6'	29.5°	73°29.6'	-50.7'	31.2°	20
21	67°14.0'	-55.1'	22.2°	68°09.4'	-54.7'	23.1°	69°04.3'	-54.2'	24.1°	69°58.9'	-53.7'	25.3°	70°52.8'	-53.1'	26.5°	71°46.2'	-52.4'	27.8°	72°38.9'	-51.6'	29.3°	21
22	66°18.9'	-55.4'	21.2°	67°14.7'	-55.1'	22.0°	68°10.1'	-54.7'	23.0°	69°05.2'	-54.2'	24.0°	69°59.8'	-53.7'	25.1°	70°53.8'	-53.1'	26.3°	71°47.3'	-52.4'	27.7°	22
23	65°23.5'	-55.8'	20.2°	66°19.6'	-55.4'	21.0°	67°15.5'	-55.1'	21.9°	68°11.0'	-54.7'	22.8°	69°06.1'	-54.2'	23.8°	70°00.7'	-53.7'	24.9°	70°54.9'	-53.1'	26.1°	23

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

10° 350° LHA			Latitude SAME as Declination												10° 350° LHA								
Dec°	0			1			2			3			4			5			6			Dec°	
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°		Hc°
0	80°00.0' -03.0'	90.0°		79°57.0' +03.1'	95.7°		79°48.2' +09.0'	101.2°		79°33.8' +14.7'	106.5°		79°14.2' +20.0'	111.6°		78°49.9' +24.8'	116.3°		78°21.2' +29.1'	120.7°		0	
1	79°57.0' -08.8'	84.3°		80°00.1' -02.9'	89.9°		79°57.2' +03.1'	95.6°		79°48.5' +09.1'	101.1°		79°34.2' +14.8'	106.5°		79°14.7' +20.1'	111.5°		78°50.4' +24.9'	116.2°		1	
2	79°48.2' -14.4'	78.6°		79°57.2' -08.7'	84.2°		80°00.4' -02.8'	89.8°		79°57.6' +03.2'	95.5°		79°49.0' +09.2'	101.0°		79°34.7' +14.9'	106.4°		79°15.3' +20.2'	111.4°		2	
3	79°33.8' -19.6'	73.2°		79°48.5' -14.3'	78.5°		79°57.6' -08.6'	84.1°		80°00.8' -02.7'	89.7°		79°58.1' +03.3'	95.4°		79°49.6' +09.3'	101.0°		79°35.4' +15.0'	106.3°		3	
4	79°14.2' -24.4'	68.1°		79°34.2' -19.5'	73.1°		79°49.0' -14.2'	78.4°		79°58.1' -08.5'	84.0°		80°01.5' -02.6'	89.7°		79°58.9' +03.4'	95.3°		79°50.4' +09.4'	100.9°		4	
5	78°49.9' -28.6'	63.3°		79°14.7' -24.3'	68.0°		79°34.7' -19.5'	73.0°		79°49.6' -14.2'	78.3°		79°58.9' -08.5'	83.9°		80°02.3' -02.5'	89.6°		79°59.8' +03.5'	95.2°		5	
6	78°21.2' -32.4'	58.8°		78°50.4' -28.6'	63.2°		79°15.3' -24.2'	67.9°		79°35.4' -19.4'	72.9°		79°50.4' -14.1'	78.2°		79°59.8' -08.4'	83.8°		80°03.3' -02.4'	89.5°		6	
7	77°48.8' -35.7'	54.7°		78°21.8' -32.3'	58.7°		78°51.0' -28.5'	63.0°		79°16.0' -24.2'	67.7°		79°36.3' -19.3'	72.8°		79°51.4' -14.0'	78.1°		80°00.9' -08.3'	83.7°		7	
8	77°13.2' -38.5'	51.0°		77°49.4' -35.6'	54.6°		78°22.5' -32.3'	58.6°		78°51.8' -28.5'	62.9°		79°17.0' -24.1'	67.6°		79°37.4' -19.3'	72.7°		79°52.5' -14.0'	78.0°		8	
9	76°34.6' -41.0'	47.6°		77°13.8' -38.5'	50.9°		77°50.2' -35.6'	54.5°		78°23.4' -32.3'	58.4°		78°52.8' -28.4'	62.8°		79°18.1' -24.1'	67.5°		79°38.6' -19.2'	72.6°		9	
10	75°53.6' -43.1'	44.6°		76°35.3' -41.0'	47.5°		77°14.6' -38.5'	50.8°		77°51.1' -35.6'	54.4°		78°24.4' -32.2'	58.3°		78°54.0' -28.4'	62.6°		79°19.3' -24.1'	67.4°		10	
11	75°10.5' -44.9'	41.8°		75°54.4' -43.1'	44.4°		76°36.1' -40.9'	47.4°		77°15.5' -38.4'	50.6°		77°52.1' -35.5'	54.2°		78°25.5' -32.2'	58.2°		78°55.3' -28.4'	62.5°		11	
12	74°25.6' -46.5'	39.2°		75°11.3' -44.9'	41.6°		75°55.2' -43.1'	44.3°		76°37.1' -40.9'	47.2°		77°16.6' -38.4'	50.5°		77°53.3' -35.5'	54.1°		78°26.9' -32.2'	58.0°		12	
13	73°39.1' -47.9'	36.9°		74°26.4' -46.5'	39.1°		75°12.1' -44.9'	41.5°		75°56.2' -43.0'	44.1°		76°38.2' -40.9'	47.1°		77°17.8' -38.4'	50.3°		77°54.7' -35.5'	53.9°		13	
14	72°51.2' -49.0'	34.9°		73°39.9' -47.9'	36.8°		74°27.2' -46.5'	39.0°		75°13.1' -44.9'	41.3°		75°57.3' -43.0'	44.0°		76°39.4' -40.9'	46.9°		77°19.1' -38.4'	50.1°		14	
15	72°02.2' -50.1'	32.9°		72°52.0' -49.0'	34.7°		73°40.8' -47.8'	36.6°		74°28.2' -46.5'	38.8°		75°14.2' -44.9'	41.2°		75°58.5' -43.0'	43.8°		76°40.7' -40.9'	46.7°		15	
16	71°12.1' -51.0'	31.2°		72°03.0' -50.1'	32.8°		72°52.9' -49.0'	34.5°		73°41.8' -47.8'	36.5°		74°29.3' -46.5'	38.6°		75°15.4' -44.9'	41.0°		75°59.8' -43.0'	43.6°		16	
17	70°21.1' -51.8'	29.6°		71°12.9' -51.0'	31.0°		72°03.9' -50.1'	32.6°		72°53.9' -49.0'	34.4°		73°42.9' -47.8'	36.3°		74°30.6' -46.5'	38.4°		75°16.8' -44.9'	40.8°		17	
18	69°29.4' -52.4'	28.1°		70°22.0' -51.7'	29.4°		71°13.8' -51.0'	30.9°		72°04.9' -50.1'	32.5°		72°55.0' -49.0'	34.2°		73°44.1' -47.8'	36.1°		74°31.9' -46.5'	38.3°		18	
19	68°36.9' -53.1'	26.8°		69°30.2' -52.4'	28.0°		70°22.9' -51.7'	29.3°		71°14.9' -51.0'	30.7°		72°06.0' -50.1'	32.3°		72°56.3' -49.0'	34.0°		73°45.4' -47.9'	35.9°		19	
20	67°43.9' -53.6'	25.5°		68°37.8' -53.0'	26.6°		69°31.1' -52.4'	27.8°		70°23.9' -51.7'	29.1°		71°16.0' -51.0'	30.5°		72°07.2' -50.1'	32.1°		72°57.6' -49.0'	33.8°		20	
21	66°50.3' -54.1'	24.3°		67°44.7' -53.6'	25.3°		68°38.7' -53.0'	26.9°		69°32.2' -52.4'	27.6°		70°25.0' -51.7'	28.9°		71°17.2' -51.0'	30.3°		72°08.5' -50.1'	31.9°		21	
22	65°56.2' -54.5'	23.3°		66°51.2' -54.1'	24.2°		67°45.7' -53.6'	25.2°		68°39.7' -53.0'	26.3°		69°33.3' -52.4'	27.4°		70°26.2' -51.7'	28.7°		71°18.5' -51.0'	30.2°		22	
23	65°01.7' -54.9'	22.2°		65°57.1' -54.5'	23.1°		66°52.1' -54.1'	24.0°		67°46.7' -53.6'	25.0°		68°40.8' -53.0'	26.1°		69°34.5' -52.4'	27.3°		70°27.5' -51.8'	28.5°		23	

10° 350° LHA Latitude SAME as Declination 10° 350° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

11° 349° LHA			Latitude SAME as Declination												11° 349° LHA								
Dec°	0			1			2			3			4			5			6			Dec°	
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°		Hc°
0	79°00.0' -02.7'	90.0°		78°57.3' +02.8'	95.1°		78°49.3' +08.2'	100.2°		78°36.2' +13.4'	105.1°		78°18.2' +18.4'	109.7°		77°55.8' +22.9'	114.2°		77°29.3' +27.1'	118.3°		0	
1	78°57.3' -08.0'	84.8°		79°00.1' -02.6'	89.9°		78°57.5' +02.9'	95.0°		78°49.6' +08.3'	100.1°		78°36.6' +13.5'	105.0°		78°18.7' +18.5'	109.7°		77°56.3' +23.0'	114.1°		1	
2	78°49.3' -13.1'	79.6°		78°57.5' -07.9'	84.7°		79°00.4' -02.5'	89.8°		78°57.9' +03.0'	94.9°		78°50.1' +08.4'	100.0°		78°37.2' +13.6'	104.9°		78°19.4' +18.6'	109.6°		2	
3	78°36.2' -18.0'	74.6°		78°49.6' -13.0'	79.5°		78°57.9' -07.8'	84.6°		79°00.9' -02.4'	89.7°		78°58.5' +03.1'	94.9°		78°50.8' +08.5'	99.9°		78°37.9' +13.8'	104.8°		3	
4	78°18.2' -22.4'	69.9°		78°36.6' -17.9'	74.5°		78°50.1' -12.9'	79.4°		78°58.5' -07.7'	84.5°		79°01.6' -02.3'	89.6°		78°59.3' +03.2'	94.8°		78°51.7' +08.6'	99.8°		4	
5	77°55.8' -26.5'	65.4°		78°18.7' -22.4'	69.8°		78°37.2' -17.8'	74.4°		78°50.8' -12.9'	79.3°		78°59.3' -07.6'	84.4°		79°02.5' -02.2'	89.5°		79°00.3' +03.3'	94.7°		5	
6	77°29.3' -30.2'	61.2°		77°56.3' -26.4'	65.3°		78°19.4' -22.3'	69.6°		78°37.9' -17.7'	74.3°		78°51.7' -12.8'	79.2°		79°00.3' -07.5'	84.3°		79°03.6' -02.1'	89.4°		6	
7	76°59.1' -33.4'	57.2°		77°29.9' -30.1'	61.0°		77°57.1' -26.4'	65.1°		78°20.2' -22.2'	69.5°		78°38.9' -17.7'	74.2°		78°52.8' -12.7'	79.1°		79°01.5' -07.5'	84.2°		7	
8	76°25.7' -36.3'	53.6°		76°59.8' -33.4'	57.1°		77°30.7' -30.1'	60.9°		77°58.0' -26.3'	65.0°		78°21.3' -22.2'	69.4°		78°40.1' -17.6'	74.1°		78°54.1' -12.6'	79.0°		8	
9	75°49.4' -38.8'	50.3°		76°26.4' -36.3'	53.5°		77°00.6' -33.3'	57.0°		77°31.7' -30.0'	60.8°		77°59.1' -26.3'	64.9°		78°22.5' -22.1'	69.3°		78°41.4' -17.5'	73.9°		9	
10	75°10.5' -41.0'	47.3°		75°50.1' -38.8'	50.2°		76°27.3' -36.2'	53.4°		77°01.6' -33.3'	56.8°		77°32.8' -30.0'	60.6°		78°00.4' -26.2'	64.7°		78°23.9' -22.1'	69.1°		10	
11	74°29.5' -43.0'	44.5°		75°11.4' -41.0'	47.1°		75°51.1' -38.7'	50.0°		76°28.3' -36.2'	53.2°		77°02.8' -33.3'	56.7°		77°34.1' -29.9'	60.5°		78°01.8' -26.2'	64.6°		11	
12	73°46.6' -44.6'	41.9°		74°30.4' -42.9'	44.3°		75°12.3' -41.0'	47.0°		75°52.2' -38.7'	49.9°		76°29.6' -36.2'	53.0°		77°04.2' -33.2'	56.5°		77°35.6' -29.9'	60.3°		12	
13	73°01.9' -46.1'	39.6°		73°47.4' -44.6'	41.8°		74°31.4' -42.9'	44.2°		75°13.4' -40.9'	46.8°		75°53.4' -38.7'	49.7°		76°30.9' -36.1'	52.9°		77°05.7' -33.2'	56.4°		13	
14	72°15.8' -47.4'	37.4°		73°02.8' -46.1'	39.4°		73°48.5' -44.6'	41.6°		74°32.5' -42.9'	44.0°		75°14.7' -40.9'	46.6°		75°54.8' -38.7'	49.5°		76°32.5' -36.1'	52.7°		14	
15	71°28.4' -48.5'	35.5°		72°16.8' -47.4'	37.3°		73°03.9' -46.1'	39.3°		73°49.6' -44.6'	41.4°		74°33.8' -42.9'	43.8°		75°16.1' -40.9'	46.5°		75°56.4' -38.7'	49.3°		15	
16	70°39.9' -49.5'	33.6°		71°29.4' -48.5'	35.3°		72°17.8' -47.4'	37.1°		73°05.0' -46.1'	39.1°		73°50.9' -44.6'	41.3°		74°35.2' -42.9'	43.6°		75°17.7' -40.9'	46.3°		16	
17	69°50.4' -50.4'	32.0°		70°40.9' -49.5'	33.5°		71°30.5' -48.5'	35.1°		72°19.0' -47.3'	36.9°		73°06.3' -46.0'	38.9°		73°52.3' -44.6'	41.1°		74°36.8' -42.9'	43.4°		17	
18	69°00.0' -51.2'	30.4°		69°51.4' -50.4'	31.8°		70°42.0' -49.5'	33.3°		71°31.7' -48.5'	34.9°		72°20.3' -47.3'	36.7°		73°07.8' -46.0'	38.7°		73°53.9' -44.6'	40.9°		18	
19	68°08.9' -51.8'	29.0°		69°01.0' -51.1'	30.3°		69°52.5' -50.4'	31.6°		70°43.2' -49.5'	33.1°		71°33.0' -48.5'	34.8°		72°21.7' -47.3'	36.5°		73°09.3' -46.1'	38.5°		19	
20	67°17.0' -52.5'	27.7°		68°09.9' -51.8'	28.8°		69°02.1' -51.1'	30.1°		69°53.7' -50.4'													

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

12° 348° LHA

Latitude SAME as Declination

12° 348° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	78°00.0'	-02.5'	90.0°	77°57.5'	+02.6'	94.7°	77°50.2'	+07.5'	99.3°	77°38.2'	+12.4'	103.8°	77°21.6'	+17.0'	108.2°	77°00.8'	+21.3'	112.3°	76°36.2'	+25.3'	116.2°	0
1	77°57.5'	-07.3'	85.2°	78°00.1'	-02.3'	89.9°	77°57.8'	+02.7'	94.6°	77°50.5'	+07.7'	99.2°	77°38.6'	+12.5'	103.7°	77°22.1'	+17.1'	108.1°	77°01.5'	+21.4'	112.2°	1
2	77°50.2'	-12.1'	80.5°	77°57.8'	-07.2'	85.1°	78°00.4'	-02.2'	89.8°	77°58.2'	+02.8'	94.5°	77°51.1'	+07.8'	99.1°	77°39.2'	+12.6'	103.6°	77°22.9'	+17.2'	108.0°	2
3	77°38.2'	-16.6'	75.9°	77°50.5'	-12.0'	80.4°	77°58.2'	-07.1'	85.0°	78°01.0'	-02.1'	89.7°	77°58.9'	+02.9'	94.4°	77°51.8'	+07.9'	99.0°	77°40.1'	+12.7'	103.6°	3
4	77°21.6'	-20.8'	71.4°	77°38.6'	-16.5'	75.7°	77°51.1'	-11.9'	80.2°	77°58.9'	-07.0'	84.9°	78°01.8'	-02.0'	89.6°	77°59.7'	+03.0'	94.3°	77°52.8'	+08.0'	98.9°	4
5	77°00.8'	-24.6'	67.2°	77°22.1'	-20.7'	71.3°	77°39.2'	-16.4'	75.6°	77°51.8'	-11.8'	80.1°	77°59.7'	-06.9'	84.8°	78°02.7'	-01.9'	89.5°	78°00.8'	+03.1'	94.2°	5
6	76°36.2'	-28.2'	63.2°	77°01.5'	-24.6'	67.1°	77°22.9'	-20.6'	71.2°	77°40.1'	-16.3'	75.5°	77°52.8'	-11.7'	80.0°	78°00.8'	-06.8'	84.7°	78°04.0'	-01.8'	89.4°	6
7	76°08.0'	-31.4'	59.4°	76°36.9'	-28.1'	63.1°	77°02.3'	-24.5'	66.9°	77°23.8'	-20.5'	71.0°	77°41.1'	-16.2'	75.4°	77°54.0'	-11.6'	79.9°	78°02.1'	-06.7'	84.5°	7
8	75°36.6'	-34.2'	55.9°	76°08.8'	-31.3'	59.3°	76°37.8'	-28.1'	62.9°	77°03.3'	-24.4'	66.8°	77°25.0'	-20.4'	70.9°	77°42.4'	-16.1'	75.2°	77°55.4'	-11.5'	79.8°	8
9	75°02.4'	-36.8'	52.7°	75°37.5'	-34.2'	55.8°	76°09.7'	-31.3'	59.2°	76°38.9'	-28.0'	62.8°	77°04.5'	-20.4'	66.6°	77°26.3'	-20.4'	70.8°	77°43.9'	-16.1'	75.1°	9
10	74°25.6'	-39.0'	49.7°	75°03.3'	-36.7'	52.6°	75°38.5'	-34.1'	55.7°	76°10.9'	-31.2'	59.0°	76°40.1'	-27.9'	62.6°	77°05.9'	-24.3'	66.5°	77°27.9'	-20.3'	70.6°	10
11	73°46.6'	-41.0'	46.9°	74°26.5'	-39.0'	49.5°	75°04.3'	-36.7'	52.4°	75°39.6'	-34.1'	55.5°	76°12.2'	-31.2'	58.8°	76°41.6'	-27.9'	62.5°	77°07.5'	-24.3'	66.3°	11
12	73°05.5'	-42.8'	44.4°	73°47.5'	-41.0'	46.8°	74°27.6'	-39.0'	49.4°	75°05.6'	-36.7'	52.2°	75°41.0'	-34.1'	55.3°	76°13.7'	-31.1'	58.7°	76°43.3'	-27.9'	62.3°	12
13	72°22.7'	-44.4'	42.0°	73°06.5'	-42.8'	44.2°	73°48.7'	-41.0'	46.6°	74°28.9'	-38.9'	49.2°	75°07.0'	-36.6'	52.1°	75°42.6'	-34.0'	55.2°	76°15.4'	-31.1'	58.5°	13
14	71°38.4'	-45.7'	39.8°	72°23.8'	-44.3'	41.8°	73°07.7'	-42.7'	44.0°	73°50.0'	-40.9'	46.4°	74°30.3'	-38.9'	49.0°	75°08.5'	-36.6'	51.9°	75°44.3'	-34.0'	55.0°	14
15	70°52.6'	-47.0'	37.8°	71°39.4'	-45.7'	39.7°	72°25.0'	-44.3'	41.7°	73°09.0'	-42.7'	43.9°	73°51.4'	-40.9'	46.2°	74°31.9'	-38.9'	48.9°	75°10.3'	-36.6'	51.7°	15
16	70°05.7'	-48.0'	35.9°	70°53.7'	-46.9'	37.6°	71°40.7'	-45.7'	39.5°	72°26.3'	-44.3'	41.5°	73°10.5'	-42.7'	43.7°	73°53.0'	-40.9'	46.1°	74°33.7'	-38.9'	48.7°	16
17	69°17.6'	-49.0'	34.2°	70°06.8'	-48.0'	35.8°	70°55.0'	-46.9'	37.5°	71°42.0'	-45.7'	39.3°	72°27.8'	-44.3'	41.3°	73°12.1'	-42.7'	43.5°	73°54.8'	-40.9'	45.9°	17
18	68°28.7'	-49.8'	32.6°	69°18.8'	-49.0'	34.0°	70°08.1'	-48.0'	35.6°	70°56.3'	-46.9'	37.3°	71°43.5'	-45.7'	39.1°	72°29.4'	-44.3'	41.1°	73°13.9'	-42.7'	43.3°	18
19	67°38.8'	-50.6'	31.1°	68°29.8'	-49.8'	32.4°	69°20.1'	-49.0'	33.9°	70°09.4'	-48.0'	35.4°	70°57.8'	-46.9'	37.1°	71°45.1'	-45.7'	38.9°	72°31.2'	-44.3'	40.9°	19
20	66°48.2'	-51.3'	29.7°	67°40.0'	-50.6'	30.9°	68°31.1'	-49.8'	32.2°	69°21.5'	-49.0'	33.7°	70°10.9'	-48.0'	35.2°	70°59.5'	-46.9'	36.9°	71°46.9'	-45.7'	38.7°	20
21	65°56.9'	-51.9'	28.4°	66°49.4'	-51.3'	29.6°	67°41.3'	-50.6'	30.7°	68°32.5'	-49.8'	32.0°	69°23.0'	-49.0'	33.5°	70°12.6'	-48.0'	35.0°	71°01.2'	-46.9'	36.6°	21
22	65°05.0'	-52.4'	27.2°	65°58.1'	-51.9'	28.3°	66°50.7'	-51.3'	29.1°	67°42.7'	-50.6'	30.5°	68°34.0'	-49.8'	31.8°	69°24.6'	-49.0'	33.2°	70°14.3'	-48.0'	34.8°	22
23	64°12.6'	-52.9'	26.1°	65°06.2'	-52.4'	27.0°	65°59.4'	-51.9'	28.4°	66°52.1'	-51.3'	29.2°	67°44.2'	-50.6'	30.3°	68°35.6'	-49.8'	31.6°	69°26.3'	-49.0'	33.0°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			Dec°

12° 348° LHA

Latitude SAME as Declination

12° 348° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

13° 347° LHA

Latitude SAME as Declination

13° 347° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	77°00.0'	-02.3'	90.0°	76°57.7'	+02.4'	94.3°	76°51.0'	+07.0'	98.6°	76°39.8'	+11.5'	102.8°	76°24.5'	+15.8'	106.8°	76°05.2'	+19.9'	110.7°	75°42.2'	+23.7'	114.4°	0
1	76°57.7'	-06.8'	85.6°	77°00.1'	-02.1'	89.9°	76°58.0'	+02.5'	94.2°	76°51.3'	+07.1'	98.5°	76°40.3'	+11.6'	102.7°	76°25.1'	+15.9'	106.7°	76°05.9'	+20.0'	110.6°	1
2	76°51.0'	-11.1'	81.2°	76°58.0'	-06.6'	85.4°	77°00.5'	-02.0'	89.8°	76°58.4'	+02.6'	94.1°	76°51.9'	+07.2'	98.4°	76°41.0'	+11.7'	102.6°	76°25.9'	+16.1'	106.6°	2
3	76°39.8'	-15.3'	76.9°	76°51.3'	-11.0'	81.1°	76°58.4'	-06.5'	85.3°	77°01.1'	-01.9'	89.7°	76°59.2'	+02.7'	94.0°	76°52.7'	+07.4'	98.3°	76°41.9'	+11.9'	102.5°	3
4	76°24.5'	-19.3'	72.7°	76°40.3'	-15.2'	76.8°	76°51.9'	-10.9'	80.9°	76°59.2'	-06.4'	85.2°	77°01.9'	-01.8'	89.5°	77°00.1'	+02.9'	93.9°	76°53.8'	+07.5'	98.2°	4
5	76°05.2'	-23.0'	68.7°	76°25.1'	-19.2'	72.6°	76°41.0'	-15.1'	76.6°	76°52.7'	-10.8'	80.8°	77°00.1'	-06.3'	85.1°	77°03.0'	-01.7'	89.4°	77°01.3'	+03.0'	93.8°	5
6	75°42.2'	-26.4'	65.0°	76°05.9'	-22.9'	68.6°	76°25.9'	-19.1'	72.5°	76°41.9'	-15.0'	76.5°	76°53.8'	-10.7'	80.7°	77°01.3'	-06.2'	85.0°	77°04.3'	-01.6'	89.3°	6
7	75°15.8'	-29.5'	61.4°	75°43.0'	-26.3'	64.8°	76°06.8'	-22.8'	68.5°	76°26.9'	-19.0'	72.3°	76°43.1'	-14.9'	76.4°	76°55.1'	-10.6'	80.6°	77°02.7'	-06.1'	84.9°	7
8	74°46.3'	-32.3'	58.0°	75°16.7'	-29.4'	61.2°	75°44.0'	-26.2'	64.7°	76°07.9'	-22.7'	68.3°	76°28.2'	-18.9'	72.2°	76°44.5'	-14.8'	76.2°	76°56.6'	-10.5'	80.4°	8
9	74°14.0'	-34.9'	54.9°	74°47.2'	-32.3'	57.9°	75°17.7'	-29.4'	61.1°	75°45.2'	-26.2'	64.5°	76°09.2'	-22.7'	68.2°	76°29.6'	-18.9'	72.1°	76°46.1'	-14.8'	76.1°	9
10	73°39.1'	-37.2'	51.9°	74°15.0'	-34.8'	54.7°	74°48.3'	-32.2'	57.7°	75°19.0'	-29.3'	60.9°	75°46.6'	-26.1'	64.4°	76°10.8'	-22.6'	68.0°	76°31.4'	-18.8'	71.9°	10
11	73°01.9'	-39.2'	49.2°	73°40.1'	-37.1'	51.7°	74°16.1'	-34.8'	54.5°	74°49.7'	-32.2'	57.5°	75°20.5'	-29.3'	60.8°	75°48.2'	-26.1'	64.2°	76°12.6'	-22.5'	67.9°	11
12	72°22.7'	-41.0'	46.6°	73°03.0'	-39.2'	49.0°	73°41.4'	-37.1'	51.6°	74°17.5'	-34.7'	54.4°	74°51.2'	-32.1'	57.4°	75°22.1'	-29.2'	60.6°	75°50.0'	-26.0'	64.0°	12
13	71°41.7'	-42.7'	44.3°	72°23.9'	-41.0'	46.5°	73°04.3'	-39.1'	48.8°	73°42.8'	-37.0'	51.4°	74°19.1'	-34.7'	54.2°	74°52.9'	-32.1'	57.2°	75°24.0'	-29.2'	60.4°	13
14	70°59.0'	-44.1'	42.1°	71°42.9'	-42.6'	44.1°	72°25.2'	-41.0'	46.3°	73°05.8'	-39.1'	48.6°	73°44.4'	-37.0'	51.2°	74°20.8'	-34.7'	54.0°	74°54.8'	-32.0'	57.0°	14
15	70°14.9'	-45.4'	40.0°	71°00.3'	-44.1'	41.9°	71°44.2'	-42.6'	43.9°	72°26.7'	-40.9'	46.1°	73°07.4'	-39.1'	48.5°	73°46.2'	-37.0'	51.0°	74°22.8'	-34.6'	53.8°	15
16	69°29.5'	-46.6'	38.1°	70°16.2'	-45.4'	39.8°	71°01.6'	-44.0'	41.7°	71°45.7'	-42.6'	43.7°	72°28.3'	-40.9'	45.9°	73°09.2'	-39.0'	48.3°	73°48.1'	-37.0'	50.8°	16
17	68°43.0'	-47.6'	36.3°	69°30.8'	-46.5'	37.9°	70°17.6'	-45.3'	39.6°	71°03.2'	-44.0'	41.5°	71°47.4'	-42.5'	43.5°	72°30.2'	-40.9'	45.7°	73°11.2'	-39.0'	48.0°	17
18	67°55.4'	-48.5'	34.7°	68°44.3'	-47.6'	36.2°	69°32.2'	-46.5'	37.7°	70°19.2'	-45.3'	39.4°	71°04.9'	-44.0'	41.3°	71°49.3'	-42.5'	43.3°	72°32.2'	-40.9'	45.5°	18
19	67°06.9'	-49.3'	33.2°	67°56.7'	-48.5'	34.5°	68°45.7'	-47.5'	36.0°	69°33.8'	-46.5'	37.5°	70°20.9'	-45.3'	39.2°	71°06.7'	-44.0'	41.1°	71°51.3'	-42.5'	43.1°	19
20	66°17.5'	-50.1'	31.7°	67°08.2'	-49.3'	33.0°	67°58.2'	-48.5'	34.3°	68°47.3'	-47.5'	35.7°	69°35.5'	-46.5'	37.3°	70°22.7'	-45.3'	39.0°	71°08.7'	-44.0'	40.9°	20
21	65°27.4'	-50.8'	30.4°	66°18.9'	-50.1'	31.5°	67°09.7'	-49.3'	32.8°	67°59.8'	-48.5'	34.1°	68°49.1'	-47.5'	35.5°	69°37.4'	-46.5'	37.1°	70°24.7'			

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

14° 346° LHA

Latitude SAME as Declination

14° 346° LHA

Table with 13 columns (Dec, 0-6, Dec) and 23 rows of astronomical data for 14° 346° LHA. Each cell contains three values (Hc, d, Z) for a specific declination.

14° 346° LHA

Latitude SAME as Declination

14° 346° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

15° 345° LHA

Latitude SAME as Declination

15° 345° LHA

Table with 13 columns (Dec, 0-6, Dec) and 23 rows of astronomical data for 15° 345° LHA. Each cell contains three values (Hc, d, Z) for a specific declination.

15° 345° LHA

Latitude SAME as Declination

15° 345° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

16° 344° LHA

Latitude SAME as Declination

16° 344° LHA

Dec°	0			1			2			3			4			5			6			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	74°00.0'	-01.8'	90.0°	73°58.2'	+02.0'	93.5°	73°52.7'	+05.7'	96.9°	73°43.7'	+09.5'	100.3°	73°31.2'	+13.1'	103.7°	73°15.4'	+16.5'	106.9°	72°56.4'	+19.9'	110.0°	0			
1	73°58.2'	-05.5'	86.4°	74°00.1'	-01.7'	89.9°	73°58.5'	+02.1'	93.3°	73°53.2'	+05.9'	96.8°	73°44.3'	+09.6'	100.2°	73°31.9'	+13.2'	103.5°	73°16.2'	+16.7'	106.8°	1			
2	73°52.7'	-09.0'	82.8°	73°58.5'	-05.3'	86.2°	74°00.6'	-01.5'	89.7°	73°59.1'	+02.3'	93.2°	73°53.9'	+06.0'	96.7°	73°45.2'	+09.8'	100.1°	73°32.9'	+13.4'	103.4°	2			
3	73°43.7'	-12.5'	79.2°	73°53.2'	-08.9'	82.6°	73°59.1'	-05.2'	86.1°	74°01.3'	-01.4'	89.6°	74°00.0'	+02.4'	93.1°	73°54.9'	+06.2'	96.5°	73°46.3'	+09.9'	100.0°	3			
4	73°31.2'	-15.8'	75.8°	73°44.3'	-12.4'	79.1°	73°53.9'	-08.7'	82.5°	74°00.0'	-05.0'	85.9°	74°02.4'	-01.2'	89.4°	74°01.1'	+02.6'	92.9°	73°56.2'	+06.4'	96.4°	4			
5	73°15.4'	-19.0'	72.4°	73°31.9'	-15.7'	75.6°	73°45.2'	-12.2'	78.9°	73°54.9'	-08.6'	82.3°	74°01.1'	-04.9'	85.8°	74°03.7'	-01.1'	89.3°	74°02.6'	+02.7'	92.8°	5			
6	72°56.4'	-22.0'	69.1°	73°16.2'	-18.9'	72.2°	73°32.9'	-15.6'	75.5°	73°46.3'	-12.1'	78.8°	73°56.2'	-08.5'	82.2°	74°02.6'	-04.7'	85.7°	74°05.3'	-01.0'	89.2°	6			
7	72°34.3'	-24.8'	66.0°	72°57.3'	-21.9'	69.0°	73°17.4'	-18.8'	72.1°	73°34.2'	-15.5'	75.3°	73°47.8'	-12.0'	78.6°	73°57.8'	-08.3'	82.0°	74°04.3'	-04.6'	85.5°	7			
8	72°09.5'	-27.5'	63.0°	72°35.4'	-24.7'	65.8°	72°58.6'	-21.8'	68.8°	73°18.8'	-18.7'	71.9°	73°35.8'	-15.3'	75.1°	73°49.5'	-11.8'	78.5°	73°59.7'	-08.2'	81.9°	8			
9	71°42.0'	-29.9'	60.1°	72°10.7'	-27.4'	62.8°	72°36.8'	-24.6'	65.7°	73°00.1'	-21.7'	68.6°	73°20.4'	-18.6'	71.7°	73°37.6'	-15.2'	75.0°	73°51.5'	-11.7'	78.3°	9			
10	71°12.1'	-32.2'	57.4°	71°43.3'	-29.8'	59.9°	72°12.1'	-27.3'	62.6°	72°38.4'	-24.5'	65.5°	73°01.9'	-21.6'	68.5°	73°22.4'	-18.5'	71.6°	73°39.8'	-15.1'	74.8°	10			
11	70°39.9'	-34.2'	54.8°	71°13.5'	-32.1'	57.2°	71°44.8'	-29.7'	59.8°	72°13.8'	-27.2'	62.4°	72°40.3'	-24.5'	65.3°	73°03.9'	-21.5'	68.3°	73°24.6'	-18.4'	71.4°	11			
12	70°05.7'	-36.1'	52.4°	70°41.4'	-34.2'	54.6°	71°15.1'	-32.0'	57.0°	71°46.6'	-29.7'	59.6°	72°15.8'	-27.1'	62.3°	72°42.4'	-24.4'	65.1°	73°06.3'	-21.4'	68.1°	12			
13	69°29.5'	-37.9'	50.1°	70°07.2'	-36.1'	52.2°	70°43.1'	-34.1'	54.4°	71°17.0'	-31.9'	56.8°	71°48.7'	-29.6'	59.4°	72°18.1'	-27.1'	62.1°	72°44.9'	-24.3'	64.9°	13			
14	68°51.7'	-39.5'	47.9°	69°31.1'	-37.8'	49.9°	70°09.0'	-36.0'	52.0°	70°45.0'	-34.0'	54.2°	71°19.1'	-31.9'	56.6°	71°51.0'	-29.5'	59.2°	72°20.5'	-27.0'	61.9°	14			
15	68°12.2'	-40.9'	45.8°	68°53.3'	-39.4'	47.7°	69°33.0'	-37.8'	49.6°	70°11.0'	-36.0'	51.8°	70°47.2'	-34.0'	54.0°	71°21.5'	-31.8'	56.4°	71°53.5'	-29.5'	58.9°	15			
16	67°31.3'	-42.2'	43.9°	68°13.9'	-40.8'	45.6°	68°55.2'	-39.4'	47.4°	69°35.0'	-37.7'	49.4°	70°13.2'	-35.9'	51.5°	70°49.6'	-33.9'	53.8°	71°24.1'	-31.8'	56.2°	16			
17	66°49.1'	-43.4'	42.0°	67°33.1'	-42.2'	43.7°	68°15.9'	-40.8'	45.4°	68°57.3'	-39.3'	47.2°	69°37.3'	-37.7'	49.2°	70°15.7'	-35.9'	51.3°	70°52.3'	-33.9'	53.6°	17			
18	66°05.7'	-44.5'	40.3°	66°50.9'	-43.4'	41.8°	67°35.1'	-42.1'	43.4°	68°18.0'	-40.8'	45.2°	68°59.6'	-39.3'	47.0°	69°39.8'	-37.6'	49.0°	70°18.4'	-35.8'	51.1°	18			
19	65°21.2'	-45.5'	38.7°	66°07.5'	-44.5'	40.1°	66°52.9'	-43.3'	41.6°	67°37.2'	-42.1'	43.2°	68°20.4'	-40.7'	44.9°	69°02.2'	-39.2'	46.8°	69°42.5'	-37.6'	48.7°	19			
20	64°35.6'	-46.4'	37.1°	65°23.1'	-45.5'	38.5°	66°09.6'	-44.4'	39.9°	66°55.1'	-43.3'	41.4°	67°39.6'	-42.1'	43.0°	68°22.9'	-40.7'	44.7°	69°04.9'	-39.2'	46.5°	20			
21	63°49.2'	-47.3'	35.7°	64°37.6'	-46.4'	36.9°	65°25.1'	-45.4'	38.2°	66°11.8'	-44.4'	39.6°	66°57.6'	-43.3'	41.1°	67°42.2'	-42.1'	42.7°	68°25.7'	-40.7'	44.4°	21			
22	63°02.0'	-48.0'	34.3°	63°51.2'	-47.2'	35.4°	64°39.7'	-46.4'	36.7°	65°27.4'	-45.4'	38.0°	66°14.3'	-44.4'	39.4°	66°50.2'	-43.3'	40.9°	67°00.2'	-42.0'	42.4°	22			
23	62°14.0'	-48.7'	33.0°	63°04.0'	-48.0'	34.1°	63°53.3'	-47.2'	35.2°	64°42.0'	-46.3'	36.4°	65°29.9'	-45.4'	37.7°	66°16.9'	-44.4'	39.1°	67°03.0'	-43.3'	40.6°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6						

16° 344° LHA

Latitude SAME as Declination

16° 344° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

17° 343° LHA

Latitude SAME as Declination

17° 343° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	73°00.0'	-01.7'	90.0°	72°58.3'	+01.9'	93.3°	72°53.2'	+05.4'	96.5°	72°44.7'	+08.9'	99.7°	72°33.0'	+12.4'	102.9°	72°18.0'	+15.7'	105.9°	72°00.1'	+18.8'	108.9°	0
1	72°58.3'	-05.1'	86.6°	73°00.2'	-01.6'	89.9°	72°58.6'	+02.0'	93.1°	72°53.6'	+05.6'	96.4°	72°45.3'	+09.1'	99.6°	72°33.7'	+12.5'	102.7°	72°18.9'	+15.8'	105.8°	1
2	72°53.2'	-08.5'	83.2°	72°58.6'	-05.0'	86.4°	73°00.6'	-01.4'	89.7°	72°59.2'	+02.2'	93.0°	72°54.4'	+05.7'	96.2°	72°46.2'	+09.3'	99.4°	72°34.8'	+12.7'	102.6°	2
3	72°44.7'	-11.7'	79.8°	72°53.6'	-08.3'	83.0°	72°59.2'	-04.8'	86.3°	73°01.4'	-01.2'	89.6°	73°00.2'	+02.3'	92.8°	72°55.5'	+05.9'	96.1°	72°47.5'	+09.4'	99.3°	3
4	72°33.0'	-14.9'	76.5°	72°45.3'	-11.6'	79.7°	72°54.4'	-08.2'	82.9°	73°00.2'	-04.7'	86.1°	73°02.5'	-01.1'	89.4°	73°01.4'	+02.5'	92.7°	72°56.9'	+06.1'	95.9°	4
5	72°18.0'	-17.9'	73.3°	72°33.7'	-14.8'	76.4°	72°46.2'	-11.5'	79.5°	72°55.5'	-08.0'	82.7°	73°01.4'	-04.5'	86.0°	73°03.9'	-00.9'	89.3°	73°03.0'	+02.7'	92.5°	5
6	72°00.1'	-20.8'	70.2°	72°18.9'	-17.8'	73.2°	72°34.8'	-14.6'	76.2°	72°47.5'	-11.3'	79.4°	72°56.9'	-07.9'	82.6°	73°03.0'	-04.4'	85.8°	73°05.6'	-00.8'	89.1°	6
7	71°39.3'	-23.6'	67.2°	72°01.1'	-20.7'	70.1°	72°20.2'	-17.7'	73.0°	72°36.2'	-14.5'	76.1°	72°49.0'	-11.2'	79.2°	72°58.6'	-07.7'	82.4°	73°04.8'	-04.2'	85.7°	7
8	71°15.7'	-26.1'	64.3°	71°40.4'	-23.4'	67.0°	72°02.5'	-20.6'	69.9°	72°21.7'	-17.6'	72.8°	72°37.8'	-14.4'	75.9°	72°50.9'	-11.1'	79.0°	73°00.6'	-07.6'	82.2°	8
9	70°49.6'	-28.5'	61.6°	71°17.0'	-26.0'	64.1°	71°41.9'	-23.3'	66.9°	72°04.1'	-20.5'	69.7°	72°23.5'	-17.4'	72.7°	72°39.8'	-14.3'	75.7°	72°53.0'	-10.9'	78.9°	9
10	70°21.1'	-30.7'	58.9°	70°51.0'	-28.4'	61.4°	71°18.6'	-25.9'	64.0°	71°43.6'	-23.2'	66.7°	72°06.0'	-20.4'	69.5°	72°25.6'	-17.3'	72.5°	72°42.1'	-14.1'	75.5°	10
11	69°50.4'	-32.8'	56.4°	70°22.6'	-30.6'	58.7°	70°52.7'	-28.3'	61.2°	71°20.4'	-25.8'	63.8°	71°45.6'	-23.1'	66.5°	72°08.2'	-20.3'	69.3°	72°27.9'	-17.2'	72.3°	11
12	69°17.6'	-34.7'	54.0°	69°52.0'	-32.7'	56.2°	70°24.4'	-30.5'	58.5°	70°54.6'	-28.2'	61.0°	71°22.5'	-25.7'	63.6°	71°48.0'	-23.0'	66.3°	72°10.7'	-20.2'	69.1°	12
13	68°43.0'	-36.4'	51.7°	69°19.3'	-34.6'	53.8°	69°53.8'	-32.6'	56.0°	70°26.4'	-30.5'	58.3°	70°56.8'	-28.1'	60.8°	71°24.9'	-25.6'	63.4°	71°50.6'	-22.9'	66.1°	13
14	68°06.6'	-38.0'	49.5°	68°44.7'	-36.3'	51.5°	69°21.2'	-34.5'	53.6°	69°55.9'	-32.5'	55.8°	70°28.7'	-30.4'	58.1°	70°59.3'	-28.1'	60.6°	71°27.6'	-25.6'	63.2°	14
15	67°28.6'	-39.5'	47.5°	68°08.4'	-37.9'	49.3°	68°46.7'	-36.3'	51.3°	69°23.4'	-34.4'	53.3°	69°58.3'	-32.5'	55.5°	70°31.2'	-30.3'	57.9°	71°02.1'	-28.0'	60.3°	15
16	66°49.1'	-40.8'	45.6°	67°30.5'	-39.4'	47.3°	68°10.5'	-37.9'	49.1°	68°49.0'	-36.2'	51.1°	69°25.8'	-34.4'	53.1°	70°00.9'	-32.4'	55.3°	70°34.1'	-30.3'	57.6°	16
17	66°08.2'	-42.1'	43.7°	66°51.0'	-40.8'	45.3°	67°32.6'	-39.4'	47.0°	68°12.8'	-37.8'	48.9°	68°51.4'	-36.2'	50.8°	69°28.5'	-34.3'	52.9°	70°03.8'	-32.4'	55.1°	17
18	65°26.2'	-43.2'	42.0°	66°10.3'	-42.0'	43.5°	66°53.2'	-40.7'	45.1°	67°34.9'	-39.3'	46.8°	68°15.3'	-37.8'	48.6°	68°54.2'	-36.1'	50.6°	69°31.4'	-34.3'	52.6°	18
19	64°43.0'	-44.2'	40.3°	65°28.2'	-43.2'	41.7°	66°12.5'	-42.0'	43.3°	66°55.6'	-40.7'	44.9°	67°37.5'	-39.3'	46.6°	68°18.1'	-37.8'	48.4°	68°57.1'	-36.1'	50.3°	19
20	63°58.7'	-45.2'	38.8°	64°45.1'	-44.2'	40.1°	65°30.5'	-43.1'	41.5°	66°14.9'	-41.9'	43.0°	66°58.2'	-40.7'	44.6°	67°40.3'	-39.3'	46.3°	68°21.1'	-37.7'	48.1°	20
21	63°13.5'	-46.1'	37.3°	64°00.9'	-45.2'	38.5°	64°47.4'	-44.2'	39.9°	65°33.0'	-43.1'	41.3°	66°17.6'	-41.9'	42.8°	67°01.0'	-40.6'	44.4°	67°43.3'	-39.2'	46.1°	21
22																						

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

18° 342° LHA

Latitude SAME as Declination

18° 342° LHA

Table with 11 columns (Dec, 0-6, Dec) and 24 rows (0-23). Each cell contains three values: Hc, d, and Z. The table is symmetric around the center row.

18° 342° LHA

Latitude SAME as Declination

18° 342° LHA

South Lat. LHA > 180° .. Zn = 180-Z LHA < 180° .. Zn= 180+Z

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

19° 341° LHA

Latitude SAME as Declination

19° 341° LHA

Table with 11 columns (Dec, 0-6, Dec) and 24 rows (0-23). Each cell contains three values: Hc, d, and Z. The table is symmetric around the center row.

19° 341° LHA

Latitude SAME as Declination

19° 341° LHA

South Lat. LHA > 180° .. Zn = 180-Z LHA < 180° .. Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

20° 340° LHA			Latitude SAME as Declination						20° 340° LHA							
Dec°	0			1		2		3		4		5		6		Dec°
	Hc°	d'	Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	
0	70°00.0'-01.4' 90.0°	69°58.6'+01.6' 92.7°	69°54.3'+04.7' 95.5°	69°47.1'+07.7' 98.2°	69°37.2'+10.7' 100.8°	69°24.6'+13.5' 103.5°	69°09.3'+16.4' 106.0°	0								
1	69°58.6'-04.3' 87.1°	70°00.2'-01.3' 89.8°	69°58.9'+01.8' 92.6°	69°54.8'+04.9' 95.3°	69°47.9'+07.9' 98.0°	69°38.1'+10.8' 100.7°	69°25.6'+13.7' 103.3°	1								
2	69°54.3'-07.1' 84.2°	69°58.9'-04.1' 86.9°	70°00.7'-01.1' 89.6°	69°59.7'+02.0' 92.4°	69°55.7'+05.0' 95.1°	69°48.9'+08.1' 97.8°	69°39.4'+11.0' 100.5°	2								
3	69°47.1'-09.9' 81.3°	69°54.8'-07.0' 84.0°	69°59.7'-03.9' 86.7°	70°01.7'-00.9' 89.5°	70°00.8'+02.2' 92.2°	69°57.0'+05.2' 95.0°	69°50.4'+08.3' 97.7°	3								
4	69°37.2'-12.6' 78.4°	69°47.9'-09.7' 81.1°	69°55.7'-06.8' 83.8°	70°00.8'-03.8' 86.5°	70°03.0'-00.7' 89.3°	70°02.2'+02.4' 92.0°	69°58.7'+05.4' 94.8°	4								
5	69°24.6'-15.3' 75.7°	69°38.1'-12.5' 78.3°	69°48.9'-09.6' 80.9°	69°57.0'-06.6' 83.6°	70°02.2'-03.6' 86.4°	70°04.6'-00.5' 89.1°	70°04.1'+02.6' 91.9°	5								
6	69°09.3'-17.8' 72.9°	69°25.6'-15.1' 75.5°	69°39.4'-12.3' 78.1°	69°50.4'-09.4' 80.7°	69°58.7'-06.4' 83.4°	70°04.1'-03.4' 86.2°	70°06.6'-00.3' 88.9°	6								
7	68°51.5'-20.2' 70.3°	69°10.5'-17.7' 72.7°	69°27.1'-15.0' 75.3°	69°41.0'-12.1' 77.9°	69°52.2'-09.2' 80.5°	70°00.7'-06.3' 83.3°	70°06.3'-03.2' 86.0°	7								
8	68°31.2'-22.6' 67.7°	68°52.9'-20.1' 70.1°	69°12.1'-17.5' 72.5°	69°28.9'-14.8' 75.1°	69°43.0'-12.0' 77.7°	69°54.4'-09.1' 80.4°	70°03.1'-06.1' 83.1°	8								
9	68°08.6'-24.8' 65.2°	68°32.8'-22.4' 67.5°	68°54.6'-20.0' 69.9°	69°14.1'-17.4' 72.3°	69°31.0'-14.6' 74.9°	69°45.3'-11.8' 77.5°	69°57.0'-08.9' 80.2°	9								
10	67°43.9'-26.9' 62.7°	68°10.3'-24.6' 64.9°	68°34.7'-22.3' 67.2°	68°56.7'-19.8' 69.6°	69°16.4'-17.2' 72.1°	69°33.5'-14.5' 74.7°	69°48.1'-11.7' 77.3°	10								
11	67°17.0'-28.8' 60.4°	67°45.7'-26.7' 62.5°	68°12.4'-24.5' 64.7°	68°36.9'-22.2' 67.0°	68°59.1'-19.7' 69.4°	69°19.0'-17.1' 71.9°	69°36.4'-14.4' 74.5°	11								
12	66°48.2'-30.7' 58.1°	67°19.0'-28.7' 60.2°	67°47.9'-26.6' 62.3°	68°14.7'-24.4' 64.5°	68°39.5'-22.0' 66.8°	69°01.9'-19.6' 69.2°	69°22.0'-17.0' 71.7°	12								
13	66°17.5'-32.4' 56.0°	66°50.3'-30.6' 57.9°	67°21.2'-28.6' 59.9°	67°50.3'-26.5' 62.1°	68°17.4'-24.3' 64.3°	68°42.4'-21.9' 66.6°	69°05.1'-19.4' 69.0°	13								
14	65°45.1'-34.0' 53.9°	66°19.7'-32.3' 55.7°	66°52.6'-30.4' 57.7°	67°23.8'-28.5' 59.7°	67°53.1'-26.4' 61.8°	68°20.4'-24.2' 64.0°	68°45.6'-21.8' 66.4°	14								
15	65°11.1'-35.5' 51.9°	65°47.4'-33.9' 53.7°	66°22.2'-32.2' 55.5°	66°55.3'-30.4' 57.4°	67°26.7'-28.4' 59.5°	67°56.3'-26.3' 61.6°	68°23.8'-24.1' 63.8°	15								
16	64°35.6'-36.9' 50.0°	65°13.5'-35.4' 51.7°	65°50.0'-33.8' 53.4°	66°25.0'-32.1' 55.3°	66°58.4'-30.3' 57.2°	67°30.0'-28.3' 59.2°	67°59.7'-26.2' 61.3°	16								
17	63°58.7'-38.2' 48.2°	64°38.1'-36.8' 49.8°	65°16.2'-35.3' 51.4°	65°52.9'-33.7' 53.2°	66°28.1'-32.0' 55.0°	67°01.7'-30.2' 56.9°	67°33.5'-28.2' 59.0°	17								
18	63°20.5'-39.4' 46.5°	64°01.3'-38.1' 48.0°	64°40.9'-36.7' 49.5°	65°19.2'-35.3' 51.2°	65°56.1'-33.7' 52.9°	66°31.5'-31.9' 54.7°	67°05.3'-30.1' 56.7°	18								
19	62°41.1'-40.6' 44.8°	63°23.1'-39.4' 46.2°	64°04.1'-38.1' 47.7°	64°43.9'-36.7' 49.3°	65°22.4'-35.2' 50.9°	65°59.5'-33.6' 52.6°	66°35.2'-31.9' 54.5°	19								
20	62°00.5'-41.6' 43.2°	62°43.8'-40.5' 44.5°	63°26.0'-39.3' 45.9°	64°07.2'-38.0' 47.4°	64°47.2'-36.6' 49.0°	65°25.9'-35.1' 50.6°	66°03.3'-33.5' 52.4°	20								
21	61°18.9'-42.6' 41.7°	62°03.3'-41.5' 43.0°	62°46.8'-40.4' 44.3°	63°29.2'-39.2' 45.7°	64°10.6'-37.9' 47.1°	64°50.8'-36.6' 48.7°	65°29.8'-35.1' 50.3°	21								
22	60°36.4'-43.5' 40.2°	61°21.8'-42.5' 41.4°	62°06.3'-41.5' 42.7°	62°50.2'-40.4' 44.0°	63°32.6'-39.2' 45.4°	64°14.2'-37.9' 46.9°	64°54.7'-36.5' 48.4°	22								
23	59°52.9'-44.3' 38.9°	60°39.3'-43.4' 40.0°	61°24.8'-42.5' 41.1°	62°09.6'-41.4' 42.4°	62°53.5'-40.3' 43.7°	63°36.3'-39.1' 45.1°	64°18.1'-37.9' 46.6°	23								
Dec°	Hc°	d'	Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Dec°
	0			1				2				3				4

20° 340° LHA Latitude SAME as Declination 20° 340° LHA
South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

21° 339° LHA			Latitude SAME as Declination						21° 339° LHA							
Dec°	0			1		2		3		4		5		6		Dec°
	Hc°	d'	Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	
0	69°00.0'-01.4' 90.0°	68°58.6'+01.6' 92.6°	68°54.6'+04.5' 95.2°	68°47.8'+07.4' 97.8°	68°38.4'+10.2' 100.3°	68°26.3'+13.0' 102.8°	68°11.8'+15.7' 105.2°	0								
1	68°58.6'-04.1' 87.2°	69°00.2'-01.2' 89.8°	68°59.0'+01.8' 92.4°	68°55.1'+04.7' 95.0°	68°48.6'+07.5' 97.6°	68°39.3'+10.4' 100.1°	68°27.5'+13.2' 102.6°	1								
2	68°54.6'-06.8' 84.4°	68°59.0'-03.9' 87.0°	69°00.8'-01.0' 89.6°	68°59.8'+01.9' 92.2°	68°56.1'+04.9' 94.8°	68°49.7'+07.7' 97.4°	68°40.7'+10.6' 99.9°	2								
3	68°47.8'-09.4' 81.7°	68°55.1'-06.6' 84.2°	68°59.8'-03.7' 86.8°	69°01.7'-00.8' 89.4°	69°01.0'+02.1' 92.1°	68°57.5'+05.1' 94.7°	68°51.2'+07.9' 97.2°	3								
4	68°38.4'-12.0' 79.0°	68°48.6'-09.2' 81.5°	68°56.1'-06.4' 84.1°	69°01.0'-03.5' 86.7°	69°03.1'-00.6' 89.3°	69°02.5'+02.3' 91.9°	68°59.2'+05.3' 94.5°	4								
5	68°26.3'-14.5' 76.3°	68°39.3'-11.8' 78.8°	68°49.7'-09.1' 81.3°	68°57.5'-06.2' 83.9°	69°02.5'-03.3' 86.5°	69°04.8'-00.4' 89.1°	69°04.4'+02.5' 91.7°	5								
6	68°11.8'-17.0' 73.7°	68°27.5'-14.4' 76.1°	68°40.7'-11.7' 78.6°	68°51.2'-08.9' 81.1°	68°59.2'-06.0' 83.7°	69°04.4'-03.1' 86.3°	69°07.0'-00.2' 88.9°	6								
7	67°54.9'-19.3' 71.1°	68°13.1'-16.8' 73.5°	68°29.0'-14.2' 75.9°	68°42.4'-11.5' 78.4°	68°53.2'-08.7' 80.9°	69°01.3'-05.8' 83.5°	69°06.8'-03.0' 86.1°	7								
8	67°35.5'-21.6' 68.6°	67°56.3'-19.2' 70.9°	68°14.8'-16.6' 73.2°	68°30.9'-14.0' 75.7°	68°44.5'-11.3' 78.2°	68°55.5'-08.5' 80.7°	69°03.8'-05.7' 83.3°	8								
9	67°14.0'-23.7' 66.2°	67°37.2'-21.4' 68.4°	67°58.2'-19.0' 70.7°	68°16.9'-16.5' 73.0°	68°33.1'-13.9' 75.5°	68°46.9'-11.2' 78.0°	68°58.1'-08.4' 80.5°	9								
10	66°50.3'-25.7' 63.8°	67°15.8'-23.6' 65.9°	67°39.2'-21.3' 68.2°	68°00.4'-18.8' 70.5°	68°19.3'-16.3' 72.8°	68°35.8'-13.7' 75.3°	68°49.8'-11.0' 77.8°	10								
11	66°24.6'-27.7' 61.5°	66°52.2'-25.6' 63.6°	67°17.9'-23.4' 65.7°	67°41.5'-21.1' 67.9°	68°03.0'-18.7' 70.2°	68°22.1'-16.2' 72.6°	68°38.8'-13.6' 75.0°	11								
12	65°56.9'-29.5' 59.3°	66°26.6'-27.5' 61.3°	66°54.5'-25.5' 63.4°	67°20.4'-23.3' 65.5°	67°44.3'-21.0' 67.7°	68°05.9'-18.6' 70.0°	68°25.2'-16.0' 72.4°	12								
13	65°27.4'-31.2' 57.2°	65°59.1'-29.3' 59.1°	66°29.0'-27.4' 61.1°	66°57.1'-25.3' 63.1°	67°23.3'-23.2' 65.3°	67°47.3'-20.9' 67.5°	68°09.2'-18.4' 69.8°	13								
14	64°56.3'-32.8' 55.2°	65°29.8'-31.1' 57.0°	66°01.6'-29.2' 58.9°	66°31.8'-27.3' 60.8°	67°00.1'-25.2' 62.9°	67°26.5'-23.0' 65.0°	67°50.8'-20.7' 67.2°	14								
15	64°23.5'-34.3' 53.2°	64°58.7'-32.7' 54.9°	65°32.4'-31.0' 56.7°	66°04.5'-29.1' 58.6°	66°34.9'-27.2' 60.6°	67°03.4'-25.1' 62.6°	67°30.0'-22.9' 64.8°	15								
16	63°49.2'-35.7' 51.3°	64°26.0'-34.2' 53.0°	65°01.5'-32.6' 54.7°	65°35.4'-30.9' 56.5°	66°07.7'-29.0' 58.3°	66°38.3'-27.1' 60.3°	67°07.1'-25.0' 62.4°	16								
17	63°13.5'-37.0' 49.5°	63°51.9'-35.6' 51.1°	64°28.9'-34.1' 52.7°	65°04.5'-32.5' 54.4°	65°38.7'-30.8' 56.2°	66°11.3'-28.9' 58.1°	66°42.1'-27.0' 60.1°	17								
18	62°36.5'-38.2' 47.8°	63°16.3'-36.9' 49.3°	63°54.8'-35.5' 50.8°	64°32.1'-34.0' 52.4°	65°07.9'-32.4' 54.1°	65°42.3'-30.7' 55.9°	66°15.1'-28.8' 57.8°	18								
19	61°58.3'-39.4' 46.1°	62°39.4'-38.1' 47.5°	63°19.3'-36.8' 49.0°	63°58.1'-35.4' 50.5°	64°35.5'-33.9' 52.2°	65°11.6'-32.3' 53.9°	65°46.3'-30.6' 55.7°	19								
20	61°18.9'-40.4' 44.6°	62°01.2'-39.3' 45.9°	62°42.5'-38.1' 47.3°	63°22.6'-36.8' 48.7°	64°01.6'-35.4' 50.3°	64°39.3'-33.9' 51.9°	65°15.7'-32.3' 53.6°	20								
21	60°38.5'-41.4' 43.0°	61°21.9'-40.4' 44.3°	62°04.4'-39.2' 45.6°	62°45.9'-38.0' 47.0°	63°26.3'-36.7' 48.4°	64°05.5'-35.3' 50.0°	64°43.4'-33.8' 51.6°	21								
22	59°57.1'-42.4' 41.6°	60°41.6'-41.4' 42.8°	61°25.2'-40.3' 44.0°	62°07.9'-39.2' 45.3°	62°49.6'-37.9' 46.7°	63°30.2'-36.6' 48.1°	64°09.6'-35.2' 49.7°	22								
23	59°14.7'-43.2' 40.2°	60°00.2'-42.3' 41.3°	60°44.9'-41.3' 42.5°	61°28.7'-40.2' 43.7°	62°11.6'-39.1' 45.0°	62°53.5'-37.9' 46.4°	63°34.4'-36.6' 47.8°	23								
Dec°	Hc°	d'	Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Dec°
	0			1				2				3				4

21° 339° LHA Latitude SAME as Declination 21° 339° LHA
South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

22° 338° LHA

Latitude SAME as Declination

22° 338° LHA

Table with columns: Dec°, 0, 1, 2, 3, 4, 5, 6, Dec°. Each column contains Hc°, d', Z° values for declinations 0 to 23.

22° 338° LHA

Latitude SAME as Declination

22° 338° LHA

South Lat. LHA > 180° .. Zn = 180-Z LHA < 180° .. Zn= 180+Z

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

23° 337° LHA

Latitude SAME as Declination

23° 337° LHA

Table with columns: Dec°, 0, 1, 2, 3, 4, 5, 6, Dec°. Each column contains Hc°, d', Z° values for declinations 0 to 23.

23° 337° LHA

Latitude SAME as Declination

23° 337° LHA

South Lat. LHA > 180° .. Zn = 180-Z LHA < 180° .. Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . . Zn = 360-Z

24° 336° LHA

Latitude SAME as Declination

24° 336° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	66°00.0'-01.2'	90.0°	65°58.8'+01.4'	92.2°	65°55.3'+04.0'	94.5°	65°49.5'+06.5'	96.7°	65°41.3'+09.0'	98.9°	65°30.9'+11.5'	101.1°	65°18.3'+13.9'	103.2°	0							
1	65°58.8'-03.5'	87.5°	66°00.2'-01.0'	89.8°	65°59.3'+01.6'	92.0°	65°56.0'+04.2'	94.3°	65°50.3'+06.7'	96.5°	65°42.4'+09.3'	98.7°	65°32.2'+11.7'	100.9°	1							
2	65°55.3'-05.8'	85.1°	65°59.3'-03.3'	87.3°	66°00.9'-00.7'	89.6°	66°00.2'+01.8'	91.8°	65°57.1'+04.4'	94.1°	65°51.7'+07.0'	96.3°	65°43.9'+09.5'	98.5°	2							
3	65°49.5'-08.1'	82.7°	65°56.0'-05.6'	84.9°	66°00.2'-03.1'	87.1°	66°02.0'-00.5'	89.4°	66°01.5'+02.1'	91.6°	65°58.6'+04.6'	93.9°	65°53.4'+07.2'	96.1°	3							
4	65°41.3'-10.4'	80.2°	65°50.3'-07.9'	82.4°	65°57.1'-05.4'	84.7°	66°01.5'-02.9'	86.9°	66°03.6'-00.3'	89.2°	66°03.3'+02.3'	91.4°	66°00.6'+04.9'	93.7°	4							
5	65°30.9'-12.6'	77.9°	65°42.4'-10.2'	80.0°	65°51.7'-07.7'	82.2°	65°58.6'-05.2'	84.4°	66°03.3'-02.6'	86.7°	66°05.6'-00.1'	88.9°	66°05.5'+02.5'	91.2°	5							
6	65°18.3'-14.8'	75.5°	65°32.2'-12.4'	77.6°	65°43.9'-10.0'	79.8°	65°53.4'-07.5'	82.0°	66°00.6'-05.0'	84.2°	66°05.5'-02.4'	86.5°	66°08.0'+00.1'	88.7°	6							
7	65°03.5'-16.9'	73.2°	65°19.8'-14.6'	75.3°	65°33.9'-12.2'	77.4°	65°45.9'-09.8'	79.6°	65°55.6'-07.3'	81.8°	66°03.1'-04.8'	84.0°	66°08.2'-02.2'	86.3°	7							
8	64°46.6'-18.9'	70.9°	65°05.2'-16.7'	73.0°	65°21.7'-14.4'	75.1°	65°36.1'-12.0'	77.2°	65°48.3'-09.6'	79.4°	65°58.3'-07.1'	81.6°	66°05.9'-04.6'	83.8°	8							
9	64°27.7'-20.9'	68.7°	64°48.5'-18.7'	70.7°	65°07.3'-16.5'	72.7°	65°24.1'-14.2'	74.8°	65°38.7'-11.8'	77.0°	65°51.2'-09.4'	79.1°	66°01.4'-06.9'	81.3°	9							
10	64°06.9'-22.7'	66.6°	64°29.8'-20.7'	68.5°	64°50.8'-18.5'	70.5°	65°09.9'-16.3'	72.5°	65°26.9'-14.0'	74.6°	65°41.8'-11.6'	76.7°	65°54.5'-09.2'	78.9°	10							
11	63°44.1'-24.5'	64.5°	64°09.1'-22.6'	66.3°	64°32.3'-20.5'	68.2°	64°53.6'-18.4'	70.2°	65°12.9'-16.1'	72.3°	65°30.1'-13.8'	74.3°	65°45.3'-11.5'	76.5°	11							
12	63°19.6'-26.2'	62.4°	63°46.6'-24.4'	64.2°	64°11.8'-22.4'	66.1°	64°35.2'-20.3'	68.0°	64°56.8'-18.2'	70.0°	65°16.3'-16.0'	72.0°	65°33.8'-13.7'	74.1°	12							
13	62°53.4'-27.9'	60.4°	63°22.2'-26.1'	62.2°	63°49.4'-24.2'	63.9°	64°14.9'-22.2'	65.8°	64°38.6'-20.2'	67.7°	65°00.3'-18.0'	69.7°	65°20.1'-15.8'	71.8°	13							
14	62°25.5'-29.4'	58.5°	62°56.1'-27.7'	60.2°	63°25.2'-25.9'	61.9°	63°52.7'-24.1'	63.7°	64°18.4'-22.1'	65.5°	64°42.3'-20.0'	67.5°	65°04.3'-17.9'	69.5°	14							
15	61°56.1'-30.9'	56.6°	62°28.4'-29.3'	58.2°	62°59.3'-27.6'	59.9°	63°28.6'-25.8'	61.6°	63°56.3'-23.9'	63.4°	64°22.3'-21.9'	65.3°	64°46.5'-19.9'	67.2°	15							
16	61°25.2'-32.3'	54.8°	61°59.2'-30.7'	56.3°	62°31.7'-29.1'	57.9°	63°02.8'-27.4'	59.6°	63°32.4'-25.7'	61.3°	64°00.3'-23.8'	63.1°	64°26.6'-21.8'	65.0°	16							
17	60°53.0'-33.6'	53.1°	61°28.4'-32.1'	54.5°	62°02.6'-30.6'	56.1°	62°35.4'-29.0'	57.7°	63°06.7'-27.3'	59.3°	63°36.6'-25.5'	61.1°	64°04.8'-23.6'	62.9°	17							
18	60°19.4'-34.8'	51.4°	60°56.3'-33.5'	52.8°	61°32.0'-32.0'	54.2°	62°06.4'-30.5'	55.8°	62°39.4'-28.9'	57.4°	63°11.0'-27.2'	59.0°	63°41.1'-25.4'	60.8°	18							
19	59°44.6'-36.0'	49.8°	60°22.8'-34.7'	51.1°	61°00.0'-33.4'	52.5°	61°35.9'-31.9'	54.0°	62°10.5'-30.4'	55.5°	62°43.8'-28.8'	57.1°	63°15.7'-27.1'	58.7°	19							
20	59°08.6'-37.1'	48.2°	59°48.1'-35.9'	49.5°	60°26.6'-34.6'	50.8°	61°03.9'-33.3'	52.2°	61°40.1'-31.8'	53.6°	62°15.0'-30.3'	55.2°	62°48.6'-28.7'	56.8°	20							
21	58°31.5'-38.1'	46.7°	59°12.2'-37.0'	47.9°	59°52.0'-35.8'	49.1°	60°30.7'-34.5'	50.5°	61°08.3'-33.2'	51.9°	61°44.8'-31.7'	53.3°	62°19.9'-30.2'	54.9°	21							
22	57°53.4'-39.1'	45.2°	58°35.2'-38.0'	46.3°	59°16.2'-36.9'	47.6°	59°56.2'-35.7'	48.8°	60°35.2'-34.4'	50.2°	61°13.0'-33.1'	51.6°	61°49.7'-31.6'	53.0°	22							
23	57°14.3'-40.0'	43.8°	57°57.2'-39.0'	44.9°	58°39.3'-38.0'	46.0°	59°20.5'-36.8'	47.2°	60°00.7'-35.6'	48.5°	60°40.0'-34.4'	49.8°	61°18.1'-33.0'	51.2°	23							

24° 336° LHA

Latitude SAME as Declination

24° 336° LHA

South Lat. LHA > 180° . . . Zn = 180-Z LHA < 180° . . . Zn = 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . . Zn = 360-Z

25° 335° LHA

Latitude SAME as Declination

25° 335° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	65°00.0'-01.1'	90.0°	64°58.9'+01.4'	92.1°	64°55.5'+03.8'	94.3°	64°49.9'+06.3'	96.4°	64°42.1'+08.7'	98.5°	64°32.2'+11.1'	100.6°	64°20.1'+13.4'	102.6°	0							
1	64°58.9'-03.4'	87.6°	65°00.2'-00.9'	89.8°	64°59.3'+01.6'	91.9°	64°56.2'+04.1'	94.1°	64°50.9'+06.5'	96.2°	64°43.3'+08.9'	98.3°	64°33.6'+11.3'	100.4°	1							
2	64°55.5'-05.6'	85.3°	64°59.3'-03.1'	87.4°	65°00.9'-00.7'	89.6°	65°00.3'+01.8'	91.7°	64°57.4'+04.3'	93.8°	64°52.2'+06.8'	96.0°	64°44.9'+09.2'	98.1°	2							
3	64°49.9'-07.8'	82.9°	64°56.2'-05.4'	85.1°	65°00.3'-02.9'	87.2°	65°02.1'-00.4'	89.3°	65°01.7'+02.1'	91.5°	64°59.0'+04.5'	93.6°	64°54.1'+07.0'	95.8°	3							
4	64°42.1'-10.0'	80.6°	64°50.9'-07.6'	82.7°	64°57.4'-05.1'	84.8°	65°01.7'-02.7'	87.0°	65°03.7'-00.2'	89.1°	65°03.5'+02.3'	91.3°	65°01.1'+04.8'	93.4°	4							
5	64°32.2'-12.1'	78.3°	64°43.3'-09.7'	80.4°	64°52.2'-07.3'	82.5°	64°59.0'-04.9'	84.6°	65°03.5'-02.4'	86.7°	65°05.8'+00.0'	88.9°	65°05.8'+02.5'	91.0°	5							
6	64°20.1'-14.2'	76.0°	64°33.6'-11.9'	78.1°	64°44.9'-09.5'	80.1°	64°54.1'-07.1'	82.2°	65°01.1'-04.7'	84.4°	65°05.8'-02.2'	86.5°	65°08.3'+00.3'	88.7°	6							
7	64°06.0'-16.2'	73.8°	64°21.7'-13.9'	75.8°	64°35.4'-11.7'	77.8°	64°47.0'-09.3'	79.9°	64°56.4'-06.9'	82.0°	65°03.6'-04.5'	84.1°	65°08.6'-02.0'	86.3°	7							
8	63°49.8'-18.1'	71.6°	64°07.7'-16.0'	73.6°	64°23.7'-13.7'	75.6°	64°37.7'-11.4'	77.6°	64°49.5'-09.1'	79.7°	64°59.1'-06.7'	81.8°	65°06.6'-04.2'	83.9°	8							
9	63°31.7'-20.0'	69.5°	63°51.8'-17.9'	71.4°	64°10.0'-15.8'	73.3°	64°26.2'-13.5'	75.3°	64°40.4'-11.2'	77.4°	64°52.5'-08.9'	79.4°	65°02.4'-06.5'	81.6°	9							
10	63°11.6'-21.8'	67.4°	63°33.9'-19.8'	69.2°	63°54.2'-17.7'	71.1°	64°12.7'-15.6'	73.1°	64°29.1'-13.3'	75.1°	64°43.6'-11.0'	77.1°	64°55.9'-08.7'	79.2°	10							
11	62°49.8'-23.6'	65.3°	63°14.0'-21.7'	67.1°	63°36.5'-19.6'	69.0°	63°57.1'-17.6'	70.9°	64°15.8'-15.4'	72.8°	64°32.5'-13.2'	74.8°	64°47.2'-10.8'	76.9°	11							
12	62°26.2'-25.3'	63.3°	62°52.4'-23.4'	65.0°	63°16.8'-21.5'	66.8°	63°39.5'-19.5'	68.7°	64°00.4'-17.4'	70.6°	64°19.4'-15.2'	72.6°	64°36.4'-13.0'	74.6°	12							
13	62°01.0'-26.9'	61.4°	62°29.0'-25.1'	63.0°	62°55.4'-23.2'	64.8°	63°20.1'-21.3'	66.6°	63°43.0'-19.3'	68.4°	64°04.2'-17.2'	70.3°	64°23.4'-15.0'	72.3°	13							
14	61°34.1'-28.4'	59.5°	62°03.9'-26.7'	61.1°	62°32.1'-24.9'	62.8°	62°58.8'-23.1'	64.5°	63°23.7'-21.2'	66.3°	63°47.0'-19.1'	68.2°	64°08.4'-17.0'	70.1°	14							
15	61°05.7'-29.8'	57.6°	61°37.2'-28.2'	59.2°	62°07.2'-26.5'	60.8°	62°35.7'-24.8'	62.5°	63°02.6'-22.9'	64.2°	63°27.8'-21.0'	66.0°	63°51.3'-19.0'	67.9°	15							
16	60°35.9'-31.2'	55.8°	61°08.9'-29.7'	57.3°	61°40.6'-28.1'	58.9°	62°10.9'-26.4'	60.5°	62°39.7'-24.6'	62.2°	63°06.8'-22.8'	63.9°	63°32.3'-20.8'	65.7°	16							
17	60°04.7'-32.5'	54.1°	60°39.2'-31.1'	55.6°	61°12.5'-29.6'	57.1°	61°44.5'-28.0'	58.6°	62°15.0'-26.3'	60.2°	62°44.0'-24.5'	61.9°	63°11.5'-22.6'	63.7°	17							
18	59°32.2'-33.8'	52.4°	60°08.2'-32.4'	53.8°	60°43.0'-30.9'	55.3°	61°16.5'-29.4'	56.8°	61°48.7'-27.8'	58.3°	62°19.5'-26.1'	59.9°	62°48.8'-24.4'	61.6°	18							
19	58°58.4'-34.9'	50.8°	59°35.8'-33.6'	52.1°	60°12.0'-32.3'	53.5°	60°47.1'-30.8'	55.0°	61°20.9'-29.3'	56.4°	61°53.4'-27.7'	58.0°	62°24.5'-26.0'	59.6°	19							
20	58°23.5'-36.0'	49.3°	59°02.2'-34.8'	50.5°	59°39.8'-33.5'	51.8°	60°16.3'-32.2'	53.2°	60°51.6'-30.7'	54.6°	61°25.7'-29.2'	56.1°	61°58.5'-27.6'	57.7°	20							
21	57°47.5'-37.1'	47.8°	58°27.3'-35.9'	49.0°	59°06.3'-34.7'	50.2°	59°44.1'-33.4'	51.5°	60°20.9'-32.1'	52.9°	60°56.5'-30.6'	54.3°	61°30.9'-29.1'	55.8°	21							
22	57°10.4'-38.1'	46.3°	57°51.4'-37.0'	47.4°	58°31.5'-35.8'	48.6°	59°10.7'-34.6'	49.9°	59°48.8'-33.3'	51.2°	60°25.9'-32.0'	52.6°	61°01.8'-30.5'	54.0°	22							
23	56°32.3'-39.0'	44.9°	57°14.5'-38.0'	46.0°	57°55.7'-36.9'	47.1°	58°36.1'-35.7'	48.3°	59°15.5'-34.5'	49.6°	59°53.9'-33.2'	50.9°	60°31.2'-31.9'	52.2°	23							

25° 335° LHA

Latitude SAME as Declination

25° 335° LHA

South Lat. LHA > 180° . . . Zn = 180-Z LHA < 180° . . . Zn = 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

26° 334° LHA

Latitude SAME as Declination

26° 334° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	64°00.0'-01.1'	90.0°		63°58.9'+01.3'	92.0°		63°55.7'+03.7'	94.1°		63°50.4'+06.1'	96.1°		63°42.9'+08.4'	98.1°		63°33.4'+10.7'	100.1°		63°21.8'+13.0'	102.1°	0	
1	63°58.9'-03.2'	87.7°		64°00.2'-00.8'	89.8°		63°59.4'+01.6'	91.8°		63°56.4'+03.9'	93.9°		63°51.3'+06.3'	95.9°		63°44.1'+08.7'	97.9°		63°34.8'+11.0'	99.9°	1	
2	63°55.7'-05.3'	85.4°		63°59.4'-03.0'	87.5°		64°01.0'-00.6'	89.5°		64°00.4'+01.8'	91.6°		63°57.6'+04.2'	93.6°		63°52.8'+06.6'	95.7°		63°45.8'+08.9'	97.7°	2	
3	63°50.4'-07.5'	83.2°		63°56.4'-05.1'	85.2°		64°00.4'-02.7'	87.3°		64°02.2'-00.4'	89.3°		64°01.8'+02.0'	91.4°		63°59.3'+04.4'	93.4°		63°54.7'+06.8'	95.5°	3	
4	63°42.9'-09.5'	80.9°		63°51.3'-07.2'	82.9°		63°57.6'-04.9'	85.0°		64°01.8'-02.5'	87.0°		64°03.9'-00.1'	89.1°		64°03.8'+02.3'	91.1°		64°01.5'+04.7'	93.2°	4	
5	63°33.4'-11.6'	78.7°		63°44.1'-09.3'	80.7°		63°52.8'-07.0'	82.7°		63°59.3'-04.6'	84.7°		64°03.8'-02.3'	86.8°		64°06.0'+00.1'	88.8°		64°06.2'+02.5'	90.9°	5	
6	63°21.8'-13.6'	76.5°		63°34.8'-11.3'	78.5°		63°45.8'-09.1'	80.5°		63°54.7'-06.8'	82.5°		64°01.5'-04.4'	84.5°		64°06.2'-02.0'	86.6°		64°08.7'+00.4'	88.6°	6	
7	63°08.3'-15.5'	74.4°		63°23.5'-13.3'	76.3°		63°36.7'-11.1'	78.2°		63°47.9'-08.8'	80.2°		63°57.1'-06.5'	82.2°		64°04.1'-04.2'	84.3°		64°09.1'-01.8'	86.3°	7	
8	62°52.7'-17.4'	72.2°		63°10.1'-15.3'	74.1°		63°25.6'-13.1'	76.0°		63°39.1'-10.9'	78.0°		63°50.6'-08.6'	80.0°		64°00.0'-06.3'	82.0°		64°07.3'-03.9'	84.0°	8	
9	62°35.4'-19.2'	70.1°		62°54.8'-17.2'	72.0°		63°12.5'-15.1'	73.9°		63°28.2'-12.9'	75.8°		63°41.9'-10.7'	77.7°		63°53.7'-08.4'	79.7°		64°03.3'-06.1'	81.7°	9	
10	62°16.1'-21.0'	68.1°		62°37.6'-19.0'	69.9°		62°57.4'-17.0'	71.7°		63°15.3'-14.9'	73.6°		63°31.2'-12.7'	75.5°		63°45.3'-10.5'	77.5°		63°57.2'-08.2'	79.5°	10	
11	61°55.1'-22.7'	66.1°		62°18.6'-20.8'	67.8°		62°40.4'-18.8'	69.6°		63°00.4'-16.8'	71.5°		63°18.5'-14.7'	73.3°		63°34.8'-12.5'	75.3°		63°49.0'-10.3'	77.2°	11	
12	61°32.4'-24.3'	64.1°		61°57.8'-22.5'	65.8°		62°21.6'-20.6'	67.6°		62°43.6'-18.6'	69.3°		63°03.9'-16.6'	71.2°		63°22.3'-14.5'	73.1°		63°38.8'-12.3'	75.0°	12	
13	61°08.1'-25.9'	62.2°		61°35.3'-24.2'	63.9°		62°00.9'-22.3'	65.5°		62°24.9'-20.4'	67.3°		62°47.2'-18.5'	69.1°		63°07.8'-16.4'	70.9°		63°26.5'-14.3'	72.8°	13	
14	60°42.2'-27.4'	60.4°		61°11.1'-25.7'	61.9°		61°38.6'-24.0'	63.6°		62°04.5'-22.2'	65.3°		62°28.8'-20.3'	67.0°		62°51.4'-18.3'	68.8°		63°12.2'-16.2'	70.6°	14	
15	60°14.8'-28.8'	58.6°		60°45.4'-27.2'	60.1°		61°14.6'-25.6'	61.7°		61°42.3'-23.8'	63.3°		62°08.5'-22.0'	65.0°		62°33.1'-20.1'	66.7°		62°55.9'-18.1'	68.5°	15	
16	59°46.0'-30.2'	56.8°		60°18.2'-28.7'	58.3°		60°49.0'-27.1'	59.8°		61°18.5'-25.4'	61.4°		61°46.5'-23.7'	63.0°		62°13.0'-21.8'	64.7°		62°37.8'-19.9'	66.4°	16	
17	59°15.8'-31.5'	55.1°		59°49.5'-30.0'	56.5°		60°22.0'-28.5'	58.0°		60°53.1'-26.9'	59.5°		61°22.8'-25.3'	61.1°		61°51.1'-23.5'	62.7°		62°17.9'-21.7'	64.4°	17	
18	58°44.3'-32.7'	53.5°		59°19.4'-31.3'	54.8°		59°53.4'-29.9'	56.2°		60°26.2'-28.4'	57.7°		60°57.6'-26.8'	59.2°		61°27.6'-25.1'	60.8°		61°56.2'-23.4'	62.4°	18	
19	58°11.6'-33.9'	51.9°		58°48.1'-32.6'	53.1°		59°23.5'-31.2'	54.5°		59°57.8'-29.8'	55.9°		60°30.8'-28.3'	57.4°		61°02.5'-26.7'	58.9°		61°32.8'-25.0'	60.5°	19	
20	57°37.7'-35.0'	50.3°		58°15.5'-33.8'	51.5°		58°52.3'-32.5'	52.8°		59°28.0'-31.1'	54.2°		60°02.5'-29.7'	55.6°		60°35.8'-28.1'	57.0°		61°07.8'-26.5'	58.6°	20	
21	57°02.7'-36.0'	48.8°		57°41.8'-34.9'	50.0°		58°19.8'-33.6'	51.2°		58°56.9'-32.3'	52.5°		59°32.9'-31.0'	53.9°		60°07.7'-29.5'	55.3°		60°41.2'-28.0'	56.7°	21	
22	56°26.6'-37.0'	47.3°		57°06.9'-35.9'	48.5°		57°46.2'-34.8'	49.7°		58°24.5'-33.5'	50.9°		59°01.9'-32.2'	52.2°		59°38.1'-30.9'	53.5°		60°13.2'-29.4'	54.9°	22	
23	55°49.6'-38.0'	45.9°		56°30.9'-36.9'	47.0°		57°11.4'-35.8'	48.1°		57°51.0'-34.7'	49.3°		58°29.6'-33.4'	50.5°		59°07.2'-32.1'	51.8°		59°43.8'-30.8'	53.2°	23	
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

26° 334° LHA

Latitude SAME as Declination

26° 334° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

27° 333° LHA

Latitude SAME as Declination

27° 333° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	63°00.0'-01.0'	90.0°		62°59.0'+01.3'	92.0°		62°55.9'+03.6'	93.9°		62°50.8'+05.9'	95.9°		62°43.6'+08.1'	97.8°		62°34.5'+10.4'	99.7°		62°23.4'+12.6'	101.6°	0	
1	62°59.0'-03.1'	87.8°		63°00.3'-00.8'	89.8°		62°59.5'+01.5'	91.7°		62°56.6'+03.8'	93.7°		62°51.8'+06.1'	95.6°		62°44.9'+08.4'	97.6°		62°36.0'+10.6'	99.5°	1	
2	62°55.9'-05.1'	85.6°		62°59.5'-02.8'	87.6°		63°01.0'-00.5'	89.5°		63°00.5'+01.8'	91.5°		62°57.9'+04.1'	93.4°		62°53.3'+06.4'	95.4°		62°46.6'+08.6'	97.3°	2	
3	62°50.8'-07.1'	83.4°		62°56.6'-04.9'	85.4°		63°00.5'-02.6'	87.3°		63°02.3'-00.3'	89.3°		63°02.0'+02.0'	91.2°		62°59.7'+04.3'	93.2°		62°55.3'+06.6'	95.2°	3	
4	62°43.6'-09.1'	81.2°		62°51.8'-06.9'	83.2°		62°57.9'-04.6'	85.1°		63°02.0'-02.3'	87.1°		63°04.0'00.0'	89.0°		63°04.0'+02.3'	91.0°		63°01.9'+04.6'	93.0°	4	
5	62°34.5'-11.1'	79.1°		62°44.9'-08.9'	81.0°		62°53.3'-06.7'	82.9°		62°59.7'-06.4'	84.9°		63°04.0'-02.1'	86.8°		63°06.3'+00.2'	88.8°		63°06.5'+02.5'	90.8°	5	
6	62°23.4'-13.0'	77.0°		62°36.0'-10.9'	78.8°		62°46.6'-08.7'	80.7°		62°55.3'-06.4'	82.7°		63°01.9'-04.1'	84.6°		63°06.5'-01.8'	86.6°		63°09.0'+00.5'	88.6°	6	
7	62°10.4'-14.9'	74.9°		62°25.1'-12.8'	76.7°		62°38.0'-10.6'	78.6°		62°48.9'-08.4'	80.5°		62°57.8'-06.2'	82.4°		63°04.7'-03.9'	84.4°		63°09.5'-01.6'	86.3°	7	
8	61°55.5'-16.7'	72.8°		62°12.4'-14.7'	74.6°		62°27.4'-12.6'	76.5°		62°40.4'-10.4'	78.3°		62°51.6'-08.2'	80.2°		63°00.8'-05.9'	82.2°		63°07.9'-03.7'	84.1°	8	
9	61°38.8'-18.5'	70.8°		61°57.7'-16.5'	72.5°		62°14.8'-14.4'	74.3°		62°30.1'-12.3'	76.2°		62°43.4'-10.2'	78.1°		62°54.8'-08.0'	80.0°		63°04.3'-05.7'	81.9°	9	
10	61°20.3'-20.2'	68.8°		61°41.2'-18.3'	70.5°		62°00.4'-16.3'	72.3°		62°17.7'-14.2'	74.1°		62°33.2'-12.1'	75.9°		62°46.9'-09.9'	77.8°		62°58.5'-07.7'	79.7°	10	
11	61°00.1'-21.9'	66.8°		61°22.9'-20.0'	68.5°		61°44.1'-18.1'	70.2°		62°03.5'-16.1'	72.0°		62°21.1'-14.0'	73.8°		62°36.9'-11.9'	75.7°		62°50.8'-09.7'	77.6°	11	
12	60°38.3'-23.5'	64.9°		61°02.9'-21.7'	66.5°		61°26.0'-19.8'	68.2°		61°47.4'-17.9'	70.0°		62°07.1'-15.9'	71.7°		62°25.0'-13.8'	73.5°		62°41.1'-11.7'	75.4°	12	
13	60°14.8'-25.0'	63.0°		60°41.3'-23.3'	64.6°		61°06.2'-21.5'	66.3°		61°29.5'-19.6'	67.9°		61°51.2'-17.7'	69.7°		62°11.2'-15.7'	71.5°		62°29.4'-13.6'	73.3°	13	
14	59°49.8'-26.5'	61.2°		60°18.0'-24.8'	62.8°		60°44.7'-23.1'	64.3°		61°09.9'-21.3'	66.0°		61°33.6'-19.4'	67.7°		61°55.5'-17.5'	69.4°		62°15.8'-15.5'	71.2°	14	
15	59°23.4'-27.9'	59.5°		59°53.2'-26.3'	60.9°		60°21.6'-24.6'	62.5°		60°48.6'-22.9'	64.0°		61°14.1'-21.1'	65.7°		61°38.0'-19.2'	67.4°		62°00.3'-17.3'	69.1°	15	
16	58°55.5'-29.2'	57.7°		59°26.9'-27.7'	59.2°		59°57.0'-26.1'	60.6°		60°25.7'-24.5'	62.2°		60°53.0'-22.7'	63.7°		61°18.8'-20.9'	65.4°		61°43.0'-19.1'	67.1°	16	
17	58°26.3'-30.5'	56.0°		58°59.2'-29.1'	57.4°		59°30.9'-27.5'	58.8°		60°01.3'-26.0'	60.3°		60°30.3'-24.3'	61.9°		60°57.8'-22.6'	63.4°		61°23.9'-20.8'	65.1°	17	
18	57°55.8'-31.7'	54.4°		58°30.1'-30.3'	55.7°		59°03.3'-28.9'	57.1°		59°35.3'-27.4'	58.5°		60°05.9'-25.8'	60.0°		60°35.2'-24.2'	61.5°		61°03.1'-22.4'	63.1°	18	
19	57°24.1'-32.9'	52.8°		57°59.8'-31.6'	54.1°		58°34.4'-30.2'	55.4°		59°07.9'-28.8'	56.8°		59°40.1'-27.3'	58.2°		60°11.1'-25.7'	59.7°		60°40.7'-24.0'	61.2°	19	
20	56°51.2'-34.0'	51.3°		57°28.2'-32.7'	52.5°		58°04.2'-31.4'	53.8°		58°39.1'-30.1'	55.1°		59°12.9'-28.6'	56.5°		59°45.4'-27.1'	57.9°		60°16.6'-25.5'	59.4°	20	
21	56°17.2'-35.0'	49.8°		56°55.5'-33.9'	51.0°		57°32.8'-32.6'	52.2°		58°09.1'-31.3'	53.4°		58°44.2'-29.9'	54.8°		59°18.3'-28.5'	56.1°		59°51.1'-27.0'	57.6°	21	
22	55°42.2'-36.0'	48.3°		56°21.6'-34.9'	49.5°		57°00.2'-33.7'	50.6°		57°37.7'-32.5'	51.8°											

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

28° 332° LHA

Latitude SAME as Declination

28° 332° LHA

Table with 12 columns (Dec, 0-6, Dec) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is structured as a grid with a central section for declinations 0-6 and a final column for declination values.

28° 332° LHA

Latitude SAME as Declination

28° 332° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

29° 331° LHA

Latitude SAME as Declination

29° 331° LHA

Table with 12 columns (Dec, 0-6, Dec) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is structured as a grid with a central section for declinations 0-6 and a final column for declination values.

29° 331° LHA

Latitude SAME as Declination

29° 331° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

30° 330° LHA

Latitude SAME as Declination

30° 330° LHA

Table with 12 columns (Dec, 0-6, Dec) and 36 rows (0-23). Each cell contains three values for Hc, d, and Z in degrees and minutes. The table is divided into two sections: North Lat. and South Lat., each with its own title and Zn calculation rule.

30° 330° LHA

Latitude SAME as Declination

30° 330° LHA

South Lat. LHA > 180° .. Zn = 180-Z LHA < 180° .. Zn= 180+Z

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

31° 329° LHA

Latitude SAME as Declination

31° 329° LHA

Table with 12 columns (Dec, 0-6, Dec) and 36 rows (0-23). Each cell contains three values for Hc, d, and Z in degrees and minutes. The table is divided into two sections: North Lat. and South Lat., each with its own title and Zn calculation rule.

31° 329° LHA

Latitude SAME as Declination

31° 329° LHA

South Lat. LHA > 180° .. Zn = 180-Z LHA < 180° .. Zn= 180+Z

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn = 360-Z

32° 328° LHA

Latitude SAME as Declination

32° 328° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	58°00.0'	-00.8'	90.0°	57°59.2'	+01.1'	91.6°	57°56.7'	+03.1'	93.2°	57°52.5'	+05.1'	94.8°	57°46.6'	+07.0'	96.4°	57°39.2'	+09.0'	97.9°	57°30.1'	+10.9'	99.5°	0
1	57°59.2'	-02.5'	88.1°	58°00.3'	-00.5'	89.7°	57°59.8'	+01.4'	91.3°	57°57.6'	+03.4'	92.9°	57°53.7'	+05.4'	94.5°	57°48.1'	+07.3'	96.1°	57°40.9'	+09.3'	97.7°	1
2	57°56.7'	-04.2'	86.2°	57°59.8'	-02.2'	87.8°	58°01.2'	-00.2'	89.4°	58°01.0'	+01.7'	91.0°	57°59.0'	+03.7'	92.6°	57°55.5'	+05.7'	94.2°	57°50.2'	+07.6'	95.8°	2
3	57°52.5'	-05.8'	84.4°	57°57.6'	-03.9'	85.9°	58°01.0'	-01.9'	87.5°	58°02.7'	+00.1'	89.1°	58°02.8'	+02.0'	90.7°	58°01.1'	+04.0'	92.3°	57°57.9'	+06.0'	93.9°	3
4	57°46.6'	-07.5'	82.5°	57°53.7'	-05.5'	84.1°	57°59.0'	-03.6'	85.7°	58°02.8'	-01.6'	87.3°	58°04.8'	+00.4'	88.9°	58°05.2'	+02.3'	90.5°	58°03.8'	+04.3'	92.1°	4
5	57°39.2'	-09.1'	80.6°	57°48.1'	-07.2'	82.2°	57°55.5'	-05.2'	83.8°	58°01.1'	-03.3'	85.4°	58°05.2'	-01.3'	87.0°	58°07.5'	+00.7'	88.6°	58°08.2'	+02.6'	90.2°	5
6	57°30.1'	-10.7'	78.8°	57°40.9'	-08.8'	80.3°	57°50.2'	-06.9'	81.9°	57°57.9'	-05.0'	83.5°	58°03.8'	-03.0'	85.1°	58°08.2'	-01.0'	86.7°	58°10.8'	+01.0'	88.3°	6
7	57°19.4'	-12.3'	77.0°	57°32.1'	-10.4'	78.5°	57°43.3'	-08.5'	80.0°	57°52.9'	-06.6'	81.6°	58°00.8'	-04.7'	83.2°	58°07.1'	-02.7'	84.8°	58°11.8'	-00.7'	86.4°	7
8	57°07.1'	-13.8'	75.1°	57°21.7'	-12.0'	76.7°	57°34.8'	-10.1'	78.2°	57°46.3'	-08.2'	79.7°	57°56.2'	-06.3'	81.3°	58°04.4'	-04.4'	82.9°	58°11.0'	-02.4'	84.5°	8
9	56°53.3'	-15.3'	73.4°	57°09.7'	-13.5'	74.8°	57°24.7'	-11.7'	76.3°	57°38.0'	-09.9'	77.9°	57°49.8'	-08.0'	79.4°	58°00.0'	-06.0'	81.0°	58°08.6'	-04.1'	82.6°	9
10	56°38.0'	-16.8'	71.6°	56°56.2'	-15.1'	73.1°	57°12.9'	-13.3'	74.5°	57°28.2'	-11.4'	76.0°	57°41.9'	-09.6'	77.6°	57°54.0'	-07.7'	79.1°	58°04.5'	-05.8'	80.7°	10
11	56°21.2'	-18.2'	69.9°	56°41.1'	-16.5'	71.3°	56°59.7'	-14.8'	72.7°	57°16.7'	-13.0'	74.2°	57°32.3'	-11.2'	75.7°	57°46.3'	-09.3'	77.3°	57°58.7'	-07.4'	78.8°	11
12	56°02.9'	-19.6'	68.1°	56°24.6'	-18.0'	69.5°	56°44.9'	-16.3'	71.0°	57°03.7'	-14.5'	72.4°	57°21.1'	-12.8'	73.9°	57°37.0'	-10.9'	75.4°	57°51.3'	-09.1'	77.0°	12
13	55°43.3'	-21.0'	66.5°	56°06.6'	-19.4'	67.8°	56°28.6'	-17.7'	69.2°	56°49.2'	-16.0'	70.6°	57°08.4'	-14.3'	72.1°	57°26.1'	-12.5'	73.6°	57°42.2'	-10.7'	75.1°	13
14	55°22.3'	-22.3'	64.8°	55°47.2'	-20.8'	66.1°	56°10.9'	-19.2'	67.5°	56°33.1'	-17.5'	68.9°	56°54.1'	-15.8'	70.3°	57°13.6'	-14.0'	71.8°	57°31.6'	-12.3'	73.3°	14
15	55°00.0'	-23.6'	63.2°	55°26.5'	-22.1'	64.5°	55°51.7'	-20.5'	65.8°	56°15.6'	-18.9'	67.2°	56°38.3'	-17.3'	68.6°	56°59.5'	-15.6'	70.0°	57°19.3'	-13.8'	71.4°	15
16	54°36.4'	-24.8'	61.6°	55°04.4'	-23.4'	62.8°	55°31.2'	-21.9'	64.1°	55°56.7'	-20.3'	65.5°	56°21.0'	-18.7'	66.8°	56°43.9'	-17.0'	68.2°	57°05.5'	-15.3'	69.7°	16
17	54°11.6'	-26.0'	60.0°	54°41.0'	-24.6'	61.2°	55°09.3'	-23.2'	62.5°	55°36.4'	-21.6'	63.8°	56°02.3'	-20.1'	65.1°	56°26.9'	-18.5'	66.5°	56°50.2'	-16.8'	67.9°	17
18	53°45.6'	-27.2'	58.5°	54°16.4'	-25.8'	59.7°	54°46.2'	-24.4'	60.9°	55°14.8'	-22.9'	62.1°	55°42.2'	-21.4'	63.4°	56°08.4'	-19.9'	64.8°	56°33.4'	-18.3'	66.1°	18
19	53°18.4'	-28.3'	57.0°	53°50.6'	-27.0'	58.1°	54°21.7'	-25.6'	59.3°	54°51.8'	-24.2'	60.5°	55°20.8'	-22.8'	61.8°	55°48.5'	-21.2'	63.1°	56°15.1'	-19.7'	64.4°	19
20	52°50.1'	-29.3'	55.5°	53°23.6'	-28.1'	56.6°	53°56.1'	-26.8'	57.8°	54°27.6'	-25.4'	58.9°	54°58.0'	-24.0'	60.2°	55°27.3'	-22.6'	61.4°	55°55.4'	-21.0'	62.7°	20
21	52°20.8'	-30.4'	54.1°	52°55.5'	-29.1'	55.1°	53°29.4'	-27.9'	56.3°	54°02.2'	-26.6'	57.4°	54°34.0'	-25.2'	58.6°	55°04.7'	-23.8'	59.8°	55°34.4'	-22.4'	61.1°	21
22	51°50.4'	-31.3'	52.7°	52°26.4'	-30.2'	53.7°	53°01.5'	-29.0'	54.8°	53°35.6'	-27.7'	55.9°	54°08.8'	-26.4'	57.0°	54°40.9'	-25.1'	58.2°	55°12.0'	-23.7'	59.4°	22
23	51°19.1'	-32.3'	51.3°	51°56.2'	-31.2'	52.3°	52°32.5'	-30.0'	53.3°	53°07.9'	-28.8'	54.4°	53°42.3'	-27.6'	55.5°	54°15.8'	-26.3'	56.6°	54°48.3'	-24.9'	57.8°	23

32° 328° LHA

Latitude SAME as Declination

32° 328° LHA

South Lat. LHA > 180° .. Zn = 180-Z LHA < 180° .. Zn = 180+Z

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn = 360-Z

33° 327° LHA

Latitude SAME as Declination

33° 327° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	57°00.0'	-00.8'	90.0°	56°59.2'	+01.1'	91.5°	56°56.8'	+03.0'	93.1°	56°52.8'	+04.9'	94.6°	56°47.1'	+06.9'	96.1°	56°39.9'	+08.7'	97.6°	56°31.2'	+10.6'	99.1°	0
1	56°59.2'	-02.4'	88.2°	57°00.3'	-00.5'	89.7°	56°59.8'	+01.4'	91.2°	56°57.7'	+03.3'	92.8°	56°54.0'	+05.3'	94.3°	56°48.7'	+07.2'	95.8°	56°41.8'	+09.1'	97.4°	1
2	56°56.8'	-04.0'	86.3°	56°59.8'	-02.1'	87.9°	57°01.2'	-00.2'	89.4°	57°01.1'	+01.7'	90.9°	56°59.3'	+03.7'	92.5°	56°55.8'	+05.6'	94.0°	56°50.8'	+07.5'	95.6°	2
3	56°52.8'	-05.6'	84.5°	56°57.7'	-03.7'	86.0°	57°01.1'	-01.8'	87.6°	57°02.8'	+00.1'	89.1°	57°02.9'	+02.0'	90.7°	57°01.4'	+04.0'	92.2°	56°58.3'	+05.9'	93.7°	3
4	56°47.1'	-07.2'	82.7°	56°54.0'	-05.3'	84.2°	56°59.3'	-03.4'	85.7°	57°02.9'	-01.5'	87.3°	57°05.0'	+00.4'	88.8°	57°05.4'	+02.4'	90.4°	57°04.2'	+04.3'	91.9°	4
5	56°39.9'	-08.8'	80.9°	56°48.7'	-06.9'	82.4°	56°55.8'	-05.0'	83.9°	57°01.4'	-03.1'	85.4°	57°05.4'	-01.2'	87.0°	57°07.7'	+00.7'	88.5°	57°08.5'	+02.7'	90.1°	5
6	56°31.2'	-10.3'	79.1°	56°41.8'	-08.5'	80.6°	56°50.8'	-06.6'	82.1°	56°58.3'	-04.7'	83.6°	57°04.2'	-02.8'	85.1°	57°08.5'	-00.9'	86.7°	57°11.2'	+01.0'	88.2°	6
7	56°20.9'	-11.8'	77.3°	56°33.3'	-10.0'	78.8°	56°44.2'	-08.2'	80.3°	56°53.6'	-06.3'	81.8°	57°01.4'	-04.4'	83.3°	57°07.6'	-02.5'	84.8°	57°12.2'	-00.6'	86.4°	7
8	56°09.1'	-13.3'	75.5°	56°23.3'	-11.5'	77.0°	56°36.1'	-09.7'	78.5°	56°47.3'	-07.9'	80.0°	56°57.0'	-06.0'	81.5°	57°05.1'	-04.1'	83.0°	57°11.6'	-02.2'	84.5°	8
9	55°55.7'	-14.8'	73.8°	56°11.8'	-13.0'	75.2°	56°26.4'	-11.3'	76.7°	56°39.4'	-09.4'	78.2°	56°51.0'	-07.6'	79.6°	57°01.0'	-05.7'	81.2°	57°09.4'	-03.8'	82.7°	9
10	55°41.0'	-16.2'	72.1°	55°58.7'	-14.5'	73.5°	56°15.1'	-12.8'	74.9°	56°30.0'	-11.0'	76.4°	56°43.4'	-09.2'	77.8°	56°55.3'	-07.3'	79.3°	57°05.6'	-05.4'	80.9°	10
11	55°24.8'	-17.6'	70.4°	55°44.2'	-15.9'	71.7°	56°02.3'	-14.2'	73.1°	56°19.0'	-12.5'	74.6°	56°34.2'	-10.7'	76.0°	56°48.0'	-08.9'	77.5°	57°00.2'	-07.0'	79.0°	11
12	55°07.2'	-19.0'	68.7°	55°28.3'	-17.3'	70.0°	55°48.1'	-15.7'	71.4°	56°06.5'	-14.0'	72.8°	56°23.5'	-12.2'	74.3°	56°39.1'	-10.4'	75.7°	56°53.1'	-08.6'	77.2°	12
13	54°48.2'	-20.3'	67.0°	55°11.0'	-18.7'	68.3°	55°32.4'	-17.1'	69.7°	55°52.6'	-15.4'	71.1°	56°11.3'	-13.7'	72.5°	56°28.7'	-12.0'	73.9°	56°44.5'	-10.2'	75.4°	13
14	54°27.9'	-21.6'	65.4°	54°52.2'	-20.0'	66.7°	55°15.4'	-18.5'	68.0°	55°37.2'	-16.8'	69.4°	55°57.6'	-15.2'	70.7°	56°16.7'	-13.4'	72.2°	56°34.4'	-11.7'	73.6°	14
15	54°06.3'	-22.8'	63.8°	54°32.2'	-21.3'	65.1°	54°56.9'	-19.8'	66.3°	55°20.3'	-18.2'	67.7°	55°42.5'	-16.6'	69.0°	56°03.3'	-14.9'	70.4°	56°22.7'	-13.2'	71.8°	15
16	53°43.5'	-24.0'	62.2°	54°10.9'	-22.6'	63.5°	54°37.1'	-21.1'	64.7°	55°02.1'	-19.6'	66.0°	55°25.9'	-18.0'	67.3°	55°48.3'	-16.4'	68.7°	56°09.5'	-14.7'	70.1°	16
17	53°19.4'	-25.2'	60.7°	53°48.3'	-23.8'	61.9°	54°16.0'	-22.4'	63.1°	54°42.5'	-20.9'	64.4°	55°07.9'	-19.3'	65.7°	55°32.0'	-17.8'	67.0°	55°54.8'	-16.1'	68.3°	17
18	52°54.2'	-26.3'	59.2°	53°24.4'	-25.0'	60.3°	53°53.6'	-23.6'	61.5°	54°21.7'	-22.2'	62.7°	54°48.5'	-20.7'	64.0°	55°14.2'	-19.1'	65.3°	55°38.7'	-17.5'	66.6°	18
19	52°27.9'	-27.4'	57.7°	52°59.5'	-26.1'	58.8°	53°30.0'	-24.8'	60.0°	53°59.5'	-23.4'	61.2°	54°27.9'	-21.9'	62.4°	54°55.1'	-20.5'	63.6°	55°21.2'	-18.9'	64.9°	19
20	52°00.5'	-28.5'	56.2°	52°33.3'	-27.2'	57.3°	53°05.2'	-25.9'	58.4°	53°36.1'	-24.6'	59.6°	54°05.9'	-23.2'	60.8°	54°34.7'	-21.7'	62.0°	55°02.2'	-20.2'	63.3°	20
21	51°32.0'	-29.5'	54.8°	52°06.1'	-28.3'	55.9°	52°39.3'	-27.0'	57.0°	53°11.5'	-25.7'	58.1°	53°42.8'	-24.4'	59.2°	54°12.9'	-23.0'	60.4°	54°42.0'	-21.5'	61.6°	21
22	51°02.5'	-30.5'	53.4°	51°37.8'	-29.3'	54.4°	52°12.3'	-28.1'	55.5°	52°45.8'	-26.8'	56.6°	53°18.4'	-25.5'	57.7°	53°49.9'	-24.2'	58.8°	54°20.4'	-22.8'	60.0°	22
23	50°32.0'	-31.4'	52.1°	51°08.5'	-3																	

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

34° 326° LHA

Latitude SAME as Declination

34° 326° LHA

Table with 10 columns (Dec°, 0-6, Dec°) and 24 rows of astronomical data for 34° LHA. Each cell contains three values: Hc°, d', and Z°.

34° 326° LHA

Latitude SAME as Declination

34° 326° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

35° 325° LHA

Latitude SAME as Declination

35° 325° LHA

Table with 10 columns (Dec°, 0-6, Dec°) and 24 rows of astronomical data for 35° LHA. Each cell contains three values: Hc°, d', and Z°.

35° 325° LHA

Latitude SAME as Declination

35° 325° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

36° 324° LHA

Latitude SAME as Declination

36° 324° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	54°00.0'	-00.7'	90.0°	53°59.3'	+01.1'	91.4°	53°57.1'	+02.8'	92.8°	53°53.5'	+04.6'	94.1°	53°48.5'	+06.4'	95.5°	53°42.1'	+08.1'	96.8°	53°34.2'	+09.9'	98.2°	0
1	53°59.3'	-02.2'	88.3°	54°00.3'	-00.4'	89.7°	54°00.0'	+01.4'	91.1°	53°58.1'	+03.2'	92.4°	53°54.9'	+05.0'	93.8°	53°50.2'	+06.7'	95.2°	53°44.1'	+08.5'	96.5°	1
2	53°57.1'	-03.6'	86.6°	54°00.0'	-01.8'	88.0°	54°01.4'	00.0'	89.4°	54°01.3'	+01.7'	90.7°	53°59.8'	+03.5'	92.1°	53°56.9'	+05.3'	93.5°	53°52.6'	+07.1'	94.8°	2
3	53°53.5'	-05.0'	84.9°	53°58.1'	-03.3'	86.3°	54°01.3'	-01.5'	87.6°	54°03.1'	+00.3'	89.0°	54°03.4'	+02.1'	90.4°	54°02.2'	+03.9'	91.8°	53°59.6'	+05.6'	93.2°	3
4	53°48.5'	-06.4'	83.2°	53°54.9'	-04.7'	84.6°	53°59.8'	-02.9'	85.9°	54°03.4'	-01.1'	87.3°	54°05.4'	+00.6'	88.7°	54°06.1'	+02.4'	90.1°	54°05.3'	+04.2'	91.5°	4
5	53°42.1'	-07.8'	81.5°	53°50.2'	-06.1'	82.9°	53°56.9'	-04.4'	84.2°	54°02.2'	-02.6'	85.6°	54°06.1'	-00.8'	87.0°	54°08.5'	+01.0'	88.4°	54°09.5'	+02.8'	89.8°	5
6	53°34.2'	-09.2'	79.9°	53°44.1'	-07.5'	81.2°	53°52.6'	-05.8'	82.6°	53°59.6'	-04.0'	83.9°	54°05.3'	-02.3'	85.3°	54°09.5'	-00.5'	86.7°	54°12.2'	+01.3'	88.1°	6
7	53°25.0'	-10.6'	78.2°	53°36.6'	-08.9'	79.5°	53°46.8'	-07.2'	80.9°	53°55.6'	-05.5'	82.2°	54°03.0'	-03.7'	83.6°	54°09.0'	-01.9'	85.0°	54°13.5'	-00.1'	86.3°	7
8	53°14.4'	-12.0'	76.6°	53°27.7'	-10.3'	77.9°	53°39.6'	-08.6'	79.2°	53°50.1'	-06.9'	80.5°	53°59.3'	-05.1'	81.9°	54°07.1'	-03.4'	83.3°	54°13.4'	-01.6'	84.6°	8
9	53°02.4'	-13.3'	74.9°	53°17.4'	-11.6'	76.2°	53°31.0'	-10.0'	77.5°	53°43.3'	-08.3'	78.9°	53°54.2'	-06.6'	80.2°	54°03.7'	-04.8'	81.6°	54°11.8'	-03.0'	82.9°	9
10	52°49.1'	-14.6'	73.3°	53°05.7'	-13.0'	74.6°	53°21.0'	-11.3'	75.9°	53°35.0'	-09.7'	77.2°	53°47.6'	-08.0'	78.5°	53°58.9'	-06.2'	79.9°	54°08.8'	-04.5'	81.2°	10
11	52°34.5'	-15.9'	71.7°	52°52.7'	-14.3'	73.0°	53°09.7'	-12.7'	74.2°	53°25.3'	-11.0'	75.5°	53°39.7'	-09.4'	76.8°	53°52.7'	-07.6'	78.2°	54°04.3'	-05.9'	79.5°	11
12	52°18.6'	-17.1'	70.1°	52°38.4'	-15.6'	71.3°	52°57.0'	-14.0'	72.6°	53°14.3'	-12.4'	73.9°	53°30.3'	-10.7'	75.2°	53°45.0'	-09.0'	76.5°	53°58.4'	-07.3'	77.8°	12
13	52°01.5'	-18.4'	68.6°	52°22.9'	-16.8'	69.8°	52°43.0'	-15.3'	71.0°	53°01.9'	-13.7'	72.2°	53°19.6'	-12.1'	73.5°	53°36.0'	-10.4'	74.8°	53°51.0'	-08.8'	76.1°	13
14	51°43.2'	-19.5'	67.0°	52°06.0'	-18.1'	68.2°	52°27.7'	-16.6'	69.4°	52°48.2'	-15.0'	70.6°	53°07.5'	-13.4'	71.9°	53°25.5'	-11.8'	73.2°	53°42.3'	-10.1'	74.5°	14
15	51°23.6'	-20.7'	65.5°	51°48.0'	-19.3'	66.6°	52°11.2'	-17.8'	67.8°	52°33.2'	-16.3'	69.0°	52°54.1'	-14.7'	70.3°	53°13.7'	-13.1'	71.5°	53°32.1'	-11.5'	72.8°	15
16	51°02.9'	-21.8'	64.0°	51°28.7'	-20.4'	65.1°	51°53.4'	-19.0'	66.3°	52°17.0'	-17.5'	67.5°	52°39.4'	-16.0'	68.7°	53°00.6'	-14.5'	69.9°	53°20.6'	-12.9'	71.2°	16
17	50°41.1'	-22.9'	62.5°	51°08.2'	-21.6'	63.6°	51°34.4'	-20.2'	64.7°	51°59.4'	-18.7'	65.9°	52°23.4'	-17.3'	67.1°	52°46.2'	-15.7'	68.3°	53°07.7'	-14.2'	69.5°	17
18	50°18.1'	-24.0'	61.1°	50°46.7'	-22.7'	62.1°	51°14.2'	-21.3'	63.2°	51°40.7'	-19.9'	64.4°	52°06.1'	-18.5'	65.5°	52°30.4'	-17.0'	66.7°	52°53.6'	-15.5'	67.9°	18
19	49°54.1'	-25.0'	59.6°	50°24.0'	-23.8'	60.7°	50°52.9'	-22.4'	61.7°	51°20.8'	-21.1'	62.8°	51°47.6'	-19.7'	64.0°	52°13.4'	-18.2'	65.1°	52°38.1'	-16.8'	66.3°	19
20	49°29.1'	-26.1'	58.2°	50°00.2'	-24.8'	59.2°	50°30.4'	-23.5'	60.3°	50°59.7'	-22.2'	61.4°	51°27.9'	-20.8'	62.4°	51°55.2'	-19.4'	63.6°	52°21.3'	-18.0'	64.7°	20
21	49°03.0'	-27.0'	56.9°	49°35.4'	-25.8'	57.8°	50°06.9'	-24.6'	58.8°	50°37.5'	-23.3'	59.9°	51°07.1'	-22.0'	60.9°	51°35.7'	-20.6'	62.0°	52°03.3'	-19.2'	63.2°	21
22	48°36.0'	-28.0'	55.5°	49°09.6'	-26.8'	56.4°	49°42.3'	-25.6'	57.4°	50°14.2'	-24.4'	58.4°	50°45.1'	-23.1'	59.5°	51°15.1'	-21.8'	60.5°	51°44.1'	-20.4'	61.6°	22
23	48°08.0'	-28.9'	54.2°	48°42.8'	-27.7'	55.1°	49°16.7'	-26.6'	56.0°	49°49.8'	-25.4'	57.0°	50°22.0'	-24.2'	58.0°	50°53.3'	-22.9'	59.1°	51°23.7'	-21.5'	60.1°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

36° 324° LHA

Latitude SAME as Declination

36° 324° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

37° 323° LHA

Latitude SAME as Declination

37° 323° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	53°00.0'	-00.7'	90.0°	52°59.3'	+01.0'	91.3°	52°57.2'	+02.8'	92.7°	52°53.8'	+04.5'	94.0°	52°48.9'	+06.2'	95.3°	52°42.7'	+08.0'	96.6°	52°35.1'	+09.7'	97.9°	0
1	52°59.3'	-02.1'	88.3°	53°00.4'	-00.3'	89.7°	53°00.0'	+01.4'	91.0°	52°58.3'	+03.1'	92.3°	52°55.2'	+04.9'	93.6°	52°50.7'	+06.6'	95.0°	52°44.8'	+08.3'	96.3°	1
2	52°57.2'	-03.5'	86.7°	53°00.0'	-01.7'	88.0°	53°01.4'	+00.0'	89.3°	53°01.4'	+01.7'	90.7°	53°00.0'	+03.5'	92.0°	52°57.2'	+05.2'	93.3°	52°53.1'	+06.9'	94.6°	2
3	52°53.8'	-04.8'	85.0°	52°58.3'	-03.1'	86.3°	53°01.4'	-01.4'	87.7°	53°03.2'	+00.4'	89.0°	53°03.5'	+02.1'	90.3°	53°02.5'	+03.8'	91.7°	53°00.0'	+05.6'	93.0°	3
4	52°48.9'	-06.2'	83.4°	52°55.2'	-04.5'	84.7°	53°00.0'	-02.8'	86.0°	53°03.5'	-01.0'	87.3°	53°05.6'	+00.7'	88.7°	53°06.3'	+02.4'	90.0°	53°05.6'	+04.2'	91.3°	4
5	52°42.7'	-07.6'	81.7°	52°50.7'	-05.9'	83.0°	52°57.2'	-04.2'	84.3°	53°02.5'	-02.4'	85.7°	53°06.3'	-00.7'	87.0°	53°08.8'	+01.1'	88.3°	53°09.8'	+02.8'	89.7°	5
6	52°35.1'	-08.9'	80.1°	52°44.8'	-07.2'	81.4°	52°53.1'	-05.5'	82.7°	53°00.0'	-03.8'	84.0°	53°05.6'	-02.1'	85.3°	53°09.8'	-00.3'	86.7°	53°12.6'	+01.4'	88.0°	6
7	52°26.2'	-10.2'	78.5°	52°37.6'	-08.6'	79.7°	52°47.6'	-06.9'	81.0°	52°56.2'	-05.2'	82.4°	53°03.5'	-03.5'	83.7°	53°09.5'	-01.7'	85.0°	53°14.0'	00.0'	86.3°	7
8	52°16.0'	-11.5'	76.9°	52°29.0'	-09.9'	78.1°	52°40.7'	-08.2'	79.4°	52°51.0'	-06.6'	80.7°	53°00.1'	-04.9'	82.0°	53°07.7'	-03.1'	83.3°	53°14.0'	-01.4'	84.7°	8
9	52°04.4'	-12.8'	75.3°	52°19.1'	-11.2'	76.5°	52°32.4'	-09.6'	77.8°	52°44.5'	-07.9'	79.1°	52°55.2'	-06.2'	80.4°	53°04.6'	-04.5'	81.7°	53°12.6'	-02.8'	83.0°	9
10	51°51.6'	-14.1'	73.7°	52°07.8'	-12.5'	74.9°	52°22.8'	-10.9'	76.2°	52°36.6'	-09.3'	77.4°	52°49.0'	-07.6'	78.7°	53°00.0'	-05.9'	80.0°	53°09.8'	-04.2'	81.3°	10
11	51°37.5'	-15.3'	72.1°	51°55.3'	-13.8'	73.3°	52°11.9'	-12.2'	74.5°	52°27.3'	-10.6'	75.8°	52°41.4'	-08.9'	77.1°	52°54.1'	-07.3'	78.4°	53°05.6'	-05.6'	79.7°	11
12	51°22.1'	-16.6'	70.5°	51°41.5'	-15.0'	71.7°	51°59.7'	-13.5'	73.0°	52°16.7'	-11.9'	74.2°	52°32.4'	-10.3'	75.4°	52°46.9'	-08.6'	76.7°	53°00.0'	-07.0'	78.0°	12
13	51°05.6'	-17.8'	69.0°	51°26.5'	-16.3'	70.2°	51°46.3'	-14.7'	71.4°	52°04.8'	-13.2'	72.6°	52°22.2'	-11.6'	73.8°	52°38.2'	-10.0'	75.1°	52°53.1'	-08.3'	76.4°	13
14	50°47.8'	-18.9'	67.5°	51°10.2'	-17.5'	68.6°	51°31.5'	-16.0'	69.8°	51°51.6'	-14.4'	71.0°	52°10.6'	-12.9'	72.2°	52°28.3'	-11.3'	73.5°	52°44.7'	-09.7'	74.7°	14
15	50°28.9'	-20.1'	66.0°	50°52.8'	-18.6'	67.1°	51°15.6'	-17.2'	68.3°	51°37.2'	-15.7'	69.4°	51°57.7'	-14.1'	70.6°	52°17.0'	-12.6'	71.8°	52°35.1'	-11.0'	73.1°	15
16	50°08.9'	-21.2'	64.5°	50°34.1'	-19.8'	65.6°	50°58.4'	-18.4'	66.7°	51°21.5'	-16.9'	67.9°	51°43.5'	-15.4'	69.1°	52°04.4'	-13.9'	70.3°	52°24.1'	-12.3'	71.5°	16
17	49°47.7'	-22.2'	63.1°	50°14.4'	-20.9'	64.1°	50°40.0'	-19.5'	65.2°	51°04.6'	-18.1'	66.4°	51°28.2'	-16.6'	67.5°	51°50.5'	-15.1'	68.7°	52°11.8'	-13.6'	69.9°	17
18	49°25.5'	-23.3'	61.6°	49°53.5'	-22.0'	62.7°	50°20.5'	-20.6'	63.7°	50°46.6'	-19.2'	64.8°	51°11.5'	-17.8'	66.0°	51°35.4'	-16.3'	67.1°	51°58.2'	-14.8'	68.3°	18
19	49°02.2'	-24.3'	60.2°	49°31.5'	-23.0'	61.2°	50°00.0'	-21.7'	62.3°	50°27.3'	-20.4'	63.3°	50°53.7'	-19.0'	64.4°	51°19.1'	-17.6'	65.6°	51°43.3'	-16.1'	66.7°	19
20	48°37.9'	-25.3'	58.8°	49°08.5'	-24.1'	59.8°	49°38.2'	-22.8'	60.8°	50°07.0'	-21.5'	61.9°	50°34.7'	-20.1'	62.9°	51°01.5'	-18.7'	64.0°	51°27.3'	-17.3'	65.2°	20
21	48°12.6'	-26.2'	57.5°	48°44.4'	-25.0'	58.4°	49°15.4'	-23.8'	59.4°	49°45.5'	-22.5'	60.4°	50°14.6'	-21.2'	61.5°	50°42.8'	-19.9'	62.5°	51°10.0'	-18.5'	63.6°	21
22	47°46.3'	-27.2'	56.1°	48°19.4'	-26.0'	57.1°	48°51.6															

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

38° 322° LHA

Latitude SAME as Declination

38° 322° LHA

Dec°	0			1			2			3			4			5			6			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	52°00.0'	-00.7'	90.0°	51°59.3'	+01.0'	91.3°	51°57.3'	+02.7'	92.6°	51°54.0'	+04.4'	93.8°	51°49.3'	+06.1'	95.1°	51°43.3'	+07.8'	96.4°	51°36.0'	+09.5'	97.6°	0			
1	51°59.3'	-02.0'	88.4°	52°00.4'	-00.3'	89.7°	52°00.1'	+01.4'	90.9°	51°58.4'	+03.1'	92.2°	51°55.4'	+04.8'	93.5°	51°51.1'	+06.5'	94.8°	51°45.5'	+08.2'	96.0°	1			
2	51°57.3'	-03.3'	86.8°	52°00.1'	-01.6'	88.0°	52°01.4'	+00.1'	89.3°	52°01.5'	+01.8'	90.6°	52°00.2'	+03.5'	91.9°	51°57.6'	+05.1'	93.2°	51°53.6'	+06.8'	94.4°	2			
3	51°54.0'	-04.7'	85.1°	51°58.4'	-03.0'	86.4°	52°01.5'	-01.3'	87.7°	52°03.2'	+00.4'	89.0°	52°03.7'	+02.1'	90.3°	52°02.7'	+03.8'	91.5°	52°00.4'	+05.5'	92.8°	3			
4	51°49.3'	-06.0'	83.5°	51°55.4'	-04.3'	84.8°	52°00.2'	-02.6'	86.1°	52°03.7'	-00.9'	87.3°	52°05.8'	+00.8'	88.6°	52°06.5'	+02.5'	89.9°	52°06.0'	+04.2'	91.2°	4			
5	51°43.3'	-07.3'	81.9°	51°51.1'	-05.6'	83.2°	51°57.6'	-04.0'	84.4°	52°02.7'	-02.3'	85.7°	52°06.5'	-00.6'	87.0°	52°09.0'	+01.1'	88.3°	52°10.1'	+02.8'	89.6°	5			
6	51°36.0'	-08.6'	80.3°	51°45.5'	-07.0'	81.6°	51°53.6'	-05.3'	82.8°	52°00.4'	-03.6'	84.1°	52°06.0'	-01.9'	85.4°	52°10.1'	-00.2'	86.7°	52°13.0'	+01.5'	87.9°	6			
7	51°27.4'	-09.9'	78.7°	51°38.5'	-08.3'	80.0°	51°48.3'	-06.6'	81.2°	51°56.8'	-04.9'	82.5°	52°04.0'	-03.3'	83.7°	52°09.9'	-01.6'	85.0°	52°14.4'	+00.1'	86.3°	7			
8	51°17.5'	-11.2'	77.1°	51°30.2'	-09.5'	78.4°	51°41.7'	-07.9'	79.6°	51°51.9'	-06.3'	80.9°	52°00.8'	-04.6'	82.1°	52°08.3'	-02.9'	83.4°	52°14.6'	-01.2'	84.7°	8			
9	51°06.4'	-12.4'	75.6°	51°20.7'	-10.8'	76.8°	51°33.8'	-09.2'	78.0°	51°45.6'	-07.6'	79.2°	51°56.2'	-05.9'	80.5°	52°05.4'	-04.3'	81.8°	52°13.4'	-02.6'	83.0°	9			
10	50°54.0'	-13.6'	74.0°	51°09.9'	-12.1'	75.2°	51°24.6'	-10.5'	76.4°	51°38.0'	-08.9'	77.6°	51°50.3'	-07.2'	78.9°	52°01.2'	-05.6'	80.1°	52°10.8'	-03.9'	81.4°	10			
11	50°40.3'	-14.8'	72.5°	50°57.8'	-13.3'	73.7°	51°14.1'	-11.7'	74.8°	51°29.2'	-10.2'	76.1°	51°43.0'	-08.5'	77.3°	51°55.6'	-06.9'	78.5°	52°06.9'	-05.3'	79.8°	11			
12	50°25.5'	-16.0'	71.0°	50°44.5'	-14.5'	72.1°	51°02.4'	-13.0'	73.3°	51°19.0'	-11.4'	74.5°	51°34.5'	-09.8'	75.7°	51°48.7'	-08.2'	76.9°	52°01.6'	-06.6'	78.2°	12			
13	50°09.5'	-17.2'	69.4°	50°30.0'	-15.7'	70.6°	50°49.4'	-14.2'	71.7°	51°07.6'	-12.7'	72.9°	51°24.6'	-11.1'	74.1°	51°40.5'	-09.5'	75.3°	51°55.0'	-07.9'	76.6°	13			
14	49°52.3'	-18.3'	68.0°	50°14.3'	-16.9'	69.1°	50°35.2'	-15.4'	70.2°	50°54.9'	-13.9'	71.4°	51°13.5'	-12.4'	72.5°	51°30.9'	-10.8'	73.7°	51°47.1'	-09.2'	74.9°	14			
15	49°34.0'	-19.4'	66.5°	49°57.4'	-18.0'	67.6°	50°19.8'	-16.6'	68.7°	50°41.0'	-15.1'	69.8°	51°01.2'	-13.6'	71.0°	51°20.1'	-12.1'	72.2°	51°37.9'	-10.5'	73.4°	15			
16	49°14.6'	-20.5'	65.0°	49°39.4'	-19.1'	66.1°	50°03.2'	-17.7'	67.2°	50°25.9'	-16.3'	68.3°	50°47.6'	-14.8'	69.4°	51°08.1'	-13.3'	70.6°	51°27.5'	-11.8'	71.8°	16			
17	48°54.1'	-21.6'	63.6°	49°20.3'	-20.2'	64.6°	49°45.5'	-18.8'	65.7°	50°09.7'	-17.4'	66.8°	50°32.8'	-16.0'	67.9°	50°54.8'	-14.5'	69.0°	51°15.7'	-13.0'	70.2°	17			
18	48°32.5'	-22.6'	62.2°	49°00.1'	-21.3'	63.2°	49°26.6'	-19.9'	64.2°	49°52.2'	-18.6'	65.3°	50°16.8'	-17.2'	66.4°	50°40.3'	-15.7'	67.5°	51°02.7'	-14.2'	68.6°	18			
19	48°10.0'	-23.6'	60.8°	48°38.8'	-22.3'	61.8°	49°06.7'	-21.0'	62.8°	49°33.7'	-19.7'	63.8°	49°59.6'	-18.3'	64.9°	50°24.6'	-16.9'	66.0°	50°48.5'	-15.4'	67.1°	19			
20	47°46.4'	-24.5'	59.4°	48°16.5'	-23.3'	60.4°	48°45.7'	-22.0'	61.4°	49°14.0'	-20.7'	62.4°	49°41.3'	-19.4'	63.4°	50°07.7'	-18.0'	64.5°	50°33.0'	-16.6'	65.6°	20			
21	47°21.8'	-25.5'	58.1°	47°53.2'	-24.3'	59.0°	48°23.6'	-23.1'	60.0°	48°53.2'	-21.8'	60.9°	49°21.9'	-20.5'	62.0°	49°49.7'	-19.2'	63.0°	50°16.4'	-17.8'	64.1°	21			
22	46°56.4'	-26.4'	56.7°	47°28.9'	-25.2'	57.6°	48°00.6'	-24.0'	58.6°	48°31.4'	-22.8'	59.5°	49°01.4'	-21.6'	60.5°	49°30.5'	-20.2'	61.5°	49°58.6'	-18.9'	62.6°	22			
23	46°30.0'	-27.3'	55.4°	47°03.6'	-26.2'	56.3°	47°36.5'	-25.0'	57.2°	48°08.6'	-23.8'	58.1°	48°39.9'	-22.6'	59.1°	49°10.2'	-21.3'	60.1°	49°39.7'	-20.0'	61.1°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°			
0				1				2				3				4				5				6	

38° 322° LHA

Latitude SAME as Declination

38° 322° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

39° 321° LHA

Latitude SAME as Declination

39° 321° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	51°00.0'	-00.6'	90.0°	50°59.4'	+01.0'	91.2°	50°57.4'	+02.7'	92.5°	50°54.2'	+04.3'	93.7°	50°49.7'	+06.0'	94.9°	50°43.9'	+07.6'	96.1°	50°36.8'	+09.3'	97.4°	0
1	50°59.4'	-01.9'	88.4°	51°00.4'	-00.3'	89.6°	51°00.1'	+01.4'	90.9°	50°58.5'	+03.1'	92.1°	50°55.7'	+04.7'	93.3°	50°51.5'	+06.4'	94.6°	50°46.1'	+08.0'	95.8°	1
2	50°57.4'	-03.2'	86.8°	51°00.1'	-01.6'	88.1°	51°01.5'	+00.1'	89.3°	51°01.6'	+01.8'	90.5°	51°00.4'	+03.4'	91.8°	50°57.9'	+05.1'	93.0°	50°54.1'	+06.7'	94.2°	2
3	50°54.2'	-04.5'	85.2°	50°58.5'	-02.9'	86.5°	51°01.6'	-01.2'	87.7°	51°03.3'	+00.5'	88.9°	51°03.8'	+02.1'	90.2°	51°03.0'	+03.8'	91.4°	51°00.8'	+05.5'	92.6°	3
4	50°49.7'	-05.8'	83.7°	50°55.7'	-04.1'	84.9°	51°00.4'	-02.5'	86.1°	51°03.8'	-00.8'	87.3°	51°05.9'	+00.8'	88.6°	51°06.8'	+02.5'	89.8°	51°06.3'	+04.2'	91.1°	4
5	50°43.9'	-07.1'	82.1°	50°51.5'	-05.4'	83.3°	50°57.9'	-03.8'	84.5°	51°03.0'	-02.1'	85.8°	51°06.8'	-00.5'	87.0°	51°09.3'	+01.2'	88.2°	51°10.5'	+02.9'	89.5°	5
6	50°36.8'	-08.3'	80.5°	50°46.1'	-06.7'	81.7°	50°54.1'	-05.1'	82.9°	51°00.8'	-03.4'	84.2°	51°06.3'	-01.8'	85.4°	51°10.5'	-00.1'	86.6°	51°13.3'	+01.6'	87.9°	6
7	50°28.5'	-09.5'	79.0°	50°39.4'	-07.9'	80.2°	50°49.0'	-06.3'	81.4°	50°57.4'	-04.7'	82.6°	51°04.5'	-03.1'	83.8°	51°10.4'	-01.4'	85.0°	51°14.9'	+00.3'	86.3°	7
8	50°19.0'	-10.8'	77.4°	50°31.5'	-09.2'	78.6°	50°42.7'	-07.6'	79.8°	50°52.7'	-06.0'	81.0°	51°01.5'	-04.3'	82.2°	51°09.0'	-02.7'	83.4°	51°15.2'	-01.0'	84.7°	8
9	50°08.2'	-12.0'	75.9°	50°22.3'	-10.4'	77.0°	50°35.1'	-08.8'	78.2°	50°46.7'	-07.2'	79.4°	50°57.1'	-05.6'	80.6°	51°06.3'	-04.0'	81.9°	51°14.1'	-02.3'	83.1°	9
10	49°56.2'	-13.2'	74.3°	50°11.8'	-11.6'	75.5°	50°26.3'	-10.1'	76.7°	50°39.5'	-08.5'	77.9°	50°51.5'	-06.9'	79.1°	51°02.3'	-05.3'	80.3°	51°11.8'	-03.6'	81.5°	10
11	49°43.1'	-14.3'	72.8°	50°00.2'	-12.8'	74.0°	50°16.2'	-11.3'	75.1°	50°31.0'	-09.7'	76.3°	50°44.6'	-08.2'	77.5°	50°57.0'	-06.6'	78.7°	51°08.1'	-04.9'	79.9°	11
12	49°28.7'	-15.5'	71.3°	49°47.4'	-14.0'	72.5°	50°04.9'	-12.5'	73.6°	50°21.2'	-11.0'	74.7°	50°36.4'	-09.4'	75.9°	50°50.4'	-07.8'	77.1°	51°03.2'	-06.2'	78.3°	12
13	49°13.2'	-16.6'	69.9°	49°33.3'	-15.2'	71.0°	49°52.4'	-13.7'	72.1°	50°10.3'	-12.2'	73.2°	50°27.0'	-10.6'	74.4°	50°42.6'	-09.1'	75.5°	50°57.0'	-07.5'	76.7°	13
14	48°56.6'	-17.7'	68.4°	49°18.2'	-16.3'	69.5°	49°38.7'	-14.9'	70.6°	49°58.1'	-13.4'	71.7°	50°16.4'	-11.9'	72.8°	50°33.5'	-10.3'	74.0°	50°49.5'	-08.8'	75.2°	14
15	48°38.9'	-18.8'	66.9°	49°01.9'	-17.4'	68.0°	49°23.8'	-16.0'	69.1°	49°44.7'	-14.5'	70.2°	50°04.5'	-13.1'	71.3°	50°23.2'	-11.5'	72.4°	50°40.7'	-10.0'	73.6°	15
16	48°20.1'	-19.9'	65.5°	48°44.5'	-18.5'	66.5°	49°07.8'	-17.1'	67.6°	49°30.2'	-15.7'	68.7°	49°51.5'	-14.2'	69.8°	50°11.7'	-12.7'	70.9°	50°30.7'	-11.2'	72.0°	16
17	48°00.2'	-20.9'	64.1°	48°26.0'	-19.6'	65.1°	48°50.7'	-18.2'	66.1°	49°14.5'	-16.8'	67.2°	49°37.2'	-15.4'	68.3°	49°58.9'	-13.9'	69.4°	50°19.5'	-12.4'	70.5°	17
18	47°39.3'	-21.9'	62.7°	48°06.4'	-20.6'	63.7°	48°32.5'	-19.3'	64.7°	48°57.7'	-17.9'	65.7°	49°21.9'	-16.5'	66.8°	49°45.0'	-15.1'	67.9°	50°07.1'	-13.6'	69.0°	18
19	47°17.4'	-22.9'	61.3°	47°45.8'	-21.6'	62.3°	48°13.3'	-20.3'	63.3°	48°39.8'	-19.0'	64.3°	49°05.3'	-17.6'	65.3°	49°29.9'	-16.2'	66.4°	49°53.4'	-14.8'	67.5°	19
20	46°54.6'	-23.8'	60.0°	47°24.2'	-22.6'	60.9°	47°52.9'	-21.3'	61.9°	48°20.8'	-20.0'	62.8°	48°47.7'	-18.7'	63.9°	49°13.6'	-17.4'	64.9°	49°38.6'	-16.0'	66.0°	20
21	46°30.8'	-24.7'	58.6°	47°01.6'	-23.6'	59.5°	47°31.6'	-22.3'	60.5°	48°00.7'	-21.1'	61.4°	48°29.0'	-19.8'	62.4°	48°56.3'	-18.5'	63.4°	49°22.6'	-17.1'	64.5°	21
22	46°06.0'	-25.6'	57.3°	46°38.1'	-24.5'	58.2°	47°09.3'	-23.3'	59.1°	47°39.7'	-22.1'</											

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

40° 320° LHA

Latitude SAME as Declination

40° 320° LHA

Table with 11 columns (Dec, 0-6, Dec) and 23 rows (0-23). Columns 1-6 contain Hc, d, Z values for each declination degree.

40° 320° LHA

Latitude SAME as Declination

40° 320° LHA

South Lat. LHA > 180° .. Zn = 180-Z LHA < 180° .. Zn= 180+Z

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

41° 319° LHA

Latitude SAME as Declination

41° 319° LHA

Table with 11 columns (Dec, 0-6, Dec) and 23 rows (0-23). Columns 1-6 contain Hc, d, Z values for each declination degree.

41° 319° LHA

Latitude SAME as Declination

41° 319° LHA

South Lat. LHA > 180° .. Zn = 180-Z LHA < 180° .. Zn= 180+Z

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

42° 318° LHA

Latitude SAME as Declination

42° 318° LHA

Table with 12 columns (Dec°, 0-6, Dec°) and 24 rows (0-23). Each cell contains three values (Hc°, d', Z°) for a specific declination and LHA offset.

42° 318° LHA

Latitude SAME as Declination

42° 318° LHA

South Lat. LHA > 180° .. Zn = 180-Z LHA < 180° .. Zn= 180+Z

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

43° 317° LHA

Latitude SAME as Declination

43° 317° LHA

Table with 12 columns (Dec°, 0-6, Dec°) and 24 rows (0-23). Each cell contains three values (Hc°, d', Z°) for a specific declination and LHA offset.

43° 317° LHA

Latitude SAME as Declination

43° 317° LHA

South Lat. LHA > 180° .. Zn = 180-Z LHA < 180° .. Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

44° 316° LHA

Latitude SAME as Declination

44° 316° LHA

Table with 10 columns (Dec°, 0-6, Dec°) and 30 rows (0-23) of celestial coordinates (Hc°, d', Z°).

44° 316° LHA

Latitude SAME as Declination

44° 316° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

45° 315° LHA

Latitude SAME as Declination

45° 315° LHA

Table with 10 columns (Dec°, 0-6, Dec°) and 30 rows (0-23) of celestial coordinates (Hc°, d', Z°).

45° 315° LHA

Latitude SAME as Declination

45° 315° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

46° 314° LHA

Latitude SAME as Declination

46° 314° LHA

Table with 12 columns (Dec, 0-6, Dec) and 24 rows (0-23). Each cell contains three values: Hc, d, Z.

46° 314° LHA

Latitude SAME as Declination

46° 314° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

47° 313° LHA

Latitude SAME as Declination

47° 313° LHA

Table with 12 columns (Dec, 0-6, Dec) and 24 rows (0-23). Each cell contains three values: Hc, d, Z.

47° 313° LHA

Latitude SAME as Declination

47° 313° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

48° 312° LHA

Latitude SAME as Declination

48° 312° LHA

Table with 13 columns (Dec°, 0-6, Dec°) and 23 rows of astronomical data for 48° LHA. Each cell contains Hc°, d', and Z° values.

48° 312° LHA

Latitude SAME as Declination

48° 312° LHA

South Lat. LHA > 180° .. Zn = 180-Z LHA < 180° .. Zn= 180+Z

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

49° 311° LHA

Latitude SAME as Declination

49° 311° LHA

Table with 13 columns (Dec°, 0-6, Dec°) and 23 rows of astronomical data for 49° LHA. Each cell contains Hc°, d', and Z° values.

49° 311° LHA

Latitude SAME as Declination

49° 311° LHA

South Lat. LHA > 180° .. Zn = 180-Z LHA < 180° .. Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn = 360-Z

50° 310° LHA

Latitude SAME as Declination

50° 310° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	40°00.0'	-00.4'	90.0°	39°59.6'	+00.9'	90.8°	39°58.2'	+02.3'	91.7°	39°56.0'	+03.7'	92.5°	39°53.0'	+05.0'	93.3°	39°49.0'	+06.4'	94.2°	39°44.2'	+07.7'	95.0°	0
1	39°59.6'	-01.3'	88.7°	40°00.5'	+00.0'	89.5°	40°00.5'	+01.4'	90.4°	39°59.7'	+02.8'	91.2°	39°58.0'	+04.1'	92.1°	39°55.4'	+05.5'	92.9°	39°52.0'	+06.9'	93.7°	1
2	39°58.2'	-02.2'	87.4°	40°00.5'	-00.8'	88.2°	40°02.0'	+00.5'	89.1°	40°02.5'	+01.9'	89.9°	40°02.1'	+03.3'	90.7°	40°00.9'	+04.6'	91.6°	39°58.8'	+06.0'	92.4°	2
3	39°56.0'	-03.1'	86.1°	39°59.7'	-01.7'	86.9°	40°02.5'	-00.3'	87.8°	40°04.4'	+01.0'	88.6°	40°05.4'	+02.4'	89.4°	40°05.6'	+03.8'	90.3°	40°04.8'	+05.1'	91.1°	3
4	39°53.0'	-03.9'	84.8°	39°58.0'	-02.6'	85.6°	40°02.1'	-01.2'	86.5°	40°05.4'	+00.1'	87.3°	40°07.8'	+01.5'	88.1°	40°09.3'	+02.9'	89.0°	40°09.9'	+04.2'	89.8°	4
5	39°49.0'	-04.8'	83.5°	39°55.4'	-03.5'	84.3°	40°00.9'	-02.1'	85.1°	40°05.6'	-00.7'	86.0°	40°09.3'	+00.6'	86.8°	40°12.2'	+02.0'	87.7°	40°14.2'	+03.4'	88.5°	5
6	39°44.2'	-05.7'	82.2°	39°52.0'	-04.3'	83.0°	39°58.8'	-03.0'	83.8°	40°04.8'	-01.6'	84.7°	40°09.9'	-00.3'	85.5°	40°14.2'	+01.1'	86.4°	40°17.6'	+02.5'	87.2°	6
7	39°38.6'	-06.5'	80.9°	39°47.6'	-05.2'	81.7°	39°55.8'	-03.9'	82.5°	40°03.2'	-02.5'	83.4°	40°09.7'	-01.1'	84.2°	40°15.3'	+00.2'	85.1°	40°20.0'	+01.6'	85.9°	7
8	39°32.0'	-07.4'	79.6°	39°42.4'	-06.1'	80.4°	39°52.0'	-04.7'	81.2°	40°00.7'	-03.4'	82.1°	40°08.5'	-02.0'	82.9°	40°15.5'	-00.7'	83.7°	40°21.6'	+00.7'	84.6°	8
9	39°24.6'	-08.2'	78.3°	39°36.4'	-06.9'	79.1°	39°47.3'	-05.6'	79.9°	39°57.3'	-04.3'	80.8°	40°06.5'	-02.9'	81.6°	40°14.9'	-01.6'	82.4°	40°22.3'	-00.2'	83.3°	9
10	39°16.4'	-09.1'	77.0°	39°29.5'	-07.8'	77.8°	39°41.7'	-06.4'	78.6°	39°53.1'	-05.1'	79.5°	40°03.6'	-03.8'	80.3°	40°13.3'	-02.4'	81.1°	40°22.1'	-01.1'	82.0°	10
11	39°07.3'	-09.9'	75.8°	39°21.7'	-08.6'	76.6°	39°35.2'	-07.3'	77.4°	39°48.0'	-06.0'	78.2°	39°59.8'	-04.7'	79.0°	40°10.9'	-03.3'	79.8°	40°21.1'	-02.0'	80.7°	11
12	38°57.4'	-10.7'	74.5°	39°13.1'	-09.4'	75.3°	39°27.9'	-08.1'	76.1°	39°42.0'	-06.8'	76.9°	39°55.2'	-05.5'	77.7°	40°07.6'	-04.2'	78.5°	40°19.1'	-02.9'	79.3°	12
13	38°46.7'	-11.5'	73.2°	39°03.6'	-10.3'	74.0°	39°19.8'	-09.0'	74.8°	39°35.1'	-07.7'	75.6°	39°49.7'	-06.4'	76.4°	40°03.4'	-05.1'	77.2°	40°16.2'	-03.7'	78.0°	13
14	38°35.2'	-12.3'	72.0°	38°53.4'	-11.1'	72.7°	39°10.8'	-09.8'	73.5°	39°27.4'	-08.5'	74.3°	39°43.3'	-07.2'	75.1°	39°58.3'	-05.9'	75.9°	40°12.5'	-04.6'	76.7°	14
15	38°22.8'	-13.1'	70.7°	38°42.3'	-11.9'	71.5°	39°01.0'	-10.6'	72.2°	39°18.9'	-09.4'	73.0°	39°36.0'	-08.1'	73.8°	39°52.3'	-06.8'	74.6°	40°07.9'	-05.5'	75.4°	15
16	38°09.7'	-13.9'	69.5°	38°30.4'	-12.7'	70.2°	38°50.3'	-11.5'	71.0°	39°09.5'	-10.2'	71.7°	39°27.9'	-08.9'	72.5°	39°45.5'	-07.7'	73.3°	40°02.4'	-06.4'	74.1°	16
17	37°55.8'	-14.7'	68.2°	38°17.7'	-13.5'	69.0°	38°38.9'	-12.3'	69.7°	38°59.3'	-11.0'	70.5°	39°19.0'	-09.8'	71.2°	39°37.9'	-08.5'	72.0°	39°56.0'	-07.2'	72.8°	17
18	37°41.1'	-15.4'	67.0°	38°04.2'	-14.3'	67.7°	38°26.6'	-13.1'	68.5°	38°48.3'	-11.8'	69.2°	39°09.2'	-10.6'	70.0°	39°29.4'	-09.4'	70.7°	39°48.8'	-08.1'	71.5°	18
19	37°25.7'	-16.2'	65.8°	37°50.0'	-15.0'	66.5°	38°13.5'	-13.8'	67.2°	38°36.4'	-12.6'	68.0°	38°58.6'	-11.4'	68.7°	39°20.0'	-10.2'	69.5°	39°40.7'	-08.9'	70.2°	19
20	37°09.5'	-16.9'	64.6°	37°34.9'	-15.8'	65.3°	37°59.7'	-14.6'	66.0°	38°23.8'	-13.4'	66.7°	38°47.1'	-12.2'	67.4°	39°09.8'	-11.0'	68.2°	39°31.7'	-09.8'	69.0°	20
21	36°52.6'	-17.6'	63.4°	37°19.2'	-16.5'	64.1°	37°45.1'	-15.4'	64.8°	38°10.3'	-14.2'	65.5°	38°34.9'	-13.0'	66.2°	38°58.8'	-11.8'	66.9°	39°21.9'	-10.6'	67.7°	21
22	36°35.0'	-18.3'	62.2°	37°02.6'	-17.2'	62.9°	37°29.7'	-16.1'	63.5°	37°56.1'	-15.0'	64.2°	38°21.9'	-14.8'	64.9°	38°46.9'	-12.6'	65.7°	39°11.3'	-11.4'	66.4°	22
23	36°16.6'	-19.0'	61.0°	36°45.4'	-18.0'	61.7°	37°13.6'	-16.9'	62.3°	37°41.1'	-15.7'	63.0°	38°08.0'	-13.6'	63.7°	38°34.3'	-13.4'	64.4°	38°59.9'	-12.3'	65.1°	23

50° 310° LHA

Latitude SAME as Declination

50° 310° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn = 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn = 360-Z

51° 309° LHA

Latitude SAME as Declination

51° 309° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	39°00.0'	-00.4'	90.0°	38°59.6'	+00.9'	90.8°	38°58.3'	+02.3'	91.6°	38°56.2'	+03.6'	92.4°	38°53.2'	+05.0'	93.2°	38°49.4'	+06.3'	94.0°	38°44.8'	+07.6'	94.8°	0
1	38°59.6'	-01.3'	88.7°	39°00.5'	+00.1'	89.5°	39°00.6'	+01.4'	90.3°	38°59.8'	+02.8'	91.1°	38°58.2'	+04.1'	92.0°	38°55.7'	+05.5'	92.8°	38°52.4'	+06.8'	93.6°	1
2	38°58.3'	-02.1'	87.4°	39°00.6'	-00.8'	88.2°	39°02.0'	+00.6'	89.0°	39°02.6'	+01.9'	89.9°	39°02.3'	+03.3'	90.7°	39°01.2'	+04.6'	91.5°	38°59.2'	+06.0'	92.3°	2
3	38°56.2'	-03.0'	86.1°	38°59.8'	-01.6'	86.9°	39°02.6'	-00.3'	87.8°	39°04.5'	+01.1'	88.6°	39°05.6'	+02.4'	89.4°	39°05.8'	+03.8'	90.2°	39°05.2'	+05.1'	91.0°	3
4	38°53.2'	-03.8'	84.9°	38°58.2'	-02.5'	85.7°	39°02.3'	-01.1'	86.5°	39°05.6'	+00.2'	87.3°	39°08.0'	+01.6'	88.1°	39°09.6'	+02.9'	88.9°	39°10.3'	+04.3'	89.7°	4
5	38°49.4'	-04.6'	83.6°	38°55.7'	-03.3'	84.4°	39°01.2'	-02.0'	85.2°	39°05.8'	-00.6'	86.0°	39°09.6'	+00.7'	86.8°	39°12.5'	+02.1'	87.6°	39°14.5'	+03.4'	88.4°	5
6	38°44.8'	-05.5'	82.3°	38°52.4'	-04.2'	83.1°	38°59.2'	-02.8'	83.9°	39°05.2'	-01.5'	84.7°	39°10.3'	-00.1'	85.5°	39°14.5'	+01.2'	86.3°	39°18.0'	+02.6'	87.1°	6
7	38°39.3'	-06.3'	81.0°	38°48.3'	-05.0'	81.8°	38°56.4'	-03.7'	82.6°	39°03.7'	-02.3'	83.4°	39°10.1'	-01.0'	84.2°	39°15.7'	+00.4'	85.0°	39°20.5'	+01.7'	85.9°	7
8	38°33.0'	-07.1'	79.7°	38°43.3'	-05.8'	80.5°	38°52.7'	-04.5'	81.3°	39°01.4'	-03.2'	82.1°	39°09.1'	-01.8'	82.9°	39°16.1'	-00.5'	83.7°	39°22.2'	+00.8'	84.6°	8
9	38°25.9'	-07.9'	78.5°	38°37.4'	-06.6'	79.3°	38°48.2'	-05.3'	80.1°	38°58.2'	-04.0'	80.8°	39°07.3'	-02.7'	81.6°	39°15.6'	-01.4'	82.5°	39°23.1'	00.0'	83.3°	9
10	38°17.9'	-08.8'	77.2°	38°30.8'	-07.5'	78.0°	38°42.9'	-06.2'	78.8°	38°54.2'	-04.9'	79.6°	39°04.6'	-03.5'	80.4°	39°14.2'	-02.2'	81.2°	39°23.0'	-00.9'	82.0°	10
11	38°09.2'	-09.6'	76.0°	38°23.3'	-08.3'	76.7°	38°36.7'	-07.0'	77.5°	38°49.3'	-05.7'	78.3°	39°01.1'	-04.4'	79.1°	39°12.0'	-03.1'	79.9°	39°22.2'	-01.7'	80.7°	11
12	37°59.6'	-10.4'	74.7°	38°15.0'	-09.1'	75.5°	38°29.7'	-07.8'	76.2°	38°43.6'	-06.5'	77.0°	38°56.7'	-05.2'	77.8°	39°09.0'	-03.9'	78.6°	39°20.4'	-02.6'	79.4°	12
13	37°49.2'	-11.1'	73.5°	38°05.9'	-09.9'	74.2°	38°21.9'	-08.6'	75.0°	38°37.1'	-07.4'	75.7°	38°51.5'	-06.1'	76.5°	39°05.1'	-04.8'	77.3°	39°17.8'	-03.4'	78.1°	13
14	37°38.1'	-11.9'	72.2°	37°56.1'	-10.7'	73.0°	38°13.3'	-09.4'	73.7°	38°29.7'	-08.2'	74.5°	38°45.4'	-06.9'	75.2°	39°00.3'	-05.6'	76.0°	39°14.4'	-04.3'	76.8°	14
15	37°26.2'	-12.7'	71.0°	37°45.4'	-11.5'	71.7°	38°03.8'	-10.2'	72.4°	38°21.6'	-09.0'	73.2°	38°38.5'	-07.7'	74.0°	38°54.7'	-06.4'	74.7°	39°10.1'	-05.1'	75.5°	15
16	37°13.5'	-13.4'	69.7°	37°33.9'	-12.2'	70.5°	37°53.6'	-11.0'	71.2°	38°12.6'	-09.8'	71.9°	38°30.8'	-08.5'	72.7°	38°48.3'	-07.3'	73.5°	39°05.0'	-06.0'	74.2°	16
17	37°00.0'	-14.2'	68.5°	37°21.7'	-13.0'	69.2°	37°42.6'	-11.8'	70.0°	38°02.8'	-10.6'	70.7°	38°22.3'	-09.3'	71.4°	38°41.0'	-08.1'	72.2°	38°59.0'	-06.8'	73.0°	17
18	36°45.8'	-14.9'	67.3°	37°08.6'	-13.8'	68.0°	37°30.8'	-12.6'	68.7°	37°52.2'	-11.4'	69.4°	38°12.9'	-10.1'	70.2°	38°32.9'	-08.9'	70.9°	38°52.1'	-07.7'	71.7°	18
19	36°30.9'	-15.7'	66.1°	36°54.9'	-14.5'	66.8°	37°18.2'	-13.3'	67.5°	37°40.8'	-12.1'	68.2°	38°02.8'	-10.7'	68.9°	38°24.0'	-09.7'	69.7°	38°44.5'	-08.5'	70.4°	19
20	36°15.2'	-16.4'	64.9°	36°40.4'	-15.2'	65.6°	37°04.9'	-14.1'	66.3°	37°28.7'	-12.9'	67.0°	37°51.8'	-11.7'	67.7°	38°14.3'	-10.5'	68.4°	38°36.0'	-09.3'	69.1°	20
21	35°58.9'	-17.1'	63.7°	36°25.1'	-16.0'	64.4°	36°50.8'	-14.8'	65.0°	37°15.8'	-13.7'	65.7°	37°40.1'	-12.5'	66.4°	38°03.7'	-11.3'	67.1°	38°26.7'	-10.1'	67.9°	21
22	35°41.8'	-17.8'	62.5°	36°09.2'	-16.7'	63.2°	36°36.0'	-15.6'	63.8°	37°02.1'	-14.4'	64.5°	37°27.6'	-13.3'	65.2°	37°52.4'	-12.1'	65.9°	38°16.6'	-10.9'	66.6°	22
23	35°24.0'	-18.4'	61.4°	35°52.5'	-17.4'	62.0°	36°20.4'	-16.3'														

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

52° 308° LHA

Latitude SAME as Declination

52° 308° LHA

Dec°	0			1			2			3			4			5			6			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	38°00.0'	-00.4'	90.0°	37°59.6'	+00.9'	90.8°	37°58.4'	+02.2'	91.6°	37°56.3'	+03.6'	92.3°	37°53.5'	+04.9'	93.1°	37°49.8'	+06.2'	93.9°	37°45.3'	+07.5'	94.7°	0			
1	37°59.6'	-01.2'	88.7°	38°00.5'	+00.1'	89.5°	38°00.6'	+01.4'	90.3°	37°59.9'	+02.8'	91.1°	37°58.4'	+04.1'	91.9°	37°56.0'	+05.4'	92.6°	37°52.8'	+06.7'	93.4°	1			
2	37°58.4'	-02.0'	87.5°	38°00.6'	-00.7'	88.2°	38°02.0'	+00.6'	89.0°	38°02.7'	+01.9'	89.8°	38°02.4'	+03.3'	90.6°	38°01.4'	+04.6'	91.4°	37°59.6'	+05.9'	92.2°	2			
3	37°56.3'	-02.9'	86.2°	37°59.9'	-01.5'	87.0°	38°02.7'	-00.2'	87.8°	38°04.6'	+01.1'	88.5°	38°05.7'	+02.5'	89.3°	38°06.0'	+03.8'	90.1°	38°05.5'	+05.1'	90.9°	3			
4	37°53.5'	-03.7'	84.9°	37°58.4'	-02.4'	85.7°	38°02.4'	-01.0'	86.5°	38°05.7'	+00.3'	87.3°	38°08.2'	+01.6'	88.1°	38°09.8'	+03.0'	88.8°	38°10.6'	+04.3'	89.6°	4			
5	37°49.8'	-04.5'	83.7°	37°56.0'	-03.2'	84.4°	38°01.4'	-01.8'	85.2°	38°06.0'	-00.5'	86.0°	38°09.8'	+00.8'	86.8°	38°12.8'	+02.1'	87.6°	38°14.9'	+03.5'	88.4°	5			
6	37°45.3'	-05.3'	82.4°	37°52.8'	-04.0'	83.2°	37°59.6'	-02.7'	83.9°	38°05.5'	-01.3'	84.7°	38°10.6'	00.0'	85.5°	38°14.9'	+01.3'	86.3°	38°18.4'	+02.6'	87.1°	6			
7	37°40.0'	-06.1'	81.1°	37°48.9'	-04.8'	81.9°	37°56.9'	-03.5'	82.7°	38°04.2'	-02.2'	83.5°	38°10.6'	-00.8'	84.2°	38°16.2'	+00.5'	85.0°	38°21.0'	+01.8'	85.8°	7			
8	37°33.9'	-06.9'	79.9°	37°44.1'	-05.6'	80.6°	37°53.4'	-04.3'	81.4°	38°02.0'	-03.0'	82.2°	38°09.7'	-01.7'	83.0°	38°16.7'	-00.3'	83.7°	38°22.8'	+01.0'	84.5°	8			
9	37°27.1'	-07.7'	78.6°	37°38.5'	-06.4'	79.4°	37°49.1'	-05.1'	80.2°	37°59.0'	-03.8'	80.9°	38°08.1'	-02.5'	81.7°	38°16.3'	-01.2'	82.5°	38°23.8'	+00.2'	83.3°	9			
10	37°19.4'	-08.5'	77.4°	37°32.1'	-07.2'	78.1°	37°44.1'	-05.9'	78.9°	37°55.2'	-04.6'	79.7°	38°05.6'	-03.3'	80.4°	38°15.2'	-02.0'	81.2°	38°24.0'	-00.7'	82.0°	10			
11	37°10.9'	-09.2'	76.1°	37°24.9'	-08.0'	76.9°	37°38.2'	-06.7'	77.6°	37°50.6'	-05.4'	78.4°	38°02.3'	-04.1'	79.2°	38°13.2'	-02.8'	79.9°	38°23.3'	-01.5'	80.7°	11			
12	37°01.7'	-10.0'	74.9°	37°16.9'	-08.8'	75.6°	37°31.5'	-07.5'	76.4°	37°45.2'	-06.2'	77.1°	37°58.2'	-04.9'	77.9°	38°10.4'	-03.6'	78.7°	38°21.8'	-02.3'	79.4°	12			
13	36°51.7'	-10.8'	73.7°	37°08.2'	-09.5'	74.4°	37°24.0'	-08.3'	75.1°	37°39.0'	-07.0'	75.9°	37°53.2'	-05.7'	76.6°	38°06.7'	-04.5'	77.4°	38°19.4'	-03.2'	78.2°	13			
14	36°40.9'	-11.5'	72.4°	36°58.7'	-10.3'	73.2°	37°15.7'	-09.1'	73.9°	37°32.0'	-07.8'	74.6°	37°47.5'	-06.5'	75.4°	38°02.3'	-05.3'	76.1°	38°16.3'	-04.0'	76.9°	14			
15	36°29.4'	-12.3'	71.2°	36°48.4'	-11.1'	71.9°	37°06.6'	-09.8'	72.6°	37°24.2'	-08.6'	73.4°	37°41.0'	-07.3'	74.1°	37°57.0'	-06.1'	74.9°	38°12.3'	-04.8'	75.6°	15			
16	36°17.1'	-13.0'	70.0°	36°37.3'	-11.8'	70.7°	36°56.8'	-10.6'	71.4°	37°15.6'	-09.4'	72.1°	37°33.6'	-08.1'	72.9°	37°50.9'	-06.9'	73.6°	38°07.5'	-05.6'	74.3°	16			
17	36°04.1'	-13.7'	68.8°	36°25.5'	-12.5'	69.5°	36°46.2'	-11.4'	70.2°	37°06.2'	-10.1'	70.9°	37°25.5'	-08.9'	71.6°	37°44.1'	-07.7'	72.3°	38°01.9'	-06.4'	73.1°	17			
18	35°50.4'	-14.4'	67.6°	36°13.0'	-13.3'	68.3°	36°34.9'	-12.1'	69.0°	36°56.1'	-10.9'	69.7°	37°16.6'	-09.7'	70.4°	37°36.4'	-08.5'	71.1°	37°55.5'	-07.2'	71.8°	18			
19	35°36.0'	-15.1'	66.4°	35°59.7'	-14.0'	67.1°	36°22.8'	-12.8'	67.7°	36°45.2'	-11.7'	68.4°	37°06.9'	-10.5'	69.1°	37°27.9'	-09.3'	69.8°	37°48.2'	-08.0'	70.6°	19			
20	35°20.8'	-15.8'	65.2°	35°45.7'	-14.7'	65.9°	36°09.9'	-13.6'	66.5°	36°33.5'	-12.4'	67.2°	36°56.4'	-11.2'	67.9°	37°18.7'	-10.0'	68.6°	37°40.2'	-08.8'	69.3°	20			
21	35°05.0'	-16.5'	64.0°	35°31.0'	-15.4'	64.7°	35°56.4'	-14.3'	65.3°	36°21.1'	-13.1'	66.0°	36°45.2'	-12.0'	66.7°	37°08.6'	-10.8'	67.4°	37°31.4'	-09.6'	68.1°	21			
22	34°48.5'	-17.2'	62.9°	35°15.6'	-16.1'	63.5°	35°42.1'	-15.0'	64.1°	36°07.9'	-13.9'	64.8°	36°33.2'	-12.7'	65.4°	36°57.8'	-11.6'	66.1°	37°21.8'	-10.4'	66.8°	22			
23	34°31.3'	-17.8'	61.7°	34°59.5'	-16.8'	62.3°	35°27.1'	-15.7'	62.9°	35°54.1'	-14.6'	63.6°	36°20.5'	-13.5'	64.2°	36°46.3'	-12.3'	64.9°	37°11.4'	-11.2'	65.6°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6						

52° 308° LHA

Latitude SAME as Declination

52° 308° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

53° 307° LHA

Latitude SAME as Declination

53° 307° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	37°00.0'	-00.4'	90.0°	36°59.6'	+00.9'	90.8°	36°58.4'	+02.2'	91.5°	36°56.5'	+03.5'	92.3°	36°53.7'	+04.8'	93.0°	36°50.2'	+06.1'	93.8°	36°45.8'	+07.4'	94.5°	0
1	36°59.6'	-01.2'	88.7°	37°00.5'	+00.1'	89.5°	37°00.6'	+01.4'	90.3°	37°00.0'	+02.7'	91.0°	36°58.5'	+04.1'	91.8°	36°56.3'	+05.4'	92.5°	36°53.3'	+06.7'	93.3°	1
2	36°58.4'	-02.0'	87.5°	37°00.6'	-00.7'	88.2°	37°02.1'	+00.6'	89.0°	37°02.7'	+02.0'	89.8°	37°02.6'	+03.3'	90.5°	37°01.7'	+04.6'	91.3°	37°00.0'	+05.9'	92.0°	2
3	36°56.3'	-02.8'	86.2°	37°00.0'	-01.5'	87.0°	37°02.7'	-00.1'	87.8°	37°04.7'	+01.2'	88.5°	37°05.9'	+02.5'	89.3°	37°06.2'	+03.8'	90.0°	37°05.8'	+05.1'	90.8°	3
4	36°53.7'	-03.5'	85.0°	36°58.5'	-02.2'	85.7°	37°02.6'	-00.9'	86.5°	37°05.9'	+00.4'	87.3°	37°08.3'	+01.7'	88.0°	37°10.0'	+03.0'	88.8°	37°10.9'	+04.3'	89.5°	4
5	36°50.2'	-04.3'	83.7°	36°56.3'	-03.0'	84.5°	37°01.7'	-01.7'	85.2°	37°06.2'	-00.4'	86.0°	37°10.0'	+00.9'	86.8°	37°13.0'	+02.2'	87.5°	37°15.2'	+03.5'	88.3°	5
6	36°45.8'	-05.1'	82.5°	36°53.3'	-03.8'	83.2°	37°00.0'	-02.5'	84.0°	37°05.8'	-01.2'	84.7°	37°10.9'	+00.1'	85.5°	37°15.2'	+01.4'	86.3°	37°18.8'	+02.7'	87.0°	6
7	36°40.7'	-05.9'	81.3°	36°49.5'	-04.6'	82.0°	36°57.4'	-03.3'	82.7°	37°04.6'	-02.0'	83.5°	37°11.0'	-00.7'	84.2°	37°16.7'	+00.6'	85.0°	37°21.5'	+01.9'	85.8°	7
8	36°34.9'	-06.6'	80.0°	36°44.9'	-05.4'	80.8°	36°54.1'	-04.1'	81.5°	37°02.6'	-02.8'	82.2°	37°10.3'	-01.5'	83.0°	37°17.3'	-00.2'	83.7°	37°23.4'	+01.1'	84.5°	8
9	36°28.2'	-07.4'	78.8°	36°39.5'	-06.1'	79.5°	36°50.1'	-04.9'	80.2°	36°59.8'	-03.6'	81.0°	37°08.9'	-02.3'	81.7°	37°17.1'	-01.0'	82.5°	37°24.5'	+00.3'	83.2°	9
10	36°20.8'	-08.2'	77.5°	36°33.4'	-06.9'	78.3°	36°45.2'	-05.6'	79.0°	36°56.3'	-04.4'	79.7°	37°06.6'	-03.1'	80.5°	37°16.1'	-01.8'	81.2°	37°24.9'	-00.5'	82.0°	10
11	36°12.6'	-08.9'	76.3°	36°26.5'	-07.7'	77.0°	36°39.6'	-06.4'	77.8°	36°51.9'	-05.1'	78.5°	37°03.5'	-03.9'	79.2°	37°14.3'	-02.6'	80.0°	37°24.4'	-01.3'	80.7°	11
12	36°03.7'	-09.7'	75.1°	36°18.8'	-08.4'	75.8°	36°33.2'	-07.2'	76.5°	36°46.8'	-05.9'	77.2°	36°59.6'	-04.6'	78.0°	37°11.8'	-03.4'	78.7°	37°23.1'	-02.1'	79.5°	12
13	35°54.1'	-10.4'	73.9°	36°10.4'	-09.2'	74.6°	36°26.0'	-07.9'	75.3°	36°40.9'	-06.7'	76.0°	36°55.0'	-05.4'	76.7°	37°08.4'	-04.2'	77.5°	37°21.0'	-02.9'	78.2°	13
14	35°43.7'	-11.1'	72.7°	36°01.2'	-09.9'	73.4°	36°18.1'	-08.7'	74.1°	36°34.2'	-07.5'	74.8°	36°49.6'	-06.2'	75.5°	37°04.2'	-04.9'	76.2°	37°18.2'	-03.7'	77.0°	14
15	35°32.6'	-11.8'	71.5°	35°51.3'	-10.6'	72.1°	36°09.4'	-09.4'	72.8°	36°26.7'	-08.2'	73.5°	36°43.4'	-07.0'	74.2°	36°59.3'	-05.7'	75.0°	37°14.5'	-04.5'	75.7°	15
16	35°20.7'	-12.6'	70.2°	35°40.7'	-11.4'	70.9°	36°00.0'	-10.2'	71.6°	36°18.5'	-09.0'	72.3°	36°36.4'	-07.7'	73.0°	36°53.6'	-06.5'	73.7°	37°10.0'	-05.2'	74.4°	16
17	35°08.2'	-13.3'	69.1°	35°29.3'	-12.1'	69.7°	35°49.8'	-10.9'	70.4°	36°09.6'	-09.7'	71.1°	36°28.7'	-08.5'	71.8°	36°47.1'	-07.3'	72.5°	37°04.8'	-06.0'	73.2°	17
18	34°54.9'	-14.0'	67.9°	35°17.2'	-12.8'	68.5°	35°38.8'	-11.6'	69.2°	35°59.8'	-10.4'	69.9°	36°20.2'	-09.3'	70.5°	36°39.8'	-08.0'	71.2°	36°58.8'	-06.8'	72.0°	18
19	34°40.9'	-14.6'	66.7°	35°04.4'	-13.5'	67.3°	35°27.2'	-12.3'	68.0°	35°49.4'	-11.2'	68.6°	36°10.9'	-10.0'	69.3°	36°31.8'	-08.8'	70.0°	36°51.9'	-07.6'	70.7°	19
20	34°26.3'	-15.3'	65.5°	34°50.9'	-14.2'	66.1°	35°14.9'	-13.1'	66.8°	35°38.2'	-11.9'	67.4°	36°00.9'	-10.7'	68.1°	36°23.0'	-09.6'	68.8°	36°44.4'	-08.4'	69.5°	20
21	34°11.0'	-16.0'	64.3°	34°36.7'	-14.9'	64.9°	35°01.8'	-13.8'	65.6°	35°26.3'	-12.6'	66.2°	35°50.2'	-11.5'	66.9°	36°13.4'	-10.3'	67.6°	36°36.0'	-09.1'	68.2°	21
22	33°55.0'	-1																				

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

54° 306° LHA

Latitude SAME as Declination

54° 306° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	36°00.0'	-00.4'	90.0°	35°59.6'	+00.9'	90.7°	35°58.5'	+02.2'	91.5°	35°56.6'	+03.5'	92.2°	35°53.9'	+04.8'	92.9°	35°50.5'	+06.1'	93.6°	35°46.3'	+07.4'	94.3°	0
1	35°59.6'	-01.1'	88.8°	36°00.5'	+00.2'	89.5°	36°00.7'	+01.4'	90.2°	36°00.1'	+02.7'	90.9°	35°58.7'	+04.0'	91.7°	35°56.6'	+05.3'	92.4°	35°53.7'	+06.6'	93.1°	1
2	35°58.5'	-01.9'	87.5°	36°00.7'	-00.6'	88.3°	36°02.1'	+00.7'	89.0°	36°02.8'	+02.0'	89.7°	36°02.7'	+03.3'	90.4°	36°01.9'	+04.6'	91.2°	36°00.3'	+05.9'	91.9°	2
3	35°56.6'	-02.7'	86.3°	36°00.1'	-01.4'	87.0°	36°02.8'	-00.1'	87.7°	36°04.8'	+01.2'	88.5°	36°06.0'	+02.5'	89.2°	36°06.5'	+03.8'	89.9°	36°06.2'	+05.1'	90.7°	3
4	35°53.9'	-03.4'	85.1°	35°58.7'	-02.1'	85.8°	36°02.7'	-00.8'	86.5°	36°06.0'	+00.5'	87.2°	36°08.5'	+01.7'	88.0°	36°10.3'	+03.0'	88.7°	36°11.3'	+04.3'	89.4°	4
5	35°50.5'	-04.2'	83.8°	35°56.6'	-02.9'	84.5°	36°01.9'	-01.6'	85.3°	36°06.5'	-00.3'	86.0°	36°10.3'	+01.0'	86.7°	36°13.3'	+02.3'	87.5°	36°15.6'	+03.6'	88.2°	5
6	35°46.3'	-04.9'	82.6°	35°53.7'	-03.6'	83.3°	36°00.3'	-02.4'	84.0°	36°06.2'	-01.1'	84.8°	36°11.3'	+00.2'	85.5°	36°15.6'	+01.5'	86.2°	36°19.2'	+02.8'	87.0°	6
7	35°41.4'	-05.7'	81.4°	35°50.1'	-04.4'	82.1°	35°57.9'	-03.1'	82.8°	36°05.1'	-01.8'	83.5°	36°11.5'	-00.5'	84.2°	36°17.1'	+00.7'	85.0°	36°22.0'	+02.0'	85.7°	7
8	35°35.8'	-06.4'	80.1°	35°45.7'	-05.1'	80.9°	35°54.8'	-03.9'	81.6°	36°03.3'	-02.6'	82.3°	36°10.9'	-01.3'	83.0°	36°17.9'	00.0'	83.7°	36°24.0'	+01.3'	84.5°	8
9	35°29.3'	-07.1'	78.9°	35°40.5'	-05.9'	79.6°	35°51.0'	-04.6'	80.3°	36°00.7'	-03.4'	81.1°	36°09.6'	-02.1'	81.8°	36°17.8'	-00.8'	82.5°	36°25.3'	+00.5'	83.2°	9
10	35°22.2'	-07.9'	77.7°	35°34.6'	-06.6'	78.4°	35°46.3'	-05.4'	79.1°	35°57.3'	-04.1'	79.8°	36°07.5'	-02.8'	80.5°	36°17.0'	-01.6'	81.3°	36°25.8'	-00.3'	82.0°	10
11	35°14.3'	-08.6'	76.5°	35°28.0'	-07.4'	77.2°	35°41.0'	-06.1'	77.9°	35°53.2'	-04.9'	78.6°	36°04.7'	-03.6'	79.3°	36°15.5'	-02.3'	80.0°	36°25.5'	-01.1'	80.7°	11
12	35°05.7'	-09.3'	75.3°	35°20.6'	-08.1'	76.0°	35°34.8'	-06.9'	76.7°	35°48.3'	-05.6'	77.4°	36°01.1'	-04.4'	78.1°	36°13.1'	-03.1'	78.8°	36°24.4'	-01.8'	79.5°	12
13	34°56.4'	-10.0'	74.1°	35°12.5'	-08.8'	74.7°	35°28.0'	-07.6'	75.4°	35°42.7'	-06.4'	76.1°	35°56.7'	-05.1'	76.8°	36°10.0'	-03.9'	77.5°	36°22.6'	-02.6'	78.3°	13
14	34°46.4'	-10.7'	72.9°	35°03.7'	-09.5'	73.5°	35°20.4'	-08.3'	74.2°	35°36.3'	-07.1'	74.9°	35°51.6'	-05.9'	75.6°	36°06.2'	-04.6'	76.3°	36°20.0'	-03.4'	77.0°	14
15	34°35.6'	-11.4'	71.7°	34°54.2'	-10.2'	72.3°	35°12.0'	-09.0'	73.0°	35°29.2'	-07.8'	73.7°	35°45.8'	-06.6'	74.4°	36°01.6'	-05.4'	75.1°	36°16.7'	-04.1'	75.8°	15
16	34°24.2'	-12.1'	70.5°	34°43.9'	-11.0'	71.1°	35°03.0'	-09.8'	71.8°	35°21.4'	-08.6'	72.5°	35°39.1'	-07.4'	73.1°	35°56.2'	-06.1'	73.8°	36°12.5'	-04.9'	74.5°	16
17	34°12.1'	-12.8'	69.3°	34°33.0'	-11.6'	69.9°	34°53.2'	-10.5'	70.6°	35°12.8'	-09.3'	71.3°	35°31.8'	-08.1'	71.9°	35°50.1'	-06.9'	72.6°	36°07.6'	-05.6'	73.3°	17
18	33°59.3'	-13.5'	68.1°	34°21.3'	-12.3'	68.7°	34°42.8'	-11.2'	69.4°	35°03.6'	-10.0'	70.0°	35°23.7'	-08.8'	70.7°	35°43.2'	-07.6'	71.4°	36°02.0'	-06.4'	72.1°	18
19	33°45.8'	-14.1'	66.9°	34°09.0'	-13.0'	67.6°	34°31.6'	-11.9'	68.2°	34°53.6'	-10.7'	68.8°	35°14.9'	-09.5'	69.5°	35°35.6'	-08.4'	70.2°	35°55.6'	-07.2'	70.8°	19
20	33°31.7'	-14.8'	65.8°	33°56.0'	-13.7'	66.4°	34°19.7'	-12.6'	67.0°	34°42.8'	-11.4'	67.6°	35°05.3'	-10.3'	68.3°	35°27.2'	-09.1'	69.0°	35°48.4'	-07.9'	69.6°	20
21	33°16.9'	-15.4'	64.6°	33°42.3'	-14.3'	65.2°	34°07.2'	-13.2'	65.8°	34°31.4'	-12.1'	66.5°	34°55.1'	-11.0'	67.1°	35°18.1'	-09.8'	67.7°	35°40.5'	-08.6'	68.4°	21
22	33°01.4'	-16.1'	63.5°	33°28.0'	-15.0'	64.1°	33°53.9'	-13.9'	64.7°	34°19.3'	-12.8'	65.3°	34°44.1'	-11.7'	65.9°	35°08.3'	-10.5'	66.5°	35°31.9'	-09.4'	67.2°	22
23	32°45.3'	-16.7'	62.3°	33°13.0'	-15.6'	62.9°	33°40.0'	-14.6'	63.5°	34°06.5'	-13.5'	64.1°	34°32.5'	-12.4'	64.7°	34°57.8'	-11.2'	65.3°	35°22.6'	-10.1'	66.0°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

54° 306° LHA

Latitude SAME as Declination

54° 306° LHA

South Lat. LHA > 180° .. Zn = 180-Z LHA < 180° .. Zn= 180+Z

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

55° 305° LHA

Latitude SAME as Declination

55° 305° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	35°00.0'	-00.4'	90.0°	34°59.6'	+00.9'	90.7°	34°58.5'	+02.2'	91.4°	34°56.7'	+03.5'	92.1°	34°54.1'	+04.7'	92.8°	34°50.8'	+06.0'	93.5°	34°46.8'	+07.3'	94.2°	0
1	34°59.6'	-01.1'	88.8°	35°00.5'	+00.2'	89.5°	35°00.7'	+01.5'	90.2°	35°00.2'	+02.7'	90.9°	34°58.9'	+04.0'	91.6°	34°56.9'	+05.3'	92.3°	34°54.1'	+06.6'	93.0°	1
2	34°58.5'	-01.8'	87.6°	35°00.7'	-00.6'	88.3°	35°02.2'	+00.7'	89.0°	35°02.9'	+02.0'	89.7°	35°02.9'	+03.3'	90.4°	35°02.1'	+04.6'	91.1°	35°00.7'	+05.8'	91.8°	2
3	34°56.6'	-02.6'	86.3°	35°00.2'	-01.3'	87.0°	35°02.9'	00.0'	87.7°	35°04.9'	+01.3'	88.4°	35°06.2'	+02.5'	89.1°	35°06.7'	+03.8'	89.8°	35°06.5'	+05.1'	90.5°	3
4	34°54.1'	-03.3'	85.1°	34°58.9'	-02.0'	85.8°	35°02.9'	-00.7'	86.5°	35°06.2'	+00.5'	87.2°	35°08.7'	+01.8'	87.9°	35°10.5'	+03.1'	88.6°	35°11.6'	+04.4'	89.3°	4
5	34°50.8'	-04.0'	83.9°	34°56.9'	-02.8'	84.6°	35°02.1'	-01.5'	85.3°	35°06.7'	-00.2'	86.0°	35°10.5'	+01.1'	86.7°	35°13.6'	+02.4'	87.4°	35°16.0'	+03.6'	88.1°	5
6	34°46.8'	-04.7'	82.7°	34°54.1'	-03.5'	83.4°	35°00.7'	-02.2'	84.1°	35°06.5'	-00.9'	84.8°	35°11.6'	+00.3'	85.5°	35°16.0'	+01.6'	86.2°	35°19.6'	+02.9'	86.9°	6
7	34°42.1'	-05.5'	81.5°	34°50.6'	-04.2'	82.2°	34°58.5'	-02.9'	82.9°	35°05.6'	-01.7'	83.6°	35°11.9'	-00.4'	84.3°	35°17.6'	+00.9'	85.0°	35°22.5'	+02.1'	85.7°	7
8	34°36.6'	-06.2'	80.3°	34°46.4'	-04.9'	80.9°	34°55.5'	-03.7'	81.6°	35°03.9'	-02.4'	82.3°	35°11.5'	-01.1'	83.0°	35°18.4'	+00.1'	83.7°	35°24.6'	+01.4'	84.4°	8
9	34°30.5'	-06.9'	79.1°	34°41.5'	-05.6'	79.7°	34°51.8'	-04.4'	80.4°	35°01.5'	-03.1'	81.1°	35°10.4'	-01.9'	81.8°	35°18.6'	-00.6'	82.5°	35°26.0'	+00.7'	83.2°	9
10	34°23.6'	-07.6'	77.9°	34°35.8'	-06.4'	78.5°	34°47.4'	-05.1'	79.2°	34°58.3'	-03.9'	79.9°	35°08.5'	-02.6'	80.6°	35°18.0'	-01.4'	81.3°	35°26.7'	-00.1'	82.0°	10
11	34°16.0'	-08.3'	76.7°	34°29.5'	-07.1'	77.3°	34°42.3'	-05.8'	78.0°	34°54.4'	-04.6'	78.7°	35°05.9'	-03.4'	79.4°	35°16.6'	-02.1'	80.1°	35°26.6'	-00.8'	80.8°	11
12	34°07.7'	-09.0'	75.5°	34°22.4'	-07.8'	76.1°	34°36.5'	-06.6'	76.8°	34°49.8'	-05.3'	77.5°	35°02.5'	-04.1'	78.1°	35°14.5'	-02.8'	78.8°	35°25.8'	-01.6'	79.5°	12
13	33°58.7'	-09.7'	74.3°	34°14.6'	-08.5'	74.9°	34°29.9'	-07.3'	75.6°	34°44.5'	-06.0'	76.2°	34°58.4'	-04.8'	76.9°	35°11.7'	-03.6'	77.6°	35°24.2'	-02.3'	78.3°	13
14	33°49.0'	-10.4'	73.1°	34°06.2'	-09.2'	73.7°	34°22.6'	-08.0'	74.4°	34°38.5'	-06.8'	75.0°	34°53.6'	-05.5'	75.7°	35°08.1'	-04.3'	76.4°	35°21.9'	-03.1'	77.1°	14
15	33°38.6'	-11.0'	71.9°	33°57.0'	-09.9'	72.5°	34°14.7'	-08.7'	73.2°	34°31.7'	-07.5'	73.8°	34°48.1'	-06.3'	74.5°	35°03.8'	-05.0'	75.2°	35°18.8'	-03.8'	75.8°	15
16	33°27.6'	-11.7'	70.7°	33°47.1'	-10.5'	71.3°	34°06.0'	-09.4'	72.0°	34°24.3'	-08.2'	72.6°	34°41.8'	-07.0'	73.3°	34°58.8'	-05.8'	73.9°	35°15.0'	-04.5'	74.6°	16
17	33°15.9'	-12.4'	69.5°	33°36.6'	-11.2'	70.2°	33°56.6'	-10.0'	70.8°	34°16.1'	-08.9'	71.4°	34°34.9'	-07.7'	72.1°	34°53.0'	-06.5'	72.7°	35°10.5'	-05.3'	73.4°	17
18	33°03.5'	-13.0'	68.4°	33°25.4'	-11.9'	69.0°	33°46.6'	-10.7'	69.6°	34°07.2'	-09.6'	70.2°	34°27.2'	-08.4'	70.9°	34°46.5'	-07.2'	71.5°	35°05.2'	-06.0'	72.2°	18
19	32°50.5'	-13.7'	67.2°	33°13.5'	-12.5'	67.8°	33°35.9'	-11.4'	68.4°	33°57.6'	-10.3'	69.0°	34°18.8'	-09.1'	69.7°	34°39.3'	-07.9'	70.3°	34°59.2'	-06.7'	71.0°	19
20	32°36.9'	-14.3'	66.0°	33°01.0'	-13.2'	66.6°	33°24.5'	-12.1'	67.2°	33°47.4'	-10.9'	67.9°	34°09.7'	-09.8'	68.5°	34°31.4'	-08.6'	69.1°	34°52.5'	-07.4'	69.8°	20
21	32°22.6'	-14.9'	64.9°	32°47.8'	-13.8'	65.5°	33°12.4'	-12.7'	66.1°	33°36.5'	-11.6'	66.7°	34°00.0'	-10.5'	67.3°	34°22.8'	-09.3'	67.9°	34°45.0'	-08.2'	68.6°	21
22	32°07.7'	-15.5'	63.7°	32°33.9'	-14.5'	64.3°	32°59.7'</															

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

56° 304° LHA

Latitude SAME as Declination

56° 304° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	34°00.0'	-00.4'	90.0°	33°59.6'	+00.9'	90.7°	33°58.6'	+02.2'	91.3°	33°56.8'	+03.4'	92.0°	33°54.4'	+04.7'	92.7°	33°51.2'	+05.9'	93.4°	33°47.3'	+07.2'	94.0°	0
1	33°59.6'	-01.1'	88.8°	34°00.6'	+00.2'	89.5°	34°00.8'	+01.5'	90.1°	34°00.3'	+02.7'	90.8°	33°59.0'	+04.0'	91.5°	33°57.1'	+05.2'	92.2°	33°54.5'	+06.5'	92.8°	1
2	33°58.6'	-01.8'	87.6°	34°00.8'	-00.5'	88.3°	34°02.2'	+00.8'	88.9°	34°03.0'	+02.0'	89.6°	34°03.0'	+03.3'	90.3°	34°02.4'	+04.5'	91.0°	34°01.0'	+05.8'	91.6°	2
3	33°56.8'	-02.5'	86.4°	34°00.3'	-01.2'	87.1°	34°03.0'	+00.1'	87.7°	34°05.0'	+01.3'	88.4°	34°06.3'	+02.6'	89.1°	34°06.9'	+03.8'	89.8°	34°06.8'	+05.1'	90.4°	3
4	33°54.4'	-03.2'	85.2°	33°59.0'	-01.9'	85.8°	34°03.0'	-00.7'	86.5°	34°06.3'	+00.6'	87.2°	34°08.9'	+01.9'	87.9°	34°10.8'	+03.1'	88.6°	34°11.9'	+04.4'	89.2°	4
5	33°51.2'	-03.9'	84.0°	33°57.1'	-02.6'	84.6°	34°02.4'	-01.4'	85.3°	34°06.9'	-00.1'	86.0°	34°10.8'	+01.2'	86.7°	34°13.9'	+02.4'	87.3°	34°16.3'	+03.7'	88.0°	5
6	33°47.3'	-04.6'	82.8°	33°54.5'	-03.3'	83.4°	34°01.0'	-02.1'	84.1°	34°06.8'	-00.8'	84.8°	34°11.9'	+00.4'	85.5°	34°16.3'	+01.7'	86.1°	34°20.0'	+03.0'	86.8°	6
7	33°42.7'	-05.3'	81.6°	33°51.2'	-04.0'	82.2°	33°59.0'	-02.8'	82.9°	34°06.0'	-01.5'	83.6°	34°12.4'	-00.3'	84.3°	34°18.0'	+01.0'	84.9°	34°23.0'	+02.3'	85.6°	7
8	33°37.5'	-06.0'	80.4°	33°47.2'	-04.7'	81.0°	33°56.2'	-03.5'	81.7°	34°04.5'	-02.2'	82.4°	34°12.1'	-01.0'	83.0°	34°19.0'	+00.3'	83.7°	34°25.2'	+01.5'	84.4°	8
9	33°31.5'	-06.6'	79.2°	33°42.5'	-05.4'	79.8°	33°52.7'	-04.2'	80.5°	34°02.3'	-02.9'	81.2°	34°11.1'	-01.7'	81.8°	34°19.3'	-00.4'	82.5°	34°26.8'	+00.8'	83.2°	9
10	33°24.9'	-07.3'	78.0°	33°37.0'	-06.1'	78.6°	33°48.5'	-04.9'	79.3°	33°59.3'	-03.6'	80.0°	34°09.4'	-02.4'	80.6°	34°18.9'	-01.1'	81.3°	34°27.6'	+00.1'	82.0°	10
11	33°17.6'	-08.0'	76.8°	33°30.9'	-06.8'	77.4°	33°43.7'	-05.6'	78.1°	33°55.7'	-04.3'	78.8°	34°07.1'	-03.1'	79.4°	34°17.7'	-01.9'	80.1°	34°27.7'	-00.6'	80.8°	11
12	33°09.6'	-08.7'	75.6°	33°24.2'	-07.5'	76.3°	33°38.1'	-06.3'	76.9°	33°51.3'	-05.0'	77.6°	34°03.9'	-03.8'	78.2°	34°15.9'	-02.6'	78.9°	34°27.1'	-01.3'	79.5°	12
13	33°00.9'	-09.3'	74.4°	33°16.7'	-08.1'	75.1°	33°31.8'	-06.9'	75.7°	33°46.3'	-05.7'	76.4°	34°00.1'	-04.5'	77.0°	34°13.3'	-03.3'	77.7°	34°25.8'	-02.0'	78.3°	13
14	32°51.6'	-10.0'	73.3°	33°08.5'	-08.8'	73.9°	33°24.9'	-07.6'	74.5°	33°40.6'	-06.4'	75.2°	33°55.6'	-05.2'	75.8°	34°10.0'	-04.0'	76.5°	34°23.7'	-02.8'	77.1°	14
15	32°41.6'	-10.6'	72.1°	32°59.7'	-09.5'	72.7°	33°17.3'	-08.3'	73.3°	33°34.2'	-07.1'	74.0°	33°50.4'	-05.9'	74.6°	34°06.0'	-04.7'	75.3°	34°20.9'	-03.5'	75.9°	15
16	32°30.9'	-11.3'	70.9°	32°50.3'	-10.1'	71.5°	33°09.0'	-09.0'	72.1°	33°27.0'	-07.8'	72.8°	33°44.5'	-06.6'	73.4°	34°01.3'	-05.4'	74.1°	34°17.5'	-04.2'	74.7°	16
17	32°19.7'	-11.9'	69.8°	32°40.1'	-10.8'	70.4°	33°00.0'	-09.6'	71.0°	33°19.3'	-08.5'	71.6°	33°37.9'	-07.3'	72.2°	33°55.9'	-06.1'	72.9°	34°13.3'	-04.9'	73.5°	17
18	32°07.7'	-12.6'	68.6°	32°29.3'	-11.4'	69.2°	32°50.4'	-10.3'	69.8°	33°10.8'	-09.1'	70.4°	33°30.6'	-08.0'	71.0°	33°49.8'	-06.8'	71.7°	34°08.4'	-05.6'	72.3°	18
19	31°55.2'	-13.2'	67.4°	32°17.9'	-12.1'	68.0°	32°40.1'	-10.9'	68.6°	33°01.7'	-09.8'	69.2°	33°22.6'	-08.6'	69.8°	33°43.0'	-07.5'	70.5°	34°02.8'	-06.3'	71.1°	19
20	31°42.0'	-13.8'	66.3°	32°05.8'	-12.7'	66.9°	32°29.1'	-11.6'	67.5°	32°51.9'	-10.5'	68.0°	33°14.0'	-09.3'	68.6°	33°35.5'	-08.2'	69.3°	33°56.5'	-07.0'	69.9°	20
21	31°28.2'	-14.4'	65.2°	31°53.1'	-13.3'	65.7°	32°17.5'	-12.2'	66.3°	32°41.4'	-11.1'	66.9°	33°04.1'	-10.0'	67.5°	33°27.4'	-08.8'	68.1°	33°49.5'	-07.7'	68.7°	21
22	31°13.8'	-15.0'	64.0°	31°39.8'	-13.9'	64.6°	32°05.3'	-12.8'	65.1°	32°20.3'	-11.8'	65.7°	32°54.7'	-10.6'	66.3°	33°18.5'	-09.5'	66.9°	33°41.8'	-08.4'	67.5°	22
23	30°58.8'	-15.6'	62.9°	31°25.9'	-14.5'	63.4°	31°52.5'	-13.5'	64.0°	32°18.5'	-12.4'	64.5°	32°44.0'	-11.3'	65.1°	33°09.0'	-10.2'	65.7°	33°33.4'	-09.1'	66.3°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	1			2			3			4			5			6			0			

56° 304° LHA

Latitude SAME as Declination

56° 304° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

57° 303° LHA

Latitude SAME as Declination

57° 303° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	33°00.0'	-00.3'	90.0°	32°59.7'	+00.9'	90.6°	32°58.6'	+02.2'	91.3°	32°56.9'	+03.4'	91.9°	32°54.6'	+04.6'	92.6°	32°51.5'	+05.9'	93.2°	32°47.8'	+07.1'	93.9°	0
1	32°59.7'	-01.0'	88.8°	33°00.6'	+00.2'	89.5°	33°00.8'	+01.5'	90.1°	33°00.3'	+02.7'	90.8°	32°59.2'	+04.0'	91.4°	32°57.4'	+05.2'	92.1°	32°54.9'	+06.5'	92.7°	1
2	32°58.6'	-01.7'	87.6°	33°00.8'	-00.5'	88.3°	33°02.3'	+00.8'	88.9°	33°03.1'	+02.0'	89.6°	33°03.2'	+03.3'	90.2°	33°02.6'	+04.5'	90.9°	33°01.4'	+05.8'	91.5°	2
3	32°56.9'	-02.4'	86.4°	33°00.3'	-01.1'	87.1°	33°03.1'	+00.1'	87.7°	33°05.1'	+01.4'	88.4°	33°06.5'	+02.6'	89.0°	33°07.2'	+03.9'	89.7°	33°07.2'	+05.1'	90.3°	3
4	32°54.6'	-03.1'	85.2°	32°59.2'	-01.8'	85.9°	33°03.2'	-00.6'	86.5°	33°06.5'	+00.7'	87.2°	33°09.1'	+01.9'	87.8°	33°11.0'	+03.2'	88.5°	33°12.3'	+04.4'	89.1°	4
5	32°51.5'	-03.7'	84.0°	32°57.4'	-02.5'	84.7°	33°02.6'	-01.2'	85.3°	33°07.2'	-00.0'	86.0°	33°11.0'	+01.2'	86.6°	33°14.2'	+02.5'	87.3°	33°16.7'	+03.7'	87.9°	5
6	32°47.8'	-04.4'	82.8°	32°54.9'	-03.2'	83.5°	33°01.4'	-01.9'	84.1°	33°07.2'	-00.7'	84.8°	33°12.3'	+00.6'	85.4°	33°16.7'	+01.8'	86.1°	33°20.4'	+03.1'	86.8°	6
7	32°43.4'	-05.1'	81.6°	32°51.7'	-03.8'	82.3°	32°59.4'	-02.6'	83.0°	33°06.5'	-01.4'	83.6°	33°12.8'	-00.1'	84.2°	33°18.5'	+01.1'	84.9°	33°23.5'	+02.4'	85.6°	7
8	32°38.3'	-05.7'	80.5°	32°47.9'	-04.5'	81.1°	32°56.8'	-03.3'	81.8°	33°05.1'	-02.0'	82.4°	33°12.7'	-00.8'	83.1°	33°19.6'	+00.4'	83.7°	33°25.9'	+01.7'	84.4°	8
9	32°32.6'	-06.4'	79.3°	32°43.4'	-05.2'	79.9°	32°53.6'	-04.0'	80.6°	33°03.1'	-02.7'	81.2°	33°11.9'	-01.5'	81.9°	33°20.0'	-00.3'	82.5°	33°27.5'	+01.0'	83.2°	9
10	32°26.2'	-07.1'	78.1°	32°38.2'	-05.8'	78.8°	32°49.6'	-04.6'	79.4°	33°00.3'	-03.4'	80.0°	33°10.4'	-02.2'	80.7°	33°19.8'	-00.9'	81.3°	33°28.5'	+00.3'	82.0°	10
11	32°19.1'	-07.7'	77.0°	32°32.4'	-06.5'	77.6°	32°45.0'	-05.3'	78.2°	32°56.9'	-04.1'	78.8°	33°08.2'	-02.9'	79.5°	33°18.8'	-01.6'	80.1°	33°28.8'	-00.4'	80.8°	11
12	32°11.4'	-08.4'	75.8°	32°25.9'	-07.2'	76.4°	32°39.7'	-06.0'	77.0°	32°52.8'	-04.8'	77.6°	33°05.3'	-03.5'	78.3°	33°17.2'	-02.3'	78.9°	33°28.4'	-01.1'	79.6°	12
13	32°03.1'	-09.0'	74.6°	32°18.7'	-07.8'	75.2°	32°33.7'	-06.6'	75.8°	32°48.1'	-05.4'	76.5°	33°01.8'	-04.2'	77.1°	33°14.9'	-03.0'	77.7°	33°27.3'	-01.8'	78.4°	13
14	31°54.1'	-09.6'	73.4°	32°10.9'	-08.5'	74.0°	32°27.1'	-07.3'	74.7°	32°42.6'	-06.1'	75.3°	32°57.6'	-04.9'	75.9°	33°11.9'	-03.7'	76.5°	33°25.5'	-02.5'	77.2°	14
15	31°44.5'	-10.3'	72.3°	32°02.4'	-09.1'	72.9°	32°19.8'	-07.9'	73.5°	32°36.5'	-06.8'	74.1°	32°52.7'	-05.6'	74.7°	33°08.2'	-04.4'	75.3°	33°23.1'	-03.2'	76.0°	15
16	31°34.2'	-10.9'	71.1°	31°53.3'	-09.7'	71.7°	32°11.9'	-08.6'	72.3°	32°29.8'	-07.4'	72.9°	32°47.1'	-06.2'	73.5°	33°03.8'	-05.0'	74.1°	33°19.9'	-03.8'	74.8°	16
17	31°23.3'	-11.5'	70.0°	31°43.6'	-10.4'	70.5°	32°03.3'	-09.2'	71.1°	32°22.4'	-08.1'	71.7°	32°40.9'	-06.9'	72.3°	32°58.8'	-05.7'	73.0°	33°16.1'	-04.5'	73.6°	17
18	31°11.8'	-12.1'	68.8°	31°33.2'	-11.0'	69.4°	31°54.1'	-09.9'	70.0°	32°14.3'	-08.7'	70.6°	32°34.0'	-07.6'	71.2°	32°53.1'	-06.4'	71.8°	33°11.5'	-05.2'	72.4°	18
19	30°59.7'	-12.7'	67.7°	31°22.2'	-11.6'	68.2°	31°44.2'	-10.5'	68.8°	32°05.6'	-09.4'	69.4°	32°26.4'	-08.2'	70.0°	32°46.7'	-07.1'	70.6°	33°06.3'	-05.9'	71.2°	19
20	30°47.0'	-13.3'	66.5°	31°10.6'	-12.2'	67.1°	31°33.7'	-11.1'	67.7°	31°56.2'	-10.0'	68.2°	32°18.2'	-08.9'	68.8°	32°39.6'	-07.7'	69.4°	33°00.4'	-06.6'	70.0°	20
21	30°33.7'	-13.9'	65.4°	30°58.4'	-12.8'	65.9°	31°22.6'	-11.7'	66.5°	31°46.2'	-10.6'	67.1°	32°09.4'	-09.5'	67.6°	32°31.9'	-08.4'	68.2°	32°53.9'	-07.2'	68.8°	21
22	30°19.8'	-14.5'	64.3°	30°45.6'</																		

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

58° 302° LHA

Latitude SAME as Declination

58° 302° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	32°00.0'-00.3'	90.0°		31°59.7'+00.9'	90.6°		31°58.7'+02.1'	91.2°		31°57.1'+03.4'	91.9°		31°54.8'+04.6'	92.5°		31°51.8'+05.8'	93.1°		31°48.2'+07.1'	93.7°		0
1	31°59.7'-01.0'	88.8°		32°00.6'+00.3'	89.4°		32°00.8'+01.5'	90.1°		32°00.4'+02.7'	90.7°		31°59.4'+04.0'	91.3°		31°57.7'+05.2'	91.9°		31°55.3'+06.4'	92.6°		1
2	31°58.7'-01.6'	87.6°		32°00.8'-00.4'	88.3°		32°02.3'+00.8'	88.9°		32°03.2'+02.1'	89.5°		32°03.3'+03.3'	90.1°		32°02.9'+04.5'	90.8°		32°01.7'+05.8'	91.4°		2
3	31°57.1'-02.3'	86.5°		32°00.4'-01.1'	87.1°		32°03.2'+00.2'	87.7°		32°05.2'+01.4'	88.3°		32°06.6'+02.6'	89.0°		32°07.4'+03.9'	89.6°		32°07.5'+05.1'	90.2°		3
4	31°54.8'-02.9'	85.3°		31°59.4'-01.7'	85.9°		32°03.3'-00.5'	86.5°		32°06.6'+00.8'	87.2°		32°09.3'+02.0'	87.8°		32°11.3'+03.2'	88.4°		32°12.6'+04.5'	89.0°		4
5	31°51.8'-03.6'	84.1°		31°57.7'-02.4'	84.7°		32°02.9'-01.1'	85.4°		32°07.4'+00.1'	86.0°		32°11.3'+01.3'	86.6°		32°14.5'+02.6'	87.2°		32°17.1'+03.8'	87.9°		5
6	31°48.2'-04.2'	82.9°		31°55.3'-03.0'	83.6°		32°01.7'-01.8'	84.2°		32°07.5'-00.6'	84.8°		32°12.6'+00.7'	85.4°		32°17.1'+01.9'	86.1°		32°20.9'+03.1'	86.7°		6
7	31°44.0'-04.9'	81.8°		31°52.3'-03.7'	82.4°		32°00.0'-02.4'	83.0°		32°06.9'-01.2'	83.6°		32°13.3'+00.0'	84.2°		32°19.0'+01.2'	84.9°		32°24.0'+02.5'	85.5°		7
8	31°39.1'-05.5'	80.6°		31°48.6'-04.3'	81.2°		31°57.5'-03.1'	81.8°		32°05.7'-01.9'	82.4°		32°13.3'-00.6'	83.1°		32°20.2'+00.6'	83.7°		32°26.5'+01.8'	84.3°		8
9	31°33.6'-06.2'	79.4°		31°44.3'-05.0'	80.0°		31°54.4'-03.7'	80.6°		32°03.8'-02.5'	81.3°		32°12.6'-01.3'	81.9°		32°20.8'-00.1'	82.5°		32°28.3'+01.1'	83.1°		9
10	31°27.5'-06.8'	78.3°		31°39.4'-05.6'	78.9°		31°50.7'-04.4'	79.5°		32°01.3'-03.2'	80.1°		32°11.3'-02.0'	80.7°		32°20.7'-00.7'	81.3°		32°29.4'+00.5'	81.9°		10
11	31°20.7'-07.4'	77.1°		31°33.8'-06.2'	77.7°		31°46.3'-05.0'	78.3°		31°58.1'-03.8'	78.9°		32°09.4'-02.6'	79.5°		32°20.0'-01.4'	80.1°		32°29.9'-00.2'	80.8°		11
12	31°13.3'-08.0'	75.9°		31°27.5'-06.9'	76.5°		31°41.2'-05.7'	77.1°		31°54.3'-04.5'	77.7°		32°06.7'-03.3'	78.3°		32°18.5'-02.1'	79.0°		32°29.7'-00.9'	79.6°		12
13	31°05.2'-08.7'	74.8°		31°20.7'-07.5'	75.4°		31°35.5'-06.3'	75.9°		31°49.8'-05.1'	76.5°		32°03.5'-03.9'	77.2°		32°16.5'-02.7'	77.8°		32°28.9'-01.5'	78.4°		13
14	30°56.6'-09.3'	73.6°		31°13.2'-08.1'	74.2°		31°29.2'-06.9'	74.8°		31°44.7'-05.8'	75.4°		31°59.5'-04.6'	76.0°		32°13.7'-03.4'	76.6°		32°27.4'-02.2'	77.2°		14
15	30°47.3'-09.9'	72.5°		31°05.1'-08.7'	73.0°		31°22.3'-07.6'	73.6°		31°38.9'-06.4'	74.2°		31°54.9'-05.2'	74.8°		32°10.4'-04.0'	75.4°		32°25.2'-02.9'	76.0°		15
16	30°37.4'-10.5'	71.3°		30°56.3'-09.3'	71.9°		31°14.7'-08.2'	72.5°		31°32.5'-07.0'	73.0°		31°49.7'-05.9'	73.6°		32°06.3'-04.7'	74.2°		32°22.3'-03.5'	74.8°		16
17	30°26.9'-11.1'	70.2°		30°47.0'-10.0'	70.7°		31°06.5'-08.8'	71.3°		31°25.5'-07.7'	71.9°		31°43.8'-06.5'	72.5°		32°01.6'-05.3'	73.1°		32°18.8'-04.2'	73.7°		17
18	30°15.8'-11.7'	69.0°		30°37.0'-10.6'	69.6°		30°57.7'-09.4'	70.1°		31°17.8'-08.3'	70.7°		31°37.3'-07.2'	71.3°		31°56.3'-06.0'	71.9°		32°14.6'-04.8'	72.5°		18
19	30°04.2'-12.3'	67.9°		30°26.5'-11.2'	68.4°		30°48.3'-10.0'	69.0°		31°09.5'-08.9'	69.6°		31°30.2'-07.8'	70.1°		31°50.3'-06.6'	70.7°		32°09.8'-05.5'	71.3°		19
20	29°51.9'-12.8'	66.8°		30°15.3'-11.7'	67.3°		30°38.2'-10.6'	67.8°		31°00.6'-09.5'	68.4°		31°22.4'-08.4'	69.0°		31°43.6'-07.3'	69.5°		32°04.3'-06.1'	70.1°		20
21	29°39.1'-13.4'	65.6°		30°03.6'-12.3'	66.2°		30°27.6'-11.2'	66.7°		30°51.0'-10.1'	67.3°		31°14.0'-09.0'	67.8°		31°36.4'-07.9'	68.4°		31°58.2'-06.8'	69.0°		21
22	29°25.7'-14.0'	64.5°		29°51.3'-12.9'	65.0°		30°16.3'-11.8'	65.6°		30°40.9'-10.7'	66.1°		31°04.9'-09.6'	66.7°		31°28.4'-08.5'	67.2°		31°51.4'-07.4'	67.8°		22
23	29°11.7'-14.5'	63.4°		29°38.4'-13.5'	63.9°		30°04.5'-12.4'	64.4°		30°30.1'-11.3'	65.0°		30°55.3'-10.3'	65.5°		31°19.9'-09.2'	66.1°		31°44.0'-08.1'	66.6°		23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

58° 302° LHA

Latitude SAME as Declination

58° 302° LHA

South Lat. LHA > 180° .. Zn = 180-Z LHA < 180° .. Zn= 180+Z

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

59° 301° LHA

Latitude SAME as Declination

59° 301° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	31°00.0'-00.3'	90.0°		30°59.7'+00.9'	90.6°		30°58.7'+02.1'	91.2°		30°57.2'+03.3'	91.8°		30°55.0'+04.6'	92.4°		30°52.1'+05.8'	93.0°		30°48.7'+07.0'	93.6°		0
1	30°59.7'-00.9'	88.8°		31°00.6'+00.3'	89.4°		31°00.9'+01.5'	90.0°		31°00.5'+02.7'	90.6°		30°59.5'+03.9'	91.2°		30°57.9'+05.2'	91.8°		30°55.7'+06.4'	92.4°		1
2	30°58.7'-01.6'	87.7°		31°00.9'-00.4'	88.3°		31°02.4'+00.9'	88.9°		31°03.2'+02.1'	89.5°		31°03.5'+03.3'	90.1°		31°03.1'+04.5'	90.7°		31°02.1'+05.8'	91.3°		2
3	30°57.2'-02.2'	86.5°		31°00.5'-01.0'	87.1°		31°03.2'+00.2'	87.7°		31°05.3'+01.5'	88.3°		31°06.8'+02.7'	88.9°		31°07.6'+03.9'	89.5°		31°07.8'+05.1'	90.1°		3
4	30°55.0'-02.8'	85.3°		30°59.5'-01.6'	85.9°		31°03.5'-00.4'	86.5°		31°06.8'+00.8'	87.1°		31°09.5'+02.0'	87.7°		31°11.5'+03.3'	88.3°		31°12.9'+04.5'	89.0°		4
5	30°52.1'-03.4'	84.2°		30°57.9'-02.2'	84.8°		31°03.1'-01.0'	85.4°		31°07.6'+00.2'	86.0°		31°11.5'+01.4'	86.6°		31°14.8'+02.6'	87.2°		31°17.4'+03.9'	87.8°		5
6	30°48.7'-04.1'	83.0°		30°55.7'-02.9'	83.6°		31°02.1'-01.7'	84.2°		31°07.8'+00.4'	84.8°		31°12.9'+00.8'	85.4°		31°17.4'+02.0'	86.0°		31°21.3'+03.2'	86.6°		6
7	30°44.6'-04.7'	81.8°		30°52.8'-03.5'	82.4°		31°00.4'-02.3'	83.0°		31°07.4'-01.1'	83.6°		31°13.7'+00.1'	84.2°		31°19.4'+01.4'	84.8°		31°24.5'+02.6'	85.4°		7
8	30°39.9'-05.3'	80.7°		30°49.3'-04.1'	81.3°		30°58.1'-02.9'	81.9°		31°06.3'-01.7'	82.5°		31°13.9'-00.5'	83.1°		31°20.8'+00.7'	83.7°		31°27.1'+01.9'	84.3°		8
9	30°34.6'-05.9'	79.5°		30°45.2'-04.7'	80.1°		30°55.2'-03.5'	80.7°		31°04.6'-02.3'	81.3°		31°13.4'-01.1'	81.9°		31°21.5'+00.1'	82.5°		31°29.0'+01.3'	83.1°		9
10	30°28.7'-06.5'	78.4°		30°40.5'-05.3'	79.0°		30°51.7'-04.2'	79.5°		31°02.3'-03.0'	80.1°		31°12.3'-01.8'	80.7°		31°21.6'-00.5'	81.3°		31°30.4'+00.7'	81.9°		10
11	30°22.2'-07.1'	77.2°		30°35.1'-06.0'	77.8°		30°47.5'-04.8'	78.4°		30°59.3'-03.6'	79.0°		31°10.5'-02.4'	79.6°		31°21.1'-01.2'	80.2°		31°31.0'+00.0'	80.8°		11
12	30°15.0'-07.7'	76.1°		30°29.2'-06.6'	76.6°		30°42.8'-05.4'	77.2°		30°55.7'-04.2'	77.8°		31°08.1'-03.0'	78.4°		31°19.9'-01.8'	79.0°		31°31.0'-00.6'	79.6°		12
13	30°07.3'-08.3'	74.9°		30°22.6'-07.2'	75.5°		30°37.4'-06.0'	76.1°		30°51.5'-04.8'	76.6°		31°05.1'-03.6'	77.2°		31°18.1'-02.5'	77.8°		31°30.4'-01.3'	78.4°		13
14	29°59.0'-08.9'	73.8°		30°15.4'-07.8'	74.3°		30°31.4'-06.6'	74.9°		30°46.7'-05.5'	75.5°		31°01.4'-04.3'	76.1°		31°15.6'-03.1'	76.6°		31°29.2'-01.9'	77.2°		14
15	29°50.0'-09.5'	72.6°		30°07.7'-08.4'	73.2°		30°24.7'-07.2'	73.8°		30°41.2'-06.1'	74.3°		30°57.2'-04.9'	74.9°		31°12.5'-03.7'	75.5°		31°27.3'-02.5'	76.1°		15
16	29°40.5'-10.1'	71.5°		29°59.3'-09.0'	72.0°		30°17.5'-07.8'	72.6°		30°35.2'-06.7'	73.2°		30°52.3'-05.5'	73.7°		31°08.8'-04.4'	74.3°		31°24.7'-03.2'	74.9°		16
17	29°30.4'-10.7'	70.4°		29°50.3'-09.6'	70.9°		30°09.7'-08.4'	71.5°		30°28.5'-07.3'	72.0°		30°46.7'-06.1'	72.6°		31°04.4'-05.0'	73.1°		31°21.5'-03.8'	73.7°		17
18	29°19.8'-11.2'	69.2°		29°40.8'-10.1'	69.8°		30°01.3'-09.0'	70.3°		30°21.2'-07.9'	70.9°		30°40.6'-06.8'	71.4°		30°59.4'-05.6'	72.0°		31°17.7'-04.5'	72.6°		18
19	29°08.5'-11.8'	68.1°		29°30.6'-10.7'	68.6°		29°52.2'-09.6'	69.2°		30°13.3'-08.5'	69.7°		30°33.8'-07.4'	70.3°		30°53.8'-06.2'	70.8°		31°13.3'-05.1'	71.4°		19
20	28°56.7'-12.4'	67.0°		29°19.9'-11.3'	67.5°		29°42.6'-10.2'	68.0°		30°04.8'-09.1'	68.6°		30°26.5'-08.0'	69.1°		30°47.6'-06.8'	69.7°		31°08.2'-05.7'	70.2°		20
21	28°44.4'-12.9'	65.9°		29°08.7'-11.8'	66.4°		29°32.4'-10.8'	66.9°		29°55.7'-09.7'	67.4°		30°18.5'-08.6'	68.0°		30°40.8'-07.5'	68.5°		31°02.5'-06.3'	69.1°		21
22	28°31.5'-13.4'	64.8°																				

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

60° 300° LHA			Latitude SAME as Declination						60° 300° LHA													
Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	30°00.0'-00.3'	90.0°		29°59.7'+00.9'	90.6°		29°58.8'+02.1'	91.2°		29°57.3'+03.3'	91.7°		29°55.2'+04.5'	92.3°		29°52.5'+05.7'	92.9°		29°49.1'+06.9'	93.5°		0
1	29°59.7'-00.9'	88.8°		30°00.6'+00.3'	89.4°		30°00.9'+01.5'	90.0°		30°00.6'+02.7'	90.6°		29°59.7'+03.9'	91.2°		29°58.2'+05.1'	91.7°		29°56.1'+06.3'	92.3°		1
2	29°58.8'-01.5'	87.7°		30°00.9'-00.3'	88.3°		30°02.4'+00.9'	88.8°		30°03.3'+02.1'	89.4°		30°03.6'+03.3'	90.0°		30°03.3'+04.5'	90.6°		30°02.4'+05.7'	91.2°		2
3	29°57.3'-02.1'	86.5°		30°00.6'-00.9'	87.1°		30°03.3'+00.3'	87.7°		30°05.4'+01.5'	88.3°		30°06.9'+02.7'	88.8°		30°07.8'+03.9'	89.4°		30°08.1'+05.1'	90.0°		3
4	29°55.2'-02.7'	85.4°		29°59.7'-01.5'	86.0°		30°03.6'-00.3'	86.5°		30°06.9'+00.9'	87.1°		30°09.7'+02.1'	87.7°		30°11.8'+03.3'	88.3°		30°13.3'+04.5'	88.9°		4
5	29°52.5'-03.3'	84.2°		29°58.2'-02.1'	84.8°		30°03.3'-00.9'	85.4°		30°07.8'+00.3'	86.0°		30°11.8'+01.5'	86.5°		30°15.1'+02.7'	87.1°		30°17.8'+03.9'	87.7°		5
6	29°49.1'-03.9'	83.1°		29°56.1'-02.7'	83.7°		30°02.4'-01.5'	84.2°		30°08.1'-00.3'	84.8°		30°13.3'+00.9'	85.4°		30°17.8'+02.1'	86.0°		30°21.7'+03.3'	86.5°		6
7	29°45.2'-04.5'	81.9°		29°53.4'-03.3'	82.5°		30°00.9'-02.1'	83.1°		30°07.8'-00.9'	83.6°		30°14.2'+00.3'	84.2°		30°19.9'+01.5'	84.8°		30°25.0'+02.7'	85.4°		7
8	29°40.7'-05.1'	80.8°		29°50.0'-03.9'	81.3°		29°58.8'-02.7'	81.9°		30°06.9'-01.5'	82.5°		30°14.5'+00.3'	83.1°		30°21.4'+00.9'	83.6°		30°27.7'+02.1'	84.2°		8
9	29°35.6'-05.7'	79.6°		29°46.1'-04.5'	80.2°		29°56.0'-03.3'	80.8°		30°05.4'-02.1'	81.3°		30°14.1'+00.9'	81.9°		30°22.3'+00.3'	82.5°		30°29.8'+01.5'	83.1°		9
10	29°29.9'-06.3'	78.5°		29°41.6'-05.1'	79.0°		29°52.7'-03.9'	79.6°		30°03.2'-02.7'	80.2°		30°13.2'-01.5'	80.8°		30°22.5'-00.4'	81.3°		30°31.3'+00.8'	81.9°		10
11	29°23.6'-06.9'	77.3°		29°36.5'-05.7'	77.9°		29°48.8'-04.5'	78.5°		30°00.5'-03.3'	79.0°		30°11.6'-02.2'	79.6°		30°22.2'-01.0'	80.2°		30°32.1'+00.2'	80.7°		11
12	29°16.8'-07.4'	76.2°		29°30.8'-06.3'	76.8°		29°44.3'-05.1'	77.3°		29°57.2'-03.9'	77.9°		30°09.5'-02.8'	78.4°		30°21.2'-01.6'	79.0°		30°32.4'-00.4'	79.6°		12
13	29°09.3'-08.0'	75.1°		29°24.5'-06.9'	75.6°		29°39.2'-05.7'	76.2°		29°53.2'-04.5'	76.7°		30°06.7'-03.4'	77.3°		30°19.6'-02.2'	77.9°		30°32.0'-01.0'	78.4°		13
14	29°01.3'-08.6'	73.9°		29°17.7'-07.4'	74.5°		29°33.4'-06.3'	75.0°		29°48.7'-05.1'	75.6°		30°03.3'-04.0'	76.1°		30°17.4'-02.8'	76.7°		30°31.0'-01.6'	77.3°		14
15	28°52.7'-09.1'	72.8°		29°10.2'-08.0'	73.3°		29°27.1'-06.9'	73.9°		29°43.5'-05.7'	74.4°		29°59.4'-04.6'	75.0°		30°14.6'-03.4'	75.5°		30°29.3'-02.2'	76.1°		15
16	28°43.6'-09.7'	71.7°		29°02.2'-08.6'	72.2°		29°20.3'-07.5'	72.7°		29°37.8'-06.3'	73.3°		29°54.8'-05.2'	73.8°		30°11.2'-04.0'	74.4°		30°27.1'-02.9'	74.9°		16
17	28°33.9'-10.3'	70.6°		28°53.6'-09.2'	71.1°		29°12.8'-08.0'	71.6°		29°31.5'-06.9'	72.1°		29°49.6'-05.8'	72.7°		30°07.2'-04.6'	73.2°		30°24.2'-03.5'	73.8°		17
18	28°23.6'-10.8'	69.4°		28°44.5'-09.7'	69.9°		29°04.8'-08.6'	70.5°		29°24.6'-07.5'	71.0°		29°43.8'-06.4'	71.5°		30°02.6'-05.2'	72.1°		30°20.8'-04.1'	72.6°		18
19	28°12.8'-11.4'	68.3°		28°34.7'-10.3'	68.8°		28°56.2'-09.2'	69.3°		29°17.1'-08.1'	69.9°		29°37.5'-06.9'	70.4°		29°57.4'-05.8'	70.9°		30°16.7'-04.7'	71.5°		19
20	28°01.5'-11.9'	67.2°		28°24.5'-10.8'	67.7°		28°47.0'-09.7'	68.2°		29°09.0'-08.6'	68.7°		29°30.5'-07.5'	69.2°		29°51.5'-06.4'	69.8°		30°12.0'-05.3'	70.3°		20
21	27°49.6'-12.4'	66.1°		28°13.6'-11.4'	66.6°		28°37.3'-10.3'	67.1°		29°00.4'-09.2'	67.6°		29°23.0'-08.1'	68.1°		29°45.1'-07.0'	68.6°		30°06.7'-05.9'	69.2°		21
22	27°37.1'-12.9'	65.0°		28°02.3'-11.9'	65.5°		28°27.0'-10.8'	66.0°		28°51.2'-09.8'	66.5°		29°14.9'-08.7'	67.0°		29°38.1'-07.6'	67.5°		30°00.8'-06.5'	68.0°		22
23	27°24.2'-13.5'	63.9°		27°50.4'-12.4'	64.4°		28°16.1'-11.4'	64.8°		28°41.4'-10.3'	65.3°		29°06.2'-09.3'	65.8°		29°30.5'-08.2'	66.3°		29°54.3'-07.1'	66.9°		23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

60° 300° LHA Latitude SAME as Declination 60° 300° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

61° 299° LHA			Latitude SAME as Declination						61° 299° LHA													
Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	29°00.0'-00.3'	90.0°		28°59.7'+00.9'	90.6°		28°58.8'+02.1'	91.1°		28°57.4'+03.3'	91.7°		28°55.4'+04.5'	92.2°		28°52.8'+05.7'	92.8°		28°49.6'+06.9'	93.3°		0
1	28°59.7'-00.9'	88.9°		29°00.6'+00.3'	89.4°		29°00.9'+01.5'	90.0°		29°00.7'+02.7'	90.5°		28°59.9'+03.9'	91.1°		28°58.4'+05.1'	91.6°		28°56.4'+06.3'	92.2°		1
2	28°58.8'-01.5'	87.7°		29°00.9'-00.3'	88.3°		29°02.5'+00.9'	88.8°		29°03.4'+02.1'	89.4°		29°03.8'+03.3'	89.9°		29°03.5'+04.5'	90.5°		29°02.7'+05.7'	91.0°		2
3	28°57.4'-02.0'	86.6°		29°00.7'-00.8'	87.1°		29°03.4'+00.4'	87.7°		29°05.5'+01.6'	88.2°		29°07.1'+02.8'	88.8°		29°08.1'+04.0'	89.3°		29°08.5'+05.1'	89.9°		3
4	28°55.4'-02.6'	85.4°		28°59.9'-01.4'	86.0°		29°03.8'-00.2'	86.5°		29°07.1'+01.0'	87.1°		29°09.9'+02.2'	87.6°		29°12.0'+03.4'	88.2°		29°13.6'+04.6'	88.8°		4
5	28°52.8'-03.2'	84.3°		28°58.4'-02.0'	84.8°		29°03.5'-00.8'	85.4°		29°08.1'+00.4'	85.9°		29°12.0'+01.6'	86.5°		29°15.4'+02.8'	87.1°		29°18.2'+04.0'	87.6°		5
6	28°49.6'-03.8'	83.1°		28°56.4'-02.6'	83.7°		29°02.7'-01.4'	84.2°		29°08.5'+00.2'	84.8°		29°13.6'+01.0'	85.4°		29°18.2'+02.2'	85.9°		29°22.2'+03.4'	86.5°		6
7	28°45.8'-04.3'	82.0°		28°53.9'-03.1'	82.6°		29°01.4'-02.0'	83.1°		29°08.3'-00.8'	83.7°		29°14.6'+00.4'	84.2°		29°20.4'+01.6'	84.8°		29°25.6'+02.8'	85.3°		7
8	28°41.5'-04.9'	80.9°		28°50.7'-03.7'	81.4°		28°59.4'-02.5'	82.0°		29°07.5'-01.4'	82.5°		29°15.0'-00.2'	83.1°		29°22.0'+01.0'	83.6°		29°28.4'+02.2'	84.2°		8
9	28°36.6'-05.5'	79.7°		28°47.0'-04.3'	80.3°		28°56.9'-03.1'	80.8°		29°06.1'-01.9'	81.4°		29°14.9'-00.8'	81.9°		29°23.0'+00.4'	82.5°		29°30.6'+01.6'	83.0°		9
10	28°31.1'-06.0'	78.6°		28°42.7'-04.9'	79.1°		28°53.7'-03.7'	79.7°		29°04.2'-02.5'	80.2°		29°14.1'-01.3'	80.8°		29°23.4'-00.2'	81.3°		29°32.2'+01.0'	81.9°		10
11	28°25.1'-06.6'	77.5°		28°37.8'-05.4'	78.0°		28°50.0'-04.3'	78.5°		29°01.7'-03.1'	79.1°		29°12.8'-01.9'	79.6°		29°23.3'-00.7'	80.2°		29°33.2'+00.4'	80.7°		11
12	28°18.5'-07.1'	76.3°		28°32.4'-06.0'	76.9°		28°45.8'-04.8'	77.4°		28°58.6'-03.7'	77.9°		29°10.8'-02.5'	78.5°		29°22.5'-01.3'	79.0°		29°33.7'-00.2'	79.6°		12
13	28°11.3'-07.7'	75.2°		28°26.4'-06.6'	75.7°		28°40.9'-05.4'	76.3°		28°54.9'-04.3'	76.8°		29°08.3'-03.1'	77.3°		29°21.2'-01.9'	77.9°		29°33.5'-00.8'	78.4°		13
14	28°03.6'-08.2'	74.1°		28°19.8'-07.1'	74.6°		28°35.5'-06.0'	75.1°		28°50.6'-04.8'	75.7°		29°05.2'-03.7'	76.2°		29°19.3'-02.5'	76.7°		29°32.7'-01.3'	77.3°		14
15	27°55.4'-08.8'	73.0°		28°12.7'-07.7'	73.5°		28°29.5'-06.5'	74.0°		28°45.8'-05.4'	74.5°		29°01.5'-04.3'	75.1°		29°16.8'-03.1'	75.6°		29°31.4'-01.9'	76.1°		15
16	27°46.6'-09.3'	71.8°		28°05.1'-08.2'	72.4°		28°23.0'-07.1'	72.9°		28°40.4'-06.0'	73.4°		28°57.3'-04.8'	73.9°		29°13.7'-03.7'	74.4°		29°29.5'-02.5'	75.0°		16
17	27°37.3'-09.9'	70.7°		27°56.8'-08.8'	71.2°		28°15.9'-07.7'	71.7°		28°34.4'-06.5'	72.3°		28°52.5'-05.4'	72.8°		29°10.0'-04.3'	73.3°		29°26.9'-03.1'	73.8°		17
18	27°27.4'-10.4'	69.6°		27°48.1'-09.3'	70.1°		28°08.2'-08.2'	70.6°		28°27.9'-07.1'	71.1°		28°47.1'-06.0'	71.6°		29°05.7'-04.8'	72.2°		29°23.8'-03.7'	72.7°		18
19	27°17.0'-10.9'	68.5°		27°38.8'-09.8'	69.0°		28°00.0'-08.7'	69.5°		28°20.8'-07.6'	70.0°		28°41.1'-06.5'	70.5°		29°00.9'-05.4'	71.0°		29°20.1'-04.3'	71.6°		19
20	27°06.1'-11.4'	67.4°		27°28.9'-10.4'	67.9°		27°51.3'-09.3'	68.4°		28°13.2'-08.2'	68.9°		28°34.5'-07.1'	69.4°		28°55.4'-06.0'	69.9°		29°15.8'-04.9'	70.4°		20
21	26°54.7'-11.9'	66.3°		27°18.6'-10.9'	66.8°		27°42.0'-09.8'	67.3°		28°05.0'-08.7'	67.7°		28°27.4'-07.7'	68.2°		28°49.4'-06.6'	68.7°		29°10.9'-05.5'	69.3°		21
22	26°42.7'-12.5'	65.2°		27°07.7'-11.4'	65.7°		27°32.2'-10.4'	66.1°		27°56.2'-09.3'	66.6°		28°19.8'-08.2'	67.1°		28°42.9'-07.1'	67.6°		29°05.5'-06.0'	68.1°		22
23	26°30.3'-12.9'	64.1°		26°56.3'-11.9'	64.6																	

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

62° 298° LHA

Latitude SAME as Declination

62° 298° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	28°00.0'	-00.3'	90.0°	27°59.7'	+00.9'	90.5°	27°58.9'	+02.1'	91.1°	27°57.5'	+03.3'	91.6°	27°55.5'	+04.5'	92.1°	27°53.0'	+05.6'	92.7°	27°50.0'	+06.8'	93.2°	0
1	27°59.7'	-00.8'	88.9°	28°00.6'	+00.4'	89.4°	28°01.0'	+01.5'	89.9°	28°00.8'	+02.7'	90.5°	28°00.0'	+03.9'	91.0°	27°58.7'	+05.1'	91.5°	27°56.8'	+06.3'	92.1°	1
2	27°58.9'	-01.4'	87.7°	28°01.0'	-00.2'	88.3°	28°02.5'	+01.0'	88.8°	28°03.5'	+02.2'	89.3°	28°03.9'	+03.4'	89.9°	28°03.8'	+04.5'	90.4°	28°03.1'	+05.7'	90.9°	2
3	27°57.5'	-01.9'	86.6°	28°00.8'	-00.8'	87.1°	28°03.5'	+00.4'	87.7°	28°05.7'	+01.6'	88.2°	28°07.3'	+02.8'	88.7°	28°08.3'	+04.0'	89.3°	28°08.8'	+05.2'	89.8°	3
4	27°55.5'	-02.5'	85.5°	28°00.0'	-01.3'	86.0°	28°03.9'	-00.1'	86.5°	28°07.3'	+01.0'	87.1°	28°10.1'	+02.2'	87.6°	28°12.3'	+03.4'	88.1°	28°14.0'	+04.6'	88.7°	4
5	27°53.0'	-03.1'	84.3°	27°58.7'	-01.9'	84.9°	28°03.8'	-00.7'	85.4°	28°08.3'	+00.5'	85.9°	28°12.3'	+01.7'	86.5°	28°15.7'	+02.9'	87.0°	28°18.6'	+04.0'	87.5°	5
6	27°50.0'	-03.6'	83.2°	27°56.8'	-02.4'	83.7°	28°03.1'	-01.3'	84.3°	28°08.8'	-00.1'	84.8°	28°14.0'	+01.1'	85.3°	28°18.6'	+02.3'	85.9°	28°22.6'	+03.5'	86.4°	6
7	27°46.4'	-04.2'	82.1°	27°54.4'	-03.0'	82.6°	28°01.8'	-01.8'	83.1°	28°08.7'	-00.6'	83.7°	28°15.1'	+00.5'	84.2°	28°20.9'	+01.7'	84.7°	28°26.1'	+02.9'	85.3°	7
8	27°42.2'	-04.7'	81.0°	27°51.4'	-03.5'	81.5°	28°00.0'	-02.4'	82.0°	28°08.1'	-01.2'	82.5°	28°15.6'	00.0'	83.1°	28°22.6'	+01.2'	83.6°	28°29.0'	+02.3'	84.1°	8
9	27°37.5'	-05.2'	79.8°	27°47.9'	-04.1'	80.3°	27°57.7'	-02.9'	80.9°	28°06.9'	-01.8'	81.4°	28°15.6'	-00.6'	81.9°	28°23.8'	+00.6'	82.5°	28°31.3'	+01.8'	83.0°	9
10	27°32.3'	-05.8'	78.7°	27°43.8'	-04.6'	79.2°	27°54.7'	-03.5'	79.7°	28°05.1'	-02.3'	80.3°	28°15.0'	-01.1'	80.8°	28°24.4'	+00.0'	81.3°	28°33.1'	+01.2'	81.9°	10
11	27°26.5'	-06.3'	77.6°	27°39.1'	-05.2'	78.1°	27°51.3'	-04.0'	78.6°	28°02.8'	-02.9'	79.1°	28°13.9'	-01.7'	79.7°	28°24.4'	-00.5'	80.2°	28°34.3'	+00.6'	80.7°	11
12	27°20.2'	-06.9'	76.5°	27°34.0'	-05.7'	77.0°	27°47.2'	-04.6'	77.5°	28°00.0'	-03.4'	78.0°	28°12.2'	-02.3'	78.5°	28°23.8'	-01.1'	79.0°	28°35.0'	+00.1'	79.6°	12
13	27°13.3'	-07.4'	75.3°	27°28.2'	-06.3'	75.8°	27°42.7'	-05.1'	76.4°	27°56.5'	-04.0'	76.9°	28°09.9'	-02.8'	77.4°	28°22.7'	-01.7'	77.9°	28°35.0'	-00.5'	78.4°	13
14	27°05.9'	-07.9'	74.2°	27°22.0'	-06.8'	74.7°	27°37.5'	-05.7'	75.2°	27°52.6'	-04.5'	75.7°	28°07.1'	-03.4'	76.3°	28°21.1'	-02.2'	76.8°	28°34.5'	-01.1'	77.3°	14
15	26°58.0'	-08.4'	73.1°	27°15.2'	-07.3'	73.6°	27°31.9'	-06.2'	74.1°	27°48.0'	-05.1'	74.6°	28°03.7'	-03.9'	75.1°	28°18.9'	-02.8'	75.6°	28°33.5'	-01.6'	76.2°	15
16	26°49.6'	-09.0'	72.0°	27°07.9'	-07.9'	72.5°	27°25.7'	-06.7'	73.0°	27°43.0'	-05.6'	73.5°	27°59.8'	-04.5'	74.0°	28°16.1'	-03.4'	74.5°	28°31.8'	-02.2'	75.0°	16
17	26°40.6'	-09.5'	70.9°	27°00.0'	-08.4'	71.4°	27°18.9'	-07.3'	71.9°	27°37.4'	-06.2'	72.4°	27°55.3'	-05.0'	72.9°	28°12.7'	-03.9'	73.4°	28°29.6'	-02.8'	73.9°	17
18	26°31.1'	-10.0'	69.8°	26°51.6'	-08.9'	70.3°	27°11.6'	-07.8'	70.8°	27°31.2'	-06.7'	71.2°	27°50.2'	-05.6'	71.7°	28°08.8'	-04.5'	72.2°	28°26.8'	-03.3'	72.8°	18
19	26°21.2'	-10.5'	68.7°	26°42.7'	-09.4'	69.2°	27°03.8'	-08.3'	69.6°	27°24.5'	-07.2'	70.1°	27°44.6'	-06.1'	70.6°	28°04.3'	-05.0'	71.1°	28°23.5'	-03.9'	71.6°	19
20	26°10.7'	-11.0'	67.6°	26°33.3'	-09.9'	68.1°	26°55.5'	-08.9'	68.5°	27°17.2'	-07.8'	69.0°	27°38.5'	-06.7'	69.5°	27°59.3'	-05.6'	70.0°	28°19.6'	-04.5'	70.5°	20
21	25°59.7'	-11.5'	66.5°	26°23.4'	-10.4'	67.0°	26°46.7'	-09.4'	67.4°	27°09.5'	-08.3'	67.9°	27°31.8'	-07.2'	68.4°	27°53.7'	-06.1'	68.9°	28°15.1'	-05.0'	69.4°	21
22	25°48.2'	-12.0'	65.4°	26°13.0'	-10.9'	65.9°	26°37.3'	-09.9'	66.3°	27°01.2'	-08.8'	66.8°	27°24.6'	-07.8'	67.2°	27°47.6'	-06.7'	67.7°	28°10.1'	-05.6'	68.2°	22
23	25°36.2'	-12.4'	64.3°	26°02.0'	-11.4'	64.8°	26°27.4'	-10.4'	65.2°	26°52.4'	-09.3'	65.7°	27°16.9'	-08.3'	66.1°	27°40.9'	-07.2'	66.6°	28°04.5'	-06.1'	67.1°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0	1	2	3	4	5	6																

62° 298° LHA

Latitude SAME as Declination

62° 298° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

63° 297° LHA

Latitude SAME as Declination

63° 297° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	27°00.0'	-00.3'	90.0°	26°59.7'	+00.9'	90.5°	26°58.9'	+02.1'	91.0°	26°57.6'	+03.3'	91.5°	26°55.7'	+04.4'	92.0°	26°53.3'	+05.6'	92.5°	26°50.4'	+06.8'	93.0°	0
1	26°59.7'	-00.8'	88.9°	27°00.6'	+00.4'	89.4°	27°01.0'	+01.5'	89.9°	27°00.9'	+02.7'	90.4°	27°00.2'	+03.9'	90.9°	26°58.9'	+05.1'	91.4°	26°57.2'	+06.2'	91.9°	1
2	26°58.9'	-01.3'	87.8°	27°01.0'	-00.2'	88.3°	27°02.6'	+01.0'	88.8°	27°03.6'	+02.2'	89.3°	27°04.1'	+03.4'	89.8°	27°04.0'	+04.5'	90.3°	27°03.4'	+05.7'	90.8°	2
3	26°57.6'	-01.9'	86.6°	27°00.9'	-00.7'	87.1°	27°03.6'	+00.5'	87.7°	27°05.8'	+01.7'	88.2°	27°07.4'	+02.8'	88.7°	27°08.5'	+04.0'	89.2°	27°09.1'	+05.2'	89.7°	3
4	26°55.7'	-02.4'	85.5°	27°00.2'	-01.2'	86.0°	27°04.1'	-00.1'	86.5°	27°07.4'	+01.1'	87.0°	27°10.3'	+02.3'	87.6°	27°12.6'	+03.5'	88.1°	27°14.3'	+04.6'	88.6°	4
5	26°53.3'	-02.9'	84.4°	26°58.9'	-01.8'	84.9°	27°04.0'	-00.6'	85.4°	27°08.5'	+00.6'	85.9°	27°12.6'	+01.8'	86.4°	27°16.0'	+02.9'	86.9°	27°19.0'	+04.1'	87.5°	5
6	26°50.4'	-03.5'	83.3°	26°57.2'	-02.3'	83.8°	27°03.4'	-01.1'	84.3°	27°09.1'	+00.0'	84.8°	27°14.3'	+01.2'	85.3°	27°19.0'	+02.4'	85.8°	27°23.1'	+03.6'	86.3°	6
7	26°47.0'	-04.0'	82.2°	26°54.9'	-02.8'	82.7°	27°02.3'	-01.7'	83.2°	27°09.2'	-00.5'	83.7°	27°15.5'	+00.7'	84.2°	27°21.3'	+01.8'	84.7°	27°26.6'	+03.0'	85.2°	7
8	26°43.0'	-04.5'	81.0°	26°52.1'	-03.4'	81.5°	27°00.6'	-02.2'	82.0°	27°08.7'	-01.0'	82.5°	27°16.2'	+00.1'	83.1°	27°23.2'	+01.3'	83.6°	27°29.6'	+02.5'	84.1°	8
9	26°38.5'	-05.0'	79.9°	26°48.7'	-03.9'	80.4°	26°58.4'	-02.7'	80.9°	27°07.7'	-01.6'	81.4°	27°16.3'	-00.4'	81.9°	27°24.5'	+00.8'	82.4°	27°32.1'	+01.9'	83.0°	9
10	26°33.4'	-05.5'	78.8°	26°44.8'	-04.4'	79.3°	26°55.7'	-03.3'	79.8°	27°06.1'	-02.1'	80.3°	27°15.9'	-00.9'	80.8°	27°25.3'	+00.2'	81.3°	27°34.1'	+01.4'	81.8°	10
11	26°27.9'	-06.1'	77.7°	26°40.4'	-04.9'	78.2°	26°52.5'	-03.8'	78.7°	27°04.0'	-02.6'	79.2°	27°15.0'	-01.5'	79.7°	27°25.5'	-00.3'	80.2°	27°35.4'	+00.8'	80.7°	11
12	26°21.8'	-06.6'	76.6°	26°35.5'	-05.4'	77.1°	26°48.7'	-04.3'	77.6°	27°01.4'	-03.2'	78.1°	27°13.5'	-02.0'	78.6°	27°25.2'	-00.9'	79.1°	27°36.3'	+00.3'	79.6°	12
13	26°15.3'	-07.1'	75.5°	26°30.1'	-06.0'	76.0°	26°44.4'	-04.8'	76.4°	26°58.2'	-03.7'	76.9°	27°11.5'	-02.6'	77.4°	27°24.3'	-01.4'	77.9°	27°36.6'	-00.3'	78.4°	13
14	26°08.2'	-07.6'	74.4°	26°24.1'	-06.5'	74.8°	26°39.5'	-05.4'	75.3°	26°54.5'	-04.2'	75.8°	27°08.9'	-03.1'	76.3°	27°22.9'	-01.9'	76.8°	27°36.3'	-00.8'	77.3°	14
15	26°00.6'	-08.1'	73.3°	26°17.6'	-07.0'	73.7°	26°34.2'	-05.9'	74.2°	26°50.3'	-04.8'	74.7°	27°05.9'	-03.6'	75.2°	27°20.9'	-02.5'	75.7°	27°35.5'	-01.3'	76.2°	15
16	25°52.5'	-08.6'	72.2°	26°10.6'	-07.5'	72.6°	26°28.3'	-06.4'	73.1°	26°45.5'	-05.3'	73.6°	27°02.2'	-04.2'	74.1°	27°18.5'	-03.0'	74.6°	27°34.2'	-01.9'	75.1°	16
17	25°43.9'	-09.1'	71.1°	26°03.1'	-08.0'	71.5°	26°21.9'	-06.9'	72.0°	26°40.2'	-05.8'	72.5°	26°58.1'	-04.7'	72.9°	27°15.4'	-03.6'	73.4°	27°32.3'	-02.4'	73.9°	17
18	25°34.8'	-09.6'	70.0°	25°55.1'	-08.5'	70.4°	26°15.0'	-07.4'	70.9°	26°34.4'	-06.3'	71.4°	26°53.4'	-05.2'	71.8°	27°11.9'	-04.1'	72.3°	27°29.8'	-03.0'	72.8°	18
19	25°25.2'	-10.1'	68.9°	25°46.6'	-09.0'	69.3°	26°07.6'	-07.9'	69.8°	26°27.1'	-06.8'	70.2°	26°48.2'	-05.7'	70.7°	27°07.8'	-04.6'	71.2°	27°26.9'	-03.5'	71.7°	19
20	25°15.2'	-10.5'	67.8°	25°37.6'	-09.5'	68.2°	25°59.7'	-08.4'	68.7°	26°21.3'	-07.3'	69.1°	26°42.4'	-06.3'	69.6°	27°03.1'	-05.2'	70.1°	27°23.3'	-04.1'	70.6°	20
21	25°04.6'	-11.0'	66.7°	25°28.2'	-10.0'	67.1°	25°51.3'	-08.9'	67.6°	26°13.9'	-07.9'	68.0°	26°36.2'	-06.8'	68.5°	26°57.9'	-05.7'	69.0°	27°19.3'	-04.6'	69.4°	21
22	24°53.6'	-11.5'																				

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

64° 296° LHA

Latitude SAME as Declination

64° 296° LHA

Dec°	0			1			2			3			4			5			6			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	26°00.0' -00.3'	90.0°		25°59.7' +00.9'	90.5°		25°59.0' +02.1'	91.0°		25°57.7' +03.2'	91.5°		25°55.9' +04.4'	91.9°		25°53.6' +05.6'	92.4°		25°50.8' +06.7'	92.9°	0				
1	25°59.7' -00.8'	88.9°		26°00.7' +00.4'	89.4°		26°01.1' +01.6'	89.9°		26°00.9' +02.7'	90.4°		26°00.3' +03.9'	90.8°		25°59.2' +05.1'	91.3°		25°57.5' +06.2'	91.8°	1				
2	25°59.0' -01.3'	87.8°		26°01.1' -00.1'	88.3°		26°02.6' +01.1'	88.8°		26°03.7' +02.2'	89.2°		26°04.2' +03.4'	89.7°		26°04.2' +04.5'	90.2°		26°03.8' +05.7'	90.7°	2				
3	25°57.7' -01.8'	86.7°		26°00.9' -00.6'	87.1°		26°03.7' +00.5'	87.6°		26°05.9' +01.7'	88.1°		26°07.6' +02.9'	88.6°		26°08.8' +04.0'	89.1°		26°09.5' +05.2'	89.6°	3				
4	25°55.9' -02.3'	85.6°		26°00.3' -01.1'	86.0°		26°04.2' +00.0'	86.5°		26°07.6' +01.2'	87.0°		26°10.5' +02.4'	87.5°		26°12.8' +03.5'	88.0°		26°14.7' +04.7'	88.5°	4				
5	25°53.6' -02.8'	84.4°		25°59.2' -01.6'	84.9°		26°04.2' -00.5'	85.4°		26°08.8' +00.7'	85.9°		26°12.8' +01.8'	86.4°		26°16.3' +03.0'	86.9°		26°19.3' +04.2'	87.4°	5				
6	25°50.8' -03.3'	83.3°		25°57.5' -02.2'	83.8°		26°03.8' -01.0'	84.3°		26°09.5' +00.2'	84.8°		26°14.7' +01.3'	85.3°		26°19.3' +02.5'	85.8°		26°23.5' +03.7'	86.3°	6				
7	25°47.5' -03.8'	82.2°		25°55.4' -02.7'	82.7°		26°02.8' -01.5'	83.2°		26°09.6' -00.4'	83.7°		26°16.0' +00.8'	84.2°		26°21.8' +02.0'	84.7°		26°27.2' +03.1'	85.1°	7				
8	25°43.7' -04.3'	81.1°		25°52.7' -03.2'	81.6°		26°01.2' -02.0'	82.1°		26°09.3' -00.9'	82.6°		26°16.8' +00.3'	83.0°		26°23.8' +01.5'	83.5°		26°30.3' +02.6'	84.0°	8				
9	25°39.4' -04.8'	80.0°		25°49.6' -03.7'	80.5°		25°59.2' -02.5'	81.0°		26°08.4' -01.4'	81.4°		26°17.1' -00.2'	81.9°		26°25.2' +00.9'	82.4°		26°32.9' +02.1'	82.9°	9				
10	25°34.6' -05.3'	78.9°		25°45.9' -04.2'	79.4°		25°56.7' -03.0'	79.8°		26°07.0' -01.9'	80.3°		26°16.9' -00.7'	80.8°		26°26.2' +00.4'	81.3°		26°35.0' +01.6'	81.8°	10				
11	25°29.3' -05.8'	77.8°		25°41.7' -04.7'	78.3°		25°53.7' -03.5'	78.7°		26°05.1' -02.4'	79.2°		26°16.1' -01.3'	79.7°		26°26.6' -00.1'	80.2°		26°36.6' +01.0'	80.7°	11				
12	25°23.5' -06.3'	76.7°		25°37.0' -05.2'	77.2°		25°50.1' -04.0'	77.6°		26°02.7' -02.9'	78.1°		26°14.9' -01.8'	78.6°		26°26.5' -00.6'	79.1°		26°37.6' +00.5'	79.6°	12				
13	25°17.2' -06.8'	75.6°		25°31.8' -05.7'	76.1°		25°46.1' -04.6'	76.5°		25°59.8' -03.4'	77.0°		26°13.1' -02.3'	77.5°		26°25.8' -01.2'	78.0°		26°38.1' 00.0'	78.4°	13				
14	25°10.4' -07.3'	74.5°		25°26.2' -06.2'	75.0°		25°41.5' -05.1'	75.4°		25°56.4' -03.9'	75.9°		26°10.8' -02.8'	76.4°		26°24.7' -01.7'	76.8°		26°38.1' -00.5'	77.3°	14				
15	25°03.1' -07.8'	73.4°		25°20.0' -06.7'	73.9°		25°36.5' -05.6'	74.3°		25°52.5' -04.4'	74.8°		26°08.0' -03.3'	75.2°		26°23.0' -02.2'	75.7°		26°37.6' -01.1'	76.2°	15				
16	24°55.3' -08.2'	72.3°		25°13.4' -07.1'	72.8°		25°30.9' -06.0'	73.2°		25°48.0' -04.9'	73.7°		26°04.7' -03.8'	74.1°		26°20.8' -02.7'	74.6°		26°36.5' -01.6'	75.1°	16				
17	24°47.1' -08.7'	71.2°		25°06.2' -07.6'	71.7°		25°24.9' -06.5'	72.1°		25°43.1' -05.4'	72.6°		26°00.8' -04.3'	73.0°		26°18.1' -03.2'	73.5°		26°34.9' -02.1'	74.0°	17				
18	24°38.4' -09.2'	70.1°		24°58.6' -08.1'	70.6°		25°18.3' -07.0'	71.0°		25°37.6' -05.9'	71.5°		25°56.5' -04.8'	71.9°		26°14.9' -03.7'	72.4°		26°32.8' -02.6'	72.9°	18				
19	24°29.2' -09.6'	69.0°		24°50.5' -08.6'	69.5°		25°11.3' -07.5'	69.9°		25°31.7' -06.4'	70.4°		25°51.7' -05.3'	70.8°		26°11.2' -04.3'	71.3°		26°30.2' -03.2'	71.7°	19				
20	24°19.6' -10.1'	68.0°		24°41.9' -09.1'	68.4°		25°03.8' -08.0'	68.8°		25°25.3' -06.9'	69.2°		25°46.3' -05.8'	69.7°		26°06.9' -04.8'	70.2°		26°27.0' -03.7'	70.6°	20				
21	24°09.5' -10.6'	66.9°		24°32.8' -09.5'	67.3°		24°55.8' -08.5'	67.7°		25°18.3' -07.4'	68.2°		25°40.5' -06.3'	68.6°		26°02.1' -05.3'	69.0°		26°23.4' -04.2'	69.5°	21				
22	23°58.9' -11.0'	65.8°		24°23.3' -10.0'	66.2°		24°47.3' -08.9'	66.6°		25°10.9' -07.9'	67.1°		25°34.1' -06.8'	67.5°		25°56.9' -05.8'	67.9°		26°19.2' -04.7'	68.4°	22				
23	23°47.9' -11.5'	64.7°		24°13.3' -09.4'	65.1°		24°38.4' -09.4'	65.5°		25°03.0' -08.4'	66.0°		25°27.3' -07.3'	66.4°		25°51.1' -06.3'	66.8°		26°14.5' -05.2'	67.3°	23				
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6						

64° 296° LHA

Latitude SAME as Declination

64° 296° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

65° 295° LHA

Latitude SAME as Declination

65° 295° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	25°00.0' -00.2'	90.0°		24°59.8' +00.9'	90.5°		24°59.0' +02.1'	90.9°		24°57.8' +03.2'	91.4°		24°56.1' +04.4'	91.9°		24°53.9' +05.5'	92.3°		24°51.2' +06.7'	92.8°	0	
1	24°59.8' -00.7'	88.9°		25°00.7' +00.4'	89.4°		25°01.1' +01.6'	89.8°		25°01.0' +02.7'	90.3°		25°00.5' +03.9'	90.8°		24°59.4' +05.0'	91.2°		24°57.9' +06.2'	91.7°	1	
2	24°59.0' -01.2'	87.8°		25°01.1' -00.1'	88.3°		25°02.7' +01.1'	88.7°		25°03.8' +02.2'	89.2°		25°04.4' +03.4'	89.7°		25°04.5' +04.6'	90.1°		25°04.1' +05.7'	90.6°	2	
3	24°57.8' -01.7'	86.7°		25°01.0' -00.6'	87.2°		25°03.8' +00.6'	87.6°		25°06.0' +01.8'	88.1°		25°07.8' +02.9'	88.6°		25°09.0' +04.1'	89.0°		25°09.8' +05.2'	89.5°	3	
4	24°56.1' -02.2'	85.6°		25°00.5' -01.0'	86.1°		25°04.4' +00.1'	86.5°		25°07.8' +01.3'	87.0°		25°10.7' +02.4'	87.5°		25°13.1' +03.6'	87.9°		25°15.0' +04.7'	88.4°	4	
5	24°53.9' -02.7'	84.5°		24°59.4' -01.5'	84.9°		25°04.5' -00.4'	85.4°		25°09.0' +00.8'	85.9°		25°13.1' +01.9'	86.4°		25°16.7' +03.1'	86.8°		25°19.7' +04.2'	87.3°	5	
6	24°51.2' -03.2'	83.4°		24°57.9' -02.0'	83.8°		25°04.1' -00.9'	84.3°		25°09.8' +00.3'	84.8°		25°15.0' +01.4'	85.2°		25°19.7' +02.6'	85.7°		25°24.0' +03.7'	86.2°	6	
7	24°48.1' -03.6'	82.3°		24°55.9' -02.5'	82.7°		25°03.2' -01.4'	83.2°		25°10.1' -00.2'	83.7°		25°16.4' +00.9'	84.1°		25°22.3' +02.1'	84.6°		25°27.7' +03.2'	85.1°	7	
8	24°44.4' -04.1'	81.2°		24°53.4' -03.0'	81.6°		25°01.9' -01.8'	82.1°		25°09.9' -00.7'	82.6°		25°17.4' +00.4'	83.0°		25°24.4' +01.6'	83.5°		25°30.9' +02.7'	84.0°	8	
9	24°40.3' -04.6'	80.1°		24°50.4' -03.5'	80.5°		25°00.0' -02.3'	81.0°		25°09.2' -01.2'	81.5°		25°17.8' -00.1'	81.9°		25°26.0' +01.1'	82.4°		25°33.7' +02.2'	82.9°	9	
10	24°35.7' -05.1'	79.0°		24°46.9' -04.0'	79.4°		24°57.7' -02.8'	79.9°		25°08.0' -01.7'	80.4°		25°17.8' -00.5'	80.8°		25°27.1' +00.6'	81.3°		25°35.9' +01.7'	81.8°	10	
11	24°30.6' -05.6'	77.9°		24°43.0' -04.4'	78.3°		24°54.8' -03.3'	78.8°		25°06.3' -02.2'	79.3°		25°17.2' -01.0'	79.7°		25°27.7' +00.1'	80.2°		25°37.7' +01.2'	80.7°	11	
12	24°25.1' -06.0'	76.8°		24°38.5' -04.9'	77.2°		24°51.5' -03.8'	77.7°		25°04.1' -02.7'	78.2°		25°16.2' -01.5'	78.6°		25°27.8' -00.4'	79.1°		25°38.9' +00.7'	79.5°	12	
13	24°19.0' -06.5'	75.7°		24°33.6' -05.4'	76.1°		24°47.8' -04.3'	76.6°		25°01.4' -03.2'	77.0°		25°14.6' -02.0'	77.5°		25°27.4' -00.9'	78.0°		25°39.7' +00.2'	78.4°	13	
14	24°12.5' -07.0'	74.6°		24°28.2' -05.9'	75.1°		24°43.5' -04.8'	75.5°		24°58.3' -03.6'	75.9°		25°12.6' -02.5'	76.4°		25°26.5' -01.4'	76.9°		25°39.9' -00.3'	77.3°	14	
15	24°05.6' -07.4'	73.5°		24°22.4' -06.3'	74.0°		24°38.7' -05.2'	74.4°		24°54.6' -04.1'	74.8°		25°10.1' -03.0'	75.3°		25°25.1' -01.9'	75.8°		25°39.6' -00.8'	76.2°	15	
16	23°58.2' -07.9'	72.4°		24°16.0' -06.8'	72.9°		24°33.5' -05.7'	73.3°		24°50.5' -04.6'	73.7°		25°07.1' -03.5'	74.2°		25°23.2' -02.4'	74.6°		25°38.8' -01.3'	75.1°	16	
17	23°50.3' -08.3'	71.4°		24°09.2' -07.3'	71.8°		24°27.8' -06.2'	72.2°		24°45.9' -05.1'	72.6°		25°03.6' -04.0'	73.1°		25°20.8' -02.9'	73.5°		25°37.6' -01.8'	74.0°	17	
18	23°41.9' -08.8'	70.3°		24°02.0' -07.7'	70.7°		24°21.6' -06.6'	71.1°		24°40.8' -05.6'	71.6°		24°59.6' -04.5'	72.0°		25°17.9' -03.4'	72.4°		25°35.8' -02.3'	72.9°	18	
19	23°33.2' -09.2'	69.2°		23°54.3' -08.2'	69.6°		24°15.0' -07.1'	70.0°		24°35.3' -06.0'	70.5°		24°55.1' -05.0'	70.9°		25°14.5' -03.9'	71.3°		25°33.5' -02.8'	71.8°	19	
20	23°23.9' -09.7'	68.1°		23°46.1' -08.6'	68.5°		24°07.9' -07.6'	68.9°		24°29.2' -06.5'	69.4°		24°50.2' -05.4'	69.8°		25°10.7' -04.4'	70.2°		25°30.7' -03.3'	70.7°	20	
21	23°14.3' -10.1'	67.0°		23°37.5' -09.1'	67.4°		24°00.3' -08.0'	67.9°		24°22.7' -07.0'	68.3°		24°44.7' -05.9'	68.7°		25°06.3' -04.8'	69.1°					

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

66° 294° LHA

Latitude SAME as Declination

66° 294° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	24°00.0'-00.2'	90.0°		23°59.8'+00.9'	90.4°		23°59.1'+02.1'	90.9°		23°57.9'+03.2'	91.3°		23°56.3'+04.3'	91.8°		23°54.2'+05.5'	92.2°		23°51.6'+06.6'	92.7°	0	
1	23°59.8'-00.7'	88.9°		24°00.7'+00.4'	89.4°		24°01.1'+01.6'	89.8°		24°01.1'+02.7'	90.2°		24°00.6'+03.9'	90.7°		23°59.7'+05.0'	91.1°		23°58.2'+06.2'	91.6°	1	
2	23°59.1'-01.2'	87.8°		24°01.1'+00.0'	88.3°		24°02.7'+01.1'	88.7°		24°03.8'+02.3'	89.1°		24°04.5'+03.4'	89.6°		24°04.7'+04.6'	90.0°		24°04.4'+05.7'	90.5°	2	
3	23°57.9'-01.6'	86.7°		24°01.1'-00.5'	87.2°		24°03.8'+00.7'	87.6°		24°06.1'+01.8'	88.1°		24°07.9'+02.9'	88.5°		24°09.3'+04.1'	88.9°		24°10.1'+05.2'	89.4°	3	
4	23°56.3'-02.1'	85.6°		24°00.6'-01.0'	86.1°		24°04.5'+00.2'	86.5°		24°07.9'+01.3'	87.0°		24°10.9'+02.5'	87.4°		24°13.4'+03.6'	87.9°		24°15.4'+04.8'	88.3°	4	
5	23°54.2'-02.6'	84.5°		23°59.7'-01.4'	85.0°		24°04.7'-00.3'	85.4°		24°09.3'+00.9'	85.9°		24°13.4'+02.0'	86.3°		24°17.0'+03.2'	86.8°		24°20.1'+04.3'	87.2°	5	
6	23°51.6'-03.0'	83.4°		23°58.2'-01.9'	83.9°		24°04.4'-00.7'	84.3°		24°10.1'+00.4'	84.8°		24°15.4'+01.5'	85.2°		24°20.1'+02.7'	85.7°		24°24.4'+03.8'	86.1°	6	
7	23°48.6'-03.5'	82.3°		23°56.4'-02.3'	82.8°		24°03.7'-01.2'	83.2°		24°10.4'+00.1'	83.7°		24°16.9'+01.1'	84.1°		24°22.8'+02.2'	84.6°		24°28.3'+03.4'	85.0°	7	
8	23°45.1'-03.9'	81.3°		23°54.0'-02.8'	81.7°		24°02.5'-01.7'	82.1°		24°10.4'-00.5'	82.6°		24°18.0'+00.6'	83.0°		24°25.0'+01.7'	83.5°		24°31.6'+02.9'	83.9°	8	
9	23°41.2'-04.4'	80.2°		23°51.2'-03.3'	80.6°		24°00.8'-02.1'	81.0°		24°09.9'-01.0'	81.5°		24°18.6'+00.1'	81.9°		24°26.8'+01.3'	82.4°		24°34.5'+02.4'	82.8°	9	
10	23°36.8'-04.9'	79.1°		23°47.9'-03.7'	79.5°		23°58.6'-02.6'	79.9°		24°08.9'-01.5'	80.4°		24°18.7'-00.4'	80.8°		24°28.0'+00.8'	81.3°		24°36.9'+01.9'	81.7°	10	
11	23°31.9'-05.3'	78.0°		23°44.2'-04.2'	78.4°		23°56.0'-03.1'	78.8°		24°07.4'-02.0'	79.3°		24°18.3'-00.8'	79.7°		24°28.8'+00.3'	80.2°		24°38.8'+01.4'	80.6°	11	
12	23°26.6'-05.8'	76.9°		23°40.0'-04.6'	77.3°		23°52.9'-03.5'	77.8°		24°05.5'-02.4'	78.2°		24°17.5'-01.3'	78.6°		24°29.1'-00.2'	79.1°		24°40.2'+01.0'	79.5°	12	
13	23°20.9'-06.2'	75.8°		23°35.4'-05.1'	76.2°		23°49.4'-04.0'	76.7°		24°03.0'-02.9'	77.1°		24°16.2'-01.8'	77.5°		24°28.9'-00.6'	78.0°		24°41.2'+00.5'	78.4°	13	
14	23°14.7'-06.6'	74.7°		23°30.3'-05.6'	75.2°		23°45.4'-04.5'	75.6°		24°00.1'-03.4'	76.0°		24°14.4'-02.2'	76.4°		24°28.3'-01.1'	76.9°		24°41.7'00.0'	77.3°	14	
15	23°08.0'-07.1'	73.7°		23°24.7'-06.0'	74.1°		23°41.0'-04.9'	74.5°		23°56.8'-03.8'	74.9°		24°12.2'-02.7'	75.3°		24°27.2'-01.6'	75.8°		24°41.7'-00.5'	76.2°	15	
16	23°00.9'-07.5'	72.6°		23°18.7'-06.5'	73.0°		23°36.0'-05.4'	73.4°		23°53.0'-04.3'	73.8°		24°09.5'-03.2'	74.2°		24°25.6'-02.1'	74.7°		24°41.2'-01.0'	75.1°	16	
17	22°53.4'-08.0'	71.5°		23°12.2'-06.9'	71.9°		23°30.7'-05.8'	72.3°		23°48.7'-04.7'	72.7°		24°06.3'-03.6'	73.2°		24°23.5'-02.6'	73.6°		24°40.2'-01.4'	74.0°	17	
18	22°45.4'-08.4'	70.4°		23°05.4'-07.3'	70.8°		23°24.9'-06.3'	71.2°		23°44.0'-05.2'	71.6°		24°02.7'-04.1'	72.1°		24°20.9'-03.0'	72.5°		24°38.8'-01.9'	72.9°	18	
19	22°37.0'-08.8'	69.3°		22°58.0'-07.8'	69.7°		23°18.6'-06.7'	70.1°		23°38.8'-05.6'	70.6°		23°58.5'-04.6'	71.0°		24°17.9'-03.5'	71.4°		24°36.8'-02.4'	71.8°	19	
20	22°28.2'-09.2'	68.3°		22°50.2'-08.2'	68.7°		23°11.9'-07.2'	69.1°		23°33.1'-06.1'	69.5°		23°54.0'-05.0'	69.9°		24°14.4'-04.0'	70.3°		24°34.4'-02.9'	70.7°	20	
21	22°19.0'-09.7'	67.2°		22°42.0'-08.6'	67.6°		23°04.7'-07.6'	68.0°		23°27.0'-06.5'	68.4°		23°48.9'-05.5'	68.8°		24°10.4'-04.4'	69.2°		24°31.5'-03.4'	69.6°	21	
22	22°09.3'-10.1'	66.1°		22°33.4'-09.1'	66.5°		22°57.1'-08.0'	66.9°		23°20.5'-07.0'	67.3°		23°43.4'-06.0'	67.7°		24°06.0'-04.9'	68.1°		24°28.2'-03.8'	68.5°	22	
23	21°59.2'-10.5'	65.1°		22°24.4'-09.5'	65.4°		22°49.1'-08.5'	65.8°		23°13.5'-07.4'	66.2°		23°37.5'-06.4'	66.6°		24°01.1'-05.4'	67.0°		24°24.3'-04.3'	67.4°	23	
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

66° 294° LHA

Latitude SAME as Declination

66° 294° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

67° 293° LHA

Latitude SAME as Declination

67° 293° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	23°00.0'-00.2'	90.0°		22°59.8'+00.9'	90.4°		22°59.1'+02.1'	90.8°		22°58.0'+03.2'	91.3°		22°56.4'+04.3'	91.7°		22°54.4'+05.5'	92.1°		22°52.0'+06.6'	92.5°	0	
1	22°59.8'-00.7'	88.9°		23°00.7'+00.5'	89.3°		23°01.2'+01.6'	89.8°		23°01.2'+02.7'	90.2°		23°00.8'+03.9'	90.6°		23°00.0'+05.0'	91.0°		22°58.6'+06.1'	91.5°	1	
2	22°59.1'-01.1'	87.8°		23°01.2'+00.0'	88.3°		23°02.8'+01.2'	88.7°		23°03.9'+02.3'	89.1°		23°04.7'+03.4'	89.5°		23°04.9'+04.6'	90.0°		23°04.7'+05.7'	90.4°	2	
3	22°58.0'-01.6'	86.7°		23°01.2'-00.4'	87.2°		23°03.9'+00.7'	87.6°		23°06.2'+01.9'	88.0°		23°08.1'+03.0'	88.4°		23°09.5'+04.1'	88.9°		23°10.5'+05.3'	89.3°	3	
4	22°56.4'-02.0'	85.7°		23°00.8'-00.9'	86.1°		23°04.7'+00.3'	86.5°		23°08.1'+01.4'	86.9°		23°11.1'+02.5'	87.4°		23°13.6'+03.7'	87.8°		23°15.7'+04.8'	88.2°	4	
5	22°54.4'-02.4'	84.6°		23°00.0'-01.3'	85.0°		23°04.9'-00.2'	85.4°		23°09.5'+01.0'	85.8°		23°13.6'+02.1'	86.3°		23°17.3'+03.2'	86.7°		23°20.5'+04.4'	87.1°	5	
6	22°52.0'-02.9'	83.5°		22°58.6'-01.8'	83.9°		23°04.7'-00.6'	84.3°		23°10.5'+00.5'	84.8°		23°15.7'+01.6'	85.2°		23°20.5'+02.8'	85.6°		23°24.9'+03.9'	86.0°	6	
7	22°49.1'-03.3'	82.4°		22°56.8'-02.2'	82.8°		23°04.1'-01.1'	83.2°		23°11.0'+00.1'	83.7°		23°17.4'+01.2'	84.1°		23°23.3'+02.3'	84.5°		23°28.8'+03.5'	85.0°	7	
8	22°45.8'-03.8'	81.3°		22°54.7'-02.6'	81.7°		23°03.1'-01.5'	82.2°		23°11.0'-00.4'	82.6°		23°18.6'+00.7'	83.0°		23°25.6'+01.9'	83.4°		23°32.3'+03.0'	83.9°	8	
9	22°42.1'-04.2'	80.2°		22°52.0'-03.1'	80.6°		23°01.5'-02.0'	81.1°		23°10.6'-00.8'	81.5°		23°19.3'+00.3'	81.9°		23°27.5'+01.4'	82.3°		23°35.3'+02.6'	82.8°	9	
10	22°37.9'-04.6'	79.2°		22°48.9'-03.5'	79.6°		22°59.6'-02.4'	80.0°		23°09.8'-01.3'	80.4°		23°19.6'-00.2'	80.8°		23°28.9'+01.0'	81.3°		23°37.8'+02.1'	81.7°	10	
11	22°33.2'-05.1'	78.1°		22°45.4'-04.0'	78.5°		22°57.2'-02.8'	78.9°		23°08.5'-01.7'	79.3°		23°19.4'-00.6'	79.7°		23°29.9'+00.5'	80.2°		23°39.9'+01.6'	80.6°	11	
12	22°28.2'-05.5'	77.0°		22°41.5'-04.4'	77.4°		22°54.3'-03.3'	77.8°		23°06.8'-02.2'	78.2°		23°18.8'-01.1'	78.6°		23°30.4'+00.1'	79.1°		23°41.6'+01.2'	79.5°	12	
13	22°22.7'-05.9'	75.9°		22°37.1'-04.8'	76.3°		22°51.1'-03.7'	76.7°		23°04.6'-02.6'	77.1°		23°17.8'-01.5'	77.6°		23°30.5'-00.4'	78.0°		23°42.7'+00.7'	78.4°	13	
14	22°16.8'-06.3'	74.8°		22°32.3'-05.3'	75.2°		22°47.3'-04.2'	75.6°		23°02.0'-03.1'	76.1°		23°16.2'-02.0'	76.5°		23°30.1'-00.9'	76.9°		23°43.5'+00.3'	77.3°	14	
15	22°10.4'-06.8'	73.8°		22°27.0'-05.7'	74.2°		22°43.2'-04.6'	74.6°		22°58.9'-03.5'	75.0°		23°14.3'-02.4'	75.4°		23°29.2'-01.3'	75.8°		23°43.7'-00.2'	76.2°	15	
16	22°03.7'-07.2'	72.7°		22°21.3'-06.1'	73.1°		22°38.6'-05.0'	73.5°		22°55.4'-03.9'	73.9°		23°11.9'-02.9'	74.3°		23°27.9'-01.8'	74.7°		23°43.5'-00.7'	75.1°	16	
17	21°56.5'-07.6'	71.6°		22°15.2'-06.5'	72.0°		22°33.5'-05.5'	72.4°		22°51.5'-04.4'	72.8°		23°09.0'-03.3'	73.2°		23°26.1'-02.2'	73.6°		23°42.8'-01.1'	74.0°	17	
18	21°48.9'-08.0'	70.6°		22°08.7'-07.0'	70.9°		22°28.1'-05.9'	71.3°		22°47.1'-04.8'	71.7°		23°05.7'-03.8'	72.1°		23°23.9'-02.7'	72.5°		23°41.7'-01.6'	73.0°	18	
19	21°40.9'-08.4'	69.5°		22°01.7'-07.4'	69.9°		22°22.2'-06.3'	70.3°		22°42.3'-05.3'	70.6°		23°02.0'-04.2'	71.0°		23°21.2'-03.1'	71.4°		23°40.1'-02.0'	71.9°	19	
20	21°32.5'-08.8'	68.4°		21°54.3'-07.8'	68.8°		22°15.9'-06.7'	69.2°		22°37.0'-05.7'	69.6°		22°57.8'-04.6'	70.0°		23°18.1'-03.6'	70.4°		23°38.1'-02.5'	70.8°	20	
21	21°23.6'-09.2'	67.4°		21°46.6'-08.2'	67.7°		22°09.1'-07.2'	68.1°		22°31.3'-06.1'	68.5°		22°53.1'-05.1'	68.9°		23°14.6'-04.0'	69.3°		23°35.6'-03.0'	69.7°	21	
22	21°14.4'-09.6'	66.3°		21°38.4'-08.6'	66.7°		22°02.0'-07.6'	67.0°		22°25.2'-06.6'	67.4°		22°48.0'-05.5'	67.8°		23°10.5'-04.5'</						

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

68° 292° LHA

Latitude SAME as Declination

68° 292° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	22°00.0'	-00.2'	90.0°	21°59.8'	+00.9'	90.4°	21°59.2'	+02.0'	90.8°	21°58.1'	+03.2'	91.2°	21°56.6'	+04.3'	91.6°	21°54.7'	+05.4'	92.0°	21°52.4'	+06.6'	92.4°	0
1	21°59.8'	-00.6'	88.9°	22°00.7'	+00.5'	89.3°	22°01.2'	+01.6'	89.7°	22°01.3'	+02.8'	90.1°	22°00.9'	+03.9'	90.5°	22°00.1'	+05.0'	90.9°	21°58.9'	+06.1'	91.3°	1
2	21°59.2'	-01.1'	87.8°	22°01.2'	+00.1'	88.2°	22°02.8'	+01.2'	88.7°	22°04.0'	+02.3'	89.1°	22°04.8'	+03.5'	89.5°	22°05.2'	+04.6'	89.9°	22°05.1'	+05.7'	90.3°	2
3	21°58.1'	-01.5'	86.8°	22°01.3'	-00.4'	87.2°	22°04.0'	+00.8'	87.6°	22°06.4'	+01.9'	88.0°	22°08.3'	+03.0'	88.4°	22°09.7'	+04.2'	88.8°	22°10.8'	+05.3'	89.2°	3
4	21°56.6'	-01.9'	85.7°	22°00.9'	-00.8'	86.1°	22°04.8'	+00.4'	86.5°	22°08.3'	+01.5'	86.9°	22°11.3'	+02.6'	87.3°	22°13.9'	+03.7'	87.7°	22°16.1'	+04.9'	88.1°	4
5	21°54.7'	-02.3'	84.6°	22°00.1'	-01.2'	85.0°	22°05.2'	-00.1'	85.4°	22°09.7'	+01.1'	85.8°	22°13.9'	+02.2'	86.2°	22°17.6'	+03.3'	86.6°	22°20.9'	+04.4'	87.0°	5
6	21°52.4'	-02.7'	83.5°	21°58.9'	-01.6'	83.9°	22°05.1'	-00.5'	84.3°	22°10.8'	+00.6'	84.7°	22°16.1'	+01.8'	85.1°	22°20.9'	+02.9'	85.6°	22°25.4'	+04.0'	86.0°	6
7	21°49.7'	-03.2'	82.5°	21°57.3'	-02.0'	82.9°	22°04.6'	-00.9'	83.3°	22°11.4'	+00.2'	83.7°	22°17.8'	+01.3'	84.1°	22°23.8'	+02.4'	84.5°	22°29.4'	+03.6'	84.9°	7
8	21°46.5'	-03.6'	81.4°	21°55.3'	-02.5'	81.8°	22°03.7'	-01.3'	82.2°	22°11.6'	-00.2'	82.6°	22°19.1'	+00.9'	83.0°	22°26.3'	+02.0'	83.4°	22°33.0'	+03.1'	83.8°	8
9	21°42.9'	-04.0'	80.3°	21°52.8'	-02.9'	80.7°	22°02.3'	-01.8'	81.1°	22°11.4'	-00.7'	81.5°	22°20.0'	+00.5'	81.9°	22°28.3'	+01.6'	82.3°	22°36.1'	+02.7'	82.7°	9
10	21°38.9'	-04.4'	79.2°	21°49.9'	-03.3'	79.6°	22°00.5'	-02.2'	80.0°	22°10.7'	-01.1'	80.4°	22°20.5'	+00.0'	80.8°	22°29.9'	+01.1'	81.2°	22°38.8'	+02.3'	81.6°	10
11	21°34.5'	-04.8'	78.2°	21°46.6'	-03.7'	78.5°	21°58.3'	-02.6'	78.9°	22°09.6'	-01.5'	79.3°	22°20.5'	-00.4'	79.7°	22°31.0'	+00.7'	80.1°	22°41.1'	+01.8'	80.6°	11
12	21°29.7'	-05.2'	77.1°	21°42.9'	-04.1'	77.5°	21°55.7'	-03.0'	77.9°	22°08.1'	-01.9'	78.3°	22°20.1'	-00.8'	78.7°	22°31.7'	+00.3'	79.1°	22°42.9'	+01.4'	79.5°	12
13	21°24.5'	-05.6'	76.0°	21°38.8'	-04.5'	76.4°	21°52.7'	-03.5'	76.8°	22°06.2'	-02.4'	77.2°	22°19.3'	-01.3'	77.6°	22°32.0'	-00.2'	78.0°	22°44.3'	+01.0'	78.4°	13
14	21°18.8'	-06.0'	74.9°	21°34.2'	-05.0'	75.3°	21°49.2'	-03.9'	75.7°	22°03.8'	-02.8'	76.1°	22°18.0'	-01.7'	76.5°	22°31.9'	-00.6'	76.9°	22°45.2'	+00.5'	77.3°	14
15	21°12.8'	-06.4'	73.9°	21°29.3'	-05.4'	74.3°	21°45.4'	-04.3'	74.6°	22°01.1'	-03.2'	75.0°	22°16.4'	-02.1'	75.4°	22°31.3'	-01.0'	75.8°	22°45.8'	+00.1'	76.2°	15
16	21°06.4'	-06.8'	72.8°	21°23.9'	-05.8'	73.2°	21°41.1'	-04.7'	73.6°	21°57.9'	-03.6'	73.9°	22°14.2'	-02.5'	74.3°	22°30.2'	-01.5'	74.7°	22°45.8'	-00.4'	75.1°	16
17	20°59.5'	-07.2'	71.8°	21°18.1'	-06.2'	72.1°	21°36.4'	-05.1'	72.5°	21°54.2'	-04.0'	72.9°	22°11.7'	-03.0'	73.3°	22°28.8'	-01.9'	73.7°	22°45.5'	-00.8'	74.1°	17
18	20°52.3'	-07.6'	70.7°	21°11.9'	-06.6'	71.1°	21°31.3'	-05.5'	71.4°	21°50.2'	-04.5'	71.8°	22°08.7'	-03.4'	72.2°	22°26.9'	-02.3'	72.6°	22°44.7'	-01.2'	73.0°	18
19	20°44.7'	-08.0'	69.6°	21°05.4'	-07.0'	70.0°	21°25.7'	-05.9'	70.4°	21°45.7'	-04.9'	70.7°	22°05.3'	-03.8'	71.1°	22°24.6'	-02.8'	71.5°	22°43.4'	-01.7'	71.9°	19
20	20°36.6'	-08.4'	68.6°	20°58.4'	-07.4'	68.9°	21°19.8'	-06.3'	69.3°	21°40.8'	-05.3'	69.7°	22°01.5'	-04.2'	70.0°	22°21.8'	-03.2'	70.4°	22°41.7'	-02.1'	70.8°	20
21	20°28.2'	-08.8'	67.5°	20°51.0'	-07.8'	67.9°	21°13.5'	-06.7'	68.2°	21°35.5'	-05.7'	68.6°	21°57.3'	-04.7'	69.0°	22°18.6'	-03.6'	69.3°	22°39.6'	-02.6'	69.7°	21
22	20°19.4'	-09.2'	66.5°	20°43.2'	-08.2'	66.8°	21°06.7'	-07.1'	67.1°	21°29.8'	-06.1'	67.5°	21°52.6'	-05.1'	67.9°	22°15.0'	-04.0'	68.3°	22°37.1'	-03.0'	68.6°	22
23	20°10.3'	-09.5'	65.4°	20°35.1'	-08.5'	65.7°	20°59.6'	-07.5'	66.1°	21°23.7'	-06.5'	66.4°	21°47.5'	-05.5'	66.8°	22°11.0'	-04.5'	67.2°	22°34.1'	-03.4'	67.6°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

68° 292° LHA

Latitude SAME as Declination

68° 292° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

69° 291° LHA

Latitude SAME as Declination

69° 291° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	21°00.0'	-00.2'	90.0°	20°59.8'	+00.9'	90.4°	20°59.2'	+02.0'	90.8°	20°58.2'	+03.2'	91.2°	20°56.8'	+04.3'	91.5°	20°55.0'	+05.4'	91.9°	20°52.8'	+06.5'	92.3°	0
1	20°59.8'	-00.6'	88.9°	21°00.7'	+00.5'	89.3°	21°01.2'	+01.6'	89.7°	21°01.4'	+02.8'	90.1°	21°01.1'	+03.9'	90.5°	21°00.4'	+05.0'	90.8°	20°59.3'	+06.1'	91.2°	1
2	20°59.2'	-01.0'	87.9°	21°01.2'	+00.1'	88.2°	21°02.9'	+01.2'	88.6°	21°04.1'	+02.4'	89.0°	21°04.9'	+03.5'	89.4°	21°05.4'	+04.6'	89.8°	21°05.4'	+05.7'	90.2°	2
3	20°58.1'	-01.4'	86.8°	21°01.4'	-00.3'	87.2°	21°04.1'	+00.8'	87.6°	21°06.5'	+02.0'	87.9°	21°08.4'	+03.1'	88.3°	21°10.0'	+04.2'	88.7°	21°11.1'	+05.3'	89.1°	3
4	20°56.8'	-01.8'	85.7°	21°01.1'	-00.7'	86.1°	21°04.9'	+00.4'	86.5°	21°08.4'	+01.6'	86.9°	21°11.5'	+02.7'	87.3°	21°14.2'	+03.8'	87.6°	21°16.4'	+04.9'	88.0°	4
5	20°55.0'	-02.2'	84.6°	21°00.4'	-01.1'	85.0°	21°05.4'	+00.0'	85.4°	21°10.0'	+01.1'	85.8°	21°14.2'	+02.3'	86.2°	21°18.0'	+03.4'	86.6°	21°21.3'	+04.5'	87.0°	5
6	20°52.8'	-02.6'	83.6°	20°59.3'	-01.5'	84.0°	21°05.4'	-00.4'	84.3°	21°11.1'	+00.7'	84.7°	21°16.4'	+01.9'	85.1°	21°21.3'	+03.0'	85.5°	21°25.9'	+04.1'	85.9°	6
7	20°50.2'	-03.0'	82.5°	20°57.8'	-01.9'	82.9°	21°05.0'	-00.8'	83.3°	21°11.9'	+00.3'	83.7°	21°18.3'	+01.4'	84.0°	21°24.3'	+02.6'	84.4°	21°29.9'	+03.7'	84.8°	7
8	20°47.2'	-03.4'	81.4°	20°55.9'	-02.3'	81.8°	21°04.2'	-01.2'	82.2°	21°12.2'	-00.1'	82.6°	21°19.7'	+01.0'	83.0°	21°26.9'	+02.2'	83.4°	21°33.6'	+03.3'	83.8°	8
9	20°43.8'	-03.8'	80.3°	20°53.6'	-02.7'	80.7°	21°03.1'	-01.6'	81.1°	21°12.1'	-00.5'	81.5°	21°20.8'	+00.6'	81.9°	21°29.0'	+01.7'	82.3°	21°36.9'	+02.9'	82.7°	9
10	20°40.0'	-04.2'	79.3°	20°50.9'	-03.1'	79.7°	21°01.5'	-02.0'	80.1°	21°11.6'	-00.9'	80.4°	21°21.4'	+00.2'	80.8°	21°30.8'	+01.3'	81.2°	21°39.8'	+02.4'	81.6°	10
11	20°35.8'	-04.6'	78.2°	20°47.8'	-03.5'	78.6°	20°59.5'	-02.4'	79.0°	21°10.8'	-01.3'	79.4°	21°21.6'	-00.2'	79.7°	21°32.1'	+00.9'	80.1°	21°42.2'	+02.0'	80.5°	11
12	20°31.2'	-05.0'	77.2°	20°44.3'	-03.9'	77.5°	20°57.1'	-02.8'	77.9°	21°09.5'	-01.7'	78.3°	21°21.4'	-00.6'	78.7°	21°33.0'	+00.5'	79.1°	21°44.2'	+01.6'	79.4°	12
13	20°26.2'	-05.4'	76.1°	20°40.5'	-04.3'	76.5°	20°54.3'	-03.2'	76.8°	21°07.8'	-02.1'	77.2°	21°20.9'	-01.0'	77.6°	21°33.5'	+00.1'	78.0°	21°45.8'	+01.2'	78.4°	13
14	20°20.9'	-05.7'	75.0°	20°36.2'	-04.7'	75.4°	20°51.1'	-03.6'	75.8°	21°05.7'	-02.5'	76.1°	21°19.8'	-01.4'	76.5°	21°33.6'	-00.3'	76.9°	21°47.0'	+00.8'	77.3°	14
15	20°15.1'	-06.1'	74.0°	20°31.5'	-05.1'	74.3°	20°47.5'	-04.0'	74.7°	21°03.2'	-02.9'	75.1°	21°18.4'	-01.8'	75.5°	21°33.3'	-00.7'	75.8°	21°47.8'	+00.4'	76.2°	15
16	20°09.0'	-06.5'	72.9°	20°26.5'	-05.4'	73.3°	20°43.5'	-04.4'	73.6°	21°00.3'	-03.3'	74.0°	21°16.6'	-02.2'	74.4°	21°32.6'	-01.1'	74.8°	21°48.2'	-00.1'	75.1°	16
17	20°02.5'	-06.9'	71.9°	20°21.0'	-05.8'	72.2°	20°39.2'	-04.8'	72.6°	20°57.0'	-03.7'	72.9°	21°14.4'	-02.6'	73.3°	21°31.4'	-01.6'	73.7°	21°48.1'	-00.5'	74.1°	17
18	19°55.6'	-07.3'	70.8°	20°15.2'	-06.2'	71.2°	20°34.4'	-05.2'	71.5°	20°53.2'	-04.1'	71.9°	21°11.7'	-03.0'	72.2°	21°29.9'	-02.0'	72.6°	21°47.6'	-00.9'	73.0°	18
19	19°48.4'	-07.6'	69.8°	20°09.0'	-06.6'	70.1°	20°29.2'	-05.5'	70.4°	20°49.1'	-04.5'	70.8°	21°08.7'	-03.4'	71.2°	21°27.9'	-02.4'	71.5°	21°46.7'	-01.3'	71.9°	19
20	19°40.8'	-08.0'	68.7°	20°02.4'	-07.0'	69.0°	20°23.7'	-05.9'	69.4°	20°44.6'	-04.9'	69.7°	21°05.3'	-03.8'	70.1°	21°25.5'	-02.8'	70.5°	21°45.4'	-01.7'	70.8°	20
21	19°32.8'	-08.4'	67.6°	19°55.4'	-07.3'	68.0°	20°17.8'	-06.3'	68.3°	20°39.7'	-05.3'	68.7°	21°01.4'	-04.2'	69.0°	21°22.7'	-03.2'	69.4°	21°43.6'	-02.2'	69.8°	21
22	19°24.4'	-08.7'																				

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

70° 290° LHA

Latitude SAME as Declination

70° 290° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	20°00.0'	-00.2'	90.0°	19°59.8'	+00.9'	90.4°	19°59.2'	+02.0'	90.7°	19°58.3'	+03.2'	91.1°	19°57.0'	+04.3'	91.5°	19°55.2'	+05.4'	91.8°	19°53.1'	+06.5'	92.2°	0
1	19°59.8'	-00.6'	88.9°	20°00.7'	+00.5'	89.3°	20°01.3'	+01.7'	89.7°	20°01.4'	+02.8'	90.0°	20°01.2'	+03.9'	90.4°	20°00.6'	+05.0'	90.8°	19°59.6'	+06.1'	91.1°	1
2	19°59.2'	-01.0'	87.9°	20°01.3'	+00.2'	88.2°	20°02.9'	+01.3'	88.6°	20°04.2'	+02.4'	89.0°	20°05.1'	+03.5'	89.3°	20°05.6'	+04.6'	89.7°	20°05.7'	+05.7'	90.1°	2
3	19°58.3'	-01.3'	86.8°	20°01.4'	-00.2'	87.2°	20°04.2'	+00.9'	87.5°	20°06.6'	+02.0'	87.9°	20°08.6'	+03.1'	88.3°	20°10.2'	+04.2'	88.6°	20°11.5'	+05.3'	89.0°	3
4	19°57.0'	-01.7'	85.7°	20°01.2'	-00.6'	86.1°	20°05.1'	+00.5'	86.5°	20°08.6'	+01.6'	86.8°	20°11.7'	+02.7'	87.2°	20°14.5'	+03.8'	87.6°	20°16.8'	+05.0'	87.9°	4
5	19°55.2'	-02.1'	84.7°	20°00.6'	-01.0'	85.0°	20°05.6'	+00.1'	85.4°	20°10.2'	+01.2'	85.8°	20°14.5'	+02.3'	86.1°	20°18.3'	+03.5'	86.5°	20°21.8'	+04.6'	86.9°	5
6	19°53.1'	-02.5'	83.6°	19°59.6'	-01.4'	84.0°	20°05.7'	-00.3'	84.3°	20°11.5'	+00.9'	84.7°	20°16.8'	+02.0'	85.1°	20°21.8'	+03.1'	85.4°	20°26.3'	+04.2'	85.8°	6
7	19°50.7'	-02.8'	82.6°	19°58.3'	-01.7'	82.9°	20°05.5'	-00.6'	83.3°	20°12.3'	+00.5'	83.6°	20°18.8'	+01.6'	84.0°	20°24.8'	+02.7'	84.4°	20°30.5'	+03.8'	84.7°	7
8	19°47.8'	-03.2'	81.5°	19°56.5'	-02.1'	81.9°	20°04.8'	-01.0'	82.2°	20°12.8'	+00.1'	82.6°	20°20.3'	+01.2'	82.9°	20°27.5'	+02.3'	83.3°	20°34.3'	+03.4'	83.7°	8
9	19°44.6'	-03.6'	80.4°	19°54.4'	-02.5'	80.8°	20°03.8'	-01.4'	81.1°	20°12.9'	-00.3'	81.5°	20°21.5'	+00.8'	81.9°	20°29.8'	+01.9'	82.2°	20°37.7'	+03.0'	82.6°	9
10	19°41.0'	-04.0'	79.4°	19°51.9'	-02.9'	79.7°	20°02.4'	-01.8'	80.1°	20°12.6'	-00.7'	80.4°	20°22.3'	+00.4'	80.8°	20°31.7'	+01.5'	81.2°	20°40.7'	+02.6'	81.5°	10
11	19°37.0'	-04.3'	78.3°	19°49.0'	-03.3'	78.7°	20°00.6'	-02.2'	79.0°	20°11.9'	-01.1'	79.4°	20°22.7'	+00.0'	79.7°	20°33.2'	+01.1'	80.1°	20°43.3'	+02.2'	80.5°	11
12	19°32.7'	-04.7'	77.3°	19°45.8'	-03.6'	77.6°	19°58.5'	-02.5'	78.0°	20°10.8'	-01.5'	78.3°	20°22.8'	-00.4'	78.7°	20°34.4'	+00.7'	79.0°	20°45.6'	+01.8'	79.4°	12
13	19°28.0'	-05.1'	76.2°	19°42.1'	-04.0'	76.5°	19°55.9'	-02.9'	76.9°	20°09.3'	-01.8'	77.2°	20°22.4'	-00.8'	77.6°	20°35.1'	+00.3'	78.0°	20°47.4'	+01.4'	78.3°	13
14	19°22.9'	-05.4'	75.1°	19°38.1'	-04.4'	75.5°	19°53.0'	-03.3'	75.8°	20°07.5'	-02.2'	76.2°	20°21.6'	-01.1'	76.5°	20°35.4'	-00.1'	76.9°	20°48.8'	+01.0'	77.3°	14
15	19°17.5'	-05.8'	74.1°	19°33.7'	-04.7'	74.4°	19°49.7'	-03.7'	74.8°	20°05.3'	-02.6'	75.1°	20°20.5'	-01.5'	75.5°	20°35.4'	-00.5'	75.8°	20°49.9'	+00.6'	76.2°	15
16	19°11.7'	-06.2'	73.0°	19°29.0'	-05.1'	73.4°	19°46.0'	-04.1'	73.7°	20°02.7'	-03.0'	74.1°	20°19.0'	-01.9'	74.4°	20°34.9'	-00.8'	74.8°	20°50.5'	+00.2'	75.1°	16
17	19°05.5'	-06.5'	72.0°	19°23.9'	-05.5'	72.3°	19°41.9'	-04.4'	72.6°	19°59.7'	-03.4'	73.0°	20°17.0'	-02.3'	73.3°	20°34.1'	-01.2'	73.7°	20°50.7'	-00.2'	74.1°	17
18	18°59.0'	-06.9'	70.9°	19°18.4'	-05.8'	71.3°	19°37.5'	-04.8'	71.6°	19°56.3'	-03.7'	71.9°	20°14.7'	-02.7'	72.3°	20°32.8'	-01.6'	72.6°	20°50.5'	-00.6'	73.0°	18
19	18°52.1'	-07.2'	69.9°	19°12.6'	-06.2'	70.2°	19°32.7'	-05.2'	70.5°	19°52.5'	-04.1'	70.9°	20°12.0'	-03.1'	71.2°	20°31.2'	-02.0'	71.6°	20°50.0'	-01.0'	71.9°	19
20	18°44.8'	-07.6'	68.8°	19°06.3'	-06.6'	69.1°	19°27.5'	-05.5'	69.5°	19°48.4'	-04.5'	69.8°	20°09.0'	-03.5'	70.2°	20°29.2'	-02.4'	70.5°	20°49.0'	-01.4'	70.9°	20
21	18°37.2'	-07.9'	67.8°	18°59.8'	-06.9'	68.1°	19°22.0'	-05.9'	68.4°	19°43.9'	-04.9'	68.7°	20°05.5'	-03.8'	69.1°	20°26.8'	-02.8'	69.4°	20°47.7'	-01.8'	69.8°	21
22	18°29.3'	-08.3'	66.7°	18°52.9'	-07.3'	67.0°	19°16.1'	-06.3'	67.4°	19°39.0'	-05.2'	67.7°	20°01.7'	-04.2'	68.0°	20°23.9'	-03.2'	68.4°	20°45.9'	-02.2'	68.7°	22
23	18°21.0'	-08.6'	65.7°	18°45.6'	-07.6'	66.0°	19°09.8'	-06.6'	66.3°	19°33.8'	-05.6'	66.6°	19°57.4'	-04.6'	67.0°	20°20.8'	-03.6'	67.3°	20°43.7'	-02.6'	67.6°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

70° 290° LHA

Latitude SAME as Declination

70° 290° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

71° 289° LHA

Latitude SAME as Declination

71° 289° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	19°00.0'	-00.2'	90.0°	18°59.8'	+00.9'	90.3°	18°59.3'	+02.0'	90.7°	18°58.4'	+03.1'	91.0°	18°57.1'	+04.2'	91.4°	18°55.5'	+05.3'	91.7°	18°53.5'	+06.5'	92.1°	0
1	18°59.8'	-00.5'	88.9°	19°00.7'	+00.6'	89.3°	19°01.3'	+01.7'	89.6°	19°01.5'	+02.8'	90.0°	19°01.4'	+03.9'	90.3°	19°00.8'	+05.0'	90.7°	19°00.0'	+06.1'	91.0°	1
2	18°59.3'	-00.9'	87.9°	19°01.3'	+00.2'	88.2°	19°03.0'	+01.3'	88.6°	19°04.3'	+02.4'	88.9°	19°05.2'	+03.5'	89.3°	19°05.8'	+04.6'	89.6°	19°06.1'	+05.7'	90.0°	2
3	18°58.4'	-01.3'	86.8°	19°01.5'	-00.2'	87.2°	19°04.3'	+01.0'	87.5°	19°06.7'	+02.1'	87.9°	19°08.8'	+03.2'	88.2°	19°10.5'	+04.3'	88.6°	19°11.8'	+05.4'	88.9°	3
4	18°57.1'	-01.6'	85.8°	19°01.4'	-00.5'	86.1°	19°05.2'	+00.6'	86.5°	19°08.8'	+01.7'	86.8°	19°11.9'	+02.8'	87.2°	19°14.7'	+03.9'	87.5°	19°17.2'	+05.0'	87.8°	4
5	18°55.5'	-02.0'	84.7°	19°00.8'	-00.9'	85.1°	19°05.8'	+00.2'	85.4°	19°10.5'	+01.3'	85.7°	19°14.7'	+02.4'	86.1°	19°18.6'	+03.5'	86.4°	19°22.2'	+04.6'	86.8°	5
6	18°53.5'	-02.3'	83.7°	19°00.0'	-01.2'	84.0°	19°06.1'	-00.1'	84.3°	19°11.8'	+01.0'	84.7°	19°17.2'	+02.1'	85.0°	19°22.2'	+03.2'	85.4°	19°26.8'	+04.3'	85.7°	6
7	18°51.2'	-02.7'	82.6°	18°58.7'	-01.6'	82.9°	19°05.9'	-00.5'	83.3°	19°12.8'	+00.6'	83.6°	19°19.2'	+01.7'	84.0°	19°25.4'	+02.8'	84.3°	19°31.1'	+03.9'	84.7°	7
8	18°48.5'	-03.0'	81.5°	18°57.1'	-02.0'	81.9°	19°05.4'	-00.9'	82.2°	19°13.4'	+00.2'	82.6°	19°20.9'	+01.3'	82.9°	19°28.2'	+02.4'	83.3°	19°35.0'	+03.5'	83.6°	8
9	18°45.4'	-03.4'	80.5°	18°55.2'	-02.3'	80.8°	19°04.6'	-01.2'	81.2°	19°13.6'	-00.1'	81.5°	19°22.3'	+01.0'	81.9°	19°30.6'	+02.1'	82.2°	19°38.5'	+03.2'	82.6°	9
10	18°42.0'	-03.8'	79.4°	18°52.9'	-02.7'	79.8°	19°03.3'	-01.6'	80.1°	19°13.5'	-00.5'	80.5°	19°23.2'	+00.6'	80.8°	19°32.7'	+01.7'	81.1°	19°41.7'	+02.8'	81.5°	10
11	18°38.3'	-04.1'	78.3°	18°50.2'	-03.0'	78.7°	19°01.8'	-01.9'	79.1°	19°13.0'	-00.9'	79.4°	19°23.8'	+00.2'	79.7°	19°34.4'	+01.3'	80.1°	19°44.5'	+02.4'	80.4°	11
12	18°34.2'	-04.5'	77.3°	18°47.2'	-03.4'	77.7°	18°59.8'	-02.3'	78.0°	19°12.1'	-01.2'	78.3°	19°24.1'	-00.1'	78.7°	19°35.7'	+00.9'	79.0°	19°46.9'	+02.0'	79.4°	12
13	18°29.7'	-04.8'	76.3°	18°43.8'	-03.7'	76.6°	18°57.5'	-02.7'	76.9°	19°10.9'	-01.6'	77.3°	19°23.9'	-00.5'	77.6°	19°36.6'	+00.6'	78.0°	19°49.0'	+01.7'	78.3°	13
14	18°24.9'	-05.2'	75.2°	18°40.0'	-04.1'	75.6°	18°54.8'	-03.0'	75.9°	19°09.3'	-02.0'	76.2°	19°23.4'	-00.9'	76.6°	19°37.2'	+00.2'	76.9°	19°50.6'	+01.3'	77.3°	14
15	18°19.7'	-05.5'	74.2°	18°35.9'	-04.4'	74.5°	18°51.8'	-03.4'	74.8°	19°07.4'	-02.3'	75.2°	19°22.5'	-01.2'	75.5°	19°37.4'	-00.2'	75.8°	19°51.9'	+00.9'	76.2°	15
16	18°14.2'	-05.8'	73.1°	18°31.5'	-04.8'	73.4°	18°48.4'	-03.7'	73.8°	19°05.0'	-02.7'	74.1°	19°21.3'	-01.6'	74.4°	19°37.2'	-00.5'	74.8°	19°52.8'	+00.5'	75.1°	16
17	18°08.4'	-06.2'	72.1°	18°26.7'	-05.1'	72.4°	18°44.7'	-04.1'	72.7°	19°02.4'	-03.0'	73.0°	19°19.7'	-02.0'	73.4°	19°36.7'	-00.9'	73.7°	19°53.3'	+00.1'	74.1°	17
18	18°02.2'	-06.5'	71.0°	18°21.6'	-05.5'	71.3°	18°40.6'	-04.4'	71.7°	18°59.3'	-03.4'	72.0°	19°17.7'	-02.3'	72.3°	19°35.8'	-01.3'	72.7°	19°53.5'	-00.2'	73.0°	18
19	17°55.7'	-06.9'	70.0°	18°16.1'	-05.8'	70.3°	18°36.2'	-04.8'	70.6°	18°55.9'	-03.8'	70.9°	19°15.4'	-02.7'	71.3°	19°34.5'	-01.7'	71.6°	19°53.3'	-00.6'	71.9°	19
20	17°48.9'	-07.2'	68.9°	18°10.3'	-06.2'	69.2°	18°31.4'	-05.1'	69.6°	18°52.2'	-04.1'	69.9°	19°12.7'	-03.1'	70.2°	19°32.8'	-02.0'	70.5°	19°52.6'	-01.0'	70.9°	20
21	17°41.7'	-07.5'	67.9°	18°04.1'	-06.5'	68.2°	18°26.2'	-05.5'	68.5°	18°48.1'	-04.5'	68.8°	19°09.6'	-03.4'	69.1°	19°30.8'	-02.4'	69.5°	19°51.7'	-01.4'	69.8°	21</

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

72° 288° LHA

Latitude SAME as Declination

72° 288° LHA

Table with 10 columns (Dec, 0-6, Dec) and 30 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is symmetric around the center row (Dec 12).

72° 288° LHA

Latitude SAME as Declination

72° 288° LHA

South Lat. LHA > 180° .. Zn = 180-Z LHA < 180° .. Zn= 180+Z

North Lat. LHA > 180° ... Zn = Z LHA < 180° .. Zn= 360-Z

73° 287° LHA

Latitude SAME as Declination

73° 287° LHA

Table with 10 columns (Dec, 0-6, Dec) and 30 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is symmetric around the center row (Dec 12).

73° 287° LHA

Latitude SAME as Declination

73° 287° LHA

South Lat. LHA > 180° .. Zn = 180-Z LHA < 180° .. Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

74° 286° LHA

Latitude SAME as Declination

74° 286° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	16°00.0'	-00.2'	90.0°	15°59.8'	+00.9'	90.3°	15°59.4'	+02.0'	90.6°	15°58.6'	+03.1'	90.9°	15°57.6'	+04.2'	91.1°	15°56.2'	+05.3'	91.4°	15°54.6'	+06.4'	91.7°	0
1	15°59.8'	-00.5'	89.0°	16°00.8'	+00.6'	89.2°	16°01.4'	+01.7'	89.5°	16°01.8'	+02.8'	89.8°	16°01.8'	+03.9'	90.1°	16°01.5'	+05.0'	90.4°	16°01.0'	+06.1'	90.7°	1
2	15°59.4'	-00.8'	87.9°	16°01.4'	+00.3'	88.2°	16°03.2'	+01.4'	88.5°	16°04.6'	+02.5'	88.8°	16°05.7'	+03.6'	89.1°	16°06.5'	+04.7'	89.4°	16°07.1'	+05.8'	89.6°	2
3	15°58.6'	-01.1'	86.9°	16°01.8'	+00.0'	87.2°	16°04.6'	+01.1'	87.5°	16°07.1'	+02.2'	87.7°	16°09.3'	+03.3'	88.0°	16°11.2'	+04.4'	88.3°	16°12.8'	+05.5'	88.6°	3
4	15°57.6'	-01.3'	85.8°	16°01.8'	-00.3'	86.1°	16°05.7'	+00.8'	86.4°	16°09.3'	+01.9'	86.7°	16°12.6'	+03.0'	87.0°	16°15.6'	+04.1'	87.3°	16°18.3'	+05.2'	87.6°	4
5	15°56.2'	-01.6'	84.8°	16°01.5'	-00.6'	85.1°	16°06.5'	+00.5'	85.4°	16°11.2'	+01.6'	85.7°	16°15.6'	+02.7'	86.0°	16°19.7'	+03.8'	86.2°	16°23.5'	+04.9'	86.5°	5
6	15°54.6'	-01.9'	83.8°	16°01.0'	-00.9'	84.0°	16°07.1'	+00.2'	84.3°	16°12.8'	+01.3'	84.6°	16°18.3'	+02.4'	84.9°	16°23.5'	+03.5'	85.2°	16°28.3'	+04.6'	85.5°	6
7	15°52.7'	-02.2'	82.7°	16°00.1'	-01.2'	83.0°	16°07.3'	-00.1'	83.3°	16°14.1'	+01.0'	83.6°	16°20.7'	+02.1'	83.9°	16°26.9'	+03.2'	84.2°	16°32.9'	+04.2'	84.5°	7
8	15°50.4'	-02.5'	81.7°	15°58.9'	-01.5'	82.0°	16°07.2'	-00.4'	82.2°	16°15.1'	+00.7'	82.5°	16°22.8'	+01.8'	82.8°	16°30.1'	+02.9'	83.1°	16°37.1'	+03.9'	83.4°	8
9	15°47.9'	-02.8'	80.6°	15°57.5'	-01.8'	80.9°	16°06.8'	-00.7'	81.2°	16°15.8'	+00.4'	81.5°	16°24.5'	+01.5'	81.8°	16°33.0'	+02.5'	82.1°	16°41.1'	+03.6'	82.4°	9
10	15°45.0'	-03.1'	79.6°	15°55.7'	-02.1'	79.9°	16°06.1'	-01.0'	80.2°	16°16.2'	+00.1'	80.5°	16°26.0'	+01.2'	80.7°	16°35.5'	+02.2'	81.0°	16°44.7'	+03.3'	81.3°	10
11	15°41.9'	-03.4'	78.6°	15°53.7'	-02.4'	78.8°	16°05.1'	-01.3'	79.1°	16°16.3'	-00.2'	79.4°	16°27.2'	+00.8'	79.7°	16°37.7'	+01.9'	80.0°	16°48.0'	+03.0'	80.3°	11
12	15°38.5'	-03.7'	77.5°	15°51.3'	-02.7'	77.8°	16°03.8'	-01.6'	78.1°	16°16.1'	-00.5'	78.4°	16°28.0'	+00.5'	78.7°	16°39.7'	+01.6'	78.9°	16°51.0'	+02.7'	79.2°	12
13	15°34.8'	-04.0'	76.5°	15°48.6'	-03.0'	76.8°	16°02.2'	-01.9'	77.0°	16°15.5'	-00.8'	77.3°	16°28.5'	+00.2'	77.6°	16°41.3'	+01.3'	77.9°	16°53.7'	+02.4'	78.2°	13
14	15°30.8'	-04.3'	75.5°	15°45.7'	-03.2'	75.7°	16°00.3'	-02.2'	76.0°	16°14.7'	-01.1'	76.3°	16°28.8'	-00.1'	76.6°	16°42.6'	+01.0'	76.9°	16°56.0'	+02.0'	77.2°	14
15	15°26.5'	-04.6'	74.4°	15°42.4'	-03.5'	74.7°	15°58.1'	-02.5'	75.0°	16°13.6'	-01.4'	75.2°	16°28.7'	-00.4'	75.5°	16°43.5'	+00.7'	75.8°	16°58.1'	+01.7'	76.1°	15
16	15°21.9'	-04.9'	73.4°	15°38.9'	-03.8'	73.7°	15°55.6'	-02.8'	73.9°	16°12.1'	-01.7'	74.2°	16°28.3'	-00.7'	74.5°	16°44.2'	+00.3'	74.8°	16°59.8'	+01.4'	75.1°	16
17	15°17.0'	-05.2'	72.4°	15°35.1'	-04.1'	72.6°	15°52.8'	-03.1'	72.9°	16°10.4'	-02.1'	73.2°	16°27.6'	-01.0'	73.4°	16°44.6'	+00.0'	73.7°	17°01.2'	+01.1'	74.0°	17
18	15°11.8'	-05.4'	71.3°	15°30.9'	-04.4'	71.6°	15°49.8'	-03.4'	71.9°	16°08.3'	-02.4'	72.1°	16°26.6'	-01.3'	72.4°	16°44.6'	-00.3'	72.7°	17°02.3'	+00.8'	73.0°	18
19	15°06.4'	-05.7'	70.3°	15°26.5'	-04.7'	70.5°	15°46.4'	-03.7'	70.8°	16°06.0'	-02.7'	71.1°	16°25.3'	-01.6'	71.4°	16°44.3'	-00.6'	71.6°	17°03.1'	+00.4'	71.9°	19
20	15°00.7'	-06.0'	69.3°	15°21.8'	-05.0'	69.5°	15°42.7'	-04.0'	69.8°	16°03.3'	-03.0'	70.0°	16°23.6'	-01.9'	70.3°	16°43.7'	-00.9'	70.6°	17°03.5'	+00.1'	70.9°	20
21	14°54.7'	-06.3'	68.2°	15°16.8'	-05.3'	68.5°	15°38.7'	-04.3'	68.7°	16°00.3'	-03.3'	69.0°	16°21.7'	-02.2'	69.3°	16°42.8'	-01.2'	69.6°	17°03.6'	-00.2'	69.8°	21
22	14°48.4'	-06.5'	67.2°	15°11.6'	-05.6'	67.4°	15°34.4'	-04.6'	67.7°	15°57.1'	-03.6'	68.0°	16°19.5'	-01.5'	68.2°	16°41.6'	-01.5'	68.5°	17°03.4'	-00.5'	68.8°	22
23	14°41.9'	-06.8'	66.2°	15°06.0'	-05.8'	66.4°	15°29.9'	-04.8'	66.7°	15°53.5'	-03.9'	66.9°	16°16.9'	-02.9'	67.2°	16°40.0'	-01.9'	67.5°	17°02.9'	-00.8'	67.7°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

74° 286° LHA

Latitude SAME as Declination

74° 286° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

75° 285° LHA

Latitude SAME as Declination

75° 285° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	15°00.0'	-00.1'	90.0°	14°59.9'	+00.9'	90.3°	14°59.4'	+02.0'	90.5°	14°58.7'	+03.1'	90.8°	14°57.8'	+04.2'	91.1°	14°56.5'	+05.3'	91.3°	14°55.0'	+06.4'	91.6°	0
1	14°59.9'	-00.4'	89.0°	15°00.8'	+00.7'	89.2°	15°01.5'	+01.7'	89.5°	15°01.8'	+02.8'	89.8°	15°01.9'	+03.9'	90.0°	15°01.8'	+05.0'	90.3°	15°01.3'	+06.1'	90.6°	1
2	14°59.4'	-00.7'	87.9°	15°01.5'	+00.4'	88.2°	15°03.2'	+01.5'	88.5°	15°04.7'	+02.5'	88.7°	15°05.9'	+03.6'	89.0°	15°06.8'	+04.7'	89.3°	15°07.4'	+05.8'	89.5°	2
3	14°58.6'	-01.0'	86.9°	15°01.8'	+00.1'	87.2°	15°04.7'	+01.2'	87.4°	15°07.2'	+02.3'	87.7°	15°09.5'	+03.3'	88.0°	15°11.5'	+04.4'	88.2°	15°13.2'	+05.5'	88.5°	3
4	14°57.8'	-01.3'	85.9°	15°01.9'	-00.2'	86.1°	15°05.9'	+00.9'	86.4°	15°09.5'	+02.0'	86.7°	15°12.8'	+03.1'	86.9°	15°15.9'	+04.1'	87.2°	15°18.7'	+05.2'	87.5°	4
5	14°56.5'	-01.5'	84.8°	15°01.8'	-00.5'	85.1°	15°06.8'	+00.6'	85.4°	15°11.5'	+01.7'	85.6°	15°15.9'	+02.8'	85.9°	15°20.1'	+03.9'	86.2°	15°23.9'	+04.9'	86.4°	5
6	14°55.0'	-01.8'	83.8°	15°01.3'	-00.7'	84.1°	15°07.4'	+00.3'	84.3°	15°13.2'	+01.4'	84.6°	15°18.7'	+02.5'	84.9°	15°19.5'	+03.6'	85.1°	15°28.9'	+04.7'	85.4°	6
7	14°53.1'	-02.1'	82.8°	15°00.6'	-01.0'	83.0°	15°07.7'	+00.1'	83.3°	15°14.6'	+01.1'	83.6°	15°21.2'	+02.2'	83.8°	15°27.5'	+03.3'	84.1°	15°33.5'	+04.4'	84.4°	7
8	14°51.0'	-02.4'	81.7°	14°59.5'	-01.3'	82.0°	15°07.8'	-00.2'	82.3°	15°15.7'	+00.8'	82.5°	15°23.4'	+01.9'	82.8°	15°30.8'	+03.0'	83.1°	15°37.9'	+04.1'	83.3°	8
9	14°48.7'	-02.7'	80.7°	14°58.2'	-01.6'	81.0°	15°07.5'	-00.5'	81.2°	15°16.6'	+00.6'	81.5°	15°25.3'	+01.6'	81.8°	15°33.8'	+02.7'	82.0°	15°41.9'	+03.8'	82.3°	9
10	14°46.0'	-02.9'	79.7°	14°56.7'	-01.9'	79.9°	15°07.0'	-00.8'	80.2°	15°17.1'	+00.3'	80.4°	15°26.9'	+01.3'	80.7°	15°36.5'	+02.4'	81.0°	15°45.7'	+03.5'	81.3°	10
11	14°43.1'	-03.2'	78.6°	14°54.8'	-02.1'	78.9°	15°06.2'	-01.1'	79.1°	15°17.4'	+00.0'	79.4°	15°28.3'	+01.1'	79.7°	15°38.9'	+02.1'	80.0°	15°49.2'	+03.2'	80.2°	11
12	14°39.9'	-03.5'	77.6°	14°52.6'	-02.4'	77.8°	15°05.1'	-01.4'	78.1°	15°17.4'	-00.3'	78.4°	15°29.3'	+00.8'	78.6°	15°41.0'	+01.8'	78.9°	15°52.4'	+02.9'	79.2°	12
13	14°36.4'	-03.7'	76.6°	14°50.2'	-02.7'	76.8°	15°03.8'	-01.6'	77.1°	15°17.1'	-00.6'	77.3°	15°30.1'	+00.5'	77.6°	15°42.8'	+01.5'	77.9°	15°55.3'	+02.6'	78.2°	13
14	14°32.7'	-04.0'	75.5°	14°47.5'	-03.0'	75.8°	15°02.1'	-01.9'	76.0°	15°16.5'	-00.9'	76.3°	15°30.6'	+00.2'	76.6°	15°44.4'	+01.2'	76.8°	15°57.9'	+02.3'	77.1°	14
15	14°28.7'	-04.3'	74.4°	14°44.6'	-03.2'	74.7°	15°00.2'	-02.2'	75.0°	15°15.6'	-01.2'	75.3°	15°30.7'	-00.1'	75.5°	15°45.6'	+00.9'	75.8°	16°00.2'	+02.0'	76.1°	15
16	14°24.4'	-04.6'	73.4°	14°41.3'	-03.5'	73.7°	14°58.0'	-02.5'	74.0°	15°14.5'	-01.4'	74.2°	15°30.6'	-00.4'	74.5°	15°46.5'	+00.6'	74.8°	16°02.2'	+01.7'	75.0°	16
17	14°19.8'	-04.8'	72.4°	14°37.8'	-03.8'	72.7°	14°55.5'	-02.8'	72.9°	15°13.0'	-01.7'	73.2°	15°30.2'	-00.7'	73.5°	15°47.2'	+00.3'	73.7°	16°03.9'	+01.4'	74.0°	17
18	14°15.0'	-05.1'	71.4°	14°34.0'	-04.1'	71.7°	14°52.8'	-03.0'	71.9°	15°11.3'	-02.0'	72.2°	15°29.5'	-01.0'	72.4°	15°47.5'	+00.1'	72.7°	16°05.2'	+01.1'	73.0°	18
19	14°09.9'	-05.3'	70.4°	14°29.9'	-04.3'	70.6°	14°49.7'	-03.3'	70.9°	15°09.3'	-02.3'	71.1°	15°28.6'	-01.3'	71.4°	15°47.6'	-00.2'	71.6°	16°06.3'	+00.8'	71.9°	19
20	14°04.6'	-05.6'	69.4°	14°25.6'	-04.6'	69.6°	14°46.4'	-03.6'	69.8°	15°07.0'	-02.6'	70.1°	15°27.3'	-01.6'	70.3°	15°47.3'	-00.5'	70.6°	16°07.1'	+00.5'	70.9°	20
21	13°59.0'	-05.9'	68.3°	14°21.0'	-04.9'	68.6°	14°42.8'	-03.9'	68.8°	15°04.4'	-02.9'	69.1°	15°25.7'	-01.8'	69.3°	15°46.8'	-00.8'	69.6°	16°07.6'	+00.2'	69.8°	21
22	13°53.1'	-06.1'																				

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

76° 284° LHA

Latitude SAME as Declination

76° 284° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	14°00.0'	-00.1'	90.0°	13°59.9'	+00.9'	90.2°	13°59.5'	+02.0'	90.5°	13°58.8'	+03.1'	90.7°	13°57.9'	+04.2'	91.0°	13°56.7'	+05.3'	91.2°	13°55.3'	+06.3'	91.5°	0
1	13°59.9'	-00.4'	89.0°	14°00.8'	+00.7'	89.2°	14°01.5'	+01.8'	89.5°	14°01.9'	+02.8'	89.7°	14°02.1'	+03.9'	90.0°	14°02.0'	+05.0'	90.2°	14°01.6'	+06.1'	90.5°	1
2	13°59.5'	-00.7'	87.9°	14°01.5'	+00.4'	88.2°	14°03.3'	+01.5'	88.4°	14°04.8'	+02.6'	88.7°	14°06.0'	+03.7'	88.9°	14°07.0'	+04.7'	89.2°	14°07.7'	+05.8'	89.4°	2
3	13°58.8'	-00.9'	86.9°	14°01.9'	+00.2'	87.2°	14°04.8'	+01.2'	87.4°	14°07.4'	+02.3'	87.7°	14°09.7'	+03.4'	87.9°	14°11.7'	+04.5'	88.2°	14°13.5'	+05.5'	88.4°	3
4	13°57.9'	-01.2'	85.9°	14°02.1'	-00.1'	86.1°	14°06.0'	+01.0'	86.4°	14°09.7'	+02.1'	86.6°	14°13.1'	+03.1'	86.9°	14°16.2'	+04.2'	87.1°	14°19.1'	+05.3'	87.4°	4
5	13°56.7'	-01.4'	84.8°	14°02.0'	-00.4'	85.1°	14°07.0'	+00.7'	85.3°	14°11.7'	+01.8'	85.6°	14°16.2'	+02.9'	85.9°	14°20.4'	+03.9'	86.1°	14°24.4'	+05.0'	86.4°	5
6	13°55.3'	-01.7'	83.8°	14°01.6'	-00.6'	84.1°	14°07.7'	+00.5'	84.3°	14°13.5'	+01.5'	84.6°	14°19.1'	+02.6'	84.8°	14°24.4'	+03.7'	85.1°	14°29.4'	+04.7'	85.3°	6
7	13°53.6'	-02.0'	82.8°	14°01.0'	-00.9'	83.0°	14°08.2'	+00.2'	83.3°	14°15.1'	+01.3'	83.5°	14°21.7'	+02.3'	83.8°	14°28.0'	+03.4'	84.0°	14°34.1'	+04.5'	84.3°	7
8	13°51.7'	-02.2'	81.8°	14°00.1'	-01.1'	82.0°	14°08.4'	-00.1'	82.3°	14°16.3'	+01.0'	82.5°	14°24.0'	+02.1'	82.8°	14°31.4'	+03.1'	83.0°	14°38.6'	+04.2'	83.3°	8
9	13°49.5'	-02.5'	80.7°	13°59.0'	-01.4'	81.0°	14°08.3'	-00.3'	81.2°	14°17.3'	+00.7'	81.5°	14°26.1'	+01.8'	81.7°	14°34.6'	+02.9'	82.0°	14°42.8'	+03.9'	82.2°	9
10	13°47.0'	-02.7'	79.7°	13°57.6'	-01.7'	79.9°	14°07.9'	-00.6'	80.2°	14°18.0'	+00.5'	80.4°	14°27.9'	+01.5'	80.7°	14°37.4'	+02.6'	80.9°	14°46.7'	+03.7'	81.2°	10
11	13°44.3'	-03.0'	78.7°	13°55.9'	-01.9'	78.9°	14°07.3'	-00.9'	79.2°	14°18.5'	+00.2'	79.4°	14°29.4'	+01.3'	79.7°	14°40.0'	+02.3'	79.9°	14°50.4'	+03.4'	80.2°	11
12	13°41.3'	-03.2'	77.6°	13°54.0'	-02.2'	77.9°	14°06.5'	-01.1'	78.1°	14°18.7'	-00.1'	78.4°	14°30.6'	+01.0'	78.6°	14°42.3'	+02.0'	78.9°	14°53.8'	+03.1'	79.1°	12
13	13°38.0'	-03.5'	76.6°	13°51.8'	-02.4'	76.9°	14°05.3'	-01.4'	77.1°	14°18.6'	-00.3'	77.3°	14°31.6'	+00.7'	77.6°	14°44.4'	+01.8'	77.8°	14°56.9'	+02.8'	78.1°	13
14	13°34.6'	-03.7'	75.6°	13°49.4'	-02.7'	75.8°	14°03.9'	-01.7'	76.1°	14°18.3'	-00.6'	76.3°	14°32.3'	+00.4'	76.6°	14°46.2'	+01.5'	76.8°	14°59.7'	+02.5'	77.1°	14
15	13°30.8'	-04.0'	74.6°	13°46.7'	-03.0'	74.8°	14°02.3'	-01.9'	75.0°	14°17.7'	-00.9'	75.3°	14°32.8'	+00.2'	75.5°	14°47.6'	+01.2'	75.8°	15°02.3'	+02.3'	76.0°	15
16	13°26.8'	-04.2'	73.5°	13°43.7'	-03.2'	73.8°	14°00.4'	-02.2'	74.0°	14°16.8'	-01.1'	74.2°	14°33.0'	-00.1'	74.5°	14°48.9'	+00.9'	74.7°	15°04.5'	+02.0'	75.0°	16
17	13°22.6'	-04.5'	72.5°	13°40.5'	-03.5'	72.7°	13°58.2'	-02.4'	73.0°	14°15.6'	-01.4'	73.2°	14°32.8'	-00.4'	73.5°	14°49.8'	+00.7'	73.7°	15°06.5'	+01.7'	74.0°	17
18	13°18.1'	-04.7'	71.5°	13°37.1'	-03.7'	71.7°	13°55.8'	-02.7'	71.9°	14°14.2'	-01.7'	72.2°	14°32.5'	-00.6'	72.4°	14°50.5'	+00.4'	72.7°	15°08.2'	+01.4'	72.9°	18
19	13°13.4'	-05.0'	70.5°	13°33.3'	-04.0'	70.7°	13°53.1'	-03.0'	70.9°	14°12.6'	-01.9'	71.2°	14°31.8'	-00.9'	71.4°	14°50.8'	+00.1'	71.6°	15°09.6'	+01.1'	71.9°	19
20	13°08.4'	-05.2'	69.4°	13°29.4'	-04.2'	69.7°	13°50.1'	-03.2'	69.9°	14°10.6'	-02.2'	70.1°	14°30.9'	-01.2'	70.4°	14°51.0'	-00.2'	70.6°	15°10.7'	+00.8'	70.9°	20
21	13°03.2'	-05.5'	68.4°	13°25.2'	-04.5'	68.6°	13°46.9'	-03.5'	68.9°	14°08.4'	-02.5'	69.1°	14°29.7'	-01.5'	69.3°	14°50.8'	-00.4'	69.6°	15°11.6'	+00.6'	69.8°	21
22	12°57.7'	-05.7'	67.4°	13°20.7'	-04.7'	67.6°	13°43.4'	-03.7'	67.8°	14°06.0'	-02.7'	68.1°	14°28.3'	-01.7'	68.3°	14°50.3'	-00.7'	68.5°	15°12.2'	+00.3'	68.8°	22
23	12°52.0'	-05.9'	66.4°	13°16.0'	-05.0'	66.6°	13°39.7'	-04.0'	66.8°	14°03.2'	-03.0'	67.0°	14°26.5'	-02.0'	67.3°	14°49.6'	-01.0'	67.5°	15°12.4'	00.0'	67.8°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

76° 284° LHA

Latitude SAME as Declination

76° 284° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

77° 283° LHA

Latitude SAME as Declination

77° 283° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	13°00.0'	-00.1'	90.0°	12°59.9'	+01.0'	90.2°	12°59.5'	+02.0'	90.5°	12°58.9'	+03.1'	90.7°	12°58.1'	+04.2'	90.9°	12°57.0'	+05.2'	91.2°	12°55.7'	+06.3'	91.4°	0
1	12°59.9'	-00.4'	89.0°	13°00.8'	+00.7'	89.2°	13°01.5'	+01.8'	89.4°	13°02.0'	+02.9'	89.7°	13°02.2'	+03.9'	89.9°	13°02.2'	+05.0'	90.1°	13°02.0'	+06.1'	90.4°	1
2	12°59.5'	-00.6'	87.9°	13°01.5'	+00.5'	88.2°	13°03.3'	+01.5'	88.4°	13°04.9'	+02.6'	88.6°	13°06.2'	+03.7'	88.9°	13°07.2'	+04.8'	89.1°	13°08.0'	+05.8'	89.3°	2
3	12°58.8'	-00.8'	86.9°	13°02.0'	+00.2'	87.2°	13°04.9'	+01.3'	87.4°	13°07.5'	+02.4'	87.6°	13°09.9'	+03.4'	87.8°	13°12.0'	+04.5'	88.1°	13°13.9'	+05.6'	88.3°	3
4	12°58.1'	-01.1'	85.9°	13°02.2'	00.0'	86.1°	13°06.2'	+01.1'	86.4°	13°09.9'	+02.1'	86.6°	13°13.3'	+03.2'	86.8°	13°16.5'	+04.3'	87.1°	13°19.5'	+05.3'	87.3°	4
5	12°57.0'	-01.3'	84.9°	13°02.2'	-00.3'	85.1°	13°07.2'	+00.8'	85.3°	13°12.0'	+01.9'	85.6°	13°16.5'	+03.0'	85.8°	13°20.8'	+04.0'	86.0°	13°24.8'	+05.1'	86.3°	5
6	12°55.7'	-01.6'	83.8°	13°02.0'	-00.5'	84.1°	13°08.0'	+00.6'	84.3°	13°13.9'	+01.6'	84.5°	13°19.5'	+02.7'	84.8°	13°24.8'	+03.8'	85.0°	13°29.9'	+04.8'	85.2°	6
7	12°54.1'	-01.8'	82.8°	13°01.5'	-00.7'	83.0°	13°08.6'	+00.3'	83.3°	13°15.5'	+01.4'	83.5°	13°22.2'	+02.5'	83.7°	13°28.6'	+03.5'	84.0°	13°34.8'	+04.6'	84.2°	7
8	12°52.3'	-02.0'	81.8°	13°00.7'	-01.0'	82.0°	13°08.9'	+00.1'	82.3°	13°16.9'	+01.1'	82.5°	13°24.6'	+02.2'	82.7°	13°32.1'	+03.3'	83.0°	13°39.3'	+04.3'	83.2°	8
9	12°50.2'	-02.3'	80.8°	12°59.7'	-01.2'	81.0°	13°09.0'	-00.2'	81.2°	13°18.1'	+00.9'	81.5°	13°26.8'	+02.0'	81.7°	13°35.4'	+03.0'	81.9°	13°43.7'	+04.1'	82.2°	9
10	12°47.9'	-02.5'	79.7°	12°58.5'	-01.5'	80.0°	13°08.9'	-00.4'	80.2°	13°18.9'	+00.6'	80.4°	13°28.8'	+01.7'	80.7°	13°38.4'	+02.8'	80.9°	13°47.8'	+03.8'	81.1°	10
11	12°45.4'	-02.8'	78.7°	12°57.0'	-01.7'	78.9°	13°08.4'	-00.7'	79.2°	13°19.6'	+00.4'	79.4°	13°30.5'	+01.5'	79.6°	13°41.2'	+02.5'	79.9°	13°51.6'	+03.6'	80.1°	11
12	12°42.7'	-03.0'	77.7°	12°55.3'	-01.9'	77.9°	13°07.8'	-00.9'	78.1°	13°20.0'	+00.2'	78.4°	13°32.0'	+01.2'	78.6°	13°43.7'	+02.3'	78.8°	13°55.2'	+03.3'	79.1°	12
13	12°39.7'	-03.2'	76.7°	12°53.4'	-02.2'	76.9°	13°06.9'	-01.1'	77.1°	13°20.1'	-00.1'	77.3°	13°33.2'	+01.0'	77.6°	13°46.0'	+02.0'	77.8°	13°58.5'	+03.1'	78.1°	13
14	12°36.4'	-03.5'	75.6°	12°51.2'	-02.4'	75.9°	13°05.7'	-01.4'	76.1°	13°20.1'	-00.3'	76.3°	13°34.1'	+00.7'	76.5°	13°48.0'	+01.7'	76.8°	14°01.6'	+02.8'	77.0°	14
15	12°33.0'	-03.7'	74.6°	12°48.8'	-02.7'	74.8°	13°04.4'	-01.6'	75.1°	13°19.7'	-00.6'	75.3°	13°34.8'	+00.4'	75.5°	13°49.7'	+01.5'	75.8°	14°04.4'	+02.5'	76.0°	15
16	12°29.3'	-03.9'	73.6°	12°46.1'	-02.9'	73.8°	13°02.7'	-01.9'	74.0°	13°19.1'	-00.8'	74.3°	13°35.3'	+00.2'	74.5°	13°51.2'	+01.2'	74.7°	14°06.9'	+02.3'	75.0°	16
17	12°25.4'	-04.2'	72.6°	12°43.2'	-03.1'	72.8°	13°00.9'	-02.1'	73.0°	13°18.3'	-01.1'	73.2°	13°35.5'	-00.1'	73.5°	13°52.4'	+01.0'	73.7°	14°09.2'	+02.0'	73.9°	17
18	12°21.2'	-04.4'	71.6°	12°40.1'	-03.4'	71.8°	12°58.7'	-02.4'	72.0°	13°17.2'	-01.3'	72.2°	13°35.4'	-00.3'	72.4°	13°53.4'	+00.7'	72.7°	14°11.2'	+01.7'	72.9°	18
19	12°16.8'	-04.6'	70.5°	12°36.7'	-03.6'	70.7°	12°56.4'	-02.6'	71.0°	13°15.9'	-00.6'	71.2°	13°35.1'	-00.6'	71.4°	13°54.1'	+00.5'	71.6°	14°12.9'	+01.5'	71.9°	19
20	12°12.2'	-04.8'	69.5°	12°33.1'	-03.8'	69.7°	12°53.8'	-02.8'	69.9°	13°14.3'	-01.8'	70.2°	13°34.5'	-00.8'	70.4°	13°54.6'	+00.2'	70.6°	14°14.4'	+01.2'	70.8°	20
21	12°07.4'	-05.1'	68.5°	12°29.3'	-04.1'	68.7°	12°51.0'	-03.1'	68.9°	13°12.4'	-02.1'	69.1°	13°33.7'	-01.1'	69.3°	13°54.8'	-00.1'	69.6°	14°15.6'	+00.9'	69.8°	21
22	12°02.3'	-05.3'																				

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

78° 282° LHA

Latitude SAME as Declination

78° 282° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	12°00.0'-00.1'	90.0°		11°59.9'+01.0'	90.2°		11°59.6'+02.0'	90.4°		11°59.0'+03.1'	90.6°		11°58.2'+04.2'	90.8°		11°57.2'+05.2'	91.1°		11°56.0'+06.3'	91.3°	0	
1	11°59.9'-00.3'	89.0°		12°00.8'+00.7'	89.2°		12°01.6'+01.8'	89.4°		12°02.1'+02.9'	89.6°		12°02.4'+03.9'	89.8°		12°02.5'+05.0'	90.0°		12°02.3'+06.1'	90.3°	1	
2	11°59.6'-00.6'	88.0°		12°01.6'+00.5'	88.2°		12°03.4'+01.6'	88.4°		12°05.0'+02.7'	88.6°		12°06.3'+03.7'	88.8°		12°07.5'+04.8'	89.0°		12°08.4'+05.9'	89.2°	2	
3	11°59.0'-00.8'	86.9°		12°02.1'+00.3'	87.1°		12°05.0'+01.4'	87.4°		12°07.6'+02.4'	87.6°		12°10.1'+03.5'	87.8°		12°12.3'+04.6'	88.0°		12°14.2'+05.6'	88.2°	3	
4	11°58.2'-01.0'	85.9°		12°02.4'+00.1'	86.1°		12°06.3'+01.1'	86.3°		12°10.1'+02.2'	86.6°		12°13.6'+03.3'	86.8°		12°16.8'+04.3'	87.0°		12°19.9'+05.4'	87.2°	4	
5	11°57.2'-01.2'	84.9°		12°02.5'-00.2'	85.1°		12°07.5'+00.9'	85.3°		12°12.3'+02.0'	85.5°		12°16.8'+03.0'	85.7°		12°21.2'+04.1'	86.0°		12°25.3'+05.2'	86.2°	5	
6	11°56.0'-01.4'	83.9°		12°02.3'-00.4'	84.1°		12°08.4'+00.7'	84.3°		12°14.2'+01.7'	84.5°		12°19.9'+02.8'	84.7°		12°25.3'+03.9'	84.9°		12°30.4'+04.9'	85.2°	6	
7	11°54.6'-01.7'	82.8°		12°01.9'-00.6'	83.1°		12°09.1'+00.5'	83.3°		12°16.0'+01.5'	83.5°		12°22.7'+02.6'	83.7°		12°29.2'+03.6'	83.9°		12°35.4'+04.7'	84.1°	7	
8	11°52.9'-01.9'	81.8°		12°01.3'-00.8'	82.0°		12°09.5'+00.2'	82.2°		12°17.5'+01.3'	82.5°		12°25.3'+02.4'	82.7°		12°32.8'+03.4'	82.9°		12°40.1'+04.5'	83.1°	8	
9	11°51.0'-02.1'	80.8°		12°00.5'-01.0'	81.0°		12°09.8'+00.0'	81.2°		12°18.8'+01.1'	81.4°		12°27.6'+02.1'	81.7°		12°36.2'+03.2'	81.9°		12°44.6'+04.2'	82.1°	9	
10	11°48.9'-02.3'	79.8°		11°59.4'-01.3'	80.0°		12°09.8'-00.2'	80.2°		12°19.9'+00.8'	80.4°		12°29.7'+01.9'	80.6°		12°39.4'+02.9'	80.9°		12°48.8'+04.0'	81.1°	10	
11	11°46.6'-02.5'	78.8°		11°58.2'-01.5'	79.0°		12°09.5'-00.4'	79.2°		12°20.7'+00.6'	79.4°		12°31.6'+01.7'	79.6°		12°42.3'+02.7'	79.8°		12°52.8'+03.8'	80.1°	11	
12	11°44.0'-02.8'	77.7°		11°56.7'-01.7'	77.9°		12°09.1'-00.7'	78.2°		12°21.3'+00.4'	78.4°		12°33.3'+01.4'	78.6°		12°45.1'+02.5'	78.8°		12°56.6'+03.5'	79.0°	12	
13	11°41.3'-03.0'	76.7°		11°55.0'-01.9'	76.9°		12°08.4'-00.9'	77.1°		12°21.7'+00.1'	77.3°		12°34.7'+01.2'	77.6°		12°47.5'+02.2'	77.8°		13°00.1'+03.3'	78.0°	13	
14	11°38.3'-03.2'	75.7°		11°53.0'-02.2'	75.9°		12°07.5'-01.1'	76.1°		12°21.8'-00.1'	76.3°		12°35.9'+01.0'	76.5°		12°49.8'+02.0'	76.8°		13°03.4'+03.0'	77.0°	14	
15	11°35.1'-03.4'	74.7°		11°50.9'-02.4'	74.9°		12°06.4'-01.3'	75.1°		12°21.8'-00.3'	75.3°		12°36.9'+00.7'	75.5°		12°51.8'+01.8'	75.7°		13°06.5'+02.8'	76.0°	15	
16	11°31.7'-03.6'	73.7°		11°48.5'-02.6'	73.9°		12°05.1'-01.6'	74.1°		12°21.4'-00.5'	74.3°		12°37.6'+00.5'	74.5°		12°53.5'+01.5'	74.7°		13°09.3'+02.6'	74.9°	16	
17	11°28.1'-03.8'	72.6°		11°45.9'-02.8'	72.8°		12°03.5'-01.8'	73.0°		12°20.9'-00.8'	73.2°		12°38.1'+00.3'	73.5°		12°55.1'+01.3'	73.7°		13°11.8'+02.3'	73.9°	17	
18	11°24.3'-04.0'	71.6°		11°43.1'-03.0'	71.8°		12°01.7'-02.0'	72.0°		12°20.1'-01.0'	72.2°		12°38.3'+00.0'	72.4°		12°56.3'+01.0'	72.7°		13°14.1'+02.1'	72.9°	18	
19	11°20.2'-04.2'	70.6°		11°40.1'-03.2'	70.8°		11°59.7'-02.2'	71.0°		12°19.1'-01.2'	71.2°		12°38.4'-00.2'	71.4°		12°57.4'+00.8'	71.6°		13°16.2'+01.8'	71.8°	19	
20	11°16.0'-04.5'	69.6°		11°36.8'-03.5'	69.8°		11°57.5'-02.5'	70.0°		12°17.9'-01.5'	70.2°		12°38.2'-00.4'	70.4°		12°58.2'+00.6'	70.6°		13°18.0'+01.6'	70.8°	20	
21	11°11.5'-04.7'	68.6°		11°33.4'-03.7'	68.8°		11°55.0'-02.7'	69.0°		12°16.5'-01.7'	69.2°		12°37.7'-00.7'	69.4°		12°58.8'+00.3'	69.6°		13°19.6'+01.3'	69.8°	21	
22	11°06.9'-04.9'	67.6°		11°29.7'-03.9'	67.7°		11°52.3'-02.9'	67.9°		12°14.8'-01.9'	68.1°		12°37.0'-00.9'	68.3°		12°59.1'+00.1'	68.5°		13°20.9'+01.1'	68.8°	22	
23	11°02.0'-05.1'	66.5°		11°25.8'-04.1'	66.7°		11°49.4'-03.1'	66.9°		12°12.9'-02.1'	67.1°		12°36.1'-01.2'	67.3°		12°59.1'-00.2'	67.5°		13°22.0'+00.8'	67.7°	23	
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

78° 282° LHA

Latitude SAME as Declination

78° 282° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

79° 281° LHA

Latitude SAME as Declination

79° 281° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	11°00.0'-00.1'	90.0°		10°59.9'+01.0'	90.2°		10°59.6'+02.0'	90.4°		10°59.1'+03.1'	90.6°		10°58.4'+04.2'	90.8°		10°57.5'+05.2'	91.0°		10°56.3'+06.3'	91.2°	0	
1	10°59.9'-00.3'	89.0°		11°00.9'+00.8'	89.2°		11°01.6'+01.8'	89.4°		11°02.2'+02.9'	89.6°		11°02.5'+04.0'	89.8°		11°02.7'+05.0'	90.0°		11°02.6'+06.1'	90.2°	1	
2	10°59.6'-00.5'	88.0°		11°01.6'+00.6'	88.2°		11°03.5'+01.6'	88.4°		11°05.1'+02.7'	88.5°		11°06.5'+03.8'	88.7°		11°07.7'+04.8'	88.9°		11°08.7'+05.9'	89.1°	2	
3	10°59.1'-00.7'	86.9°		11°02.2'+00.4'	87.1°		11°05.1'+01.4'	87.3°		11°07.8'+02.5'	87.5°		11°10.2'+03.5'	87.7°		11°12.5'+04.6'	87.9°		11°14.6'+05.7'	88.1°	3	
4	10°58.4'-00.9'	85.9°		11°02.5'+00.1'	86.1°		11°06.5'+01.2'	86.3°		11°10.2'+02.3'	86.5°		11°13.8'+03.3'	86.7°		11°17.1'+04.4'	86.9°		11°20.3'+05.5'	87.1°	4	
5	10°57.5'-01.1'	84.9°		11°02.7'-00.1'	85.1°		11°07.7'+01.0'	85.3°		11°12.5'+02.1'	85.5°		11°17.1'+03.1'	85.7°		11°21.5'+04.2'	85.9°		11°25.7'+05.3'	86.1°	5	
6	10°56.3'-01.3'	83.9°		11°02.6'-00.3'	84.1°		11°08.7'+00.8'	84.3°		11°14.6'+01.9'	84.5°		11°20.3'+02.9'	84.7°		11°25.7'+04.0'	84.9°		11°31.0'+05.0'	85.1°	6	
7	10°55.0'-01.5'	82.9°		11°02.4'-00.5'	83.1°		11°09.5'+00.6'	83.3°		11°16.5'+01.7'	83.5°		11°23.2'+02.7'	83.7°		11°29.7'+03.8'	83.9°		11°36.0'+04.8'	84.1°	7	
8	10°53.5'-01.7'	81.9°		11°01.9'-00.7'	82.0°		11°10.1'+00.4'	82.2°		11°18.1'+01.4'	82.4°		11°25.9'+02.5'	82.6°		11°33.5'+03.6'	82.8°		11°40.9'+04.6'	83.0°	8	
9	10°51.8'-01.9'	80.8°		11°01.2'-00.9'	81.0°		11°10.5'+00.2'	81.2°		11°19.6'+01.2'	81.4°		11°28.4'+02.3'	81.6°		11°37.0'+03.3'	81.8°		11°45.5'+04.4'	82.0°	9	
10	10°49.9'-02.1'	79.8°		11°00.4'-01.1'	80.0°		11°10.7'00.0'	80.2°		11°20.8'+01.0'	80.4°		11°30.7'+02.1'	80.6°		11°40.4'+03.1'	80.8°		11°49.9'+04.2'	81.0°	10	
11	10°47.7'-02.3'	78.8°		10°59.3'-01.3'	79.0°		11°10.6'-00.2'	79.2°		11°21.8'+00.8'	79.4°		11°32.8'+01.9'	79.6°		11°43.5'+02.9'	79.8°		11°54.1'+04.0'	80.0°	11	
12	10°45.4'-02.5'	77.8°		10°58.0'-01.5'	78.0°		11°10.4'-00.4'	78.2°		11°22.6'+00.6'	78.4°		11°34.6'+01.6'	78.6°		11°46.4'+02.7'	78.8°		11°58.0'+03.7'	79.0°	12	
13	10°42.9'-02.7'	76.8°		10°56.5'-01.7'	77.0°		11°10.0'-00.6'	77.1°		11°23.2'+00.4'	77.3°		11°36.3'+01.4'	77.5°		11°49.1'+02.5'	77.7°		12°01.8'+03.5'	77.9°	13	
14	10°40.2'-02.9'	75.7°		10°54.8'-01.9'	75.9°		11°09.3'-00.9'	76.1°		11°23.6'+00.2'	76.3°		11°37.7'+01.2'	76.5°		11°51.6'+02.3'	76.7°		12°05.3'+03.3'	76.9°	14	
15	10°37.2'-03.1'	74.7°		10°53.0'-02.1'	74.9°		11°08.5'-01.1'	75.1°		11°23.8'00.0'	75.3°		11°38.9'+01.0'	75.5°		11°53.9'+02.0'	75.7°		12°08.6'+03.1'	75.9°	15	
16	10°34.1'-03.3'	73.7°		10°50.9'-02.3'	73.9°		11°07.4'-01.3'	74.1°		11°23.8'-00.2'	74.3°		11°39.9'+00.8'	74.5°		11°55.9'+01.8'	74.7°		12°11.6'+02.8'	74.9°	16	
17	10°30.8'-03.5'	72.7°		10°48.6'-02.5'	72.9°		11°06.1'-01.5'	73.1°		11°23.5'-00.5'	73.3°		11°40.7'+00.6'	73.5°		11°57.7'+01.6'	73.7°		12°14.5'+02.6'	73.9°	17	
18	10°27.3'-03.7'	71.7°		10°46.1'-02.7'	71.9°		11°04.7'-01.7'	72.0°		11°23.1'-00.7'	72.2°		11°41.3'+00.4'	72.4°		11°59.3'+01.4'	72.6°		12°17.1'+02.4'	72.8°	18	
19	10°23.6'-03.9'	70.7°		10°43.4'-02.9'	70.8°		11°03.0'-01.9'	71.0°		11°22.4'-00.9'	71.2°		11°41.6'+00.1'	71.4°		12°00.7'+01.1'	71.6°		12°19.5'+02.2'	71.8°	19	
20	10°19.7'-04.1'	69.7°		10°40.5'-03.1'	69.8°		11°01.1'-02.1'	70.0°		11°21.5'-01.1'	70.2°		11°41.8'+00.1'	70.4°		12°01.8'+00.9'	70.6°		12°21.7'+01.9'	70.8°	20	
21	10°15.7'-04.3'	68.6°		10°37.4'-03.3'	68.8°		10°59.0'-02.3'	69.0°		11°20.5'-01.3'	69.2°		11°41.7'-00.3'	69.4°		12°02.7'+00.7'	69.6°		12°23.6'+01.7'	69.8°	21	
22	10°11.4'-04.5'	67.6°		10°34.2'-03.5'	67.8°		10°56.7'-02.5'	68.0°		11°19.2'-01.5'	68.2°		11°41.4'-00.5'	68.3°		12°03.4'+00.5'	68.5°		12°25.3'+01.5'	6		

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

80° 280° LHA

Latitude SAME as Declination

80° 280° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	10°00.0'	-00.1'	90.0°	10°00.0'	+01.0'	90.2°	9°59.6'	+02.0'	90.4°	9°59.2'	+03.1'	90.5°	9°58.5'	+04.2'	90.7°	9°57.7'	+05.2'	90.9°	9°56.7'	+06.3'	91.1°	0
1	10°00.0'	-00.3'	89.0°	10°00.9'	+00.8'	89.2°	10°01.7'	+01.8'	89.3°	10°02.3'	+02.9'	89.5°	10°02.7'	+04.0'	89.7°	10°02.9'	+05.0'	89.9°	10°03.0'	+06.1'	90.0°	1
2	9°59.6'	-00.5'	88.0°	10°01.7'	+00.6'	88.1°	10°03.5'	+01.7'	88.3°	10°05.2'	+02.7'	88.5°	10°06.7'	+03.8'	88.7°	10°07.9'	+04.8'	88.9°	10°09.0'	+05.9'	89.0°	2
3	9°59.2'	-00.6'	87.0°	10°02.3'	+00.4'	87.1°	10°05.2'	+01.5'	87.3°	10°07.9'	+02.5'	87.5°	10°10.4'	+03.6'	87.7°	10°12.8'	+04.7'	87.8°	10°15.0'	+05.7'	88.0°	3
4	9°58.5'	-00.8'	85.9°	10°02.7'	+00.2'	86.1°	10°06.7'	+01.3'	86.3°	10°10.4'	+02.4'	86.5°	10°14.0'	+03.4'	86.7°	10°17.5'	+04.5'	86.8°	10°20.7'	+05.5'	87.0°	4
5	9°57.7'	-01.0'	84.9°	10°02.9'	+00.0'	85.1°	10°07.9'	+01.1'	85.3°	10°12.8'	+02.2'	85.5°	10°17.5'	+03.2'	85.6°	10°21.9'	+04.3'	85.8°	10°26.2'	+05.3'	86.0°	5
6	9°56.7'	-01.2'	83.9°	10°03.0'	-00.1'	84.1°	10°09.0'	+00.9'	84.3°	10°15.0'	+02.0'	84.4°	10°20.7'	+03.0'	84.6°	10°26.2'	+04.1'	84.8°	10°31.5'	+05.1'	85.0°	6
7	9°55.5'	-01.4'	82.9°	10°02.8'	-00.3'	83.1°	10°10.0'	+00.7'	83.2°	10°16.9'	+01.8'	83.4°	10°23.7'	+02.8'	83.6°	10°30.3'	+03.9'	83.8°	10°36.7'	+05.0'	84.0°	7
8	9°54.1'	-01.6'	81.9°	10°02.5'	-00.5'	82.1°	10°10.7'	+00.5'	82.2°	10°18.7'	+01.6'	82.4°	10°26.5'	+02.6'	82.6°	10°34.2'	+03.7'	82.8°	10°41.6'	+04.8'	83.0°	8
9	9°52.5'	-01.7'	80.9°	10°02.0'	-00.7'	81.0°	10°11.2'	+00.4'	81.2°	10°20.3'	+01.4'	81.4°	10°29.2'	+02.5'	81.6°	10°37.9'	+03.5'	81.8°	10°46.4'	+04.6'	81.9°	9
10	9°50.8'	-01.9'	79.8°	10°01.3'	-00.9'	80.0°	10°11.6'	+00.2'	80.2°	10°21.7'	+01.2'	80.4°	10°31.6'	+02.3'	80.6°	10°41.4'	+03.3'	80.7°	10°51.0'	+04.4'	80.9°	10
11	9°48.9'	-02.1'	78.8°	10°00.4'	-01.1'	79.0°	10°11.7'	00.0'	79.2°	10°22.9'	+01.0'	79.4°	10°33.9'	+02.1'	79.5°	10°44.7'	+03.1'	79.7°	10°55.3'	+04.2'	79.9°	11
12	9°46.8'	-02.3'	77.8°	9°59.3'	-01.3'	78.0°	10°11.7'	-00.2'	78.2°	10°23.9'	+00.8'	78.3°	10°36.0'	+01.9'	78.5°	10°47.8'	+02.9'	78.7°	10°59.5'	+04.0'	78.9°	12
13	9°44.5'	-02.5'	76.8°	9°58.1'	-01.4'	77.0°	10°11.5'	-00.4'	77.1°	10°24.8'	+00.6'	77.3°	10°37.8'	+01.7'	77.5°	10°50.7'	+02.7'	77.7°	11°03.4'	+03.7'	77.9°	13
14	9°42.0'	-02.6'	75.8°	9°56.6'	-01.6'	76.0°	10°11.1'	-00.6'	76.1°	10°25.4'	+00.4'	76.3°	10°39.5'	+01.5'	76.5°	10°53.4'	+02.5'	76.7°	11°07.2'	+03.5'	76.9°	14
15	9°39.4'	-02.8'	74.8°	9°55.0'	-01.8'	74.9°	10°10.5'	-00.8'	75.1°	10°25.8'	+00.2'	75.3°	10°41.0'	+01.3'	75.5°	10°55.9'	+02.3'	75.7°	11°10.7'	+03.3'	75.8°	15
16	9°36.5'	-03.0'	73.8°	9°53.2'	-02.0'	73.9°	10°09.7'	-01.0'	74.1°	10°26.1'	+00.1'	74.3°	10°42.3'	+01.1'	74.5°	10°58.3'	+02.1'	74.6°	11°14.0'	+03.1'	74.8°	16
17	9°33.5'	-03.2'	72.8°	9°51.2'	-02.2'	72.9°	10°08.8'	-01.2'	73.1°	10°26.2'	-00.1'	73.3°	10°43.3'	+00.9'	73.4°	11°00.4'	+01.9'	73.6°	11°17.2'	+02.9'	73.8°	17
18	9°30.4'	-03.4'	71.7°	9°49.1'	-02.3'	71.9°	10°07.6'	-01.3'	72.1°	10°26.0'	-00.3'	72.2°	10°44.2'	+00.7'	72.4°	11°02.3'	+01.7'	72.6°	11°20.1'	+02.7'	72.8°	18
19	9°27.0'	-03.5'	70.7°	9°46.7'	-02.5'	70.9°	10°06.3'	-01.5'	71.1°	10°25.7'	-00.5'	71.2°	10°44.9'	+00.5'	71.4°	11°04.0'	+01.5'	71.6°	11°22.8'	+02.5'	71.8°	19
20	9°23.5'	-03.7'	69.7°	9°44.2'	-02.7'	69.9°	10°04.8'	-01.7'	70.0°	10°25.2'	-00.7'	70.2°	10°45.4'	+00.3'	70.4°	11°05.4'	+01.3'	70.6°	11°25.3'	+02.3'	70.8°	20
21	9°19.8'	-03.9'	68.7°	9°41.5'	-02.9'	68.9°	10°03.1'	-01.9'	69.0°	10°24.5'	-00.9'	69.2°	10°45.7'	+00.1'	69.4°	11°06.7'	+01.1'	69.5°	11°27.6'	+02.1'	69.7°	21
22	9°15.9'	-04.0'	67.7°	9°38.6'	-03.1'	67.8°	10°01.2'	-02.1'	68.0°	10°23.5'	-01.1'	68.2°	10°45.8'	-00.1'	68.3°	11°07.8'	+00.9'	68.5°	11°29.7'	+01.9'	68.7°	22
23	9°11.9'	-04.2'	66.7°	9°35.5'	-03.2'	66.8°	9°59.1'	-02.3'	67.0°	10°22.4'	-01.3'	67.2°	10°45.7'	-00.3'	67.3°	11°08.7'	+00.7'	67.5°	11°31.6'	+01.7'	67.7°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

80° 280° LHA

Latitude SAME as Declination

80° 280° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

81° 279° LHA

Latitude SAME as Declination

81° 279° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	9°00.0'	-00.1'	90.0°	9°00.0'	+01.0'	90.2°	8°59.7'	+02.0'	90.3°	8°59.3'	+03.1'	90.5°	8°58.7'	+04.2'	90.6°	8°57.9'	+05.2'	90.8°	8°57.0'	+06.3'	90.9°	0
1	9°00.0'	-00.2'	89.0°	9°00.9'	+00.8'	89.1°	9°01.7'	+01.9'	89.3°	9°02.4'	+02.9'	89.5°	9°02.8'	+04.0'	89.6°	9°03.1'	+05.0'	89.8°	9°03.3'	+06.1'	89.9°	1
2	8°59.7'	-00.4'	88.0°	9°01.7'	+00.6'	88.1°	9°03.6'	+01.7'	88.3°	9°05.3'	+02.8'	88.5°	9°06.8'	+03.8'	88.6°	9°08.2'	+04.9'	88.8°	9°09.4'	+05.9'	88.9°	2
3	8°59.3'	-00.6'	87.0°	9°02.4'	+00.5'	87.1°	9°05.3'	+01.5'	87.3°	9°08.0'	+02.6'	87.4°	9°10.6'	+03.7'	87.6°	9°13.1'	+04.7'	87.8°	9°15.3'	+05.8'	87.9°	3
4	8°58.7'	-00.7'	86.0°	9°02.8'	+00.3'	86.1°	9°06.8'	+01.4'	86.3°	9°10.6'	+02.4'	86.4°	9°14.3'	+03.5'	86.6°	9°17.8'	+04.5'	86.8°	9°21.1'	+05.6'	86.9°	4
5	8°57.9'	-00.9'	84.9°	9°03.1'	+00.1'	85.1°	9°08.2'	+01.2'	85.3°	9°13.1'	+02.3'	85.4°	9°17.8'	+03.3'	85.6°	9°22.3'	+04.4'	85.7°	9°26.7'	+05.4'	85.9°	5
6	8°57.0'	-01.1'	83.9°	9°03.3'	00.0'	84.1°	9°09.4'	+01.0'	84.2°	9°15.3'	+02.1'	84.4°	9°21.1'	+03.1'	84.6°	9°26.7'	+04.2'	84.7°	9°32.1'	+05.2'	84.9°	6
7	8°55.9'	-01.2'	82.9°	9°03.3'	-00.2'	83.1°	9°10.4'	+00.9'	83.2°	9°17.4'	+01.9'	83.4°	9°24.2'	+03.0'	83.6°	9°30.9'	+04.0'	83.7°	9°37.4'	+05.1'	83.9°	7
8	8°54.7'	-01.4'	81.9°	9°03.1'	-00.4'	82.1°	9°11.3'	+00.7'	82.2°	9°19.3'	+01.7'	82.4°	9°27.2'	+02.8'	82.5°	9°34.9'	+03.8'	82.7°	9°42.4'	+04.9'	82.9°	8
9	8°53.3'	-01.6'	80.9°	9°02.7'	-00.5'	81.0°	9°12.0'	+00.5'	81.2°	9°21.1'	+01.6'	81.4°	9°30.0'	+02.6'	81.5°	9°38.7'	+03.7'	81.7°	9°47.3'	+04.7'	81.9°	9
10	8°51.7'	-01.7'	79.9°	9°02.2'	-00.7'	80.0°	9°12.5'	+00.4'	80.2°	9°22.6'	+01.4'	80.4°	9°32.6'	+02.4'	80.5°	9°42.4'	+03.5'	80.7°	9°52.0'	+04.5'	80.9°	10
11	8°50.0'	-01.9'	78.9°	9°01.5'	-00.9'	79.0°	9°12.9'	+00.2'	79.2°	9°24.0'	+01.2'	79.3°	9°35.1'	+02.3'	79.5°	9°45.9'	+03.3'	79.7°	9°56.6'	+04.4'	79.8°	11
12	8°48.1'	-02.1'	77.9°	9°00.7'	-01.0'	78.0°	9°13.0'	+00.0'	78.2°	9°25.3'	+01.1'	78.3°	9°37.3'	+02.1'	78.5°	9°49.2'	+03.1'	78.7°	10°00.9'	+04.2'	78.8°	12
13	8°46.0'	-02.2'	76.8°	8°59.6'	-01.2'	77.0°	9°13.1'	-00.2'	77.2°	9°26.3'	+00.9'	77.3°	9°39.4'	+01.9'	77.5°	9°52.3'	+02.9'	77.6°	10°05.1'	+04.0'	77.8°	13
14	8°43.8'	-02.4'	75.8°	8°58.4'	-01.4'	76.0°	9°12.9'	-00.3'	76.1°	9°27.2'	+00.7'	76.3°	9°41.3'	+01.7'	76.5°	9°55.3'	+02.8'	76.6°	10°09.1'	+03.8'	76.8°	14
15	8°41.5'	-02.5'	74.8°	8°57.1'	-01.5'	75.0°	9°12.6'	-00.5'	75.1°	9°27.9'	+00.5'	75.3°	9°43.0'	+01.6'	75.4°	9°58.0'	+02.6'	75.6°	10°12.9'	+03.6'	75.8°	15
16	8°38.9'	-02.7'	73.8°	8°55.6'	-01.7'	74.0°	9°12.1'	-00.7'	74.1°	9°28.4'	+00.4'	74.3°	9°44.6'	+01.4'	74.4°	10°00.6'	+02.4'	74.6°	10°16.5'	+03.4'	74.8°	16
17	8°36.2'	-02.9'	72.8°	8°53.9'	-01.8'	72.9°	9°11.4'	-00.8'	73.1°	9°28.8'	+00.2'	73.3°	9°46.0'	+01.2'	73.4°	10°03.0'	+02.2'	73.6°	10°19.9'	+03.2'	73.8°	17
18	8°33.4'	-03.0'	71.8°	8°52.0'	-02.0'	71.9°	9°10.6'	-01.0'	72.1°	9°29.0'	+00.0'	72.2°	9°47.2'	+01.0'	72.4°	10°05.2'	+02.0'	72.6°	10°23.1'	+03.0'	72.7°	18
19	8°30.4'	-03.2'	70.8°	8°50.0'	-02.2'	70.9°	9°09.6'	-01.2'	71.1°	9°29.0'	-00.2'	71.2°	9°48.2'	+00.8'	71.4°	10°07.2'	+01.8'	71.6°	10°26.1'	+02.8'	71.7°	19
20	8°27.2'	-03.3'	69.8°	8°47.9'	-02.3'	69.9°	9°08.4'	-01.3'	70.1°	9°28.8'	-00.3'	70.2°	9°49.0'	+00.7'	70.4°	10°09.1'	+01.6'	70.5°	10°29.0'	+02.6'	70.7°	20
21	8°23.9'	-03.5'	68.8°	8°45.5'	-02.5'	68.9°	9°07.1'	-01.5'	69.0°	9°28.4'	-00.5'	69.2°	9°49.7'	+00.5'	69.4°	10°10.7'	+01.5'	69.5°	10°31.6'	+02.5'	69.7°	21
22	8°20.4'	-03.6'	67.8°	8°43.0'	-02.7'	67.9°	9°05.5'	-01.7'	68.0°	9°27.9'	-00.7'	68.2°	9°50.1'	+00.3'	68.3°	10°12.2'	+01.3'	68.5°	10°34.1'	+02.3'</		

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

82° 278° LHA

Latitude SAME as Declination

82° 278° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	8°00.0'	-00.1'	90.0°	8°00.0'	+01.0'	90.1°	7°59.7'	+02.0'	90.3°	7°59.3'	+03.1'	90.4°	7°58.8'	+04.2'	90.6°	7°58.2'	+05.2'	90.7°	7°57.4'	+06.3'	90.8°	0
1	8°00.0'	-00.2'	89.0°	8°00.9'	+00.8'	89.1°	8°01.7'	+01.9'	89.3°	8°02.4'	+02.9'	89.4°	8°03.0'	+04.0'	89.6°	8°03.4'	+05.1'	89.7°	8°03.6'	+06.1'	89.8°	1
2	7°59.7'	-00.4'	88.0°	8°01.7'	+00.7'	88.1°	8°03.6'	+01.7'	88.3°	8°05.4'	+02.8'	88.4°	8°07.0'	+03.9'	88.5°	8°08.4'	+04.9'	88.7°	8°09.7'	+06.0'	88.8°	2
3	7°59.3'	-00.5'	87.0°	8°02.4'	+00.5'	87.1°	8°05.4'	+01.6'	87.3°	8°08.2'	+02.7'	87.4°	8°10.8'	+03.7'	87.5°	8°13.3'	+04.8'	87.7°	8°15.7'	+05.8'	87.8°	3
4	7°58.8'	-00.7'	86.0°	8°03.0'	+00.4'	86.1°	8°07.0'	+01.4'	86.2°	8°10.8'	+02.5'	86.4°	8°14.5'	+03.6'	86.5°	8°18.1'	+04.6'	86.7°	8°21.5'	+05.7'	86.8°	4
5	7°58.2'	-00.8'	85.0°	8°03.4'	+00.2'	85.1°	8°08.4'	+01.3'	85.2°	8°13.3'	+02.4'	85.4°	8°18.1'	+03.4'	85.5°	8°22.7'	+04.5'	85.7°	8°27.2'	+05.5'	85.8°	5
6	7°57.4'	-01.0'	83.9°	8°03.6'	+00.1'	84.1°	8°09.7'	+01.1'	84.2°	8°15.7'	+02.2'	84.4°	8°21.5'	+03.3'	84.5°	8°27.2'	+04.3'	84.7°	8°32.7'	+05.4'	84.8°	6
7	7°56.4'	-01.1'	82.9°	8°03.7'	-00.1'	83.1°	8°10.9'	+01.0'	83.2°	8°17.9'	+02.0'	83.4°	8°24.8'	+03.1'	83.5°	8°31.5'	+04.1'	83.7°	8°38.0'	+05.2'	83.8°	7
8	7°55.3'	-01.2'	81.9°	8°03.7'	-00.2'	82.1°	8°11.9'	+00.8'	82.2°	8°19.9'	+01.9'	82.3°	8°27.9'	+02.9'	82.5°	8°35.6'	+04.0'	82.6°	8°43.2'	+05.0'	82.8°	8
9	7°54.1'	-01.4'	80.9°	8°03.5'	-00.3'	81.1°	8°12.7'	+00.7'	81.2°	8°21.8'	+01.7'	81.3°	8°30.8'	+02.8'	81.5°	8°39.6'	+03.8'	81.6°	8°48.3'	+04.9'	81.8°	9
10	7°52.7'	-01.5'	79.9°	8°03.1'	-00.5'	80.0°	8°13.4'	+00.5'	80.2°	8°23.6'	+01.6'	80.3°	8°33.6'	+02.6'	80.5°	8°43.4'	+03.7'	80.6°	8°53.1'	+04.7'	80.8°	10
11	7°51.1'	-01.7'	78.9°	8°02.6'	-00.6'	79.0°	8°14.0'	+00.4'	79.2°	8°25.2'	+01.4'	79.3°	8°36.2'	+02.5'	79.5°	8°47.1'	+03.5'	79.6°	8°57.8'	+04.5'	79.8°	11
12	7°49.4'	-01.8'	77.9°	8°02.0'	-00.8'	78.0°	8°14.3'	+00.2'	78.2°	8°26.6'	+01.3'	78.3°	8°38.7'	+02.3'	78.5°	8°50.6'	+03.3'	78.6°	9°02.4'	+04.4'	78.8°	12
13	7°47.6'	-02.0'	76.9°	8°01.2'	-00.9'	77.0°	8°14.6'	+00.1'	77.2°	8°27.9'	+01.1'	77.3°	8°41.0'	+02.1'	77.4°	8°53.9'	+03.2'	77.6°	9°06.8'	+04.2'	77.7°	13
14	7°45.7'	-02.1'	75.9°	8°00.2'	-01.1'	76.0°	8°14.7'	-00.1'	76.1°	8°29.0'	+01.0'	76.3°	8°43.1'	+02.0'	76.4°	8°57.1'	+03.0'	76.6°	9°11.0'	+04.0'	76.7°	14
15	7°43.5'	-02.3'	74.9°	7°59.1'	-01.2'	75.0°	8°14.6'	-00.2'	75.1°	8°29.9'	+00.8'	75.3°	8°45.1'	+01.8'	75.4°	9°00.1'	+02.9'	75.6°	9°15.0'	+03.9'	75.7°	15
16	7°41.3'	-02.4'	73.9°	7°57.9'	-01.4'	74.0°	8°14.4'	-00.4'	74.1°	8°30.7'	+00.6'	74.3°	8°46.9'	+01.7'	74.4°	9°03.0'	+02.7'	74.6°	9°18.9'	+03.7'	74.7°	16
17	7°38.9'	-02.5'	72.8°	7°56.5'	-01.5'	73.0°	8°14.0'	-00.5'	73.1°	8°31.4'	+00.5'	73.3°	8°48.6'	+01.5'	73.4°	9°05.7'	+02.5'	73.5°	9°22.6'	+03.5'	73.7°	17
18	7°36.4'	-02.7'	71.8°	7°55.0'	-01.7'	72.0°	8°13.5'	-00.7'	72.1°	8°31.9'	+00.3'	72.2°	8°50.1'	+01.3'	72.4°	9°08.2'	+02.3'	72.5°	9°26.1'	+03.4'	72.7°	18
19	7°33.7'	-02.8'	70.8°	7°53.3'	-01.8'	71.0°	8°12.8'	-00.8'	71.1°	8°32.2'	+00.2'	71.2°	8°51.5'	+01.2'	71.4°	9°10.6'	+02.2'	71.5°	9°29.5'	+03.2'	71.7°	19
20	7°30.9'	-02.9'	69.8°	7°51.5'	-02.0'	69.9°	8°12.0'	-01.0'	70.1°	8°32.4'	+00.0'	70.2°	8°52.6'	+01.0'	70.4°	9°12.7'	+02.0'	70.5°	9°32.7'	+03.0'	70.7°	20
21	7°27.9'	-03.1'	68.8°	7°49.6'	-02.1'	68.9°	8°11.1'	-01.1'	69.1°	8°32.4'	-00.1'	69.2°	8°53.7'	+00.9'	69.3°	9°14.7'	+01.8'	69.5°	9°35.7'	+02.8'	69.7°	21
22	7°24.8'	-03.2'	67.8°	7°47.5'	-02.2'	67.9°	8°09.9'	-01.3'	68.1°	8°32.3'	-00.3'	68.2°	8°54.5'	+00.7'	68.3°	9°16.6'	+01.7'	68.5°	9°38.5'	+02.7'	68.6°	22
23	7°21.6'	-03.4'	66.8°	7°45.2'	-02.4'	66.9°	8°08.7'	-01.4'	67.0°	8°32.0'	-00.5'	67.2°	8°55.2'	+00.5'	67.3°	9°18.3'	+01.5'	67.5°	9°41.2'	+02.5'	67.6°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

82° 278° LHA

Latitude SAME as Declination

82° 278° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

83° 277° LHA

Latitude SAME as Declination

83° 277° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	7°00.0'	-00.1'	90.0°	7°00.0'	+01.0'	90.1°	6°59.7'	+02.0'	90.2°	6°59.4'	+03.1'	90.4°	6°59.0'	+04.2'	90.5°	6°58.4'	+05.2'	90.6°	6°57.7'	+06.3'	90.7°	0
1	7°00.0'	-00.2'	89.0°	7°00.9'	+00.9'	89.1°	7°01.8'	+01.9'	89.2°	7°02.5'	+03.0'	89.4°	7°03.1'	+04.0'	89.5°	7°03.6'	+05.1'	89.6°	7°03.9'	+06.1'	89.7°	1
2	6°59.7'	-00.3'	88.0°	7°01.8'	+00.7'	88.1°	7°03.7'	+01.8'	88.2°	7°05.5'	+02.8'	88.4°	7°07.1'	+03.9'	88.5°	7°08.7'	+04.9'	88.6°	7°10.1'	+06.0'	88.7°	2
3	6°59.4'	-00.4'	87.0°	7°02.5'	+00.6'	87.1°	7°05.5'	+01.7'	87.2°	7°08.3'	+02.7'	87.3°	7°11.0'	+03.8'	87.5°	7°13.6'	+04.8'	87.6°	7°16.1'	+05.9'	87.7°	3
4	6°59.0'	-00.6'	86.0°	7°03.1'	+00.5'	86.1°	7°07.1'	+01.5'	86.2°	7°11.0'	+02.6'	86.3°	7°14.8'	+03.6'	86.5°	7°18.4'	+04.7'	86.6°	7°21.9'	+05.7'	86.7°	4
5	6°58.4'	-00.7'	85.0°	7°03.6'	+00.3'	85.1°	7°08.7'	+01.4'	85.2°	7°13.6'	+02.4'	85.3°	7°18.4'	+03.5'	85.5°	7°23.1'	+04.5'	85.6°	7°27.7'	+05.6'	85.7°	5
6	6°57.7'	-00.8'	84.0°	7°03.9'	+00.2'	84.1°	7°10.1'	+01.3'	84.2°	7°16.1'	+02.3'	84.3°	7°21.9'	+03.4'	84.5°	7°27.7'	+04.4'	84.6°	7°33.3'	+05.5'	84.7°	6
7	6°56.9'	-01.0'	82.9°	7°04.2'	+00.1'	83.1°	7°11.3'	+01.1'	83.2°	7°18.4'	+02.2'	83.3°	7°25.3'	+03.2'	83.4°	7°32.1'	+04.3'	83.6°	7°38.7'	+05.3'	83.7°	7
8	6°55.9'	-01.1'	81.9°	7°04.2'	00.0'	82.1°	7°12.5'	+01.0'	82.2°	7°20.6'	+02.0'	82.3°	7°28.5'	+03.1'	82.4°	7°36.3'	+04.1'	82.6°	7°44.0'	+05.2'	82.7°	8
9	6°54.8'	-01.2'	80.9°	7°04.2'	-00.2'	81.1°	7°13.5'	+00.9'	81.2°	7°22.6'	+01.9'	81.3°	7°31.6'	+02.9'	81.4°	7°40.5'	+04.0'	81.6°	7°49.2'	+05.0'	81.7°	9
10	6°53.6'	-01.3'	79.9°	7°04.0'	-00.3'	80.0°	7°14.3'	+00.7'	80.2°	7°24.5'	+01.8'	80.3°	7°34.6'	+02.8'	80.4°	7°44.5'	+03.8'	80.6°	7°54.2'	+04.9'	80.7°	10
11	6°52.2'	-01.5'	78.9°	7°03.7'	-00.4'	79.0°	7°15.1'	+00.6'	79.2°	7°26.3'	+01.6'	79.3°	7°37.4'	+02.7'	79.4°	7°48.3'	+03.7'	79.6°	7°59.1'	+04.7'	79.7°	11
12	6°50.8'	-01.6'	77.9°	7°03.3'	-00.6'	78.0°	7°15.7'	+00.5'	78.2°	7°27.9'	+01.5'	78.3°	7°40.0'	+02.5'	78.4°	7°52.0'	+03.6'	78.5°	8°03.9'	+04.6'	78.7°	12
13	6°49.2'	-01.7'	76.9°	7°02.7'	-00.7'	77.0°	7°16.1'	+00.3'	77.1°	7°29.4'	+01.4'	77.3°	7°42.6'	+02.4'	77.4°	7°55.6'	+03.4'	77.5°	8°08.5'	+04.4'	77.7°	13
14	6°47.5'	-01.8'	75.9°	7°02.0'	-00.8'	76.0°	7°16.5'	+00.2'	76.1°	7°30.8'	+01.2'	76.3°	7°45.0'	+02.2'	76.4°	7°59.0'	+03.3'	76.5°	8°12.9'	+04.3'	76.7°	14
15	6°45.6'	-02.0'	74.9°	7°01.2'	-01.0'	75.0°	7°16.7'	+00.1'	75.1°	7°32.0'	+01.1'	75.3°	7°47.2'	+02.1'	75.4°	8°02.3'	+03.1'	75.5°	8°17.2'	+04.1'	75.7°	15
16	6°43.7'	-02.1'	73.9°	7°00.2'	-01.1'	74.0°	7°16.7'	-00.1'	74.1°	7°33.1'	+00.9'	74.2°	7°49.3'	+02.0'	74.4°	8°05.4'	+03.0'	74.5°	8°21.3'	+04.0'	74.7°	16
17	6°41.6'	-02.2'	72.9°	6°59.2'	-01.2'	73.0°	7°16.7'	-00.2'	73.1°	7°34.0'	+00.8'	73.2°	7°51.3'	+01.8'	73.4°	8°08.4'	+02.8'	73.5°	8°25.3'	+03.8'	73.6°	17
18	6°39.3'	-02.3'	71.9°	6°58.0'	-01.3'	72.0°	7°16.5'	-00.3'	72.1°	7°34.8'	+00.7'	72.2°	7°53.1'	+01.7'	72.4°	8°11.2'	+02.7'	72.5°	8°29.2'	+03.7'	72.6°	18
19	6°37.0'	-02.5'	70.9°	6°56.6'	-01.5'	71.0°	7°16.1'	-00.5'	71.1°	7°35.5'	+00.5'	71.2°	7°54.7'	+01.5'	71.4°	8°13.9'	+02.5'	71.5°	8°32.9'	+03.5'	71.6°	19
20	6°34.6'	-02.6'	69.9°	6°55.2'	-01.6'	70.0°	7°15.6'	-00.6'	70.1°	7°36.0'	+00.4'	70.2°	7°56.3'	+01.4'	70.3°	8°16.4'	+02.4'	70.5°	8°36.4'	+03.4'	70.6°	20
21	6°32.0'	-02.7'	68.9°	6°53.6'	-01.7'	69.0°	7°15.0'	-00.7'	69.1°	7°36.4'	+00.2'	69.2°	7°57.7'	+01.2'	69.3°	8°18.8'	+02.2'	69.5°	8°39.7'	+03.2'	69.6°	21
22	6°29.3'	-02.8'	67.9°	6°51.8'	-01.8'	68.0°	7°14.3'	-00.9'	68.1°	7°36.7'	+00.1'	68.2°	7°58.9'	+01.1'	68.3°	8°21.0'	+02.1'	68.5°	8°42.9'	+03.0'	68.6°	22
23	6°26.5'	-02.9'	66.8°	6°50.0'	-02.0'	67.0°	7°13.4'	-01.0'	67.1°	7°36.8'	00.0'	67.										

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

84° 276° LHA

Latitude SAME as Declination

84° 276° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	6°00.0'	-00.1'	90.0°	6°00.0'	+01.0'	90.1°	5°59.8'	+02.1'	90.2°	5°59.5'	+03.1'	90.3°	5°59.1'	+04.2'	90.4°	5°58.6'	+05.2'	90.5°	5°58.0'	+06.3'	90.6°	0
1	6°00.0'	-00.2'	89.0°	6°00.9'	+00.9'	89.1°	6°01.8'	+01.9'	89.2°	6°02.6'	+03.0'	89.3°	6°03.3'	+04.0'	89.4°	6°03.8'	+05.1'	89.5°	6°04.3'	+06.1'	89.6°	1
2	5°59.8'	-00.3'	88.0°	6°01.8'	+00.8'	88.1°	6°03.8'	+01.8'	88.2°	6°05.6'	+02.9'	88.3°	6°07.3'	+03.9'	88.4°	6°08.9'	+05.0'	88.5°	6°10.4'	+06.0'	88.6°	2
3	5°59.5'	-00.4'	87.0°	6°02.6'	+00.7'	87.1°	6°05.6'	+01.7'	87.2°	6°08.5'	+02.8'	87.3°	6°11.2'	+03.8'	87.4°	6°13.9'	+04.9'	87.5°	6°16.4'	+05.9'	87.6°	3
4	5°59.1'	-00.5'	86.0°	6°03.3'	+00.6'	86.1°	6°07.3'	+01.6'	86.2°	6°11.2'	+02.7'	86.3°	6°15.1'	+03.7'	86.4°	6°18.8'	+04.8'	86.5°	6°22.4'	+05.8'	86.6°	4
5	5°58.6'	-00.6'	85.0°	6°03.8'	+00.4'	85.1°	6°08.9'	+01.5'	85.2°	6°13.9'	+02.5'	85.3°	6°18.8'	+03.6'	85.4°	6°23.5'	+04.6'	85.5°	6°28.2'	+05.7'	85.6°	5
6	5°58.0'	-00.7'	84.0°	6°04.3'	+00.3'	84.1°	6°10.4'	+01.4'	84.2°	6°16.4'	+02.4'	84.3°	6°22.4'	+03.5'	84.4°	6°28.2'	+04.5'	84.5°	6°33.8'	+05.6'	84.6°	6
7	5°57.3'	-00.8'	83.0°	6°04.6'	+00.2'	83.1°	6°11.8'	+01.3'	83.2°	6°18.9'	+02.3'	83.3°	6°25.8'	+03.4'	83.4°	6°32.7'	+04.4'	83.5°	6°39.4'	+05.4'	83.6°	7
8	5°56.5'	-00.9'	82.0°	6°04.8'	+00.1'	82.1°	6°13.1'	+01.2'	82.2°	6°21.2'	+02.2'	82.3°	6°29.2'	+03.2'	82.4°	6°37.1'	+04.3'	82.5°	6°44.8'	+05.3'	82.6°	8
9	5°55.6'	-01.0'	81.0°	6°04.9'	00.0'	81.1°	6°14.2'	+01.0'	81.2°	6°23.4'	+02.1'	81.3°	6°32.4'	+03.1'	81.4°	6°41.3'	+04.2'	81.5°	6°50.2'	+05.2'	81.6°	9
10	5°54.5'	-01.1'	79.9°	6°04.9'	-00.1'	80.0°	6°15.2'	+00.9'	80.2°	6°25.4'	+02.0'	80.3°	6°35.5'	+03.0'	80.4°	6°45.5'	+04.0'	80.5°	6°55.4'	+05.1'	80.6°	10
11	5°53.4'	-01.3'	78.9°	6°04.8'	-00.2'	79.0°	6°16.2'	+00.8'	79.2°	6°27.4'	+01.8'	79.3°	6°38.5'	+02.9'	79.4°	6°49.5'	+03.9'	79.5°	7°00.4'	+04.9'	79.6°	11
12	5°52.1'	-01.4'	77.9°	6°04.6'	-00.3'	78.0°	6°17.0'	+00.7'	78.1°	6°29.2'	+01.7'	78.3°	6°41.4'	+02.8'	78.4°	6°53.4'	+03.8'	78.5°	7°05.4'	+04.8'	78.6°	12
13	5°50.7'	-01.5'	76.9°	6°04.3'	-00.4'	77.0°	6°17.7'	+00.6'	77.1°	6°31.0'	+01.6'	77.2°	6°44.2'	+02.6'	77.4°	6°57.2'	+03.7'	77.5°	7°10.2'	+04.7'	77.6°	13
14	5°49.3'	-01.6'	75.9°	6°03.8'	-00.6'	76.0°	6°18.2'	+00.5'	76.1°	6°32.6'	+01.5'	76.2°	6°46.8'	+02.5'	76.4°	7°00.9'	+03.5'	76.5°	7°14.8'	+04.5'	76.6°	14
15	5°47.7'	-01.7'	74.9°	6°03.2'	-00.7'	75.0°	6°18.7'	+00.3'	75.1°	6°34.1'	+01.4'	75.2°	6°49.3'	+02.4'	75.3°	7°04.4'	+03.4'	75.5°	7°19.4'	+04.4'	75.6°	15
16	5°46.0'	-01.8'	73.9°	6°02.6'	-00.8'	74.0°	6°19.0'	+00.2'	74.1°	6°35.4'	+01.2'	74.2°	6°51.7'	+02.3'	74.3°	7°07.8'	+03.3'	74.5°	7°23.8'	+04.3'	74.6°	16
17	5°44.2'	-01.9'	72.9°	6°01.8'	-00.9'	73.0°	6°19.3'	+00.1'	73.1°	6°36.7'	+01.1'	73.2°	6°53.9'	+02.1'	73.3°	7°11.1'	+03.1'	73.5°	7°28.1'	+04.1'	73.6°	17
18	5°42.3'	-02.0'	71.9°	6°00.9'	-01.0'	72.0°	6°19.4'	00.0'	72.1°	6°37.8'	+01.0'	72.2°	6°56.0'	+02.0'	72.3°	7°14.2'	+03.0'	72.4°	7°32.2'	+04.0'	72.6°	18
19	5°40.3'	-02.1'	70.9°	6°00.0'	-01.1'	71.0°	6°19.4'	-00.1'	71.1°	6°38.8'	+00.9'	71.2°	6°58.0'	+01.9'	71.3°	7°17.2'	+02.9'	71.4°	7°36.2'	+03.9'	71.6°	19
20	5°38.2'	-02.2'	69.9°	5°58.8'	-01.2'	70.0°	6°19.3'	-00.2'	70.1°	6°39.6'	+00.8'	70.2°	7°00.0'	+01.7'	70.3°	7°20.1'	+02.7'	70.4°	7°40.1'	+03.7'	70.6°	20
21	5°36.0'	-02.3'	68.9°	5°57.6'	-01.3'	69.0°	6°19.0'	-00.4'	69.1°	6°40.4'	+00.6'	69.2°	7°01.7'	+01.6'	69.3°	7°22.8'	+02.6'	69.4°	7°43.8'	+03.6'	69.6°	21
22	5°33.7'	-02.4'	67.9°	5°56.2'	-01.4'	68.0°	6°18.7'	-00.5'	68.1°	6°41.0'	+00.5'	68.2°	7°03.3'	+01.5'	68.3°	7°25.4'	+02.5'	68.4°	7°47.4'	+03.4'	68.5°	22
23	5°31.3'	-02.5'	66.9°	5°54.8'	-01.5'	67.0°	6°18.2'	-00.6'	67.1°	6°41.5'	+00.4'	67.2°	7°04.7'	+01.4'	67.3°	7°27.9'	+02.3'	67.4°	7°50.8'	+03.3'	67.5°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

84° 276° LHA

Latitude SAME as Declination

84° 276° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

85° 275° LHA

Latitude SAME as Declination

85° 275° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°00.0'	00.0'	90.0°	5°00.0'	+01.0'	90.1°	4°59.8'	+02.1'	90.2°	4°59.6'	+03.1'	90.3°	4°59.3'	+04.2'	90.3°	4°58.9'	+05.2'	90.4°	4°58.4'	+06.3'	90.5°	0
1	5°00.0'	-00.1'	89.0°	5°01.0'	+00.9'	89.1°	5°01.9'	+02.0'	89.2°	5°02.7'	+03.0'	89.3°	5°03.4'	+04.1'	89.3°	5°04.1'	+05.1'	89.4°	5°04.6'	+06.2'	89.5°	1
2	4°59.8'	-00.2'	88.0°	5°01.9'	+00.8'	88.1°	5°03.8'	+01.9'	88.2°	5°05.7'	+02.9'	88.3°	5°07.5'	+04.0'	88.3°	5°09.2'	+05.0'	88.4°	5°10.8'	+06.1'	88.5°	2
3	4°59.6'	-00.3'	87.0°	5°02.7'	+00.7'	87.1°	5°05.7'	+01.8'	87.2°	5°08.6'	+02.8'	87.3°	5°11.5'	+03.9'	87.3°	5°14.2'	+04.9'	87.4°	5°16.8'	+06.0'	87.5°	3
4	4°59.3'	-00.4'	86.0°	5°03.4'	+00.6'	86.1°	5°07.5'	+01.7'	86.2°	5°11.5'	+02.7'	86.3°	5°15.3'	+03.8'	86.3°	5°19.1'	+04.8'	86.4°	5°22.8'	+05.9'	86.5°	4
5	4°58.9'	-00.5'	85.0°	5°04.1'	+00.5'	85.1°	5°09.2'	+01.6'	85.2°	5°14.2'	+02.6'	85.2°	5°19.1'	+03.7'	85.3°	5°23.9'	+04.7'	85.4°	5°28.7'	+05.8'	85.5°	5
6	4°58.4'	-00.6'	84.0°	5°04.6'	+00.5'	84.1°	5°10.8'	+01.5'	84.2°	5°16.8'	+02.5'	84.2°	5°22.8'	+03.6'	84.3°	5°28.7'	+04.6'	84.4°	5°34.4'	+05.7'	84.5°	6
7	4°57.8'	-00.7'	83.0°	5°05.1'	+00.4'	83.1°	5°12.3'	+01.4'	83.2°	5°19.4'	+02.4'	83.2°	5°26.4'	+03.5'	83.3°	5°33.3'	+04.5'	83.4°	5°40.1'	+05.6'	83.5°	7
8	4°57.1'	-00.8'	82.0°	5°05.4'	+00.3'	82.1°	5°13.7'	+01.3'	82.1°	5°21.8'	+02.3'	82.2°	5°29.9'	+03.4'	82.3°	5°37.8'	+04.4'	82.4°	5°45.7'	+05.5'	82.5°	8
9	4°56.3'	-00.9'	81.0°	5°05.7'	+00.2'	81.1°	5°15.0'	+01.2'	81.1°	5°24.2'	+02.2'	81.2°	5°33.2'	+03.3'	81.3°	5°42.2'	+04.3'	81.4°	5°51.1'	+05.4'	81.5°	9
10	4°55.4'	-01.0'	80.0°	5°05.8'	+00.1'	80.0°	5°16.2'	+01.1'	80.1°	5°26.4'	+02.1'	80.2°	5°36.5'	+03.2'	80.3°	5°46.6'	+04.2'	80.4°	5°56.5'	+05.2'	80.5°	10
11	4°54.5'	-01.0'	79.0°	5°05.9'	00.0'	79.0°	5°17.3'	+01.0'	79.1°	5°28.5'	+02.0'	79.2°	5°39.7'	+03.1'	79.3°	5°50.8'	+04.1'	79.4°	6°01.7'	+05.1'	79.5°	11
12	4°53.4'	-01.1'	78.0°	5°05.9'	-00.1'	78.0°	5°18.3'	+00.9'	78.1°	5°30.6'	+01.9'	78.2°	5°42.8'	+03.0'	78.3°	5°54.9'	+04.0'	78.4°	6°06.9'	+05.0'	78.5°	12
13	4°52.3'	-01.2'	77.0°	5°05.8'	-00.2'	77.0°	5°19.2'	+00.8'	77.1°	5°32.5'	+01.8'	77.2°	5°45.8'	+02.9'	77.3°	5°58.9'	+03.9'	77.4°	6°11.9'	+04.9'	77.5°	13
14	4°51.1'	-01.3'	75.9°	5°05.6'	-00.3'	76.0°	5°20.0'	+00.7'	76.1°	5°34.4'	+01.7'	76.2°	5°48.6'	+02.8'	76.3°	6°02.8'	+03.8'	76.4°	6°16.8'	+04.8'	76.5°	14
15	4°49.8'	-01.4'	74.9°	5°05.3'	-00.4'	75.0°	5°20.8'	+00.6'	75.1°	5°36.1'	+01.6'	75.2°	5°51.4'	+02.7'	75.3°	6°06.6'	+03.7'	75.4°	6°21.6'	+04.7'	75.5°	15
16	4°48.4'	-01.5'	73.9°	5°04.9'	-00.5'	74.0°	5°21.4'	+00.5'	74.1°	5°37.8'	+01.5'	74.2°	5°54.0'	+02.5'	74.3°	6°10.2'	+03.6'	74.4°	6°26.3'	+04.6'	74.5°	16
17	4°46.9'	-01.6'	72.9°	5°04.4'	-00.6'	73.0°	5°21.9'	+00.4'	73.1°	5°39.3'	+01.4'	73.2°	5°56.6'	+02.4'	73.3°	6°13.8'	+03.4'	73.4°	6°30.9'	+04.4'	73.5°	17
18	4°45.3'	-01.7'	71.9°	5°03.8'	-00.7'	72.0°	5°22.3'	+00.3'	72.1°	5°40.7'	+01.3'	72.2°	5°59.0'	+02.3'	72.3°	6°17.2'	+03.3'	72.4°	6°35.3'	+04.3'	72.5°	18
19	4°43.6'	-01.8'	70.9°	5°03.2'	-00.8'	71.0°	5°22.7'	+00.2'	71.1°	5°42.0'	+01.2'	71.2°	6°01.3'	+02.2'	71.3°	6°20.5'	+03.2'	71.4°	6°39.6'	+04.2'	71.5°	19
20	4°41.9'	-01.8'	69.9°	5°02.4'	-00.9'	70.0°	5°22.9'	+00.1'	70.1°	5°43.3'	+01.1'	70.2°	6°03.6'	+02.1'	70.3°	6°23.8'	+03.1'	70.4°	6°43.8'	+04.1'	70.5°	20
21	4°40.0'	-01.9'	68.9°	5°01.6'	-00.9'	69.0°	5°23.0'	+00.0'	69.1°	5°44.4'	+01.0'	69.2°	6°05.7'	+02.0'	69.3°	6°26.8'	+03.0'	69.4°	6°47.9'	+04.0'	69.5°	21
22	4°38.1'	-02.0'	67.9°	5°00.6'	-01.0'	68.0°	5°23.1'	-00.1'	68.1°	5°45.4'	+00.9'	68.2°	6°07.7'	+01.9'	68.3°	6°29.8'	+02.9'	68.4°	6°51.9'	+03.8'	68.5°	22
23	4°36.1'	-02.1'	66.9°	4°59.6'	-01.1'	67.0°	5°23.0'	-00.2'	67.1°	5°46.3'	+00.8'	67.										

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

86° 274° LHA

Latitude SAME as Declination

86° 274° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°00.0'	00.0'	90.0°	4°00.0'	+01.0'	90.1°	3°59.9'	+02.1'	90.1°	3°59.7'	+03.1'	90.2°	3°59.4'	+04.2'	90.3°	3°59.1'	+05.2'	90.3°	3°58.7'	+06.3'	90.4°	0
1	4°00.0'	-00.1'	89.0°	4°01.0'	+00.9'	89.1°	4°01.9'	+02.0'	89.1°	4°02.8'	+03.0'	89.2°	4°03.6'	+04.1'	89.3°	4°04.3'	+05.1'	89.4°	4°04.9'	+06.2'	89.4°	1
2	3°59.9'	-00.2'	88.0°	4°01.9'	+00.9'	88.1°	4°03.9'	+01.9'	88.1°	4°05.8'	+03.0'	88.2°	4°07.7'	+04.0'	88.3°	4°09.4'	+05.1'	88.4°	4°11.1'	+06.1'	88.4°	2
3	3°59.7'	-00.3'	87.0°	4°02.8'	+00.8'	87.1°	4°05.8'	+01.8'	87.1°	4°08.8'	+02.9'	87.2°	4°11.7'	+03.9'	87.3°	4°14.5'	+05.0'	87.4°	4°17.2'	+06.0'	87.4°	3
4	3°59.4'	-00.3'	86.0°	4°03.6'	+00.7'	86.1°	4°07.7'	+01.8'	86.1°	4°11.7'	+02.8'	86.2°	4°15.6'	+03.9'	86.3°	4°19.5'	+04.9'	86.4°	4°23.2'	+05.9'	86.4°	4
5	3°59.1'	-00.4'	85.0°	4°04.3'	+00.6'	85.1°	4°09.4'	+01.7'	85.1°	4°14.5'	+02.7'	85.2°	4°19.5'	+03.8'	85.3°	4°24.4'	+04.8'	85.4°	4°29.2'	+05.9'	85.4°	5
6	3°58.7'	-00.5'	84.0°	4°04.9'	+00.6'	84.1°	4°11.1'	+01.6'	84.1°	4°17.2'	+02.7'	84.2°	4°23.2'	+03.7'	84.3°	4°29.2'	+04.7'	84.4°	4°35.0'	+05.8'	84.4°	6
7	3°58.2'	-00.5'	83.0°	4°05.5'	+00.5'	83.1°	4°12.7'	+01.5'	83.1°	4°19.9'	+02.6'	83.2°	4°26.9'	+03.6'	83.3°	4°33.9'	+04.7'	83.4°	4°40.8'	+05.7'	83.4°	7
8	3°57.7'	-00.6'	82.0°	4°06.0'	+00.4'	82.1°	4°14.3'	+01.5'	82.1°	4°22.4'	+02.5'	82.2°	4°30.5'	+03.5'	82.3°	4°38.6'	+04.6'	82.4°	4°46.5'	+05.6'	82.4°	8
9	3°57.0'	-00.7'	81.0°	4°06.4'	+00.3'	81.0°	4°15.7'	+01.4'	81.1°	4°24.9'	+02.4'	81.2°	4°34.1'	+03.4'	81.3°	4°43.1'	+04.5'	81.4°	4°52.1'	+05.5'	81.4°	9
10	3°56.3'	-00.8'	80.0°	4°06.8'	+00.3'	80.0°	4°17.1'	+01.3'	80.1°	4°27.4'	+02.3'	80.2°	4°37.5'	+03.4'	80.3°	4°47.6'	+04.4'	80.4°	4°57.6'	+05.4'	80.4°	10
11	3°55.6'	-00.8'	79.0°	4°07.0'	+00.2'	79.0°	4°18.4'	+01.2'	79.1°	4°29.7'	+02.3'	79.2°	4°40.9'	+03.3'	79.3°	4°52.0'	+04.3'	79.4°	5°03.1'	+05.3'	79.4°	11
12	3°54.7'	-00.9'	78.0°	4°07.2'	+00.1'	78.0°	4°19.6'	+01.1'	78.1°	4°31.9'	+02.2'	78.2°	4°44.2'	+03.2'	78.3°	4°56.3'	+04.2'	78.4°	5°08.4'	+05.2'	78.4°	12
13	3°53.8'	-01.0'	77.0°	4°07.3'	+00.0'	77.0°	4°20.8'	+01.1'	77.1°	4°34.1'	+02.1'	77.2°	4°47.4'	+03.1'	77.3°	5°00.6'	+04.1'	77.3°	5°13.6'	+05.1'	77.4°	13
14	3°52.9'	-01.1'	76.0°	4°07.4'	00.0'	76.0°	4°21.8'	+01.0'	76.1°	4°36.2'	+02.0'	76.2°	4°50.5'	+03.0'	76.3°	5°04.7'	+04.0'	76.3°	5°18.8'	+05.1'	76.4°	14
15	3°51.8'	-01.1'	75.0°	4°07.3'	-00.1'	75.0°	4°22.8'	+00.9'	75.1°	4°38.2'	+01.9'	75.2°	4°53.5'	+02.9'	75.3°	5°08.7'	+03.9'	75.3°	5°23.8'	+05.0'	75.4°	15
16	3°50.7'	-01.2'	74.0°	4°07.2'	-00.2'	74.0°	4°23.7'	+00.8'	74.1°	4°40.1'	+01.8'	74.2°	4°56.4'	+02.8'	74.3°	5°12.7'	+03.8'	74.3°	5°28.8'	+04.9'	74.4°	16
17	3°49.5'	-01.3'	73.0°	4°07.0'	-00.3'	73.0°	4°24.5'	+00.7'	73.1°	4°41.9'	+01.7'	73.2°	4°59.3'	+02.7'	73.3°	5°16.5'	+03.7'	73.3°	5°33.7'	+04.8'	73.4°	17
18	3°48.2'	-01.3'	72.0°	4°06.8'	-00.3'	72.0°	4°25.3'	+00.7'	72.1°	4°43.7'	+01.7'	72.2°	5°02.0'	+02.7'	72.3°	5°20.3'	+03.7'	72.3°	5°38.4'	+04.6'	72.4°	18
19	3°46.9'	-01.4'	71.0°	4°06.4'	-00.4'	71.0°	4°25.9'	+00.6'	71.1°	4°45.3'	+01.6'	71.2°	5°04.7'	+02.6'	71.3°	5°23.9'	+03.6'	71.3°	5°43.1'	+04.5'	71.4°	19
20	3°45.5'	-01.5'	70.0°	4°06.0'	-00.5'	70.0°	4°26.5'	+00.5'	70.1°	4°46.9'	+01.5'	70.2°	5°07.2'	+02.5'	70.2°	5°27.5'	+03.5'	70.3°	5°47.6'	+04.4'	70.4°	20
21	3°44.0'	-01.5'	69.0°	4°05.6'	-00.6'	69.0°	4°27.0'	+00.4'	69.1°	4°48.4'	+01.4'	69.2°	5°09.7'	+02.4'	69.2°	5°30.9'	+03.4'	69.3°	5°52.0'	+04.3'	69.4°	21
22	3°42.5'	-01.6'	68.0°	4°05.0'	-00.6'	68.0°	4°27.4'	+00.3'	68.1°	4°49.8'	+01.3'	68.2°	5°12.1'	+02.3'	68.2°	5°34.3'	+03.3'	68.3°	5°56.4'	+04.2'	68.4°	22
23	3°40.9'	-01.7'	66.9°	4°04.4'	-00.7'	67.0°	4°27.8'	+00.3'	67.1°	4°51.1'	+01.2'	67.2°	5°14.3'	+02.2'	67.2°	5°37.5'	+03.1'	67.3°	6°00.6'	+04.1'	67.4°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

86° 274° LHA

Latitude SAME as Declination

86° 274° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

87° 273° LHA

Latitude SAME as Declination

87° 273° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	3°00.0'	00.0'	90.0°	3°00.0'	+01.0'	90.1°	2°59.9'	+02.1'	90.1°	2°59.8'	+03.1'	90.2°	2°59.6'	+04.2'	90.2°	2°59.3'	+05.2'	90.3°	2°59.0'	+06.3'	90.3°	0
1	3°00.0'	-00.1'	89.0°	3°01.0'	+01.0'	89.1°	3°02.0'	+02.0'	89.1°	3°02.9'	+03.1'	89.2°	3°03.7'	+04.1'	89.2°	3°04.5'	+05.2'	89.3°	3°05.3'	+06.2'	89.3°	1
2	2°59.9'	-00.1'	88.0°	3°02.0'	+00.9'	88.0°	3°04.0'	+02.0'	88.1°	3°05.9'	+03.0'	88.2°	3°07.8'	+04.1'	88.2°	3°09.7'	+05.1'	88.3°	3°11.5'	+06.1'	88.3°	2
3	2°59.8'	-00.2'	87.0°	3°02.9'	+00.9'	87.0°	3°05.9'	+01.9'	87.1°	3°08.9'	+02.9'	87.2°	3°11.9'	+04.0'	87.2°	3°14.8'	+05.0'	87.3°	3°17.6'	+06.1'	87.3°	3
4	2°59.6'	-00.2'	86.0°	3°03.7'	+00.8'	86.0°	3°07.8'	+01.8'	86.1°	3°11.9'	+02.9'	86.2°	3°15.9'	+03.9'	86.2°	3°19.8'	+05.0'	86.3°	3°23.7'	+06.0'	86.3°	4
5	2°59.3'	-00.3'	85.0°	3°04.5'	+00.7'	85.0°	3°09.7'	+01.8'	85.1°	3°14.8'	+02.8'	85.2°	3°19.8'	+03.9'	85.2°	3°24.8'	+04.9'	85.3°	3°29.7'	+06.0'	85.3°	5
6	2°59.0'	-00.4'	84.0°	3°05.3'	+00.7'	84.0°	3°11.5'	+01.7'	84.1°	3°17.6'	+02.8'	84.2°	3°23.7'	+03.8'	84.2°	3°29.7'	+04.9'	84.3°	3°35.7'	+05.9'	84.3°	6
7	2°58.7'	-00.4'	83.0°	3°06.0'	+00.6'	83.0°	3°13.2'	+01.7'	83.1°	3°20.4'	+02.7'	83.2°	3°27.5'	+03.7'	83.2°	3°34.6'	+04.8'	83.3°	3°41.5'	+05.8'	83.3°	7
8	2°58.2'	-00.5'	82.0°	3°06.6'	+00.6'	82.0°	3°14.9'	+01.6'	82.1°	3°23.1'	+02.6'	82.2°	3°31.2'	+03.7'	82.2°	3°39.3'	+04.7'	82.3°	3°47.4'	+05.8'	82.3°	8
9	2°57.8'	-00.5'	81.0°	3°07.2'	+00.5'	81.0°	3°16.5'	+01.5'	81.1°	3°25.7'	+02.6'	81.2°	3°34.9'	+03.6'	81.2°	3°44.1'	+04.7'	81.3°	3°53.1'	+05.7'	81.3°	9
10	2°57.3'	-00.6'	80.0°	3°07.7'	+00.5'	80.0°	3°18.0'	+01.5'	80.1°	3°28.3'	+02.5'	80.2°	3°38.5'	+03.6'	80.2°	3°48.7'	+04.6'	80.3°	3°58.8'	+05.6'	80.3°	10
11	2°56.7'	-00.6'	79.0°	3°08.1'	+00.4'	79.0°	3°19.5'	+01.4'	79.1°	3°30.8'	+02.5'	79.2°	3°42.1'	+03.5'	79.2°	3°53.3'	+04.5'	79.3°	4°04.4'	+05.5'	79.3°	11
12	2°56.1'	-00.7'	78.0°	3°08.5'	+00.3'	78.0°	3°20.9'	+01.4'	78.1°	3°33.3'	+02.4'	78.2°	3°45.6'	+03.4'	78.2°	3°57.8'	+04.4'	78.3°	4°10.0'	+05.5'	78.3°	12
13	2°55.4'	-00.7'	77.0°	3°08.9'	+00.3'	77.0°	3°22.3'	+01.3'	77.1°	3°35.7'	+02.3'	77.1°	3°49.0'	+03.3'	77.2°	4°02.2'	+04.4'	77.3°	4°15.4'	+05.4'	77.4°	13
14	2°54.6'	-00.8'	76.0°	3°09.2'	+00.2'	76.0°	3°23.6'	+01.2'	76.1°	3°38.0'	+02.3'	76.1°	3°52.3'	+03.3'	76.2°	4°06.6'	+04.3'	76.3°	4°20.8'	+05.3'	76.4°	14
15	2°53.9'	-00.8'	75.0°	3°09.4'	+00.2'	75.0°	3°24.9'	+01.2'	75.1°	3°40.3'	+02.2'	75.1°	3°55.6'	+03.2'	75.2°	4°10.9'	+04.2'	75.3°	4°26.1'	+05.2'	75.4°	15
16	2°53.0'	-00.9'	74.0°	3°09.6'	+00.1'	74.0°	3°26.0'	+01.1'	74.1°	3°42.5'	+02.1'	74.1°	3°58.8'	+03.1'	74.2°	4°15.1'	+04.1'	74.3°	4°31.3'	+05.1'	74.4°	16
17	2°52.1'	-00.9'	73.0°	3°09.7'	+00.1'	73.0°	3°27.2'	+01.1'	73.1°	3°44.6'	+02.1'	73.1°	4°01.9'	+03.1'	73.2°	4°19.2'	+04.1'	73.3°	4°36.5'	+05.1'	73.4°	17
18	2°51.2'	-01.0'	72.0°	3°09.7'	00.0'	72.0°	3°28.2'	+01.0'	72.1°	3°46.6'	+02.0'	72.1°	4°05.0'	+03.0'	72.2°	4°23.3'	+04.0'	72.3°	4°41.5'	+05.0'	72.4°	18
19	2°50.2'	-01.0'	71.0°	3°09.7'	-00.1'	71.0°	3°29.2'	+00.9'	71.1°	3°48.6'	+01.9'	71.1°	4°08.0'	+02.9'	71.2°	4°27.3'	+03.9'	71.3°	4°46.5'	+04.9'	71.4°	19
20	2°49.1'	-01.1'	70.0°	3°09.7'	-00.1'	70.0°	3°30.1'	+00.9'	70.1°	3°50.5'	+01.8'	70.1°	4°10.9'	+02.8'	70.2°	4°31.2'	+03.8'	70.3°	4°51.4'	+04.8'	70.4°	20
21	2°48.0'	-01.2'	69.0°	3°09.5'	-00.2'	69.0°	3°31.0'	+00.8'	69.1°	3°52.4'	+01.8'	69.1°	4°13.7'	+02.8'	69.2°	4°35.0'	+03.7'	69.3°	4°56.2'	+04.7'	69.4°	21
22	2°46.9'	-01.2'	68.0°	3°09.4'	-00.2'	68.0°	3°31.8'	+00.7'	68.1°	3°54.2'	+01.7'	68.1°	4°16.5'	+02.7'	68.2°	4°38.7'	+03.6'	68.3°	5°00.9'	+04.6'	68.4°	22
23	2°45.7'	-01.3'	67.0°	3°09.1'	-00.3'	67.0°	3°32.5'	+00.7'	67.1°	3°55.9'	+01.6'	67.										

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

88° 272° LHA

Latitude SAME as Declination

88° 272° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	2°00.0'	00.0'	90.0°	2°00.0'	+01.0'	90.0°	2°00.0'	+02.1'	90.1°	1°59.8'	+03.1'	90.1°	1°59.7'	+04.2'	90.1°	1°59.5'	+05.2'	90.2°	1°59.3'	+06.3'	90.2°	0
1	2°00.0'	-00.1'	89.0°	2°01.0'	+01.0'	89.0°	2°02.0'	+02.0'	89.1°	2°03.0'	+03.1'	89.1°	2°03.9'	+04.1'	89.1°	2°04.8'	+05.2'	89.2°	2°05.6'	+06.2'	89.2°	1
2	2°00.0'	-00.1'	88.0°	2°02.0'	+01.0'	88.0°	2°04.0'	+02.0'	88.1°	2°06.0'	+03.0'	88.1°	2°08.0'	+04.1'	88.1°	2°09.9'	+05.1'	88.2°	2°11.8'	+06.2'	88.2°	2
3	1°59.8'	-00.1'	87.0°	2°03.0'	+00.9'	87.0°	2°06.0'	+02.0'	87.1°	2°09.1'	+03.0'	87.1°	2°12.1'	+04.1'	87.1°	2°15.1'	+05.1'	87.2°	2°18.0'	+06.1'	87.2°	3
4	1°59.7'	-00.2'	86.0°	2°03.9'	+00.9'	86.0°	2°08.0'	+01.9'	86.1°	2°12.1'	+03.0'	86.1°	2°16.2'	+04.0'	86.1°	2°20.2'	+05.1'	86.2°	2°24.1'	+06.1'	86.2°	4
5	1°59.5'	-00.2'	85.0°	2°04.8'	+00.8'	85.0°	2°09.9'	+01.9'	85.1°	2°15.1'	+02.9'	85.1°	2°20.2'	+04.0'	85.1°	2°25.2'	+05.0'	85.2°	2°30.2'	+06.0'	85.2°	5
6	1°59.3'	-00.2'	84.0°	2°05.6'	+00.8'	84.0°	2°11.8'	+01.8'	84.1°	2°18.0'	+02.9'	84.1°	2°24.1'	+03.9'	84.1°	2°30.2'	+05.0'	84.2°	2°36.3'	+06.0'	84.2°	6
7	1°59.1'	-00.3'	83.0°	2°06.4'	+00.8'	83.0°	2°13.7'	+01.8'	83.1°	2°20.9'	+02.8'	83.1°	2°28.1'	+03.9'	83.2°	2°35.2'	+04.9'	83.2°	2°42.3'	+06.0'	83.2°	7
8	1°58.8'	-00.3'	82.0°	2°07.2'	+00.7'	82.0°	2°15.5'	+01.8'	82.1°	2°23.7'	+02.8'	82.1°	2°31.9'	+03.8'	82.2°	2°40.1'	+04.9'	82.2°	2°48.2'	+05.9'	82.2°	8
9	1°58.5'	-00.3'	81.0°	2°07.9'	+00.7'	81.0°	2°17.2'	+01.7'	81.1°	2°26.5'	+02.8'	81.1°	2°35.8'	+03.8'	81.2°	2°45.0'	+04.8'	81.2°	2°54.1'	+05.8'	81.2°	9
10	1°58.2'	-00.4'	80.0°	2°08.6'	+00.6'	80.0°	2°19.0'	+01.7'	80.1°	2°29.3'	+02.7'	80.1°	2°39.6'	+03.7'	80.2°	2°49.8'	+04.8'	80.2°	3°00.0'	+05.8'	80.3°	10
11	1°57.8'	-00.4'	79.0°	2°09.2'	+00.6'	79.0°	2°20.6'	+01.6'	79.1°	2°32.0'	+02.7'	79.1°	2°43.3'	+03.7'	79.2°	2°54.6'	+04.7'	79.2°	3°05.8'	+05.7'	79.3°	11
12	1°57.4'	-00.5'	78.0°	2°09.8'	+00.6'	78.0°	2°22.3'	+01.6'	78.1°	2°34.7'	+02.6'	78.1°	2°47.0'	+03.6'	78.2°	2°59.3'	+04.7'	78.2°	3°11.5'	+05.7'	78.3°	12
13	1°56.9'	-00.5'	77.0°	2°10.4'	+00.5'	77.0°	2°23.9'	+01.5'	77.1°	2°37.3'	+02.6'	77.1°	2°50.6'	+03.6'	77.2°	3°03.9'	+04.6'	77.2°	3°17.2'	+05.6'	77.3°	13
14	1°56.4'	-00.5'	76.0°	2°10.9'	+00.5'	76.0°	2°25.4'	+01.5'	76.1°	2°39.8'	+02.5'	76.1°	2°54.2'	+03.5'	76.2°	3°08.5'	+04.5'	76.2°	3°22.8'	+05.6'	76.3°	14
15	1°55.9'	-00.6'	75.0°	2°11.4'	+00.4'	75.0°	2°26.9'	+01.5'	75.1°	2°42.4'	+02.5'	75.1°	2°57.8'	+03.5'	75.2°	3°13.1'	+04.5'	75.2°	3°28.4'	+05.5'	75.3°	15
16	1°55.3'	-00.6'	74.0°	2°11.9'	+00.4'	74.0°	2°28.4'	+01.4'	74.1°	2°44.8'	+02.4'	74.1°	3°01.2'	+03.4'	74.2°	3°17.6'	+04.4'	74.2°	3°33.9'	+05.4'	74.3°	16
17	1°54.8'	-00.6'	73.0°	2°12.3'	+00.4'	73.0°	2°29.8'	+01.4'	73.1°	2°47.2'	+02.4'	73.1°	3°04.7'	+03.4'	73.2°	3°22.0'	+04.4'	73.2°	3°39.3'	+05.4'	73.3°	17
18	1°54.1'	-00.7'	72.0°	2°12.7'	+00.3'	72.0°	2°31.2'	+01.3'	72.1°	2°49.6'	+02.3'	72.1°	3°08.0'	+03.3'	72.2°	3°26.4'	+04.3'	72.2°	3°44.7'	+05.3'	72.3°	18
19	1°53.5'	-00.7'	71.0°	2°13.0'	+00.3'	71.0°	2°32.5'	+01.3'	71.1°	2°51.9'	+02.3'	71.1°	3°11.3'	+03.3'	71.2°	3°30.7'	+04.2'	71.2°	3°50.0'	+05.2'	71.3°	19
20	1°52.8'	-00.7'	70.0°	2°13.3'	+00.2'	70.0°	2°33.8'	+01.2'	70.1°	2°54.2'	+02.2'	70.1°	3°14.6'	+03.2'	70.2°	3°34.9'	+04.2'	70.2°	3°55.2'	+05.2'	70.3°	20
21	1°52.0'	-00.8'	69.0°	2°13.5'	+00.2'	69.0°	2°35.0'	+01.2'	69.1°	2°56.4'	+02.2'	69.1°	3°17.8'	+03.1'	69.2°	3°39.1'	+04.1'	69.2°	4°00.4'	+05.1'	69.3°	21
22	1°51.3'	-00.8'	68.0°	2°13.7'	+00.2'	68.0°	2°36.2'	+01.1'	68.1°	2°58.6'	+02.1'	68.1°	3°20.9'	+03.1'	68.2°	3°43.2'	+04.0'	68.2°	4°05.5'	+05.0'	68.3°	22
23	1°50.5'	-00.8'	67.0°	2°13.9'	+00.1'	67.0°	2°37.3'	+01.1'	67.1°	3°00.7'	+02.0'	67.1°	3°24.0'	+03.0'	67.2°	3°47.3'	+04.0'	67.2°	4°10.5'	+04.9'	67.3°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

88° 272° LHA

Latitude SAME as Declination

88° 272° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

89° 271° LHA

Latitude SAME as Declination

89° 271° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	1°00.0'	00.0'	90.0°	1°00.0'	+01.0'	90.0°	1°00.0'	+02.1'	90.0°	1°00.0'	+03.1'	90.1°	0°59.9'	+04.2'	90.1°	0°59.8'	+05.2'	90.1°	0°59.7'	+06.3'	90.1°	0
1	1°00.0'	00.0'	89.0°	1°01.0'	+01.0'	89.0°	1°02.0'	+02.1'	89.0°	1°03.0'	+03.1'	89.1°	1°04.0'	+04.2'	89.1°	1°05.0'	+05.2'	89.1°	1°05.9'	+06.2'	89.1°	1
2	1°00.0'	00.0'	88.0°	1°02.0'	+01.0'	88.0°	1°04.1'	+02.0'	88.0°	1°06.2'	+03.1'	88.1°	1°08.2'	+04.1'	88.1°	1°10.2'	+05.2'	88.1°	1°12.2'	+06.2'	88.1°	2
3	1°00.0'	-00.1'	87.0°	1°03.0'	+01.0'	87.0°	1°06.2'	+02.0'	87.0°	1°09.3'	+03.1'	87.1°	1°12.3'	+04.1'	87.1°	1°15.4'	+05.2'	87.1°	1°18.4'	+06.2'	87.1°	3
4	0°59.9'	-00.1'	86.0°	1°04.0'	+01.0'	86.0°	1°08.2'	+02.0'	86.0°	1°12.3'	+03.0'	86.1°	1°16.4'	+04.1'	86.1°	1°20.5'	+05.1'	86.1°	1°24.6'	+06.2'	86.1°	4
5	0°59.8'	-00.1'	85.0°	1°05.0'	+00.9'	85.0°	1°10.2'	+02.0'	85.0°	1°15.4'	+03.0'	85.1°	1°20.5'	+04.1'	85.1°	1°25.7'	+05.1'	85.1°	1°30.8'	+06.1'	85.1°	5
6	0°59.7'	-00.1'	84.0°	1°05.9'	+00.9'	84.0°	1°12.2'	+02.0'	84.0°	1°18.4'	+03.0'	84.1°	1°24.6'	+04.0'	84.1°	1°30.8'	+05.1'	84.1°	1°36.9'	+06.1'	84.1°	6
7	0°59.6'	-00.1'	83.0°	1°06.9'	+00.9'	83.0°	1°14.1'	+01.9'	83.0°	1°21.4'	+03.0'	83.1°	1°28.6'	+04.0'	83.1°	1°35.8'	+05.1'	83.1°	1°43.0'	+06.1'	83.1°	7
8	0°59.4'	-00.2'	82.0°	1°07.8'	+00.9'	82.0°	1°16.1'	+01.9'	82.0°	1°24.4'	+03.0'	82.1°	1°32.7'	+04.0'	82.1°	1°40.9'	+05.0'	82.1°	1°49.1'	+06.1'	82.1°	8
9	0°59.3'	-00.2'	81.0°	1°08.6'	+00.9'	81.0°	1°18.0'	+01.9'	81.0°	1°27.3'	+02.9'	81.1°	1°36.6'	+04.0'	81.1°	1°45.9'	+05.0'	81.1°	1°55.2'	+06.0'	81.1°	9
10	0°59.1'	-00.2'	80.0°	1°09.5'	+00.8'	80.0°	1°19.9'	+01.9'	80.0°	1°30.3'	+02.9'	80.1°	1°40.6'	+03.9'	80.1°	1°50.9'	+05.0'	80.1°	2°01.2'	+06.0'	80.2°	10
11	0°58.9'	-00.2'	79.0°	1°10.3'	+00.8'	79.0°	1°21.8'	+01.8'	79.0°	1°33.2'	+02.9'	79.1°	1°44.5'	+03.9'	79.1°	1°55.9'	+04.9'	79.1°	2°07.2'	+05.9'	79.2°	11
12	0°58.7'	-00.2'	78.0°	1°11.2'	+00.8'	78.0°	1°23.6'	+01.8'	78.0°	1°36.0'	+02.8'	78.1°	1°48.4'	+03.9'	78.1°	2°00.8'	+04.9'	78.1°	2°13.1'	+05.9'	78.2°	12
13	0°58.5'	-00.2'	77.0°	1°12.0'	+00.8'	77.0°	1°25.4'	+01.8'	77.0°	1°38.9'	+02.8'	77.1°	1°52.3'	+03.8'	77.1°	2°05.7'	+04.8'	77.1°	2°19.0'	+05.9'	77.2°	13
14	0°58.2'	-00.3'	76.0°	1°12.7'	+00.8'	76.0°	1°27.2'	+01.8'	76.0°	1°41.7'	+02.8'	76.1°	1°56.1'	+03.8'	76.1°	2°10.5'	+04.8'	76.1°	2°24.9'	+05.8'	76.2°	14
15	0°58.0'	-00.3'	75.0°	1°13.5'	+00.7'	75.0°	1°29.0'	+01.7'	75.0°	1°44.5'	+02.7'	75.1°	2°00.0'	+03.8'	75.1°	2°15.3'	+04.8'	75.1°	2°30.7'	+05.8'	75.2°	15
16	0°57.7'	-00.3'	74.0°	1°14.2'	+00.7'	74.0°	1°30.7'	+01.7'	74.0°	1°47.2'	+02.7'	74.1°	2°03.7'	+03.7'	74.1°	2°20.1'	+04.7'	74.1°	2°36.5'	+05.7'	74.2°	16
17	0°57.4'	-00.3'	73.0°	1°14.9'	+00.7'	73.0°	1°32.4'	+01.7'	73.0°	1°49.9'	+02.7'	73.1°	2°07.4'	+03.7'	73.1°	2°24.8'	+04.7'	73.1°	2°42.2'	+05.7'	73.2°	17
18	0°57.1'	-00.3'	72.0°	1°15.6'	+00.7'	72.0°	1°34.1'	+01.7'	72.0°	1°52.6'	+02.6'	72.1°	2°11.1'	+03.6'	72.1°	2°29.5'	+04.6'	72.1°	2°47.9'	+05.6'	72.2°	18
19	0°56.7'	-00.3'	71.0°	1°16.3'	+00.6'	71.0°	1°35.8'	+01.6'	71.0°	1°55.2'	+02.6'	71.1°	2°14.7'	+03.6'	71.1°	2°34.1'	+04.6'	71.1°	2°53.5'	+05.6'	71.2°	19
20	0°56.4'	-00.4'	70.0°	1°16.9'	+00.6'	70.0°	1°37.4'	+01.6'	70.0°	1°57.9'	+02.6'	70.1°	2°18.3'	+03.6'	70.1°	2°38.7'	+04.5'	70.1°	2°59.1'	+05.5'	70.2°	20
21	0°56.0'	-00.4'	69.0°	1°17.5'	+00.6'	69.0°	1°39.0'	+01.6'	69.0°	2°00.4'	+02.5'	69.1°	2°21.9'	+03.5'	69.1°	2°43.2'	+04.5'	69.1°	3°04.6'	+05.5'	69.2°	21
22	0°55.6'	-00.4'	68.0°	1°18.1'	+00.6'	68.0°	1°40.6'	+01.5'	68.0°	2°03.0'	+02.5'	68.1°	2°25.4'	+03.5'	68.1°	2°47.7'	+04.4'	68.1°	3°10.0'	+05.4'	68.2°	22
23	0°55.2'	-00.4'	67.0°	1°18.7'	+00.5'	67.0°	1°42.1'	+01.5'	67.0°	2°05.5'	+02.5'	67.										

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

90° 270° LHA

Latitude CONTRARY or SAME as Declination

90° 270° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°00.0' 00.0'	90.0°		0°00.0' +01.0'	90.0°		0°00.0' +02.1'	90.0°		0°00.0' +03.1'	90.0°		0°00.0' +04.2'	90.0°		0°00.0' +05.2'	90.0°		0°00.0' +06.3'	90.0°	0	
1	0°00.0' 00.0'	89.0°		0°01.0' +01.0'	89.0°		0°02.1' +02.1'	89.0°		0°03.1' +03.1'	89.0°		0°04.2' +04.2'	89.0°		0°05.2' +05.2'	89.0°		0°06.3' +06.3'	89.0°	1	
2	0°00.0' 00.0'	88.0°		0°02.1' +01.0'	88.0°		0°04.2' +02.1'	88.0°		0°06.3' +03.1'	88.0°		0°08.4' +04.2'	88.0°		0°10.5' +05.2'	88.0°		0°12.5' +06.3'	88.0°	2	
3	0°00.0' 00.0'	87.0°		0°03.1' +01.0'	87.0°		0°06.3' +02.1'	87.0°		0°09.4' +03.1'	87.0°		0°12.6' +04.2'	87.0°		0°15.7' +05.2'	87.0°		0°18.8' +06.3'	87.0°	3	
4	0°00.0' 00.0'	86.0°		0°04.2' +01.0'	86.0°		0°08.4' +02.1'	86.0°		0°12.6' +03.1'	86.0°		0°16.7' +04.2'	86.0°		0°20.9' +05.2'	86.0°		0°25.1' +06.3'	86.0°	4	
5	0°00.0' 00.0'	85.0°		0°05.2' +01.0'	85.0°		0°10.5' +02.1'	85.0°		0°15.7' +03.1'	85.0°		0°20.9' +04.2'	85.0°		0°26.1' +05.2'	85.0°		0°31.3' +06.2'	85.0°	5	
6	0°00.0' 00.0'	84.0°		0°06.3' +01.0'	84.0°		0°12.5' +02.1'	84.0°		0°18.8' +03.1'	84.0°		0°25.1' +04.2'	84.0°		0°31.3' +05.2'	84.0°		0°37.6' +06.2'	84.0°	6	
7	0°00.0' 00.0'	83.0°		0°07.3' +01.0'	83.0°		0°14.6' +02.1'	83.0°		0°21.9' +03.1'	83.0°		0°29.2' +04.1'	83.0°		0°36.5' +05.2'	83.0°		0°43.8' +06.2'	83.0°	7	
8	0°00.0' 00.0'	82.0°		0°08.3' +01.0'	82.0°		0°16.7' +02.1'	82.0°		0°25.0' +03.1'	82.0°		0°33.4' +04.1'	82.0°		0°41.7' +05.2'	82.0°		0°50.0' +06.2'	82.0°	8	
9	0°00.0' 00.0'	81.0°		0°09.4' +01.0'	81.0°		0°18.8' +02.1'	81.0°		0°28.1' +03.1'	81.0°		0°37.5' +04.1'	81.0°		0°46.9' +05.2'	81.0°		0°56.2' +06.2'	81.0°	9	
10	0°00.0' 00.0'	80.0°		0°10.4' +01.0'	80.0°		0°20.8' +02.1'	80.0°		0°31.2' +03.1'	80.0°		0°41.6' +04.1'	80.0°		0°52.0' +05.1'	80.0°		1°02.4' +06.2'	80.0°	10	
11	0°00.0' 00.0'	79.0°		0°11.4' +01.0'	79.0°		0°22.9' +02.1'	79.0°		0°34.3' +03.1'	79.0°		0°45.8' +04.1'	79.0°		0°57.2' +05.1'	79.0°		1°08.6' +06.1'	79.0°	11	
12	0°00.0' 00.0'	78.0°		0°12.5' +01.0'	78.0°		0°24.9' +02.0'	78.0°		0°37.4' +03.1'	78.0°		0°49.9' +04.1'	78.0°		1°02.3' +05.1'	78.0°		1°14.7' +06.1'	78.0°	12	
13	0°00.0' 00.0'	77.0°		0°13.5' +01.0'	77.0°		0°27.0' +02.0'	77.0°		0°40.5' +03.1'	77.0°		0°53.9' +04.1'	77.0°		1°07.4' +05.1'	77.0°		1°20.8' +06.1'	77.0°	13	
14	0°00.0' 00.0'	76.0°		0°14.5' +01.0'	76.0°		0°29.0' +02.0'	76.0°		0°43.5' +03.0'	76.0°		0°58.0' +04.1'	76.0°		1°12.5' +05.1'	76.0°		1°26.9' +06.1'	76.0°	14	
15	0°00.0' 00.0'	75.0°		0°15.5' +01.0'	75.0°		0°31.1' +02.0'	75.0°		0°46.6' +03.0'	75.0°		1°02.1' +04.0'	75.0°		1°17.6' +05.0'	75.0°		1°33.0' +06.0'	75.0°	15	
16	0°00.0' 00.0'	74.0°		0°16.5' +01.0'	74.0°		0°33.1' +02.0'	74.0°		0°49.6' +03.0'	74.0°		1°06.1' +04.0'	74.0°		1°22.6' +05.0'	74.0°		1°39.1' +06.0'	74.0°	16	
17	0°00.0' 00.0'	73.0°		0°17.5' +01.0'	73.0°		0°35.1' +02.0'	73.0°		0°52.6' +03.0'	73.0°		1°10.1' +04.0'	73.0°		1°27.6' +05.0'	73.0°		1°45.1' +06.0'	73.0°	17	
18	0°00.0' 00.0'	72.0°		0°18.5' +01.0'	72.0°		0°37.1' +02.0'	72.0°		0°55.6' +03.0'	72.0°		1°14.1' +04.0'	72.0°		1°32.6' +05.0'	72.0°		1°51.1' +06.0'	72.0°	18	
19	0°00.0' 00.0'	71.0°		0°19.5' +01.0'	71.0°		0°39.1' +02.0'	71.0°		0°58.6' +03.0'	71.0°		1°18.1' +03.9'	71.0°		1°37.6' +04.9'	71.0°		1°57.0' +05.9'	71.0°	19	
20	0°00.0' 00.0'	70.0°		0°20.5' +01.0'	70.0°		0°41.0' +02.0'	70.0°		1°01.5' +02.9'	70.0°		1°22.0' +03.9'	70.0°		1°42.5' +04.9'	70.0°		2°02.9' +05.9'	70.0°	20	
21	0°00.0' 00.0'	69.0°		0°21.5' +01.0'	69.0°		0°43.0' +01.9'	69.0°		1°04.5' +02.9'	69.0°		1°25.9' +03.9'	69.0°		1°47.4' +04.9'	69.0°		2°08.8' +05.8'	69.0°	21	
22	0°00.0' 00.0'	68.0°		0°22.5' +01.0'	68.0°		0°44.9' +01.9'	68.0°		1°07.4' +02.9'	68.0°		1°29.8' +03.9'	68.0°		1°52.3' +04.8'	68.0°		2°14.6' +05.8'	68.0°	22	
23	0°00.0' 00.0'	67.0°		0°23.4' +01.0'	67.0°		0°46.9' +01.9'	67.0°		1°10.3' +02.9'	67.0°		1°33.7' +03.8'	67.0°		1°57.1' +04.8'	67.0°		2°20.4' +05.8'	67.0°	23	
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

90° 270° LHA

Latitude CONTRARY or SAME as Declination

90° 270° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

89° 271° LHA

Latitude CONTRARY to Declination

89° 271° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	1°00.0' 00.0'	90.0°		1°00.0' -01.1'	90.0°		1°00.0' -02.1'	90.0°		1°00.0' -03.1'	90.1°		0°59.9' -04.2'	90.1°		0°59.8' -05.2'	90.1°		0°59.7' -06.3'	90.1°	0	
1	1°00.0' 00.0'	91.0°		0°58.9' -01.1'	91.0°		0°57.9' -02.1'	91.0°		0°56.8' -03.2'	91.1°		0°55.7' -04.2'	91.1°		0°54.5' -05.3'	91.1°		0°53.4' -06.3'	91.1°	1	
2	1°00.0' 00.0'	92.0°		0°57.9' -01.1'	92.0°		0°55.7' -02.1'	92.0°		0°53.6' -03.2'	92.0°		0°51.4' -04.2'	92.1°		0°49.3' -05.3'	92.1°		0°47.1' -06.3'	92.1°	2	
3	1°00.0' -00.1'	93.0°		0°56.8' -01.1'	93.0°		0°53.6' -02.2'	93.0°		0°50.4' -03.2'	93.0°		0°47.2' -04.2'	93.1°		0°44.0' -05.3'	93.1°		0°40.8' -06.3'	93.1°	3	
4	0°59.9' -00.1'	94.0°		0°55.7' -01.1'	94.0°		0°51.4' -02.2'	94.0°		0°47.2' -03.2'	94.0°		0°43.0' -04.3'	94.1°		0°38.7' -05.3'	94.1°		0°34.5' -06.3'	94.1°	4	
5	0°59.8' -00.1'	95.0°		0°54.5' -01.1'	95.0°		0°49.3' -02.2'	95.0°		0°44.0' -03.2'	95.0°		0°38.7' -04.3'	95.1°		0°33.4' -05.3'	95.1°		0°28.1' -06.3'	95.1°	5	
6	0°59.7' -00.1'	96.0°		0°53.4' -01.2'	96.0°		0°47.1' -02.2'	96.0°		0°40.8' -03.2'	96.0°		0°34.5' -04.3'	96.1°		0°28.1' -05.3'	96.1°		0°21.8' -06.3'	96.1°	6	
7	0°59.6' -00.1'	97.0°		0°52.2' -01.2'	97.0°		0°44.9' -02.2'	97.0°		0°37.5' -03.2'	97.0°		0°30.2' -04.3'	97.1°		0°22.8' -05.3'	97.1°		0°15.4' -06.4'	97.1°	7	
8	0°59.4' -00.2'	98.0°		0°51.1' -01.2'	98.0°		0°42.7' -02.2'	98.0°		0°34.3' -03.3'	98.0°		0°25.9' -04.3'	98.1°		0°17.5' -05.3'	98.1°		0°09.1' -06.4'	98.1°	8	
9	0°59.3' -00.2'	99.0°		0°49.9' -01.2'	99.0°		0°40.5' -02.2'	99.0°		0°31.0' -03.3'	99.0°		0°21.6' -04.3'	99.0°		0°12.2' -05.3'	99.1°		<u>0°02.7' -06.4'</u>	<u>99.1°</u>	9	
10	0°59.1' -00.2'	100.0°		0°48.7' -01.2'	100.0°		0°38.2' -02.2'	100.0°		0°27.8' -03.3'	100.0°		0°17.3' -04.3'	100.0°		0°06.8' -05.3'	100.0°		0°03.6' +06.4'	80.0°	10	
11	0°58.9' -00.2'	101.0°		0°47.4' -01.2'	101.0°		0°36.0' -02.3'	101.0°		0°24.5' -03.3'	101.0°		0°13.0' -04.3'	101.0°		<u>0°01.5' -05.3'</u>	<u>101.0°</u>		0°10.0' +06.4'	79.0°	11	
12	0°58.7' -00.2'	102.0°		0°46.2' -01.2'	102.0°		0°33.7' -02.3'	102.0°		0°21.2' -03.3'	102.0°		0°08.7' -04.3'	102.0°		0°03.8' +05.3'	78.0°		0°16.3' +06.3'	78.0°	12	
13	0°58.5' -00.2'	103.0°		0°45.0' -01.3'	103.0°		0°31.4' -02.3'	103.0°		0°17.9' -03.3'	103.0°		0°04.4' -04.3'	103.0°		0°09.2' +05.3'	77.0°		0°22.7' +06.3'	77.0°	13	
14	0°58.2' -00.3'	104.0°		0°43.7' -01.3'	104.0°		0°29.2' -02.3'	104.0°		0°14.6' -03.3'	104.0°		<u>0°00.1' -04.3'</u>	<u>104.0°</u>		0°14.5' +05.3'	76.0°		0°29.0' +06.3'	76.0°	14	
15	0°58.0' -00.3'	105.0°		0°42.4' -01.3'	105.0°		0°26.9' -02.3'	105.0°		0°11.3' -03.3'	105.0°		0°04.3' +04.3'	75.0°		0°19.8' +05.3'	75.0°		0°35.4' +06.3'	75.0°	15	
16	0°57.7' -00.3'	106.0°		0°41.1' -01.3'	106.0°		0°24.6' -02.3'	106.0°		0°08.0' -03.3'	106.0°		0°08.6' +04.3'	74.0°		0°25.1' +05.3'	74.0°		0°41.7' +06.3'	74.0°	16	
17	0°57.4' -00.3'	107.0°		0°39.8' -01.3'	107.0°		0°22.3' -02.3'	107.0°		0°04.7' -03.3'	107.0°		0°12.9' +04.3'	73.0°		0°30.4' +05.3'	73.0°		0°48.0' +06.3'	73.0°	17	
18	0°57.1' -00.3'	108.0°		0°38.5' -01.3'	108.0°		0°20.0' -02.3'	108.0°		<u>0°01.4' -03.3'</u>	<u>108.0°</u>		0°17.2' +04.3'	72.0°		0°35.7' +05.3'	72.0°		0°54.3' +06.3'	72.0°	18	
19	0°56.7' -00.3'	109.0°		0°37.2' -01.3'	109.0°		0°17.6' -02.3'	109.0°		0°01.9' +03.3'	71.0°		0°21.5' +04.3'	71.0°		0°41.0' +05.3'	71.0°		1°00.6' +06.3'	71.0°	19	
20	0°56.4' -00.4'	110.0°		0°35.9' -01.3'	110.0°		0°15.3' -02.3'	110.0°		0°05.2' +03.3'	70.0°		0°25.8' +04.3'	70.0°		0°46.3' +05.3'	70.0°		1°06.8' +06.2'	70.0°	20	
21	0°56.0' -00.4'	111.0°		0°34.5' -01.4'	111.0°		0°13.0' -02.3'	111.0°		0°08.5' +03.3'	69.0°		0°30.1' +04.3'	69.0°		0°51.6' +05.2'	69.0°		1°13.1' +06.2'	69.0°	21	
22	0°55.6' -00.4'	112.0°		0°33.1' -01.4'	112.0°		0°10.7' -02.3'	112.0°		0°11.8' +03.3'												

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

88° 272° LHA

Latitude CONTRARY to Declination

88° 272° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	2°00.0'	00.0'	90.0°	1°60.0'	-01.1'	90.0°	1°59.9'	-02.1'	90.1°	1°59.8'	-03.2'	90.1°	1°59.7'	-04.2'	90.1°	1°59.5'	-05.3'	90.2°	1°59.3'	-06.3'	90.2°	0
1	1°59.9'	-00.1'	91.0°	1°58.9'	-01.1'	91.0°	1°57.8'	-02.1'	91.1°	1°56.7'	-03.2'	91.1°	1°55.5'	-04.2'	91.1°	1°54.3'	-05.3'	91.2°	1°53.0'	-06.3'	91.2°	1
2	1°59.9'	-00.1'	92.0°	1°57.8'	-01.1'	92.0°	1°55.7'	-02.2'	92.1°	1°53.5'	-03.2'	92.1°	1°51.3'	-04.3'	92.1°	1°49.0'	-05.3'	92.2°	1°46.7'	-06.4'	92.2°	2
3	1°59.8'	-00.1'	93.0°	1°56.7'	-01.2'	93.0°	1°53.5'	-02.2'	93.1°	1°50.2'	-03.3'	93.1°	1°47.0'	-04.3'	93.1°	1°43.7'	-05.3'	93.2°	1°40.4'	-06.4'	93.2°	3
4	1°59.7'	-00.2'	94.0°	1°55.5'	-01.2'	94.0°	1°51.3'	-02.3'	94.1°	1°47.0'	-03.3'	94.1°	1°42.7'	-04.3'	94.1°	1°38.3'	-05.4'	94.2°	1°34.0'	-06.4'	94.2°	4
5	1°59.5'	-00.2'	95.0°	1°54.3'	-01.2'	95.0°	1°49.0'	-02.3'	95.1°	1°43.7'	-03.3'	95.1°	1°38.3'	-04.4'	95.1°	1°33.0'	-05.4'	95.2°	1°27.6'	-06.4'	95.2°	5
6	1°59.3'	-00.2'	96.0°	1°53.0'	-01.3'	96.0°	1°46.7'	-02.3'	96.1°	1°40.4'	-03.4'	96.1°	1°34.0'	-04.4'	96.1°	1°27.6'	-05.4'	96.2°	1°21.1'	-06.5'	96.2°	6
7	1°59.1'	-00.3'	97.0°	1°51.8'	-01.3'	97.0°	1°44.4'	-02.4'	97.1°	1°37.0'	-03.4'	97.1°	1°29.6'	-04.4'	97.1°	1°22.1'	-05.5'	97.1°	1°14.6'	-06.5'	97.2°	7
8	1°58.8'	-00.3'	98.0°	1°50.5'	-01.3'	98.0°	1°42.1'	-02.4'	98.1°	1°33.6'	-03.4'	98.1°	1°25.2'	-04.4'	98.1°	1°16.7'	-05.5'	98.1°	1°08.2'	-06.5'	98.2°	8
9	1°58.5'	-00.3'	99.0°	1°49.1'	-01.4'	99.0°	1°39.7'	-02.4'	99.1°	1°30.2'	-03.4'	99.1°	1°20.7'	-04.5'	99.1°	1°11.2'	-05.5'	99.1°	1°01.6'	-06.5'	99.2°	9
10	1°58.2'	-00.4'	100.0°	1°47.7'	-01.4'	100.0°	1°37.3'	-02.4'	100.1°	1°26.8'	-03.5'	100.1°	1°16.2'	-04.5'	100.1°	1°05.7'	-05.5'	100.1°	0°55.1'	-06.5'	100.2°	10
11	1°57.8'	-00.4'	101.0°	1°46.3'	-01.4'	101.0°	1°34.8'	-02.5'	101.1°	1°23.3'	-03.5'	101.1°	1°11.7'	-04.5'	101.1°	1°00.2'	-05.5'	101.1°	0°48.6'	-06.6'	101.1°	11
12	1°57.4'	-00.5'	102.0°	1°44.9'	-01.5'	102.0°	1°32.3'	-02.5'	102.1°	1°19.8'	-03.5'	102.1°	1°07.2'	-04.5'	102.1°	0°54.6'	-05.6'	102.1°	0°42.0'	-06.6'	102.1°	12
13	1°56.9'	-00.5'	103.0°	1°43.4'	-01.5'	103.0°	1°29.9'	-02.5'	103.1°	1°16.3'	-03.5'	103.1°	1°02.7'	-04.6'	103.1°	0°49.1'	-05.6'	103.1°	0°35.4'	-06.6'	103.1°	13
14	1°56.4'	-00.5'	104.0°	1°41.9'	-01.5'	104.0°	1°27.3'	-02.6'	104.1°	1°12.7'	-03.6'	104.1°	0°58.1'	-04.6'	104.1°	0°43.5'	-05.6'	104.1°	0°28.8'	-06.6'	104.1°	14
15	1°55.9'	-00.6'	105.0°	1°40.4'	-01.6'	105.0°	1°24.8'	-02.6'	105.1°	1°09.2'	-03.6'	105.1°	0°53.5'	-04.6'	105.1°	0°37.9'	-05.6'	105.1°	0°22.2'	-06.6'	105.1°	15
16	1°55.3'	-00.6'	106.0°	1°38.8'	-01.6'	106.0°	1°22.2'	-02.6'	106.1°	1°05.6'	-03.6'	106.1°	0°48.9'	-04.6'	106.1°	0°32.3'	-05.6'	106.1°	0°15.6'	-06.6'	106.1°	16
17	1°54.8'	-00.6'	107.0°	1°37.2'	-01.6'	107.0°	1°19.6'	-02.6'	107.1°	1°02.0'	-03.6'	107.1°	0°44.3'	-04.6'	107.1°	0°26.7'	-05.6'	107.1°	0°09.0'	-06.6'	107.1°	17
18	1°54.1'	-00.7'	108.0°	1°35.6'	-01.7'	108.0°	1°17.0'	-02.7'	108.1°	0°58.4'	-03.6'	108.1°	0°39.7'	-04.6'	108.1°	0°21.1'	-05.6'	108.1°	<u>0°02.4'</u>	<u>-06.6'</u>	<u>108.1°</u>	18
19	1°53.5'	-00.7'	109.0°	1°33.9'	-01.7'	109.0°	1°14.3'	-02.7'	109.1°	0°54.7'	-03.7'	109.1°	0°35.1'	-04.6'	109.1°	0°15.5'	-05.6'	109.1°	0°04.2'	+06.6'	70.9°	19
20	1°52.8'	-00.7'	110.0°	1°32.2'	-01.7'	110.0°	1°11.6'	-02.7'	110.1°	0°51.1'	-03.7'	110.1°	0°30.4'	-04.7'	110.1°	0°09.8'	-05.6'	110.1°	0°10.8'	+06.6'	69.9°	20
21	1°52.0'	-00.8'	111.0°	1°30.5'	-01.7'	111.0°	1°08.9'	-02.7'	111.1°	0°47.4'	-03.7'	111.1°	0°25.8'	-04.7'	111.1°	<u>0°04.2'</u>	<u>-05.6'</u>	<u>111.1°</u>	0°17.4'	+06.6'	68.9°	21
22	1°51.3'	-00.8'	112.0°	1°28.8'	-01.8'	112.0°	1°06.2'	-02.7'	112.1°	0°43.7'	-03.7'	112.1°	0°21.1'	-04.7'	112.1°	0°01.4'	+05.6'	67.9°	0°24.0'	+06.6'	67.9°	22
23	1°50.5'	-00.8'	113.0°	1°27.0'	-01.8'	113.0°	1°03.5'	-02.8'	113.1°	0°40.0'	-03.7'	113.1°	0°16.5'	-04.7'	113.1°	0°07.1'	+05.6'	66.9°	0°30.6'	+06.6'	66.9°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

92° 268° LHA

Latitude SAME as DECLINATION

92° 268° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

87° 273° LHA

Latitude CONTRARY to Declination

87° 273° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	3°00.0'	00.0'	90.0°	2°60.0'	-01.1'	90.1°	2°59.9'	-02.1'	90.1°	2°59.8'	-03.2'	90.2°	2°59.6'	-04.2'	90.2°	2°59.3'	-05.3'	90.3°	2°59.0'	-06.3'	90.3°	0
1	2°59.9'	-00.1'	91.0°	2°58.9'	-01.1'	91.1°	2°57.8'	-02.2'	91.1°	2°56.6'	-03.2'	91.2°	2°55.3'	-04.3'	91.2°	2°54.1'	-05.3'	91.3°	2°52.7'	-06.4'	91.3°	1
2	2°59.8'	-00.1'	92.0°	2°57.8'	-01.2'	92.1°	2°55.6'	-02.2'	92.1°	2°53.4'	-03.3'	92.2°	2°51.1'	-04.3'	92.2°	2°48.7'	-05.4'	92.3°	2°46.3'	-06.4'	92.3°	2
3	2°59.8'	-00.2'	93.0°	2°56.6'	-01.2'	93.1°	2°53.4'	-02.3'	93.1°	2°50.1'	-03.3'	93.2°	2°46.7'	-04.4'	93.2°	2°43.4'	-05.4'	93.3°	2°39.9'	-06.5'	93.3°	3
4	2°59.6'	-00.2'	94.0°	2°55.3'	-01.3'	94.1°	2°51.1'	-02.3'	94.1°	2°46.7'	-03.4'	94.2°	2°42.4'	-04.4'	94.2°	2°38.0'	-05.5'	94.3°	2°33.5'	-06.5'	94.3°	4
5	2°59.3'	-00.3'	95.0°	2°54.1'	-01.3'	95.1°	2°48.7'	-02.4'	95.1°	2°43.4'	-03.4'	95.2°	2°38.0'	-04.5'	95.2°	2°32.5'	-05.5'	95.2°	2°27.0'	-06.5'	95.3°	5
6	2°59.0'	-00.4'	96.0°	2°52.7'	-01.4'	96.1°	2°46.3'	-02.4'	96.1°	2°39.9'	-03.5'	96.2°	2°33.5'	-04.5'	96.2°	2°27.0'	-05.6'	96.2°	2°20.4'	-06.6'	96.3°	6
7	2°58.7'	-00.4'	97.0°	2°51.3'	-01.4'	97.1°	2°43.9'	-02.5'	97.1°	2°36.5'	-03.5'	97.2°	2°29.0'	-04.6'	97.2°	2°21.4'	-05.6'	97.2°	2°13.8'	-06.6'	97.3°	7
8	2°58.2'	-00.5'	98.0°	2°49.9'	-01.5'	98.1°	2°41.4'	-02.5'	98.1°	2°32.9'	-03.6'	98.2°	2°24.4'	-04.6'	98.2°	2°15.8'	-05.6'	98.2°	2°07.2'	-06.7'	98.3°	8
9	2°57.8'	-00.5'	99.0°	2°48.4'	-01.6'	99.1°	2°38.9'	-02.6'	99.1°	2°29.4'	-03.6'	99.2°	2°19.8'	-04.6'	99.2°	2°10.2'	-05.7'	99.2°	2°00.5'	-06.7'	99.3°	9
10	2°57.3'	-00.6'	100.0°	2°46.8'	-01.6'	100.1°	2°36.3'	-02.6'	100.1°	2°25.7'	-03.7'	100.2°	2°15.1'	-04.7'	100.2°	2°04.5'	-05.7'	100.2°	1°53.8'	-06.7'	100.3°	10
11	2°56.7'	-00.6'	101.0°	2°45.2'	-01.7'	101.1°	2°33.7'	-02.7'	101.1°	2°22.1'	-03.7'	101.2°	2°10.5'	-04.7'	101.2°	1°58.8'	-05.8'	101.2°	1°47.1'	-06.8'	101.3°	11
12	2°56.1'	-00.7'	102.0°	2°43.5'	-01.7'	102.1°	2°31.0'	-02.7'	102.1°	2°18.4'	-03.7'	102.2°	2°05.7'	-04.8'	102.2°	1°53.0'	-05.8'	102.2°	1°40.3'	-06.8'	102.3°	12
13	2°55.4'	-00.7'	103.0°	2°41.8'	-01.8'	103.1°	2°28.3'	-02.8'	103.1°	2°14.6'	-03.8'	103.1°	2°01.0'	-04.8'	103.2°	1°47.3'	-05.8'	103.2°	1°33.5'	-06.8'	103.2°	13
14	2°54.6'	-00.8'	104.0°	2°40.1'	-01.8'	104.1°	2°25.5'	-02.8'	104.1°	2°10.8'	-03.8'	104.1°	1°56.2'	-04.8'	104.2°	1°41.4'	-05.8'	104.2°	1°26.7'	-06.9'	104.2°	14
15	2°53.9'	-00.8'	105.0°	2°38.3'	-01.9'	105.1°	2°22.7'	-02.9'	105.1°	2°07.0'	-03.9'	105.1°	1°51.3'	-04.9'	105.2°	1°35.6'	-05.9'	105.2°	1°19.8'	-06.9'	105.2°	15
16	2°53.0'	-00.9'	106.0°	2°36.4'	-01.9'	106.1°	2°19.8'	-02.9'	106.1°	2°03.1'	-03.9'	106.1°	1°46.4'	-04.9'	106.2°	1°29.7'	-05.9'	106.2°	1°13.0'	-06.9'	106.2°	16
17	2°52.1'	-00.9'	107.0°	2°34.5'	-01.9'	107.1°	2°16.9'	-02.9'	107.1°	1°59.2'	-03.9'	107.1°	1°41.5'	-04.9'	107.2°	1°23.8'	-05.9'	107.2°	1°06.1'	-06.9'	107.2°	17
18	2°51.2'	-01.0'	108.0°	2°32.6'	-02.0'	108.1°	2°14.0'	-03.0'	108.1°	1°55.3'	-04.0'	108.1°	1°36.6'	-05.0'	108.2°	1°17.9'	-06.0'	108.2°	0°59.1'	-06.9'	108.2°	18
19	2°50.2'	-01.0'	109.0°	2°30.6'	-02.0'	109.1°	2°11.0'	-03.0'	109.1°	1°51.3'	-04.0'	109.1°	1°31.6'	-05.0'	109.2°	1°11.9'	-06.0'	109.2°	0°52.2'	-07.0'	109.2°	19
20	2°49.1'	-01.1'	110.0°	2°28.6'	-02.1'	110.1°	2°08.0'	-03.1'	110.1°	1°47.3'	-04.0'	110.1°	1°26.6'	-05.0'	110.2°	1°06.0'	-06.0'	110.2°	0°45.2'	-07.0'	110.2°	20
21	2°48.0'	-01.2'	111.0°	2°26.5'	-02.1'	111.1°	2°04.9'	-03.1'	111.1°	1°43.3'	-04.1'	111.1°	1°21.6'	-05.0'	111.2°	0°60.0'	-06.0'	111.2°	0°38.3'	-07.0'	111.2°	21
22	2°46.9'	-01.2'	112.0°	2°24.4'	-02.2'	112.1°	2°01.8'	-03.1'	112.1°	1°39.2'	-04.1'	112.1°	1°16.6'	-05.1'								

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

86° 274° LHA

Latitude CONTRARY to Declination

86° 274° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°00.0'	00.0'	90.0°	3°60.0'	-01.1'	90.1°	3°59.9'	-02.1'	90.1°	3°59.7'	-03.2'	90.2°	3°59.4'	-04.2'	90.3°	3°59.1'	-05.3'	90.3°	3°58.7'	-06.3'	90.4°	0
1	3°59.9'	-00.1'	91.0°	3°58.9'	-01.2'	91.1°	3°57.7'	-02.2'	91.1°	3°56.5'	-03.3'	91.2°	3°55.2'	-04.3'	91.3°	3°53.8'	-05.3'	91.3°	3°52.4'	-06.4'	91.4°	1
2	3°59.8'	-00.2'	92.0°	3°57.7'	-01.2'	92.1°	3°55.5'	-02.3'	92.1°	3°53.2'	-03.3'	92.2°	3°50.9'	-04.4'	92.3°	3°48.5'	-05.4'	92.3°	3°46.0'	-06.5'	92.4°	2
3	3°59.7'	-00.3'	93.0°	3°56.5'	-01.3'	93.1°	3°53.2'	-02.4'	93.1°	3°49.9'	-03.4'	93.2°	3°46.5'	-04.4'	93.3°	3°43.0'	-05.5'	93.3°	3°39.5'	-06.5'	93.4°	3
4	3°59.4'	-00.3'	94.0°	3°55.2'	-01.4'	94.1°	3°50.9'	-02.4'	94.1°	3°46.5'	-03.5'	94.2°	3°42.1'	-04.5'	94.3°	3°37.6'	-05.6'	94.3°	3°33.0'	-06.6'	94.4°	4
5	3°59.1'	-00.4'	95.0°	3°53.8'	-01.4'	95.1°	3°48.5'	-02.5'	95.1°	3°43.0'	-03.5'	95.2°	3°37.6'	-04.6'	95.3°	3°32.0'	-05.6'	95.3°	3°26.4'	-06.7'	95.4°	5
6	3°58.7'	-00.5'	96.0°	3°52.4'	-01.5'	96.1°	3°46.0'	-02.6'	96.1°	3°39.5'	-03.6'	96.2°	3°33.0'	-04.6'	96.3°	3°26.4'	-05.7'	96.3°	3°19.7'	-06.7'	96.4°	6
7	3°58.2'	-00.6'	97.0°	3°50.8'	-01.6'	97.1°	3°43.4'	-02.6'	97.2°	3°35.9'	-03.7'	97.2°	3°28.3'	-04.7'	97.3°	3°20.7'	-05.7'	97.3°	3°13.0'	-06.8'	97.4°	7
8	3°57.7'	-00.6'	98.0°	3°49.3'	-01.7'	98.1°	3°40.8'	-02.7'	98.2°	3°32.2'	-03.7'	98.2°	3°23.6'	-04.8'	98.3°	3°15.0'	-05.8'	98.3°	3°06.3'	-06.8'	98.4°	8
9	3°57.0'	-00.7'	99.0°	3°47.6'	-01.7'	99.1°	3°38.1'	-02.8'	99.2°	3°28.5'	-03.8'	99.2°	3°18.9'	-04.8'	99.3°	3°09.2'	-05.9'	99.3°	2°59.4'	-06.9'	99.4°	9
10	3°56.3'	-00.8'	100.0°	3°45.9'	-01.8'	100.1°	3°35.3'	-02.8'	100.2°	3°24.7'	-03.9'	100.2°	3°14.0'	-04.9'	100.3°	3°03.3'	-05.9'	100.3°	2°52.5'	-06.9'	100.4°	10
11	3°55.6'	-00.8'	101.0°	3°44.1'	-01.9'	101.1°	3°32.5'	-02.9'	101.2°	3°20.9'	-03.9'	101.2°	3°09.2'	-04.9'	101.3°	2°57.4'	-06.0'	101.3°	2°45.6'	-07.0'	101.4°	11
12	3°54.7'	-00.9'	102.0°	3°42.2'	-01.9'	102.1°	3°29.6'	-03.0'	102.2°	3°16.9'	-04.0'	102.2°	3°04.2'	-05.0'	102.3°	2°51.4'	-06.0'	102.3°	2°38.6'	-07.0'	102.4°	12
13	3°53.8'	-01.0'	103.0°	3°40.3'	-02.0'	103.1°	3°26.7'	-03.0'	103.2°	3°13.0'	-04.0'	103.2°	2°59.2'	-05.1'	103.3°	2°45.4'	-06.1'	103.3°	2°31.6'	-07.1'	103.4°	13
14	3°52.9'	-01.1'	104.0°	3°38.3'	-02.1'	104.1°	3°23.6'	-03.1'	104.2°	3°08.9'	-04.1'	104.2°	2°54.2'	-05.1'	104.3°	2°39.4'	-06.1'	104.3°	2°24.5'	-07.1'	104.4°	14
15	3°51.8'	-01.1'	105.0°	3°36.2'	-02.1'	105.1°	3°20.6'	-03.1'	105.2°	3°04.8'	-04.1'	105.2°	2°49.1'	-05.2'	105.3°	2°33.3'	-06.2'	105.3°	2°17.4'	-07.2'	105.3°	15
16	3°50.7'	-01.2'	106.0°	3°34.1'	-02.2'	106.1°	3°17.4'	-03.2'	106.2°	3°00.7'	-04.2'	106.2°	2°43.9'	-05.2'	106.3°	2°27.1'	-06.2'	106.3°	2°10.2'	-07.2'	106.3°	16
17	3°49.5'	-01.3'	107.0°	3°31.9'	-02.3'	107.1°	3°14.2'	-03.3'	107.2°	2°56.5'	-04.3'	107.2°	2°38.7'	-05.3'	107.3°	2°20.9'	-06.2'	107.3°	2°03.0'	-07.2'	107.3°	17
18	3°48.2'	-01.3'	108.0°	3°29.6'	-02.3'	108.1°	3°11.0'	-03.3'	108.2°	2°52.2'	-04.3'	108.2°	2°33.5'	-05.3'	108.3°	2°14.6'	-06.3'	108.3°	1°55.8'	-07.3'	108.3°	18
19	3°46.9'	-01.4'	109.0°	3°27.3'	-02.4'	109.1°	3°07.6'	-03.4'	109.2°	2°47.9'	-04.4'	109.2°	2°28.2'	-05.3'	109.2°	2°08.4'	-06.3'	109.3°	1°48.5'	-07.3'	109.3°	19
20	3°45.5'	-01.5'	110.0°	3°24.9'	-02.5'	110.1°	3°04.3'	-03.4'	110.2°	2°43.6'	-04.4'	110.2°	2°22.8'	-05.4'	110.2°	2°02.0'	-06.4'	110.3°	1°41.2'	-07.3'	110.3°	20
21	3°44.0'	-01.5'	111.0°	3°22.5'	-02.5'	111.1°	3°00.8'	-03.5'	111.2°	2°39.2'	-04.5'	111.2°	2°17.4'	-05.4'	111.2°	1°55.7'	-06.4'	111.3°	1°33.9'	-07.4'	111.3°	21
22	3°42.5'	-01.6'	112.0°	3°19.9'	-02.6'	112.1°	2°57.3'	-03.5'	112.2°	2°34.7'	-04.5'	112.2°	2°12.0'	-05.5'	112.2°	1°49.3'	-06.4'	112.3°	1°26.5'	-07.4'	112.3°	22
23	3°40.9'	-01.7'	113.1°	3°17.4'	-02.6'	113.1°	2°53.8'	-03.6'	113.2°	2°30.2'	-04.6'	113.2°	2°06.5'	-05.5'	113.2°	1°42.8'	-06.5'	113.2°	1°19.1'	-07.4'	113.3°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

86° 274° LHA

Latitude CONTRARY to DECLINATION

86° 274° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

85° 275° LHA

Latitude CONTRARY to Declination

85° 275° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°00.0'	00.0'	90.0°	4°60.0'	-01.1'	90.1°	4°59.8'	-02.1'	90.2°	4°59.6'	-03.2'	90.3°	4°59.3'	-04.2'	90.3°	4°58.9'	-05.3'	90.4°	4°58.4'	-06.3'	90.5°	0
1	4°59.9'	-00.1'	91.0°	4°58.9'	-01.2'	91.1°	4°57.7'	-02.2'	91.2°	4°56.4'	-03.3'	91.3°	4°55.0'	-04.3'	91.4°	4°53.6'	-05.4'	91.4°	4°52.0'	-06.4'	91.5°	1
2	4°59.8'	-00.2'	92.0°	4°57.7'	-01.3'	92.1°	4°55.4'	-02.3'	92.2°	4°53.1'	-03.4'	92.3°	4°50.7'	-04.4'	92.4°	4°48.2'	-05.5'	92.4°	4°45.6'	-06.5'	92.5°	2
3	4°59.6'	-00.3'	93.0°	4°56.4'	-01.4'	93.1°	4°53.1'	-02.4'	93.2°	4°49.7'	-03.5'	93.3°	4°46.3'	-04.5'	93.4°	4°42.7'	-05.6'	93.4°	4°39.1'	-06.6'	93.5°	3
4	4°59.3'	-00.4'	94.0°	4°55.0'	-01.5'	94.1°	4°50.7'	-02.5'	94.2°	4°46.3'	-03.6'	94.3°	4°41.7'	-04.6'	94.4°	4°37.2'	-05.6'	94.4°	4°32.5'	-06.7'	94.5°	4
5	4°58.9'	-00.5'	95.0°	4°53.6'	-01.5'	95.1°	4°48.2'	-02.6'	95.2°	4°42.7'	-03.6'	95.3°	4°37.2'	-04.7'	95.4°	4°31.5'	-05.7'	95.4°	4°25.8'	-06.8'	95.5°	5
6	4°58.4'	-00.6'	96.0°	4°52.0'	-01.6'	96.1°	4°45.6'	-02.7'	96.2°	4°39.1'	-03.7'	96.3°	4°32.5'	-04.8'	96.4°	4°25.8'	-05.8'	96.4°	4°19.0'	-06.8'	96.5°	6
7	4°57.8'	-00.7'	97.0°	4°50.4'	-01.7'	97.1°	4°42.9'	-02.8'	97.2°	4°35.3'	-03.8'	97.3°	4°27.7'	-04.8'	97.4°	4°20.0'	-05.9'	97.4°	4°12.2'	-06.9'	97.5°	7
8	4°57.1'	-00.8'	98.0°	4°48.6'	-01.8'	98.1°	4°40.1'	-02.9'	98.2°	4°31.5'	-03.9'	98.3°	4°22.9'	-04.9'	98.4°	4°14.1'	-06.0'	98.4°	4°05.3'	-07.0'	98.5°	8
9	4°56.3'	-00.9'	99.0°	4°46.8'	-01.9'	99.1°	4°37.3'	-02.9'	99.2°	4°27.6'	-04.0'	99.3°	4°17.9'	-05.0'	99.4°	4°08.1'	-06.0'	99.4°	3°58.3'	-07.1'	99.5°	9
10	4°55.4'	-01.0'	100.0°	4°44.9'	-02.0'	100.1°	4°34.3'	-03.0'	100.2°	4°23.7'	-04.1'	100.3°	4°12.9'	-05.1'	100.4°	4°02.1'	-06.1'	100.4°	3°51.2'	-07.1'	100.5°	10
11	4°54.5'	-01.0'	101.0°	4°42.9'	-02.1'	101.1°	4°31.3'	-03.1'	101.2°	4°19.6'	-04.1'	101.3°	4°07.9'	-05.2'	101.4°	3°56.0'	-06.2'	101.4°	3°44.1'	-07.2'	101.5°	11
12	4°53.4'	-01.1'	102.0°	4°40.9'	-02.2'	102.1°	4°28.2'	-03.2'	102.2°	4°15.5'	-04.2'	102.3°	4°02.7'	-05.2'	102.4°	3°49.8'	-06.2'	102.4°	3°36.9'	-07.3'	102.5°	12
13	4°52.3'	-01.2'	103.0°	4°38.7'	-02.2'	103.1°	4°25.0'	-03.3'	103.2°	4°11.3'	-04.3'	103.3°	3°57.5'	-05.3'	103.3°	3°43.6'	-06.3'	103.4°	3°29.6'	-07.3'	103.5°	13
14	4°51.1'	-01.3'	104.0°	4°36.5'	-02.3'	104.1°	4°21.8'	-03.3'	104.2°	4°07.0'	-04.4'	104.3°	3°52.2'	-05.4'	104.3°	3°37.3'	-06.4'	104.4°	3°22.3'	-07.4'	104.5°	14
15	4°49.8'	-01.4'	105.0°	4°34.1'	-02.4'	105.1°	4°18.4'	-03.4'	105.2°	4°02.6'	-04.4'	105.3°	3°46.8'	-05.4'	105.3°	3°30.9'	-06.4'	105.4°	3°14.9'	-07.4'	105.5°	15
16	4°48.4'	-01.5'	106.0°	4°31.7'	-02.5'	106.1°	4°15.0'	-03.5'	106.2°	3°58.2'	-04.5'	106.3°	3°41.4'	-05.5'	106.3°	3°24.5'	-06.5'	106.4°	3°07.5'	-07.5'	106.5°	16
17	4°46.9'	-01.6'	107.0°	4°29.2'	-02.6'	107.1°	4°11.5'	-03.6'	107.2°	3°53.7'	-04.6'	107.3°	3°35.9'	-05.6'	107.3°	3°17.9'	-06.6'	107.4°	2°60.0'	-07.6'	107.5°	17
18	4°45.3'	-01.7'	108.0°	4°26.6'	-02.7'	108.1°	4°07.9'	-03.7'	108.2°	3°49.1'	-04.6'	108.3°	3°30.3'	-05.6'	108.3°	3°11.4'	-06.6'	108.4°	2°52.4'	-07.6'	108.4°	18
19	4°43.6'	-01.8'	109.0°	4°24.0'	-02.7'	109.1°	4°04.3'	-03.7'	109.2°	3°44.5'	-04.7'	109.3°	3°24.7'	-05.7'	109.3°	3°04.8'	-06.7'	109.4°	2°44.8'	-07.7'	109.4°	19
20	4°41.9'	-01.8'	110.0°	4°21.2'	-02.8'	110.1°	4°00.5'	-03.8'	110.2°	3°39.8'	-04.8'	110.3°	3°19.0'	-05.8'	110.3°	2°58.1'	-06.7'	110.4°	2°37.2'	-07.7'	110.4°	20
21	4°40.0'	-01.9'	111.0°	4°18.4'	-02.9'	111.1°	3°56.7'	-03.9'	111.2°	3°35.0'	-04.8'	111.3°	3°13.2'	-05.8'	111.3°	2°51.4'	-06.8'	111.4°	2°29.5'	-07.7'	111.4°	21
22	4°38.1'	-02.0'	112.0°	4°15.5'	-03.0'	112.1°	3°52.9'	-03.9'	112.2°	3°30.2'	-04.9'	112.3°	3°07.4'	-05.9'	112.3°	2°						

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

84° 276° LHA

Latitude CONTRARY to Declination

84° 276° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	6°00.0' -00.1'	90.0°		5°59.9' -01.1'	90.1°		5°59.8' -02.2'	90.2°		5°59.5' -03.2'	90.3°		5°59.1' -04.3'	90.4°		5°58.6' -05.3'	90.5°		5°58.0' -06.4'	90.6°	0	
1	5°59.9' -00.2'	91.0°		5°58.8' -01.2'	91.1°		5°57.6' -02.3'	91.2°		5°56.3' -03.3'	91.3°		5°54.9' -04.4'	91.4°		5°53.3' -05.4'	91.5°		5°51.7' -06.5'	91.6°	1	
2	5°59.7' -00.3'	92.0°		5°57.6' -01.3'	92.1°		5°55.4' -02.4'	92.2°		5°53.0' -03.4'	92.3°		5°50.5' -04.5'	92.4°		5°47.9' -05.5'	92.5°		5°45.2' -06.6'	92.6°	2	
3	5°59.5' -00.4'	93.0°		5°56.3' -01.4'	93.1°		5°53.0' -02.5'	93.2°		5°49.5' -03.5'	93.3°		5°46.0' -04.6'	93.4°		5°42.4' -05.6'	93.5°		5°38.6' -06.7'	93.6°	3	
4	5°59.1' -00.5'	94.0°		5°54.9' -01.5'	94.1°		5°50.5' -02.6'	94.2°		5°46.0' -03.6'	94.3°		5°41.4' -04.7'	94.4°		5°36.7' -05.7'	94.5°		5°32.0' -06.8'	94.6°	4	
5	5°58.6' -00.6'	95.0°		5°53.3' -01.7'	95.1°		5°47.9' -02.7'	95.2°		5°42.4' -03.7'	95.3°		5°36.7' -04.8'	95.4°		5°31.0' -05.8'	95.5°		5°25.2' -06.9'	95.6°	5	
6	5°58.0' -00.7'	96.0°		5°51.7' -01.8'	96.1°		5°45.2' -02.8'	96.2°		5°38.6' -03.8'	96.3°		5°32.0' -04.9'	96.4°		5°25.2' -05.9'	96.5°		5°18.3' -07.0'	96.6°	6	
7	5°57.3' -00.8'	97.0°		5°49.9' -01.9'	97.1°		5°42.4' -02.9'	97.2°		5°34.8' -03.9'	97.3°		5°27.1' -05.0'	97.4°		5°19.3' -06.0'	97.5°		5°11.3' -07.1'	97.6°	7	
8	5°56.5' -00.9'	98.0°		5°48.0' -02.0'	98.1°		5°39.5' -03.0'	98.2°		5°30.8' -04.0'	98.3°		5°22.1' -05.1'	98.4°		5°13.2' -06.1'	98.5°		5°04.3' -07.2'	98.6°	8	
9	5°55.6' -01.0'	99.0°		5°46.1' -02.1'	99.1°		5°36.5' -03.1'	99.2°		5°26.8' -04.1'	99.3°		5°17.0' -05.2'	99.4°		5°07.1' -06.2'	99.5°		4°57.1' -07.2'	99.6°	9	
10	5°54.5' -01.1'	100.1°		5°44.0' -02.2'	100.2°		5°33.4' -03.2'	100.3°		5°22.6' -04.2'	100.3°		5°11.8' -05.3'	100.4°		5°00.9' -06.3'	100.5°		4°49.9' -07.3'	100.6°	10	
11	5°53.4' -01.3'	101.1°		5°41.8' -02.3'	101.2°		5°30.1' -03.3'	101.3°		5°18.4' -04.3'	101.3°		5°06.5' -05.4'	101.4°		4°54.6' -06.4'	101.5°		4°42.6' -07.4'	101.6°	11	
12	5°52.1' -01.4'	102.1°		5°39.5' -02.4'	102.2°		5°26.8' -03.4'	102.3°		5°14.0' -04.4'	102.3°		5°01.2' -05.5'	102.4°		4°48.2' -06.5'	102.5°		4°35.1' -07.5'	102.6°	12	
13	5°50.7' -01.5'	103.1°		5°37.1' -02.5'	103.2°		5°23.4' -03.5'	103.3°		5°09.6' -04.5'	103.4°		4°55.7' -05.6'	103.4°		4°41.7' -06.6'	103.5°		4°27.7' -07.6'	103.6°	13	
14	5°49.3' -01.6'	104.1°		5°34.6' -02.6'	104.2°		5°19.9' -03.6'	104.3°		5°05.1' -04.6'	104.4°		4°50.1' -05.6'	104.4°		4°35.2' -06.6'	104.5°		4°20.1' -07.7'	104.6°	14	
15	5°47.7' -01.7'	105.1°		5°32.0' -02.7'	105.2°		5°16.3' -03.7'	105.3°		5°00.4' -04.7'	105.4°		4°44.5' -05.7'	105.4°		4°28.5' -06.7'	105.5°		4°12.4' -07.7'	105.6°	15	
16	5°46.0' -01.8'	106.1°		5°29.3' -02.8'	106.2°		5°12.6' -03.8'	106.3°		4°55.7' -04.8'	106.4°		4°38.8' -05.8'	106.4°		4°21.8' -06.8'	106.5°		4°04.7' -07.8'	106.6°	16	
17	5°44.2' -01.9'	107.1°		5°26.5' -02.9'	107.2°		5°08.8' -03.9'	107.3°		4°50.9' -04.9'	107.4°		4°33.0' -05.9'	107.4°		4°15.0' -06.9'	107.5°		3°56.9' -07.9'	107.6°	17	
18	5°42.3' -02.0'	108.1°		5°23.6' -03.0'	108.2°		5°04.9' -04.0'	108.3°		4°46.0' -05.0'	108.4°		4°27.1' -06.0'	108.4°		4°08.1' -07.0'	108.5°		3°49.0' -07.9'	108.6°	18	
19	5°40.3' -02.1'	109.1°		5°20.6' -03.1'	109.2°		5°00.9' -04.1'	109.3°		4°41.0' -05.1'	109.4°		4°21.1' -06.1'	109.4°		4°01.1' -07.0'	109.5°		3°41.1' -08.0'	109.6°	19	
20	5°38.2' -02.2'	110.1°		5°17.6' -03.2'	110.2°		4°56.8' -04.2'	110.3°		4°36.0' -05.2'	110.4°		4°15.1' -06.1'	110.4°		3°54.1' -07.1'	110.5°		3°33.1' -08.1'	110.6°	20	
21	5°36.0' -02.3'	111.1°		5°14.4' -03.3'	111.2°		4°52.6' -04.3'	111.3°		4°30.8' -05.2'	111.4°		4°08.9' -06.2'	111.4°		3°47.0' -07.2'	111.5°		3°25.0' -08.1'	111.5°	21	
22	5°33.7' -02.4'	112.1°		5°11.1' -03.4'	112.2°		4°48.4' -04.3'	112.3°		4°25.6' -05.3'	112.4°		4°02.7' -06.3'	112.4°		3°39.8' -07.2'	112.5°		3°16.8' -08.2'	112.5°	22	
23	5°31.3' -02.5'	113.1°		5°07.7' -03.5'	113.2°		4°44.0' -04.4'	113.3°		4°20.3' -05.4'	113.4°		3°56.5' -06.3'	113.4°		3°32.6' -07.3'	113.5°		3°08.7' -08.3'	113.5°	23	
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			Dec°

84° 276° LHA

Latitude CONTRARY to DECLINATION

84° 276° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

83° 277° LHA

Latitude CONTRARY to Declination

83° 277° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	7°00.0' -00.1'	90.0°		6°59.9' -01.1'	90.1°		6°59.7' -02.2'	90.2°		6°59.4' -03.2'	90.4°		6°59.0' -04.3'	90.5°		6°58.4' -05.3'	90.6°		6°57.7' -06.4'	90.7°	0	
1	6°59.9' -00.2'	91.0°		6°58.8' -01.2'	91.1°		6°57.6' -02.3'	91.3°		6°56.2' -03.4'	91.4°		6°54.7' -04.4'	91.5°		6°53.1' -05.5'	91.6°		6°51.3' -06.5'	91.7°	1	
2	6°59.7' -00.3'	92.0°		6°57.6' -01.4'	92.1°		6°55.3' -02.4'	92.3°		6°52.8' -03.5'	92.4°		6°50.3' -04.5'	92.5°		6°47.6' -05.6'	92.6°		6°44.8' -06.6'	92.7°	2	
3	6°59.4' -00.4'	93.0°		6°56.2' -01.5'	93.1°		6°52.8' -02.6'	93.3°		6°49.4' -03.6'	93.4°		6°45.8' -04.7'	93.5°		6°42.0' -05.7'	93.6°		6°38.2' -06.7'	93.7°	3	
4	6°59.0' -00.6'	94.0°		6°54.7' -01.6'	94.2°		6°50.3' -02.7'	94.3°		6°45.8' -03.7'	94.4°		6°41.1' -04.8'	94.5°		6°36.3' -05.8'	94.6°		6°31.4' -06.9'	94.7°	4	
5	6°58.4' -00.7'	95.0°		6°53.1' -01.8'	95.2°		6°47.6' -02.8'	95.3°		6°42.0' -03.9'	95.4°		6°36.3' -04.9'	95.5°		6°30.5' -05.9'	95.6°		6°24.6' -07.0'	95.7°	5	
6	6°57.7' -00.8'	96.0°		6°51.3' -01.9'	96.2°		6°44.8' -02.9'	96.3°		6°38.2' -04.0'	96.4°		6°31.4' -05.0'	96.5°		6°24.6' -06.1'	96.6°		6°17.6' -07.1'	96.7°	6	
7	6°56.9' -01.0'	97.0°		6°49.4' -02.0'	97.2°		6°41.9' -03.1'	97.3°		6°34.2' -04.1'	97.4°		6°26.4' -05.1'	97.5°		6°18.5' -06.2'	97.6°		6°10.5' -07.2'	97.7°	7	
8	6°55.9' -01.1'	98.0°		6°47.4' -02.1'	98.2°		6°38.8' -03.2'	98.3°		6°30.1' -04.2'	98.4°		6°21.3' -05.2'	98.5°		6°12.3' -06.3'	98.6°		6°03.3' -07.3'	98.7°	8	
9	6°54.8' -01.2'	99.0°		6°45.3' -02.3'	99.2°		6°35.7' -03.3'	99.3°		6°25.9' -04.3'	99.4°		6°16.0' -05.4'	99.5°		6°06.0' -06.4'	99.6°		5°56.0' -07.4'	99.7°	9	
10	6°53.6' -01.3'	100.1°		6°43.0' -02.4'	100.2°		6°32.4' -03.4'	100.3°		6°21.6' -04.4'	100.4°		6°10.7' -05.5'	100.5°		5°59.6' -06.5'	100.6°		5°48.5' -07.5'	100.7°	10	
11	6°52.2' -01.5'	101.1°		6°40.7' -02.5'	101.2°		6°28.9' -03.5'	101.3°		6°17.1' -04.6'	101.4°		6°05.2' -05.6'	101.5°		5°53.1' -06.6'	101.6°		5°41.0' -07.6'	101.7°	11	
12	6°50.8' -01.6'	102.1°		6°38.2' -02.6'	102.2°		6°25.4' -03.6'	102.3°		6°12.6' -04.7'	102.4°		5°59.6' -05.7'	102.5°		5°46.5' -06.7'	102.6°		5°33.4' -07.7'	102.7°	12	
13	6°49.2' -01.7'	103.1°		6°35.5' -02.7'	103.2°		6°21.8' -03.8'	103.3°		6°07.9' -04.8'	103.4°		5°53.9' -05.8'	103.5°		5°39.8' -06.8'	103.6°		5°25.6' -07.8'	103.7°	13	
14	6°47.5' -01.8'	104.1°		6°32.8' -02.9'	104.2°		6°18.0' -03.9'	104.3°		6°03.1' -04.9'	104.4°		5°48.1' -05.9'	104.5°		5°33.0' -06.9'	104.6°		5°17.8' -07.9'	104.7°	14	
15	6°45.6' -02.0'	105.1°		6°29.9' -03.0'	105.2°		6°14.1' -04.0'	105.3°		5°58.2' -05.0'	105.4°		5°42.2' -06.0'	105.5°		5°26.1' -07.0'	105.6°		5°09.9' -08.0'	105.7°	15	
16	6°43.7' -02.1'	106.1°		6°26.9' -03.1'	106.2°		6°10.1' -04.1'	106.3°		5°53.2' -05.1'	106.4°		5°36.2' -06.1'	106.5°		5°19.1' -07.1'	106.6°		5°01.9' -08.1'	106.7°	16	
17	6°41.6' -02.2'	107.1°		6°23.8' -03.2'	107.2°		6°06.0' -04.2'	107.3°		5°48.1' -05.2'	107.4°		5°30.1' -06.2'	107.5°		5°12.0' -07.2'	107.6°		4°53.8' -08.2'	107.7°	17	
18	6°39.3' -02.3'	108.1°		6°20.6' -03.3'	108.2°		6°01.8' -04.3'	108.3°		5°42.9' -05.3'	108.4°		5°23.9' -06.3'	108.5°		5°04.7' -07.3'	108.6°		4°45.6' -08.3'	108.7°	18	
19	6°37.0' -02.5'	109.1°		6°17.3' -03.4'	109.2°		5°57.5' -04.4'	109.3°		5°37.6' -05.4'	109.4°		5°17.5' -06.4'	109.5°		4°54.4' -07.4'	109.6°		4°37.3' -08.4'	109.7°	19	
20	6°34.6' -02.6'	110.1°		6°13.8' -03.6'	110.2°		5°53.0' -04.5'	110.3°		5°32.1' -05.5'	110.4°		5°11.1' -06.5'	110.5°		4°50.1' -07.5'	110.6°		4°28.9' -08.4'	110.7°	20	
21	6°32.0' -02.7'	111.1°		6°10.3' -03.7'	111.2°		5°48.5' -04.7'	111.3°		5°26.6' -05.6'	111.4°		5°04.6' -06.6'	111.5°		4°42.6' -07.6'	111.6°		4°20.5' -08.5'	111.7°	21	
22	6°29.3' -02.8'																					

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

82° 278° LHA

Latitude CONTRARY to Declination

82° 278° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	8°00.0'	-00.1'	90.0°	7°59.9'	-01.1'	90.1°	7°59.7'	-02.2'	90.3°	7°59.3'	-03.2'	90.4°	7°58.8'	-04.3'	90.6°	7°58.2'	-05.4'	90.7°	7°57.4'	-06.4'	90.8°	0
1	7°59.9'	-00.2'	91.0°	7°58.8'	-01.3'	91.2°	7°57.5'	-02.3'	91.3°	7°56.1'	-03.4'	91.4°	7°54.5'	-04.4'	91.6°	7°52.8'	-05.5'	91.7°	7°50.9'	-06.5'	91.8°	1
2	7°59.7'	-00.4'	92.0°	7°57.5'	-01.4'	92.2°	7°55.2'	-02.5'	92.3°	7°52.7'	-03.5'	92.4°	7°50.1'	-04.6'	92.6°	7°47.3'	-05.6'	92.7°	7°44.4'	-06.7'	92.8°	2
3	7°59.3'	-00.5'	93.0°	7°56.1'	-01.6'	93.2°	7°52.7'	-02.6'	93.3°	7°49.2'	-03.7'	93.4°	7°45.5'	-04.7'	93.6°	7°41.7'	-05.8'	93.7°	7°37.7'	-06.8'	93.9°	3
4	7°58.8'	-00.7'	94.0°	7°54.5'	-01.7'	94.2°	7°50.1'	-02.8'	94.3°	7°45.5'	-03.8'	94.5°	7°40.8'	-04.9'	94.6°	7°35.9'	-05.9'	94.7°	7°30.9'	-07.0'	94.9°	4
5	7°58.2'	-00.8'	95.0°	7°52.8'	-01.9'	95.2°	7°47.3'	-02.9'	95.3°	7°41.7'	-04.0'	95.5°	7°35.9'	-05.0'	95.6°	7°30.0'	-06.1'	95.7°	7°23.9'	-07.1'	95.9°	5
6	7°57.4'	-01.0'	96.1°	7°50.9'	-02.0'	96.2°	7°44.4'	-03.1'	96.3°	7°37.7'	-04.1'	96.5°	7°30.9'	-05.1'	96.6°	7°23.9'	-06.2'	96.7°	7°16.8'	-07.2'	96.9°	6
7	7°56.4'	-01.1'	97.1°	7°48.9'	-02.1'	97.2°	7°41.3'	-03.2'	97.3°	7°33.6'	-04.2'	97.5°	7°25.7'	-05.3'	97.6°	7°17.7'	-06.3'	97.7°	7°09.6'	-07.4'	97.9°	7
8	7°55.3'	-01.2'	98.1°	7°46.8'	-02.3'	98.2°	7°38.2'	-03.3'	98.3°	7°29.4'	-04.4'	98.5°	7°20.5'	-05.4'	98.6°	7°11.4'	-06.5'	98.7°	7°02.2'	-07.5'	98.9°	8
9	7°54.1'	-01.4'	99.1°	7°44.5'	-02.4'	99.2°	7°34.8'	-03.5'	99.4°	7°25.0'	-04.5'	99.5°	7°15.0'	-05.5'	99.6°	7°05.0'	-06.6'	99.7°	6°54.8'	-07.6'	99.9°	9
10	7°52.7'	-01.5'	100.1°	7°42.1'	-02.6'	100.2°	7°31.3'	-03.6'	100.4°	7°20.5'	-04.6'	100.5°	7°09.5'	-05.7'	100.6°	6°58.4'	-06.7'	100.7°	6°47.1'	-07.7'	100.9°	10
11	7°51.1'	-01.7'	101.1°	7°39.5'	-02.7'	101.2°	7°27.7'	-03.7'	101.4°	7°15.8'	-04.8'	101.5°	7°03.8'	-05.8'	101.6°	6°51.7'	-06.8'	101.7°	6°39.4'	-07.9'	101.9°	11
12	7°49.4'	-01.8'	102.1°	7°36.8'	-02.9'	102.2°	7°24.0'	-03.9'	102.4°	7°11.1'	-04.9'	102.5°	6°58.0'	-05.9'	102.6°	6°44.8'	-07.0'	102.7°	6°31.6'	-08.0'	102.9°	12
13	7°47.6'	-02.0'	103.1°	7°33.9'	-03.0'	103.3°	7°20.1'	-04.0'	103.4°	7°06.2'	-05.0'	103.5°	6°52.1'	-06.1'	103.6°	6°37.9'	-07.1'	103.7°	6°23.6'	-08.1'	103.9°	13
14	7°45.7'	-02.1'	104.1°	7°30.9'	-03.1'	104.3°	7°16.1'	-04.1'	104.4°	7°01.1'	-05.2'	104.5°	6°46.0'	-06.2'	104.6°	6°30.8'	-07.2'	104.7°	6°15.5'	-08.2'	104.8°	14
15	7°43.5'	-02.3'	105.1°	7°27.8'	-03.3'	105.3°	7°11.9'	-04.3'	105.4°	6°56.0'	-05.3'	105.5°	6°39.8'	-06.3'	105.6°	6°23.6'	-07.3'	105.7°	6°07.3'	-08.3'	105.8°	15
16	7°41.3'	-02.4'	106.1°	7°24.5'	-03.4'	106.3°	7°07.7'	-04.4'	106.4°	6°50.7'	-05.4'	106.5°	6°33.5'	-06.4'	106.6°	6°16.3'	-07.4'	106.7°	5°59.0'	-08.4'	106.8°	16
17	7°38.9'	-02.5'	107.2°	7°21.1'	-03.5'	107.3°	7°03.2'	-04.5'	107.4°	6°45.2'	-05.5'	107.5°	6°27.1'	-06.5'	107.6°	6°08.9'	-07.5'	107.7°	5°50.6'	-08.5'	107.8°	17
18	7°36.4'	-02.7'	108.2°	7°17.6'	-03.7'	108.3°	6°58.7'	-04.7'	108.4°	6°39.7'	-05.7'	108.5°	6°20.6'	-06.7'	108.6°	6°01.4'	-07.6'	108.7°	5°42.1'	-08.6'	108.8°	18
19	7°33.7'	-02.8'	109.2°	7°13.9'	-03.8'	109.3°	6°54.0'	-04.8'	109.4°	6°34.0'	-05.8'	109.5°	6°13.9'	-06.8'	109.6°	5°53.7'	-07.7'	109.7°	5°33.4'	-08.7'	109.8°	19
20	7°30.9'	-02.9'	110.2°	7°10.1'	-03.9'	110.3°	6°49.2'	-04.9'	110.4°	6°28.3'	-05.9'	110.5°	6°07.2'	-06.9'	110.6°	5°46.0'	-07.9'	110.7°	5°24.7'	-08.8'	110.8°	20
21	7°27.9'	-03.1'	111.2°	7°06.2'	-04.1'	111.3°	6°44.3'	-05.0'	111.4°	6°22.4'	-06.0'	111.5°	6°00.3'	-07.0'	111.6°	5°38.1'	-08.0'	111.7°	5°15.9'	-09.0'	111.8°	21
22	7°24.8'	-03.2'	112.2°	7°02.1'	-04.2'	112.3°	6°39.3'	-05.2'	112.4°	6°16.3'	-06.1'	112.5°	5°53.3'	-07.1'	112.6°	5°30.2'	-08.1'	112.7°	5°07.0'	-09.0'	112.8°	22
23	7°21.6'	-03.4'	113.2°	6°57.9'	-04.3'	113.3°	6°34.1'	-05.3'	113.4°	6°10.2'	-06.2'	113.5°	5°46.2'	-07.2'	113.6°	5°22.1'	-08.1'	113.7°	4°58.0'	-09.1'	113.8°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

82° 278° LHA

Latitude CONTRARY to DECLINATION

82° 278° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

81° 279° LHA

Latitude CONTRARY to Declination

81° 279° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	9°00.0'	-00.1'	90.0°	8°59.9'	-01.1'	90.2°	8°59.7'	-02.2'	90.3°	8°59.3'	-03.3'	90.5°	8°58.7'	-04.3'	90.6°	8°57.9'	-05.4'	90.8°	8°57.0'	-06.4'	90.9°	0
1	8°59.9'	-00.2'	91.0°	8°58.8'	-01.3'	91.2°	8°57.5'	-02.4'	91.3°	8°56.0'	-03.4'	91.5°	8°54.4'	-04.5'	91.6°	8°52.6'	-05.5'	91.8°	8°50.6'	-06.6'	92.0°	1
2	8°59.6'	-00.4'	92.0°	8°57.5'	-01.5'	92.2°	8°55.1'	-02.5'	92.3°	8°52.6'	-03.6'	92.5°	8°49.9'	-04.6'	92.7°	8°47.0'	-05.7'	92.8°	8°44.0'	-06.8'	93.0°	2
3	8°59.3'	-00.6'	93.0°	8°56.0'	-01.6'	93.2°	8°52.6'	-02.7'	93.4°	8°49.0'	-03.8'	93.5°	8°45.2'	-04.8'	93.7°	8°41.3'	-05.9'	93.8°	8°37.2'	-06.9'	94.0°	3
4	8°58.7'	-00.7'	94.0°	8°54.4'	-01.8'	94.2°	8°49.9'	-02.9'	94.4°	8°45.2'	-03.9'	94.5°	8°40.4'	-05.0'	94.7°	8°35.5'	-06.0'	94.8°	8°30.3'	-07.1'	95.0°	4
5	8°57.9'	-00.9'	95.1°	8°52.6'	-02.0'	95.2°	8°47.0'	-03.0'	95.4°	8°41.3'	-04.1'	95.5°	8°35.5'	-05.1'	95.7°	8°29.4'	-06.2'	95.8°	8°23.3'	-07.2'	96.0°	5
6	8°57.0'	-01.1'	96.1°	8°50.6'	-02.1'	96.2°	8°44.0'	-03.2'	96.4°	8°37.2'	-04.2'	96.5°	8°30.3'	-05.3'	96.7°	8°23.3'	-06.3'	96.8°	8°16.1'	-07.4'	97.0°	6
7	8°55.9'	-01.2'	97.1°	8°48.5'	-02.3'	97.2°	8°40.8'	-03.3'	97.4°	8°33.0'	-04.4'	97.5°	8°25.1'	-05.4'	97.7°	8°17.0'	-06.5'	97.8°	8°08.7'	-07.5'	98.0°	7
8	8°54.7'	-01.4'	98.1°	8°46.2'	-02.5'	98.3°	8°37.5'	-03.5'	98.4°	8°28.6'	-04.5'	98.6°	8°19.6'	-05.6'	98.7°	8°10.5'	-06.6'	98.8°	8°01.2'	-07.7'	99.0°	8
9	8°53.3'	-01.6'	99.1°	8°43.7'	-02.6'	99.3°	8°34.0'	-03.7'	99.4°	8°24.1'	-04.7'	99.6°	8°14.1'	-05.7'	99.7°	8°03.9'	-06.8'	99.8°	7°53.5'	-07.8'	100.0°	9
10	8°51.7'	-01.7'	100.1°	8°41.1'	-02.8'	100.3°	8°30.3'	-03.8'	100.4°	8°19.4'	-04.8'	100.6°	8°08.3'	-05.9'	100.7°	7°57.1'	-06.9'	100.8°	7°45.7'	-07.9'	101.0°	10
11	8°50.0'	-01.9'	101.1°	8°38.3'	-02.9'	101.3°	8°26.5'	-04.0'	101.4°	8°14.6'	-05.0'	101.6°	8°02.4'	-06.0'	101.7°	7°50.2'	-07.1'	101.9°	7°37.8'	-08.1'	102.0°	11
12	8°48.1'	-02.1'	102.1°	8°35.4'	-03.1'	102.3°	8°22.6'	-04.1'	102.4°	8°09.6'	-05.1'	102.6°	7°56.4'	-06.2'	102.7°	7°43.1'	-07.2'	102.9°	7°29.7'	-08.2'	103.0°	12
13	8°46.0'	-02.2'	103.2°	8°32.3'	-03.2'	103.3°	8°18.4'	-04.3'	103.4°	8°04.4'	-05.3'	103.6°	7°50.2'	-06.3'	103.7°	7°35.9'	-07.3'	103.9°	7°21.5'	-08.3'	104.0°	13
14	8°43.8'	-02.4'	104.2°	8°29.1'	-03.4'	104.3°	8°14.2'	-04.4'	104.5°	7°59.1'	-05.4'	104.6°	7°43.9'	-06.5'	104.7°	7°28.6'	-07.5'	104.9°	7°13.2'	-08.5'	105.0°	14
15	8°41.5'	-02.5'	105.2°	8°25.7'	-03.6'	105.3°	8°09.7'	-04.6'	105.5°	7°53.7'	-05.6'	105.6°	7°37.5'	-06.6'	105.7°	7°21.1'	-07.6'	105.9°	7°04.7'	-08.6'	106.0°	15
16	8°38.9'	-02.7'	106.2°	8°22.1'	-03.7'	106.3°	8°05.2'	-04.7'	106.5°	7°48.1'	-05.7'	106.6°	7°30.9'	-06.7'	106.7°	7°13.5'	-07.7'	106.9°	6°56.1'	-08.7'	107.0°	16
17	8°36.2'	-02.9'	107.2°	8°18.4'	-03.9'	107.3°	8°00.5'	-04.9'	107.5°	7°42.4'	-05.9'	107.6°	7°24.2'	-06.9'	107.7°	7°05.8'	-07.9'	107.9°	6°47.4'	-08.8'	108.0°	17
18	8°33.4'	-03.0'	108.2°	8°14.5'	-04.0'	108.3°	7°55.6'	-05.0'	108.5°	7°36.5'	-06.0'	108.6°	7°17.3'	-07.0'	108.7°	6°58.0'	-08.0'	108.9°	6°38.5'	-09.0'	109.0°	18
19	8°30.4'	-03.2'	109.2°	8°10.5'	-04.2'	109.4°	7°50.6'	-05.2'	109.5°	7°30.5'	-06.1'	109.6°	7°10.3'	-07.1'	109.7°	6°50.0'	-08.1'	109.9°	6°29.5'	-09.1'	110.0°	19
20	8°27.2'	-03.3'	110.2°	8°06.4'	-04.3'	110.4°	7°45.4'	-05.3'	110.5°	7°24.4'	-06.3'	110.6°	7°03.2'	-07.3'	110.7°	6°41.9'	-08.2'	110.9°	6°20.5'	-09.2'	111.0°	20
21	8°23.9'	-03.5'	111.2°	8°02.1'	-04.5'	111.4°	7°40.1'	-05.4'	111.5°	7°18.1'	-06.4'	111.6°	6°55.9'	-07.4'	111.7°	6°33.6'	-08.3'	111.8°	6°11.3'	-09.3'	112.0°	21
22	8°20.4'	-03.6'	112.2°	7°57.6'	-04.6'	112.4°	7°34.7'	-05.6'	112.5°	7°11.7'	-06.5'	112.6°	6°48.5'	-07.5'	112.7°	6						

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

80° 280° LHA

Latitude CONTRARY to Declination

80° 280° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	10°00.0'	-00.1'	90.0°	9°59.9'	-01.2'	90.2°	9°59.6'	-02.2'	90.4°	9°59.2'	-03.3'	90.5°	9°58.5'	-04.3'	90.7°	9°57.7'	-05.4'	90.9°	9°56.7'	-06.5'	91.1°	0
1	9°59.9'	-00.3'	91.0°	9°58.8'	-01.3'	91.2°	9°57.4'	-02.4'	91.4°	9°55.9'	-03.5'	91.5°	9°54.2'	-04.5'	91.7°	9°52.3'	-05.6'	91.9°	9°50.2'	-06.6'	92.1°	1
2	9°59.6'	-00.5'	92.0°	9°57.4'	-01.5'	92.2°	9°55.0'	-02.6'	92.4°	9°52.4'	-03.6'	92.6°	9°49.7'	-04.7'	92.7°	9°46.7'	-05.8'	92.9°	9°43.6'	-06.8'	93.1°	2
3	9°59.2'	-00.6'	93.0°	9°55.9'	-01.7'	93.2°	9°52.4'	-02.8'	93.4°	9°48.8'	-03.8'	93.6°	9°45.0'	-04.9'	93.7°	9°41.0'	-05.9'	93.9°	9°36.8'	-07.0'	94.1°	3
4	9°58.5'	-00.8'	94.1°	9°54.2'	-01.9'	94.2°	9°49.7'	-02.9'	94.4°	9°45.0'	-04.0'	94.6°	9°40.1'	-05.1'	94.8°	9°35.0'	-06.1'	94.9°	9°29.8'	-07.2'	95.1°	4
5	9°57.7'	-01.0'	95.1°	9°52.3'	-02.1'	95.3°	9°46.7'	-03.1'	95.4°	9°41.0'	-04.2'	95.6°	9°35.0'	-05.2'	95.8°	9°28.9'	-06.3'	95.9°	9°22.6'	-07.3'	96.1°	5
6	9°56.7'	-01.2'	96.1°	9°50.2'	-02.3'	96.3°	9°43.6'	-03.3'	96.4°	9°36.8'	-04.4'	96.6°	9°29.8'	-05.4'	96.8°	9°22.6'	-06.5'	96.9°	9°15.3'	-07.5'	97.1°	6
7	9°55.5'	-01.4'	97.1°	9°48.0'	-02.4'	97.3°	9°40.3'	-03.5'	97.4°	9°32.4'	-04.5'	97.6°	9°24.4'	-05.6'	97.8°	9°16.2'	-06.6'	97.9°	9°07.8'	-07.7'	98.1°	7
8	9°54.1'	-01.6'	98.1°	9°45.5'	-02.6'	98.3°	9°36.8'	-03.7'	98.5°	9°27.9'	-04.7'	98.6°	9°18.8'	-05.8'	98.8°	9°09.5'	-06.8'	99.0°	9°00.1'	-07.8'	99.1°	8
9	9°52.5'	-01.7'	99.1°	9°42.9'	-02.8'	99.3°	9°33.1'	-03.8'	99.5°	9°23.2'	-04.9'	99.6°	9°13.0'	-05.9'	99.8°	9°02.7'	-07.0'	100.0°	8°52.3'	-08.0'	100.1°	9
10	9°50.8'	-01.9'	100.2°	9°40.1'	-03.0'	100.3°	9°29.3'	-04.0'	100.5°	9°18.3'	-05.0'	100.6°	9°07.1'	-06.1'	100.8°	8°55.8'	-07.1'	101.0°	8°44.3'	-08.1'	101.1°	10
11	9°48.9'	-02.1'	101.2°	9°37.2'	-03.1'	101.3°	9°25.3'	-04.2'	101.5°	9°13.2'	-05.2'	101.7°	9°01.0'	-06.2'	101.8°	8°48.7'	-07.3'	102.0°	8°36.2'	-08.3'	102.1°	11
12	9°46.8'	-02.3'	102.2°	9°34.0'	-03.3'	102.3°	9°21.1'	-04.4'	102.5°	9°08.0'	-05.4'	102.7°	8°54.8'	-06.4'	102.8°	8°41.4'	-07.4'	103.0°	8°27.8'	-08.5'	103.1°	12
13	9°44.5'	-02.5'	103.2°	9°30.7'	-03.5'	103.4°	9°16.7'	-04.5'	103.5°	9°02.6'	-05.6'	103.7°	8°48.4'	-06.6'	103.8°	8°34.0'	-07.6'	104.0°	8°19.4'	-08.6'	104.1°	13
14	9°42.0'	-02.6'	104.2°	9°27.2'	-03.7'	104.4°	9°12.2'	-04.7'	104.5°	8°57.1'	-05.7'	104.7°	8°41.8'	-06.7'	104.8°	8°26.4'	-07.7'	105.0°	8°10.8'	-08.8'	105.1°	14
15	9°39.4'	-02.8'	105.2°	9°23.5'	-03.8'	105.4°	9°07.5'	-04.9'	105.5°	8°51.4'	-05.9'	105.7°	8°35.1'	-06.9'	105.8°	8°18.6'	-07.9'	106.0°	8°02.0'	-08.9'	106.1°	15
16	9°36.5'	-03.0'	106.2°	9°19.7'	-04.0'	106.4°	9°02.7'	-05.0'	106.5°	8°45.5'	-06.0'	106.7°	8°28.2'	-07.0'	106.8°	8°10.7'	-08.0'	107.0°	7°53.1'	-09.0'	107.1°	16
17	9°33.5'	-03.2'	107.2°	9°15.7'	-04.2'	107.4°	8°57.6'	-05.2'	107.6°	8°39.5'	-06.2'	107.7°	8°21.1'	-07.2'	107.8°	8°02.7'	-08.2'	108.0°	7°44.1'	-09.2'	108.1°	17
18	9°30.4'	-03.4'	108.3°	9°11.5'	-04.4'	108.4°	8°52.4'	-05.4'	108.6°	8°33.3'	-06.3'	108.7°	8°14.0'	-07.3'	108.9°	7°54.5'	-08.3'	109.0°	7°34.9'	-09.3'	109.1°	18
19	9°27.0'	-03.5'	109.3°	9°07.1'	-04.5'	109.4°	8°47.1'	-05.5'	109.6°	8°26.9'	-06.5'	109.7°	8°06.6'	-07.5'	109.9°	7°46.2'	-08.5'	110.0°	7°25.6'	-09.4'	110.1°	19
20	9°23.5'	-03.7'	110.3°	9°02.6'	-04.7'	110.4°	8°41.6'	-05.7'	110.6°	8°20.4'	-06.7'	110.7°	7°59.1'	-07.6'	110.9°	7°37.7'	-08.6'	111.0°	7°16.2'	-09.6'	111.1°	20
21	9°19.8'	-03.9'	111.3°	8°57.9'	-04.9'	111.4°	8°35.9'	-05.8'	111.6°	8°13.8'	-06.8'	111.7°	7°51.5'	-07.8'	111.9°	7°29.1'	-08.7'	112.0°	7°06.6'	-09.7'	112.1°	21
22	9°15.9'	-04.0'	112.3°	8°53.1'	-05.0'	112.5°	8°30.1'	-06.0'	112.6°	8°07.0'	-07.0'	112.7°	7°43.7'	-07.9'	112.9°	7°20.3'	-08.9'	113.0°	6°56.9'	-09.8'	113.1°	22
23	9°11.9'	-04.2'	113.3°	8°48.1'	-05.2'	113.5°	8°24.1'	-06.1'	113.6°	8°00.0'	-07.1'	113.7°	7°35.8'	-08.1'	113.9°	7°11.5'	-09.0'	114.0°	6°47.0'	-10.0'	114.1°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

80° 280° LHA

Latitude CONTRARY to DECLINATION

80° 280° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

79° 281° LHA

Latitude CONTRARY to Declination

79° 281° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	11°00.0'	-00.1'	90.0°	10°59.9'	-01.2'	90.2°	10°59.6'	-02.2'	90.4°	10°59.1'	-03.3'	90.6°	10°58.4'	-04.4'	90.8°	10°57.5'	-05.4'	91.0°	10°56.3'	-06.5'	91.2°	0
1	10°59.8'	-00.3'	91.0°	10°58.7'	-01.4'	91.2°	10°57.4'	-02.4'	91.4°	10°55.8'	-03.5'	91.6°	10°54.0'	-04.6'	91.8°	10°52.0'	-05.6'	92.0°	10°49.9'	-06.7'	92.2°	1
2	10°59.5'	-00.5'	92.0°	10°57.4'	-01.6'	92.2°	10°54.9'	-02.6'	92.4°	10°52.3'	-03.7'	92.6°	10°49.4'	-04.8'	92.8°	10°46.4'	-05.8'	93.0°	10°43.2'	-06.9'	93.2°	2
3	10°59.1'	-00.7'	93.1°	10°55.8'	-01.8'	93.2°	10°52.3'	-02.8'	93.4°	10°48.6'	-03.9'	93.6°	10°44.7'	-05.0'	93.8°	10°40.6'	-06.0'	94.0°	10°36.3'	-07.1'	94.2°	3
4	10°58.4'	-00.9'	94.1°	10°54.0'	-02.0'	94.3°	10°49.4'	-03.0'	94.5°	10°44.7'	-04.1'	94.6°	10°39.7'	-05.2'	94.8°	10°34.6'	-06.2'	95.0°	10°29.2'	-07.3'	95.2°	4
5	10°57.5'	-01.1'	95.1°	10°52.0'	-02.2'	95.3°	10°46.4'	-03.2'	95.5°	10°40.6'	-04.3'	95.7°	10°34.6'	-05.4'	95.9°	10°28.3'	-06.4'	96.0°	10°21.9'	-07.5'	96.2°	5
6	10°56.3'	-01.3'	96.1°	10°49.9'	-02.4'	96.3°	10°43.2'	-03.4'	96.5°	10°36.3'	-04.5'	96.7°	10°29.2'	-05.5'	96.9°	10°21.9'	-06.6'	97.0°	10°14.5'	-07.6'	97.2°	6
7	10°55.0'	-01.5'	97.1°	10°47.5'	-02.6'	97.3°	10°39.7'	-03.6'	97.5°	10°31.8'	-04.7'	97.7°	10°23.7'	-05.7'	97.9°	10°15.4'	-06.8'	98.1°	10°06.9'	-07.8'	98.2°	7
8	10°53.5'	-01.7'	98.1°	10°44.9'	-02.8'	98.3°	10°36.1'	-03.8'	98.5°	10°27.1'	-04.9'	98.7°	10°17.9'	-05.9'	98.9°	10°08.6'	-07.0'	99.1°	9°59.0'	-08.0'	99.2°	8
9	10°51.8'	-01.9'	99.2°	10°42.1'	-03.0'	99.4°	10°32.3'	-04.0'	99.5°	10°22.2'	-05.1'	99.7°	10°12.0'	-06.1'	99.9°	10°01.6'	-07.1'	100.1°	9°51.0'	-08.2'	100.2°	9
10	10°49.9'	-02.1'	100.2°	10°39.1'	-03.2'	100.4°	10°28.3'	-04.2'	100.6°	10°17.2'	-05.3'	100.7°	10°05.9'	-06.3'	100.9°	9°54.5'	-07.3'	101.1°	9°42.8'	-08.4'	101.3°	10
11	10°47.7'	-02.3'	101.2°	10°36.0'	-03.4'	101.4°	10°24.0'	-04.4'	101.6°	10°11.9'	-05.4'	101.7°	9°59.6'	-06.5'	101.9°	9°47.1'	-07.5'	102.1°	9°34.5'	-08.5'	102.3°	11
12	10°45.4'	-02.5'	102.2°	10°32.6'	-03.6'	102.4°	10°19.6'	-04.6'	102.6°	10°06.5'	-05.6'	102.8°	9°53.1'	-06.7'	102.9°	9°39.6'	-07.7'	103.1°	9°25.9'	-08.7'	103.3°	12
13	10°42.9'	-02.7'	103.2°	10°29.1'	-03.8'	103.4°	10°15.0'	-04.8'	103.6°	10°00.8'	-05.8'	103.8°	9°46.5'	-06.8'	103.9°	9°31.9'	-07.9'	104.1°	9°17.2'	-08.9'	104.3°	13
14	10°40.2'	-02.9'	104.3°	10°25.3'	-03.9'	104.4°	10°10.3'	-05.0'	104.6°	9°55.0'	-06.0'	104.8°	9°39.6'	-07.0'	104.9°	9°24.1'	-08.0'	105.1°	9°08.4'	-09.0'	105.3°	14
15	10°37.2'	-03.1'	105.3°	10°21.4'	-04.1'	105.4°	10°05.3'	-05.2'	105.6°	9°49.0'	-06.2'	105.8°	9°32.6'	-07.2'	106.0°	9°16.1'	-08.2'	106.1°	8°59.3'	-09.2'	106.3°	15
16	10°34.1'	-03.3'	106.3°	10°17.2'	-04.3'	106.5°	10°00.1'	-05.3'	106.6°	9°42.9'	-06.3'	106.8°	9°25.5'	-07.4'	107.0°	9°07.9'	-08.4'	107.1°	8°50.1'	-09.4'	107.3°	16
17	10°30.8'	-03.5'	107.3°	10°12.9'	-04.5'	107.5°	9°54.8'	-05.5'	107.6°	9°36.5'	-06.5'	107.8°	9°18.1'	-07.5'	108.0°	8°59.5'	-08.5'	108.1°	8°40.8'	-09.5'	108.3°	17
18	10°27.3'	-03.7'	108.3°	10°08.4'	-04.7'	108.5°	9°49.3'	-05.7'	108.7°	9°30.0'	-06.7'	108.8°	9°10.6'	-07.7'	109.0°	8°51.0'	-08.7'	109.1°	8°31.3'	-09.7'	109.3°	18
19	10°23.6'	-03.9'	109.3°	10°03.7'	-04.9'	109.5°	9°43.6'	-05.9'	109.7°	9°23.3'	-06.9'	109.8°	9°02.9'	-07.9'	110.0°	8°42.3'	-08.8'	110.1°	8°21.6'	-09.8'	110.3°	19
20	10°19.7'	-04.1'	110.3°	9°58.8'	-05.1'	110.5°	9°37.7'	-06.1'	110.7°	9°16.4'	-07.0'	110.8°	8°55.0'	-08.0'	111.0°	8°33.5'	-09.0'	111.1°	8°11.8'	-10.0'	111.3°	20
21	10°15.7'	-04.3'	111.4°	9°53.7'	-05.2'	111.5°	9°31.6'	-06.2'	111.7°	9°09.4'	-07.2'	111.8°	8°47.0'	-08.2'	112.0°	8°24.5'	-09.1'	112.1°	8°01.8'	-10.1'	112.3°	21
22	10°11.4'	-04.5'	112.4°	9°48.5'	-05.4'																	

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

78° 282° LHA

Latitude CONTRARY to Declination

78° 282° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	12°00.0'	-00.1'	90.0°	11°59.9'	-01.2'	90.2°	11°59.6'	-02.3'	90.4°	11°59.0'	-03.3'	90.6°	11°58.2'	-04.4'	90.8°	11°57.2'	-05.5'	91.1°	11°56.0'	-06.5'	91.3°	0
1	11°59.8'	-00.3'	91.0°	11°58.7'	-01.4'	91.2°	11°57.3'	-02.5'	91.4°	11°55.7'	-03.5'	91.7°	11°53.8'	-04.6'	91.9°	11°51.8'	-05.7'	92.1°	11°49.5'	-06.7'	92.3°	1
2	11°59.5'	-00.6'	92.0°	11°57.3'	-01.6'	92.3°	11°54.8'	-02.7'	92.5°	11°52.1'	-03.8'	92.7°	11°49.2'	-04.8'	92.9°	11°46.1'	-05.9'	93.1°	11°42.7'	-07.0'	93.3°	2
3	11°59.0'	-00.8'	93.1°	11°55.7'	-01.8'	93.3°	11°52.1'	-02.9'	93.5°	11°48.4'	-04.0'	93.7°	11°44.4'	-05.0'	93.9°	11°40.2'	-06.1'	94.1°	11°35.8'	-07.2'	94.3°	3
4	11°58.2'	-01.0'	94.1°	11°53.8'	-02.1'	94.3°	11°49.2'	-03.1'	94.5°	11°44.4'	-04.2'	94.7°	11°39.4'	-05.3'	94.9°	11°34.1'	-06.3'	95.1°	11°28.6'	-07.4'	95.3°	4
5	11°57.2'	-01.2'	95.1°	11°51.8'	-02.3'	95.3°	11°46.1'	-03.3'	95.5°	11°40.2'	-04.4'	95.7°	11°34.1'	-05.5'	95.9°	11°27.8'	-06.5'	96.1°	11°21.3'	-07.6'	96.3°	5
6	11°56.0'	-01.4'	96.1°	11°49.5'	-02.5'	96.3°	11°42.7'	-03.6'	96.5°	11°35.8'	-04.6'	96.8°	11°28.6'	-05.7'	97.0°	11°21.3'	-06.7'	97.2°	11°13.7'	-07.8'	97.4°	6
7	11°54.6'	-01.7'	97.2°	11°47.0'	-02.7'	97.4°	11°39.2'	-03.8'	97.6°	11°31.2'	-04.8'	97.8°	11°23.0'	-05.9'	98.0°	11°14.5'	-06.9'	98.2°	11°05.9'	-08.0'	98.4°	7
8	11°52.9'	-01.9'	98.2°	11°44.2'	-02.9'	98.4°	11°35.4'	-04.0'	98.6°	11°26.3'	-05.0'	98.8°	11°17.1'	-06.1'	99.0°	11°07.6'	-07.1'	99.2°	10°57.9'	-08.2'	99.4°	8
9	11°51.0'	-02.1'	99.2°	11°41.3'	-03.2'	99.4°	11°31.4'	-04.2'	99.6°	11°21.3'	-05.3'	99.8°	11°11.0'	-06.3'	100.0°	11°00.4'	-07.3'	100.2°	10°49.7'	-08.4'	100.4°	9
10	11°48.9'	-02.3'	100.2°	11°38.2'	-03.4'	100.4°	11°27.2'	-04.4'	100.6°	11°16.0'	-05.5'	100.8°	11°04.7'	-06.5'	101.0°	10°53.1'	-07.5'	101.2°	10°41.3'	-08.6'	101.4°	10
11	11°46.6'	-02.5'	101.2°	11°34.8'	-03.6'	101.4°	11°22.8'	-04.6'	101.6°	11°10.6'	-05.7'	101.8°	10°58.2'	-06.7'	102.0°	10°45.6'	-07.7'	102.2°	10°32.8'	-08.8'	102.4°	11
12	11°44.0'	-02.8'	102.3°	11°31.2'	-03.8'	102.5°	11°18.1'	-04.8'	102.7°	11°04.9'	-05.9'	102.9°	10°51.5'	-06.9'	103.0°	10°37.8'	-07.9'	103.2°	10°24.0'	-09.0'	103.4°	12
13	11°41.3'	-03.0'	103.3°	11°27.4'	-04.0'	103.5°	11°13.3'	-05.0'	103.7°	10°59.0'	-06.1'	103.9°	10°44.6'	-07.1'	104.1°	10°29.9'	-08.1'	104.2°	10°15.1'	-09.1'	104.4°	13
14	11°38.3'	-03.2'	104.3°	11°23.4'	-04.2'	104.5°	11°08.3'	-05.2'	104.7°	10°53.0'	-06.3'	104.9°	10°37.5'	-07.3'	105.1°	10°21.8'	-08.3'	105.2°	10°05.9'	-09.3'	105.4°	14
15	11°35.1'	-03.4'	105.3°	11°19.2'	-04.4'	105.5°	11°03.0'	-05.4'	105.7°	10°46.7'	-06.5'	105.9°	10°30.2'	-07.5'	106.1°	10°13.5'	-08.5'	106.2°	9°56.6'	-09.5'	106.4°	15
16	11°31.7'	-03.6'	106.3°	11°14.7'	-04.6'	106.5°	10°57.6'	-05.7'	106.7°	10°40.2'	-06.7'	106.9°	10°22.7'	-07.7'	107.1°	10°05.0'	-08.7'	107.3°	9°47.1'	-09.7'	107.4°	16
17	11°28.1'	-03.8'	107.4°	11°10.1'	-04.8'	107.5°	10°51.9'	-05.8'	107.7°	10°33.6'	-06.9'	107.9°	10°15.0'	-07.9'	108.1°	9°56.3'	-08.9'	108.3°	9°37.4'	-09.8'	108.4°	17
18	11°24.3'	-04.0'	108.4°	11°05.3'	-05.0'	108.6°	10°46.1'	-06.0'	108.7°	10°26.7'	-07.0'	108.9°	10°07.2'	-08.0'	109.1°	9°47.4'	-09.0'	109.3°	9°27.6'	-10.0'	109.4°	18
19	11°20.2'	-04.2'	109.4°	11°00.2'	-05.2'	109.6°	10°40.0'	-06.2'	109.8°	10°19.7'	-07.2'	109.9°	9°59.1'	-08.2'	110.1°	9°38.4'	-09.2'	110.3°	9°17.6'	-10.2'	110.4°	19
20	11°16.0'	-04.5'	110.4°	10°55.0'	-05.4'	110.6°	10°33.8'	-06.4'	110.8°	10°12.4'	-07.4'	110.9°	9°50.9'	-08.4'	111.1°	9°29.2'	-09.4'	111.3°	9°07.4'	-10.3'	111.4°	20
21	11°11.5'	-04.7'	111.4°	10°49.5'	-05.6'	111.6°	10°27.3'	-06.6'	111.8°	10°05.0'	-07.6'	112.0°	9°42.5'	-08.6'	112.1°	9°19.8'	-09.5'	112.3°	8°57.0'	-10.5'	112.4°	21
22	11°06.9'	-04.9'	112.4°	10°43.9'	-05.8'	112.6°	10°20.7'	-06.8'	112.8°	9°57.4'	-07.8'	113.0°	9°33.9'	-08.7'	113.1°	9°00.3'	-09.7'	113.3°	8°46.5'	-10.7'	113.4°	22
23	11°02.0'	-05.1'	113.5°	10°38.0'	-06.0'	113.6°	10°13.9'	-07.0'	113.8°	9°49.6'	-08.0'	114.0°	9°25.2'	-08.9'	114.1°	9°00.6'	-09.9'	114.3°	8°35.9'	-10.8'	114.4°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

78° 282° LHA

Latitude CONTRARY to DECLINATION

78° 282° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

77° 283° LHA

Latitude CONTRARY to Declination

77° 283° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	13°00.0'	-00.1'	90.0°	12°59.9'	-01.2'	90.2°	12°59.5'	-02.3'	90.5°	12°58.9'	-03.3'	90.7°	12°58.1'	-04.4'	90.9°	12°57.0'	-05.5'	91.2°	12°55.7'	-06.6'	91.4°	0
1	12°59.8'	-00.4'	91.0°	12°58.7'	-01.4'	91.3°	12°57.2'	-02.5'	91.5°	12°55.6'	-03.6'	91.7°	12°53.7'	-04.7'	91.9°	12°51.5'	-05.7'	92.2°	12°49.1'	-06.8'	92.4°	1
2	12°59.5'	-00.6'	92.1°	12°57.2'	-01.7'	92.3°	12°54.7'	-02.7'	92.5°	12°52.0'	-03.8'	92.7°	12°49.0'	-04.9'	93.0°	12°45.8'	-06.0'	93.2°	12°42.3'	-07.0'	93.4°	2
3	12°58.9'	-00.8'	93.1°	12°55.6'	-01.9'	93.3°	12°52.0'	-03.0'	93.5°	12°48.2'	-04.1'	93.8°	12°44.1'	-05.1'	94.0°	12°39.8'	-06.2'	94.2°	12°35.3'	-07.3'	94.4°	3
4	12°58.1'	-01.1'	94.1°	12°53.7'	-02.2'	94.3°	12°49.0'	-03.2'	94.6°	12°44.1'	-04.3'	94.8°	12°39.0'	-05.4'	95.0°	12°33.6'	-06.4'	95.2°	12°28.0'	-07.5'	95.5°	4
5	12°57.0'	-01.3'	95.1°	12°51.5'	-02.4'	95.4°	12°45.8'	-03.5'	95.6°	12°39.8'	-04.5'	95.8°	12°33.6'	-05.6'	96.0°	12°27.2'	-06.6'	96.3°	12°20.6'	-07.7'	96.5°	5
6	12°55.7'	-01.6'	96.2°	12°49.1'	-02.6'	96.4°	12°42.3'	-03.7'	96.6°	12°35.3'	-04.8'	96.8°	12°28.0'	-05.8'	97.1°	12°20.6'	-06.9'	97.3°	12°12.9'	-07.9'	97.5°	6
7	12°54.1'	-01.8'	97.2°	12°46.5'	-02.9'	97.4°	12°38.6'	-03.9'	97.6°	12°30.5'	-05.0'	97.9°	12°22.2'	-06.0'	98.1°	12°13.7'	-07.1'	98.3°	12°04.9'	-08.1'	98.5°	7
8	12°52.3'	-02.0'	98.2°	12°43.6'	-03.1'	98.4°	12°34.7'	-04.2'	98.7°	12°25.5'	-05.2'	98.9°	12°16.2'	-06.3'	99.1°	12°06.6'	-07.3'	99.3°	11°56.8'	-08.4'	99.5°	8
9	12°50.2'	-02.3'	99.2°	12°40.5'	-03.3'	99.5°	12°30.5'	-04.4'	99.7°	12°20.3'	-05.4'	99.9°	12°09.9'	-06.5'	100.1°	11°59.3'	-07.5'	100.3°	11°48.4'	-08.6'	100.5°	9
10	12°47.9'	-02.5'	100.3°	12°37.1'	-03.6'	100.5°	12°26.1'	-04.6'	100.7°	12°14.9'	-05.7'	100.9°	12°03.4'	-06.7'	101.1°	11°51.7'	-07.8'	101.3°	11°39.8'	-08.8'	101.5°	10
11	12°45.4'	-02.8'	101.3°	12°33.6'	-03.8'	101.5°	12°21.5'	-04.9'	101.7°	12°09.2'	-05.9'	101.9°	11°56.7'	-06.9'	102.1°	11°44.0'	-08.0'	102.3°	11°31.0'	-09.0'	102.5°	11
12	12°42.7'	-03.0'	102.3°	12°29.8'	-04.0'	102.5°	12°16.6'	-05.1'	102.7°	12°03.3'	-06.1'	102.9°	11°49.8'	-07.2'	103.2°	11°36.0'	-08.2'	103.4°	11°22.0'	-09.2'	103.6°	12
13	12°39.7'	-03.2'	103.3°	12°25.7'	-04.3'	103.5°	12°11.6'	-05.3'	103.8°	11°57.2'	-06.3'	104.0°	11°42.6'	-07.4'	104.2°	11°27.8'	-08.4'	104.4°	11°12.8'	-09.4'	104.6°	13
14	12°36.4'	-03.5'	104.4°	12°21.5'	-04.5'	104.6°	12°06.3'	-05.5'	104.8°	11°50.9'	-06.6'	105.0°	11°35.2'	-07.6'	105.2°	11°19.4'	-08.6'	105.4°	11°03.4'	-09.6'	105.6°	14
15	12°33.0'	-03.7'	105.4°	12°17.0'	-04.7'	105.6°	12°00.7'	-05.7'	105.8°	11°44.3'	-06.8'	106.0°	11°27.7'	-07.8'	106.2°	11°10.8'	-08.8'	106.4°	10°53.8'	-09.8'	106.6°	15
16	12°29.3'	-03.9'	106.4°	12°12.2'	-04.9'	106.6°	11°55.0'	-06.0'	106.8°	11°37.5'	-07.0'	107.0°	11°19.9'	-08.0'	107.2°	11°02.0'	-09.0'	107.4°	10°44.0'	-10.0'	107.6°	16
17	12°25.4'	-04.2'	107.4°	12°07.3'	-05.2'	107.6°	11°49.0'	-06.2'	107.8°	11°30.6'	-07.2'	108.0°	11°11.9'	-08.2'	108.2°	10°53.0'	-09.2'	108.4°	10°34.0'	-10.2'	108.6°	17
18	12°21.2'	-04.4'	108.4°	12°02.1'	-05.4'	108.6°	11°42.8'	-06.4'	108.8°	11°23.4'	-07.4'	109.0°	11°03.7'	-08.4'	109.2°	10°43.8'	-09.4'	109.4°	10°23.8'	-10.4'	109.6°	18
19	12°16.8'	-04.6'	109.5°	11°56.7'	-05.6'	109.7°	11°36.4'	-06.6'	109.9°	11°16.0'	-07.6'	110.1°	10°55.3'	-08.6'	110.2°	10°34.5'	-09.6'	110.4°	10°13.4'	-10.6'	110.6°	19
20	12°12.2'	-04.8'	110.5°	11°51.1'	-05.8'	110.7°	11°29.8'	-06.8'	110.9°	11°08.4'	-07.8'	111.1°	10°46.7'	-08.8'	111.2°	10°24.9'	-09.8'	111.4°	10°02.9'	-10.7'	111.6°	20
21	12°07.4'	-05.1'	111.5°	11°45.3'	-06.0'	111.7°	11°23.0'	-07.0'	111.9°													

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

76° 284° LHA

Latitude CONTRARY to Declination

76° 284° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	14°00.0'	-00.1'	90.0°	13°59.9'	-01.2'	90.2°	13°59.5'	-02.3'	90.5°	13°58.8'	-03.4'	90.7°	13°57.9'	-04.4'	91.0°	13°56.7'	-05.5'	91.2°	13°55.3'	-06.6'	91.5°	0
1	13°59.8'	-00.4'	91.0°	13°58.7'	-01.5'	91.3°	13°57.2'	-02.5'	91.5°	13°55.5'	-03.6'	91.8°	13°53.5'	-04.7'	92.0°	13°51.2'	-05.8'	92.3°	13°48.7'	-06.8'	92.5°	1
2	13°59.4'	-00.7'	92.1°	13°57.2'	-01.7'	92.3°	13°54.6'	-02.8'	92.6°	13°51.8'	-03.9'	92.8°	13°48.8'	-05.0'	93.1°	13°45.4'	-06.0'	93.3°	13°41.9'	-07.1'	93.5°	2
3	13°58.8'	-00.9'	93.1°	13°55.5'	-02.0'	93.3°	13°51.8'	-03.1'	93.6°	13°48.0'	-04.1'	93.8°	13°43.8'	-05.2'	94.1°	13°39.4'	-06.3'	94.3°	13°34.8'	-07.3'	94.6°	3
4	13°57.9'	-01.2'	94.1°	13°53.5'	-02.2'	94.4°	13°48.8'	-03.3'	94.6°	13°43.8'	-04.4'	94.9°	13°38.6'	-05.5'	95.1°	13°33.1'	-06.5'	95.3°	13°27.4'	-07.6'	95.6°	4
5	13°56.7'	-01.4'	95.2°	13°51.2'	-02.5'	95.4°	13°45.4'	-03.6'	95.6°	13°39.4'	-04.6'	95.9°	13°33.1'	-05.7'	96.1°	13°26.6'	-06.8'	96.4°	13°19.8'	-07.8'	96.6°	5
6	13°55.3'	-01.7'	96.2°	13°48.7'	-02.8'	96.4°	13°41.9'	-03.8'	96.7°	13°34.8'	-04.9'	96.9°	13°27.4'	-06.0'	97.2°	13°19.8'	-07.0'	97.4°	13°12.0'	-08.1'	97.6°	6
7	13°53.6'	-02.0'	97.2°	13°46.0'	-03.0'	97.5°	13°38.0'	-04.1'	97.7°	13°29.9'	-05.1'	97.9°	13°21.5'	-06.2'	98.2°	13°12.8'	-07.3'	98.4°	13°03.9'	-08.3'	98.6°	7
8	13°51.7'	-02.2'	98.2°	13°42.9'	-03.3'	98.5°	13°34.0'	-04.3'	98.7°	13°24.7'	-05.4'	99.0°	13°15.3'	-06.5'	99.2°	13°05.6'	-07.5'	99.4°	12°55.6'	-08.6'	99.7°	8
9	13°49.5'	-02.5'	99.3°	13°39.7'	-03.5'	99.5°	13°29.6'	-04.6'	99.8°	13°19.3'	-05.6'	100.0°	13°08.8'	-06.7'	100.2°	12°58.1'	-07.7'	100.4°	12°47.1'	-08.8'	100.7°	9
10	13°47.0'	-02.7'	100.3°	13°36.1'	-03.8'	100.5°	13°25.0'	-04.8'	100.8°	13°13.7'	-05.9'	101.0°	13°02.1'	-06.9'	101.2°	12°50.3'	-08.0'	101.5°	12°38.3'	-09.0'	101.7°	10
11	13°44.3'	-03.0'	101.3°	13°32.4'	-04.0'	101.6°	13°20.2'	-05.1'	101.8°	13°07.8'	-06.1'	102.0°	12°55.2'	-07.2'	102.3°	12°42.3'	-08.2'	102.5°	12°29.3'	-09.2'	102.7°	11
12	13°41.3'	-03.2'	102.4°	13°28.3'	-04.3'	102.6°	13°15.1'	-05.3'	102.8°	13°01.7'	-06.4'	103.1°	12°48.0'	-07.4'	103.3°	12°34.1'	-08.4'	103.5°	12°20.0'	-09.5'	103.7°	12
13	13°38.0'	-03.5'	103.4°	13°24.0'	-04.5'	103.6°	13°09.8'	-05.6'	103.8°	12°55.3'	-06.6'	104.1°	12°40.6'	-07.6'	104.3°	12°25.7'	-08.7'	104.5°	12°10.6'	-09.7'	104.7°	13
14	13°34.6'	-03.7'	104.4°	13°19.5'	-04.8'	104.6°	13°04.2'	-05.8'	104.9°	12°48.7'	-06.8'	105.1°	12°33.0'	-07.9'	105.3°	12°17.0'	-08.9'	105.5°	12°00.9'	-09.9'	105.7°	14
15	13°30.8'	-04.0'	105.4°	13°14.7'	-05.0'	105.7°	12°58.4'	-06.0'	105.9°	12°41.9'	-07.1'	106.1°	12°25.1'	-08.1'	106.3°	12°08.2'	-09.1'	106.5°	11°51.0'	-10.1'	106.7°	15
16	13°26.8'	-04.2'	106.5°	13°09.7'	-05.3'	106.7°	12°52.4'	-06.3'	106.9°	12°34.8'	-07.3'	107.1°	12°17.0'	-08.3'	107.3°	11°59.1'	-09.3'	107.5°	11°40.9'	-10.3'	107.7°	16
17	13°22.6'	-04.5'	107.5°	13°04.5'	-05.5'	107.7°	12°46.1'	-06.5'	107.9°	12°27.5'	-07.5'	108.1°	12°08.7'	-08.5'	108.4°	11°49.7'	-09.5'	108.6°	11°30.5'	-10.5'	108.7°	17
18	13°18.1'	-04.7'	108.5°	12°58.9'	-05.7'	108.7°	12°39.6'	-06.8'	109.0°	12°20.0'	-07.8'	109.2°	12°00.2'	-08.8'	109.4°	11°40.2'	-09.7'	109.6°	11°20.0'	-10.7'	109.8°	18
19	13°13.4'	-05.0'	109.5°	12°53.2'	-06.0'	109.8°	12°32.8'	-07.0'	110.0°	12°12.2'	-08.0'	110.2°	11°51.4'	-09.0'	110.4°	11°30.4'	-10.0'	110.6°	11°09.3'	-10.9'	110.8°	19
20	13°08.4'	-05.2'	110.6°	12°47.2'	-06.2'	110.8°	12°25.8'	-07.2'	111.0°	12°04.2'	-08.2'	111.2°	11°42.5'	-09.2'	111.4°	11°20.5'	-10.2'	111.6°	10°58.3'	-11.1'	111.8°	20
21	13°03.2'	-05.5'	111.6°	12°41.0'	-06.4'	111.8°	12°18.6'	-07.4'	112.0°	11°56.1'	-08.4'	112.2°	11°33.3'	-09.4'	112.4°	11°10.3'	-10.4'	112.6°	10°47.2'	-11.3'	112.8°	21
22	12°57.7'	-05.7'	112.6°	12°34.6'	-06.7'	112.8°	12°11.2'	-07.7'	113.0°	11°47.6'	-08.6'	113.2°	11°23.9'	-09.6'	113.4°	10°60.0'	-10.6'	113.6°	10°35.9'	-11.5'	113.8°	22
23	12°52.0'	-05.9'	113.8°	12°27.9'	-06.9'	113.8°	12°03.5'	-07.9'	114.0°	11°39.0'	-08.8'	114.2°	11°14.3'	-09.8'	114.4°	10°49.4'	-10.7'	114.6°	10°24.4'	-11.7'	114.8°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

76° 284° LHA

Latitude CONTRARY to DECLINATION

76° 284° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

75° 285° LHA

Latitude CONTRARY to Declination

75° 285° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	15°00.0'	-00.1'	90.0°	14°59.9'	-01.2'	90.3°	14°59.4'	-02.3'	90.5°	14°58.7'	-03.4'	90.8°	14°57.8'	-04.5'	91.1°	14°56.5'	-05.6'	91.3°	14°55.0'	-06.6'	91.6°	0
1	14°59.8'	-00.4'	91.0°	14°58.6'	-01.5'	91.3°	14°57.1'	-02.6'	91.6°	14°55.3'	-03.7'	91.8°	14°53.3'	-04.7'	92.1°	14°50.9'	-05.8'	92.4°	14°48.3'	-06.9'	92.6°	1
2	14°59.4'	-00.7'	92.1°	14°57.1'	-01.8'	92.3°	14°54.5'	-02.9'	92.6°	14°51.7'	-03.9'	92.9°	14°48.5'	-05.0'	93.1°	14°45.1'	-06.1'	93.4°	14°41.4'	-07.2'	93.7°	2
3	14°58.7'	-01.0'	93.1°	14°55.3'	-02.1'	93.4°	14°51.7'	-03.1'	93.6°	14°47.7'	-04.2'	93.9°	14°43.5'	-05.3'	94.2°	14°39.0'	-06.4'	94.4°	14°34.3'	-07.4'	94.7°	3
4	14°57.8'	-01.3'	94.1°	14°53.3'	-02.3'	94.4°	14°48.5'	-03.4'	94.7°	14°43.5'	-04.5'	94.9°	14°38.2'	-05.6'	95.2°	14°32.7'	-06.6'	95.5°	14°26.8'	-07.7'	95.7°	4
5	14°56.5'	-01.5'	95.2°	14°50.9'	-02.6'	95.4°	14°45.1'	-03.7'	95.7°	14°41.1'	-04.8'	96.0°	14°32.7'	-05.8'	96.2°	14°26.0'	-06.9'	96.5°	14°19.1'	-08.0'	96.7°	5
6	14°55.0'	-01.8'	96.2°	14°48.3'	-02.9'	96.5°	14°41.4'	-04.0'	96.7°	14°34.3'	-05.0'	97.0°	14°26.8'	-06.1'	97.3°	14°19.1'	-07.2'	97.5°	14°11.1'	-08.2'	97.8°	6
7	14°53.1'	-02.1'	97.2°	14°45.4'	-03.2'	97.5°	14°37.5'	-04.2'	97.8°	14°29.2'	-05.3'	98.0°	14°20.7'	-06.4'	98.3°	14°11.9'	-07.4'	98.5°	14°02.9'	-08.5'	98.8°	7
8	14°51.0'	-02.4'	98.3°	14°42.3'	-03.4'	98.5°	14°33.2'	-04.5'	98.8°	14°23.9'	-05.6'	99.1°	14°14.3'	-06.6'	99.3°	14°04.5'	-07.7'	99.6°	13°54.4'	-08.7'	99.8°	8
9	14°48.7'	-02.7'	99.3°	14°38.8'	-03.7'	99.6°	14°28.7'	-04.8'	99.8°	14°18.3'	-05.8'	100.1°	14°07.7'	-06.9'	100.3°	13°56.8'	-07.9'	100.6°	13°45.7'	-09.0'	100.8°	9
10	14°46.0'	-02.9'	100.3°	14°35.1'	-04.0'	100.6°	14°23.9'	-05.0'	100.9°	14°12.5'	-06.1'	101.1°	14°00.8'	-07.1'	101.4°	13°48.9'	-08.2'	101.6°	13°36.7'	-09.2'	101.8°	10
11	14°43.1'	-03.2'	101.4°	14°31.1'	-04.3'	101.6°	14°18.9'	-05.3'	101.9°	14°06.4'	-06.4'	102.1°	13°53.7'	-07.4'	102.4°	13°40.7'	-08.4'	102.6°	13°27.5'	-09.5'	102.9°	11
12	14°39.9'	-03.5'	102.4°	14°26.9'	-04.5'	102.7°	14°13.6'	-05.6'	102.9°	14°00.0'	-06.6'	103.2°	13°46.3'	-07.7'	103.4°	13°32.2'	-08.7'	103.6°	13°18.0'	-09.7'	103.9°	12
13	14°36.4'	-03.7'	103.4°	14°22.3'	-04.8'	103.7°	14°08.0'	-05.8'	103.9°	13°53.4'	-06.9'	104.2°	13°38.6'	-07.9'	104.4°	13°23.5'	-08.9'	104.7°	13°08.3'	-10.0'	104.9°	13
14	14°32.7'	-04.0'	104.5°	14°17.5'	-05.1'	104.7°	14°02.2'	-06.1'	105.0°	13°46.6'	-07.1'	105.2°	13°30.7'	-08.2'	105.4°	13°14.6'	-09.2'	105.7°	12°58.3'	-10.2'	105.9°	14
15	14°28.7'	-04.3'	105.5°	14°12.5'	-05.3'	105.8°	13°56.1'	-06.4'	106.0°	13°39.4'	-07.4'	106.2°	13°22.5'	-08.4'	106.5°	13°05.4'	-09.4'	106.7°	12°48.1'	-10.4'	106.9°	15
16	14°24.4'	-04.6'	106.5°	14°07.2'	-05.6'	106.8°	13°49.7'	-06.6'	107.0°	13°32.1'	-07.6'	107.2°	13°14.1'	-08.6'	107.5°	12°56.0'	-09.6'	107.7°	12°37.7'	-10.7'	107.9°	16
17	14°19.8'	-04.8'	107.6°	14°01.6'	-05.8'	107.8°	13°43.1'	-06.9'	108.0°	13°24.4'	-07.9'	108.3°	13°05.5'	-08.9'	108.5°	12°46.4'	-09.9'	108.7°	12°27.0'	-10.9'	108.9°	17
18	14°15.0'	-05.1'	108.6°	13°55.7'	-06.1'	108.8°	13°36.3'	-07.1'	109.1°	13°16.6'	-08.1'	109.3°	12°56.6'	-09.1'	109.5°	12°36.5'	-10.1'	109.7°	12°16.1'	-11.1'	109.9°	18
19	14°09.9'	-05.3'	109.6°	13°49.6'	-06.4'	109.9°	13°29.2'	-07.4'	110.1°	13°08.4'	-08.4'	110.3°	12°47.5'	-09.3'	110.5°	12°26.4'	-10.3'	110.7°	12°05.0'	-11.3'	110.9°	19
20	14°04.6'	-05.6'	110.6°	13°43.3'	-06.6'	110.9°	13°21.8'	-07.6'	111.1°	13°00.1'	-08.6'	111.3°	12°38.2'	-09.6'	111.5°	12°16.0'	-10.6'	111.7°	11°53.7'	-11.5'	111.9°	20
21	13°59.0'	-05.9'	111.7°	13°36.7'	-06.9'	111.9°	13°14.															

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

74° 286° LHA

Latitude CONTRARY to Declination

74° 286° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	16°00.0'	-00.2'	90.0°	15°59.8'	-01.2'	90.3°	15°59.4'	-02.3'	90.6°	15°58.6'	-03.4'	90.9°	15°57.6'	-04.5'	91.1°	15°56.2'	-05.6'	91.4°	15°54.6'	-06.7'	91.7°	0
1	15°59.8'	-00.5'	91.0°	15°58.6'	-01.5'	91.3°	15°57.1'	-02.6'	91.6°	15°55.2'	-03.7'	91.9°	15°53.1'	-04.8'	92.2°	15°50.7'	-05.9'	92.5°	15°47.9'	-07.0'	92.7°	1
2	15°59.3'	-00.8'	92.1°	15°57.1'	-01.8'	92.4°	15°54.4'	-02.9'	92.7°	15°51.5'	-04.0'	92.9°	15°48.3'	-05.1'	93.2°	15°44.8'	-06.2'	93.5°	15°41.0'	-07.3'	93.8°	2
3	15°58.6'	-01.1'	93.1°	15°55.2'	-02.1'	93.4°	15°51.5'	-03.2'	93.7°	15°47.5'	-04.3'	94.0°	15°43.2'	-05.4'	94.3°	15°38.6'	-06.5'	94.5°	15°33.7'	-07.5'	94.8°	3
4	15°57.6'	-01.3'	94.2°	15°53.1'	-02.4'	94.4°	15°48.3'	-03.5'	94.7°	15°43.2'	-04.6'	95.0°	15°37.8'	-05.7'	95.3°	15°32.1'	-06.8'	95.6°	15°26.2'	-07.8'	95.8°	4
5	15°56.2'	-01.6'	95.2°	15°50.7'	-02.7'	95.5°	15°44.8'	-03.8'	95.8°	15°38.6'	-04.9'	96.0°	15°32.1'	-06.0'	96.3°	15°25.4'	-07.0'	96.6°	15°18.4'	-08.1'	96.9°	5
6	15°54.6'	-01.9'	96.2°	15°47.9'	-03.0'	96.5°	15°41.0'	-04.1'	96.8°	15°33.7'	-05.2'	97.1°	15°26.2'	-06.2'	97.4°	15°18.4'	-07.3'	97.6°	15°10.3'	-08.4'	97.9°	6
7	15°52.7'	-02.2'	97.3°	15°44.9'	-03.3'	97.6°	15°36.9'	-04.4'	97.8°	15°28.5'	-05.5'	98.1°	15°19.9'	-06.5'	98.4°	15°11.0'	-07.6'	98.7°	15°01.9'	-08.7'	98.9°	7
8	15°50.4'	-02.5'	98.3°	15°41.6'	-03.6'	98.6°	15°32.5'	-04.7'	98.9°	15°23.1'	-05.8'	99.1°	15°13.4'	-06.8'	99.4°	15°03.4'	-07.9'	99.7°	14°53.2'	-08.9'	99.9°	8
9	15°47.9'	-02.8'	99.4°	15°38.0'	-03.9'	99.6°	15°27.8'	-05.0'	99.9°	15°17.3'	-06.0'	100.2°	15°06.6'	-07.1'	100.4°	14°55.6'	-08.1'	100.7°	14°44.3'	-09.2'	101.0°	9
10	15°45.0'	-03.1'	100.4°	15°34.1'	-04.2'	100.7°	15°22.8'	-05.3'	100.9°	15°11.3'	-06.3'	101.2°	14°59.5'	-07.4'	101.5°	14°47.4'	-08.4'	101.7°	14°35.1'	-09.5'	102.0°	10
11	15°41.9'	-03.4'	101.4°	15°29.9'	-04.5'	101.7°	15°17.6'	-05.5'	102.0°	15°05.0'	-06.6'	102.2°	14°52.1'	-07.6'	102.5°	14°39.0'	-08.7'	102.8°	14°25.6'	-09.7'	103.0°	11
12	15°38.5'	-03.7'	102.5°	15°25.4'	-04.8'	102.7°	15°12.0'	-05.8'	103.0°	14°58.4'	-06.9'	103.3°	14°44.5'	-07.9'	103.5°	14°30.3'	-09.0'	103.8°	14°15.9'	-10.0'	104.0°	12
13	15°34.8'	-04.0'	103.5°	15°20.6'	-05.1'	103.8°	15°06.2'	-06.1'	104.0°	14°51.5'	-07.1'	104.3°	14°36.6'	-08.2'	104.6°	14°21.4'	-09.2'	104.8°	14°05.9'	-10.2'	105.0°	13
14	15°30.8'	-04.3'	104.5°	15°15.6'	-05.3'	104.8°	15°00.1'	-06.4'	105.1°	14°44.4'	-07.4'	105.3°	14°28.4'	-08.4'	105.6°	14°12.1'	-09.5'	105.8°	13°55.7'	-10.5'	106.1°	14
15	15°26.5'	-04.6'	105.6°	15°10.2'	-05.6'	105.8°	14°53.7'	-06.7'	106.1°	14°36.9'	-07.7'	106.4°	14°19.9'	-08.7'	106.6°	14°02.7'	-09.7'	106.8°	13°45.2'	-10.7'	107.1°	15
16	15°21.9'	-04.9'	106.6°	15°04.6'	-05.9'	106.9°	14°47.1'	-06.9'	107.1°	14°29.3'	-08.0'	107.4°	14°11.2'	-09.0'	107.6°	13°52.9'	-10.0'	107.9°	13°34.4'	-11.0'	108.1°	16
17	15°17.0'	-05.2'	107.6°	14°58.7'	-06.2'	107.9°	14°40.1'	-07.2'	108.2°	14°21.3'	-08.2'	108.4°	14°02.2'	-09.2'	108.6°	13°43.0'	-10.2'	108.9°	13°23.4'	-11.2'	109.1°	17
18	15°11.8'	-05.4'	108.7°	14°52.5'	-06.5'	108.9°	14°32.9'	-07.5'	109.2°	14°13.1'	-08.5'	109.4°	13°53.0'	-09.5'	109.7°	13°32.7'	-10.5'	109.9°	13°12.2'	-11.5'	110.1°	18
19	15°06.4'	-05.7'	109.7°	14°46.1'	-06.7'	110.0°	14°25.5'	-07.7'	110.2°	14°04.6'	-08.7'	110.4°	13°43.5'	-09.7'	110.7°	13°22.3'	-10.7'	110.9°	13°00.7'	-11.7'	111.1°	19
20	15°00.7'	-06.0'	110.7°	14°39.3'	-07.0'	111.0°	14°17.7'	-08.0'	111.2°	13°55.9'	-09.0'	111.5°	13°33.8'	-10.0'	111.7°	13°11.5'	-11.0'	111.9°	12°49.0'	-11.9'	112.1°	20
21	14°54.7'	-06.3'	111.8°	14°32.3'	-07.3'	112.0°	14°09.7'	-08.3'	112.2°	13°46.9'	-09.2'	112.5°	13°23.8'	-10.2'	112.7°	13°00.6'	-11.2'	112.9°	12°37.1'	-12.2'	113.1°	21
22	14°48.4'	-06.5'	112.8°	14°25.1'	-07.5'	113.0°	14°01.5'	-08.5'	113.3°	13°37.7'	-09.5'	113.5°	13°13.6'	-10.5'	113.7°	12°49.4'	-11.4'	113.9°	12°25.0'	-12.4'	114.1°	22
23	14°41.9'	-06.8'	113.8°	14°17.5'	-07.8'	114.1°	13°53.0'	-08.8'	114.3°	13°28.2'	-09.7'	114.5°	13°03.2'	-10.7'	114.7°	12°38.0'	-11.6'	114.9°	12°12.6'	-12.6'	115.1°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			Dec°

74° 286° LHA

Latitude CONTRARY to DECLINATION

74° 286° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

73° 287° LHA

Latitude CONTRARY to Declination

73° 287° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	17°00.0'	-00.2'	90.0°	16°59.8'	-01.3'	90.3°	16°59.4'	-02.3'	90.6°	16°58.6'	-03.4'	90.9°	16°57.4'	-04.5'	91.2°	16°56.0'	-05.6'	91.5°	16°54.2'	-06.7'	91.8°	0
1	16°59.8'	-00.5'	91.0°	16°58.6'	-01.6'	91.4°	16°57.0'	-02.7'	91.7°	16°55.1'	-03.8'	92.0°	16°52.9'	-04.8'	92.3°	16°50.4'	-05.9'	92.6°	16°47.5'	-07.0'	92.9°	1
2	16°59.3'	-00.8'	92.1°	16°57.0'	-01.9'	92.4°	16°54.3'	-03.0'	92.7°	16°51.4'	-04.1'	93.0°	16°48.1'	-05.2'	93.3°	16°44.4'	-06.2'	93.6°	16°40.5'	-07.3'	93.9°	2
3	16°58.6'	-01.1'	93.1°	16°55.1'	-02.2'	93.4°	16°51.4'	-03.3'	93.7°	16°47.3'	-04.4'	94.0°	16°42.9'	-05.5'	94.3°	16°38.2'	-06.6'	94.6°	16°33.2'	-07.6'	94.9°	3
4	16°57.4'	-01.4'	94.2°	16°52.9'	-02.5'	94.5°	16°48.1'	-03.6'	94.8°	16°42.9'	-04.7'	95.1°	16°37.4'	-05.8'	95.4°	16°31.6'	-06.9'	95.7°	16°25.5'	-07.9'	96.0°	4
5	16°56.0'	-01.8'	95.2°	16°50.4'	-02.8'	95.5°	16°44.4'	-03.9'	95.8°	16°38.2'	-05.0'	96.1°	16°31.6'	-06.1'	96.4°	16°24.8'	-07.2'	96.7°	16°17.6'	-08.2'	97.0°	5
6	16°54.2'	-02.1'	96.3°	16°47.5'	-03.2'	96.6°	16°40.5'	-04.2'	96.9°	16°33.2'	-05.3'	97.2°	16°25.5'	-06.4'	97.5°	16°17.6'	-07.5'	97.8°	16°09.4'	-08.5'	98.0°	6
7	16°52.2'	-02.4'	97.3°	16°44.4'	-03.5'	97.6°	16°36.3'	-04.6'	97.9°	16°27.9'	-05.6'	98.2°	16°19.1'	-06.7'	98.5°	16°10.1'	-07.8'	98.8°	16°00.8'	-08.8'	99.1°	7
8	16°49.8'	-02.7'	98.4°	16°40.9'	-03.8'	98.7°	16°31.7'	-04.9'	99.0°	16°22.2'	-05.9'	99.2°	16°12.4'	-07.0'	99.5°	16°02.4'	-08.1'	99.8°	15°52.0'	-09.1'	100.1°	8
9	16°47.1'	-03.0'	99.4°	16°37.1'	-04.1'	99.7°	16°26.9'	-05.2'	100.0°	16°16.3'	-06.2'	100.3°	16°05.4'	-07.3'	100.6°	15°54.3'	-08.4'	100.8°	15°42.8'	-09.4'	101.1°	9
10	16°44.0'	-03.3'	100.4°	16°33.0'	-04.4'	100.7°	16°21.7'	-05.5'	101.0°	16°10.1'	-06.5'	101.3°	15°58.1'	-07.6'	101.6°	15°45.9'	-08.6'	101.9°	15°33.4'	-09.7'	102.2°	10
11	16°40.7'	-03.7'	101.5°	16°28.6'	-04.7'	101.8°	16°16.2'	-05.8'	102.1°	16°03.5'	-06.8'	102.4°	15°50.5'	-07.9'	102.6°	15°37.3'	-08.9'	102.9°	15°23.7'	-10.0'	103.2°	11
12	16°37.1'	-04.0'	102.5°	16°23.9'	-05.0'	102.8°	16°10.4'	-06.1'	103.1°	15°56.7'	-07.1'	103.4°	15°42.7'	-08.2'	103.7°	15°28.3'	-09.2'	103.9°	15°13.8'	-10.3'	104.2°	12
13	16°33.1'	-04.3'	103.6°	16°18.9'	-05.3'	103.9°	16°04.4'	-06.4'	104.1°	15°49.6'	-07.4'	104.4°	15°34.5'	-08.5'	104.7°	15°19.1'	-09.5'	105.0°	15°03.5'	-10.5'	105.2°	13
14	16°28.8'	-04.6'	104.6°	16°13.5'	-05.6'	104.9°	15°58.0'	-06.7'	105.2°	15°42.1'	-07.7'	105.4°	15°26.0'	-08.7'	105.7°	15°09.6'	-09.8'	106.0°	14°53.0'	-10.8'	106.2°	14
15	16°24.2'	-04.9'	105.7°	16°07.9'	-05.9'	105.9°	15°51.3'	-07.0'	106.2°	15°34.4'	-08.0'	106.5°	15°17.3'	-09.0'	106.7°	14°59.9'	-10.0'	107.0°	14°42.2'	-11.1'	107.3°	15
16	16°19.4'	-05.2'	106.7°	16°02.0'	-06.2'	107.0°	15°44.3'	-07.3'	107.2°	15°26.4'	-08.3'	107.5°	15°08.2'	-09.3'	107.8°	14°49.8'	-10.3'	108.0°	14°31.1'	-11.3'	108.3°	16
17	16°14.2'	-05.5'	107.7°	15°55.8'	-06.5'	108.0°	15°37.1'	-07.5'	108.3°	15°18.1'	-08.6'	108.5°	14°58.9'	-09.6'	108.8°	14°39.5'	-10.6'	109.0°	14°19.8'	-11.6'	109.3°	17
18	16°08.7'	-05.8'	108.8°	15°49.2'	-06.8'	109.0°	15°29.5'	-07.8'	109.3°	15°09.6'	-08.8'	109.6°	14°49.4'	-09.8'	109.8°	14°28.9'	-10.8'	110.1°	14°08.2'	-11.8'	110.3°	18
19	16°02.9'	-06.1'	109.8°	15°42.4'	-07.1'	110.1°	15°21.7'	-08.1'	110.3°	15°00.7'	-09.1'	110.6°	14°39.5'	-10.1'	110.8°	14°18.1'	-11.1'	111.1°	13°56.4'	-12.1'	111.3°	19
20	15°56.8'	-06.4'	110.8°	15°35.3'	-07.4'	111.1°	15°13.6'	-08.4'	111.4°	14°51.6'	-09.4'	111.6°	14°29.4'	-10.4'	111.9°	14°07.0'	-11.4'	112.1°	13°44.3'	-12.3'	112.3°	20
21	15°50.4'	-06.7'	111.9°	15°27.9'	-07.7'	112.1°	1															

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

72° 288° LHA

Latitude CONTRARY to Declination

72° 288° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	18°00.0'	-00.2'	90.0°	17°59.8'	-01.3'	90.3°	17°59.3'	-02.4'	90.6°	17°58.5'	-03.5'	91.0°	17°57.3'	-04.6'	91.3°	17°55.8'	-05.7'	91.6°	17°53.9'	-06.8'	91.9°	0
1	17°59.8'	-00.5'	91.1°	17°58.6'	-01.6'	91.4°	17°56.9'	-02.7'	91.7°	17°55.0'	-03.8'	92.0°	17°52.7'	-04.9'	92.3°	17°50.1'	-06.0'	92.7°	17°47.1'	-07.1'	93.0°	1
2	17°59.3'	-00.9'	92.1°	17°56.9'	-01.9'	92.4°	17°54.2'	-03.0'	92.8°	17°51.2'	-04.1'	93.1°	17°47.8'	-05.2'	93.4°	17°44.1'	-06.3'	93.7°	17°40.0'	-07.4'	94.0°	2
3	17°58.5'	-01.2'	93.2°	17°55.0'	-02.3'	93.5°	17°51.2'	-03.4'	93.8°	17°47.0'	-04.5'	94.1°	17°42.6'	-05.6'	94.4°	17°37.8'	-06.7'	94.8°	17°32.6'	-07.7'	95.1°	3
4	17°57.3'	-01.5'	94.2°	17°52.7'	-02.6'	94.5°	17°47.8'	-03.7'	94.8°	17°42.6'	-04.8'	95.2°	17°37.0'	-05.9'	95.5°	17°31.1'	-07.0'	95.8°	17°24.9'	-08.1'	96.1°	4
5	17°55.8'	-01.9'	95.3°	17°50.1'	-03.0'	95.6°	17°44.1'	-04.1'	95.9°	17°37.8'	-05.1'	96.2°	17°31.1'	-06.2'	96.5°	17°24.1'	-07.3'	96.8°	17°16.8'	-08.4'	97.2°	5
6	17°53.9'	-02.2'	96.3°	17°47.1'	-03.3'	96.6°	17°40.0'	-04.4'	96.9°	17°32.6'	-05.5'	97.3°	17°24.9'	-06.6'	97.6°	17°16.8'	-07.6'	97.9°	17°08.4'	-08.7'	98.2°	6
7	17°51.7'	-02.5'	97.4°	17°43.8'	-03.6'	97.7°	17°35.7'	-04.7'	98.0°	17°27.2'	-05.8'	98.3°	17°18.3'	-06.9'	98.6°	17°09.2'	-07.9'	98.9°	16°59.7'	-09.0'	99.2°	7
8	17°49.1'	-02.9'	98.4°	17°40.2'	-04.0'	98.7°	17°30.9'	-05.0'	99.0°	17°21.4'	-06.1'	99.3°	17°11.5'	-07.2'	99.7°	17°01.2'	-08.3'	100.0°	16°50.7'	-09.3'	100.3°	8
9	17°46.3'	-03.2'	99.5°	17°36.2'	-04.3'	99.8°	17°25.9'	-05.4'	100.1°	17°15.2'	-06.4'	100.4°	17°04.3'	-07.5'	100.7°	16°53.0'	-08.6'	101.0°	16°41.4'	-09.6'	101.3°	9
10	17°43.0'	-03.5'	100.5°	17°31.9'	-04.6'	100.8°	17°20.5'	-05.7'	101.1°	17°08.8'	-06.8'	101.4°	16°56.8'	-07.8'	101.7°	16°44.4'	-08.9'	102.0°	16°31.8'	-09.9'	102.3°	10
11	17°39.5'	-03.9'	101.6°	17°27.3'	-04.9'	101.9°	17°14.8'	-06.0'	102.2°	17°02.0'	-07.1'	102.5°	16°48.9'	-08.1'	102.8°	16°35.5'	-09.2'	103.1°	16°21.8'	-10.2'	103.3°	11
12	17°35.6'	-04.2'	102.6°	17°22.4'	-05.3'	102.9°	17°08.8'	-06.3'	103.2°	16°55.0'	-07.4'	103.5°	16°40.8'	-08.4'	103.8°	16°26.3'	-09.5'	104.1°	16°11.6'	-10.5'	104.4°	12
13	17°31.4'	-04.5'	103.6°	17°17.1'	-05.6'	103.9°	17°02.5'	-06.7'	104.2°	16°47.6'	-07.7'	104.5°	16°32.4'	-08.7'	104.8°	16°16.8'	-09.8'	105.1°	16°01.1'	-10.8'	105.4°	13
14	17°26.9'	-04.9'	104.7°	17°11.5'	-05.9'	105.0°	16°55.8'	-07.0'	105.3°	16°39.9'	-08.0'	105.6°	16°23.6'	-09.0'	105.9°	16°07.1'	-10.1'	106.1°	15°50.2'	-11.1'	106.4°	14
15	17°22.0'	-05.2'	105.7°	17°05.6'	-06.2'	106.0°	16°48.9'	-07.3'	106.3°	16°31.9'	-08.3'	106.6°	16°14.6'	-09.3'	106.9°	15°57.0'	-10.4'	107.2°	15°39.1'	-11.4'	107.4°	15
16	17°16.8'	-05.5'	106.8°	16°59.3'	-06.6'	107.1°	16°41.6'	-07.6'	107.4°	16°23.5'	-08.6'	107.6°	16°05.2'	-09.6'	107.9°	15°46.6'	-10.7'	108.2°	15°27.7'	-11.7'	108.5°	16
17	17°11.3'	-05.8'	107.8°	16°52.8'	-06.9'	108.1°	16°34.0'	-07.9'	108.4°	16°14.9'	-08.9'	108.7°	15°55.6'	-09.9'	108.9°	15°36.0'	-10.9'	109.2°	15°16.1'	-11.9'	109.5°	17
18	17°05.5'	-06.2'	108.9°	16°45.9'	-07.2'	109.2°	16°26.1'	-08.2'	109.4°	16°06.0'	-09.2'	109.7°	15°45.6'	-10.2'	110.0°	15°25.0'	-11.2'	110.2°	15°04.1'	-12.2'	110.5°	18
19	16°59.3'	-06.5'	109.9°	16°38.7'	-07.5'	110.2°	16°17.9'	-08.5'	110.5°	15°56.8'	-09.5'	110.7°	15°35.4'	-10.5'	111.0°	15°13.8'	-11.5'	111.3°	14°51.9'	-12.5'	111.5°	19
20	16°52.8'	-06.8'	110.9°	16°31.3'	-07.8'	111.2°	16°09.4'	-08.8'	111.5°	15°47.3'	-09.8'	111.8°	15°24.9'	-10.8'	112.0°	15°02.3'	-11.8'	112.3°	14°39.4'	-12.7'	112.5°	20
21	16°46.1'	-07.1'	112.0°	16°23.5'	-08.1'	112.3°	16°00.6'	-09.1'	112.5°	15°37.5'	-10.1'	112.8°	15°14.1'	-11.1'	113.0°	14°50.5'	-12.0'	113.3°	14°26.7'	-13.0'	113.5°	21
22	16°39.0'	-07.4'	113.0°	16°15.4'	-08.4'	113.3°	15°51.5'	-09.4'	113.6°	15°27.4'	-10.4'	113.8°	15°03.1'	-11.3'	114.1°	14°38.5'	-12.3'	114.3°	14°13.7'	-13.3'	114.5°	22
23	16°31.6'	-07.7'	114.1°	16°07.0'	-08.7'	114.3°	15°42.1'	-09.7'	114.6°	15°17.1'	-10.6'	114.8°	14°51.8'	-11.6'	115.1°	14°26.2'	-12.6'	115.3°	14°00.5'	-13.5'	115.5°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

72° 288° LHA

Latitude CONTRARY to DECLINATION

72° 288° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

71° 289° LHA

Latitude CONTRARY to Declination

71° 289° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	19°00.0'	-00.2'	90.0°	18°59.8'	-01.3'	90.3°	18°59.3'	-02.4'	90.7°	18°58.4'	-03.5'	91.0°	18°57.1'	-04.6'	91.4°	18°55.5'	-05.7'	91.7°	18°53.5'	-06.8'	92.1°	0
1	18°59.8'	-00.5'	91.1°	18°58.5'	-01.6'	91.4°	18°56.9'	-02.8'	91.7°	18°54.9'	-03.9'	92.1°	18°52.5'	-05.0'	92.4°	18°49.8'	-06.1'	92.8°	18°46.7'	-07.2'	93.1°	1
2	18°59.2'	-00.9'	92.1°	18°56.9'	-02.0'	92.5°	18°54.1'	-03.1'	92.8°	18°51.0'	-04.2'	93.1°	18°47.6'	-05.3'	93.5°	18°43.7'	-06.4'	93.8°	18°39.6'	-07.5'	94.2°	2
3	18°58.4'	-01.3'	93.2°	18°54.9'	-02.4'	93.5°	18°51.0'	-03.5'	93.9°	18°46.8'	-04.6'	94.2°	18°42.2'	-05.7'	94.5°	18°37.3'	-06.8'	94.9°	18°32.1'	-07.9'	95.2°	3
4	18°57.1'	-01.6'	94.2°	18°52.5'	-02.7'	94.6°	18°47.6'	-03.8'	94.9°	18°42.2'	-04.9'	95.2°	18°36.6'	-06.0'	95.6°	18°30.6'	-07.1'	95.9°	18°24.2'	-08.2'	96.3°	4
5	18°55.5'	-02.0'	95.3°	18°49.8'	-03.1'	95.6°	18°43.7'	-04.2'	96.0°	18°37.3'	-05.3'	96.3°	18°30.6'	-06.4'	96.6°	18°23.5'	-07.4'	97.0°	18°16.0'	-08.5'	97.3°	5
6	18°53.5'	-02.3'	96.3°	18°46.7'	-03.4'	96.7°	18°39.6'	-04.5'	97.0°	18°32.1'	-05.6'	97.4°	18°24.2'	-06.7'	97.7°	18°16.0'	-07.8'	98.0°	18°07.5'	-08.9'	98.3°	6
7	18°51.2'	-02.7'	97.4°	18°43.3'	-03.8'	97.7°	18°35.0'	-04.9'	98.1°	18°26.4'	-06.0'	98.4°	18°17.5'	-07.0'	98.7°	18°08.2'	-08.1'	99.1°	17°58.6'	-09.2'	99.4°	7
8	18°48.5'	-03.0'	98.5°	18°39.5'	-04.1'	98.8°	18°30.2'	-05.2'	99.1°	18°20.5'	-06.3'	99.5°	18°10.4'	-07.4'	99.8°	18°00.1'	-08.5'	100.1°	17°49.4'	-09.5'	100.4°	8
9	18°45.4'	-03.4'	99.5°	18°35.4'	-04.5'	99.8°	18°24.9'	-05.6'	100.2°	18°14.2'	-06.6'	100.5°	18°03.1'	-07.7'	100.8°	17°51.6'	-08.8'	101.1°	17°39.9'	-09.9'	101.5°	9
10	18°42.0'	-03.8'	100.6°	18°30.9'	-04.8'	100.9°	18°19.4'	-05.9'	101.2°	18°07.5'	-07.0'	101.5°	17°55.3'	-08.1'	101.9°	17°42.8'	-09.1'	102.2°	17°30.0'	-10.2'	102.5°	10
11	18°38.3'	-04.1'	101.6°	18°26.0'	-05.2'	101.9°	18°13.4'	-06.3'	102.3°	18°00.5'	-07.3'	102.6°	17°47.3'	-08.4'	102.9°	17°33.7'	-09.4'	103.2°	17°19.9'	-10.5'	103.5°	11
12	18°34.2'	-04.5'	102.7°	18°20.8'	-05.5'	103.0°	18°07.2'	-06.6'	103.3°	17°53.2'	-07.7'	103.6°	17°38.9'	-08.7'	103.9°	17°24.3'	-09.8'	104.2°	17°09.4'	-10.8'	104.6°	12
13	18°29.7'	-04.8'	103.7°	18°15.3'	-05.9'	104.0°	18°00.6'	-06.9'	104.4°	17°45.5'	-08.0'	104.7°	17°30.2'	-09.0'	105.0°	17°14.5'	-10.1'	105.3°	16°58.6'	-11.1'	105.6°	13
14	18°24.9'	-05.2'	104.8°	18°09.4'	-06.2'	105.1°	17°53.7'	-07.3'	105.4°	17°37.6'	-08.3'	105.7°	17°21.2'	-09.4'	106.0°	17°04.5'	-10.4'	106.3°	16°47.5'	-11.4'	106.6°	14
15	18°19.7'	-05.5'	105.8°	18°03.2'	-06.5'	106.1°	17°46.4'	-07.6'	106.4°	17°29.3'	-08.6'	106.8°	17°11.8'	-09.7'	107.1°	16°54.1'	-10.7'	107.3°	16°36.0'	-11.7'	107.6°	15
16	18°14.2'	-05.8'	106.9°	17°56.7'	-06.9'	107.2°	17°38.8'	-07.9'	107.5°	17°20.6'	-09.0'	107.8°	17°02.1'	-10.0'	108.1°	16°43.4'	-11.0'	108.4°	16°24.3'	-12.0'	108.7°	16
17	18°08.4'	-06.2'	107.9°	17°49.8'	-07.2'	108.2°	17°30.9'	-08.2'	108.5°	17°11.7'	-09.3'	108.8°	16°52.2'	-10.3'	109.1°	16°32.4'	-11.3'	109.4°	16°12.3'	-12.3'	109.7°	17
18	18°02.2'	-06.5'	109.0°	17°42.6'	-07.5'	109.3°	17°22.6'	-08.6'	109.6°	17°02.4'	-09.6'	109.9°	16°41.9'	-10.6'	110.1°	16°21.1'	-11.6'	110.4°	15°50.0'	-12.6'	110.7°	18
19	17°55.7'	-06.9'	110.0°	17°35.0'	-07.9'	110.3°	17°14.1'	-08.9'	110.6°	16°52.8'	-09.9'	110.9°	16°31.3'	-10.9'	111.2°	16°09.5'	-11.9'	111.4°	15°47.4'	-12.9'	111.7°	19
20	17°48.9'	-07.2'	111.1°	17°27.2'	-08.2'	111.4°	17°05.2'	-09.2'	111.6°	16°42.9'	-10.2'	111.9°	16°20.4'	-11.2'	112.2°	15°57.6'	-12.2'	112.5°	15°34.5'	-13.2'	112.7°	20
21	17°41.7'	-07.5'	112.1°	17°19.0'	-08.5'																	

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

70° 290° LHA

Latitude CONTRARY to Declination

70° 290° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	20°00.0'	-00.2'	90.0°	19°59.8'	-01.3'	90.4°	19°59.2'	-02.4'	90.7°	19°58.3'	-03.5'	91.1°	19°57.0'	-04.6'	91.5°	19°55.2'	-05.7'	91.8°	19°53.1'	-06.9'	92.2°	0
1	19°59.8'	-00.6'	91.1°	19°58.5'	-01.7'	91.4°	19°56.8'	-02.8'	91.8°	19°54.8'	-03.9'	92.2°	19°52.3'	-05.0'	92.5°	19°49.5'	-06.1'	92.9°	19°46.3'	-07.2'	93.2°	1
2	19°59.2'	-01.0'	92.1°	19°56.8'	-02.1'	92.5°	19°54.0'	-03.2'	92.9°	19°50.8'	-04.3'	93.2°	19°47.3'	-05.4'	93.6°	19°43.4'	-06.5'	93.9°	19°39.1'	-07.6'	94.3°	2
3	19°58.3'	-01.3'	93.2°	19°54.8'	-02.4'	93.6°	19°50.8'	-03.6'	93.9°	19°46.6'	-04.7'	94.3°	19°41.9'	-05.8'	94.6°	19°36.9'	-06.9'	95.0°	19°31.5'	-08.0'	95.3°	3
4	19°57.0'	-01.7'	94.3°	19°52.3'	-02.8'	94.6°	19°47.3'	-03.9'	95.0°	19°41.9'	-05.0'	95.3°	19°36.1'	-06.1'	95.7°	19°30.0'	-07.2'	96.0°	19°23.5'	-08.3'	96.4°	4
5	19°55.2'	-02.1'	95.3°	19°49.5'	-03.2'	95.7°	19°43.4'	-04.3'	96.0°	19°36.9'	-05.4'	96.4°	19°30.0'	-06.5'	96.7°	19°22.8'	-07.6'	97.1°	19°15.2'	-08.7'	97.4°	5
6	19°53.1'	-02.5'	96.4°	19°46.3'	-03.6'	96.7°	19°39.1'	-04.7'	97.1°	19°31.5'	-05.8'	97.4°	19°23.5'	-06.9'	97.8°	19°15.2'	-08.0'	98.1°	19°06.5'	-09.0'	98.5°	6
7	19°50.7'	-02.8'	97.4°	19°42.7'	-03.9'	97.8°	19°34.4'	-05.0'	98.2°	19°25.7'	-06.1'	98.5°	19°16.6'	-07.2'	98.9°	19°07.2'	-08.3'	99.2°	18°57.5'	-09.4'	99.5°	7
8	19°47.8'	-03.2'	98.5°	19°38.8'	-04.3'	98.9°	19°29.3'	-05.4'	99.2°	19°19.6'	-06.5'	99.6°	19°09.4'	-07.6'	99.9°	18°58.9'	-08.7'	100.2°	18°48.1'	-09.7'	100.6°	8
9	19°44.6'	-03.6'	99.6°	19°34.5'	-04.7'	99.9°	19°23.9'	-05.8'	100.3°	19°13.1'	-06.9'	100.6°	19°01.8'	-07.9'	101.0°	18°50.3'	-09.0'	101.3°	18°38.3'	-10.1'	101.6°	9
10	19°41.0'	-04.0'	100.6°	19°29.8'	-05.1'	101.0°	19°18.2'	-06.1'	101.3°	19°06.2'	-07.2'	101.7°	18°53.9'	-08.3'	102.0°	18°41.3'	-09.4'	102.3°	18°28.3'	-10.4'	102.7°	10
11	19°37.0'	-04.3'	101.7°	19°24.7'	-05.4'	102.0°	19°12.0'	-06.5'	102.4°	18°59.0'	-07.6'	102.7°	18°45.6'	-08.6'	103.0°	18°31.9'	-09.7'	103.4°	18°17.9'	-10.8'	103.7°	11
12	19°32.7'	-04.7'	102.7°	19°19.3'	-05.8'	103.1°	19°05.5'	-06.9'	103.4°	18°51.4'	-07.9'	103.8°	18°37.0'	-09.0'	104.1°	18°22.2'	-10.0'	104.4°	18°07.1'	-11.1'	104.7°	12
13	19°28.0'	-05.1'	103.8°	19°13.5'	-06.1'	104.1°	18°58.7'	-07.2'	104.5°	18°43.5'	-08.3'	104.8°	18°28.0'	-09.3'	105.1°	18°12.2'	-10.4'	105.5°	17°56.0'	-11.4'	105.8°	13
14	19°22.9'	-05.4'	104.9°	19°07.3'	-06.5'	105.2°	18°51.5'	-07.6'	105.5°	18°35.2'	-08.6'	105.9°	18°18.7'	-09.7'	106.2°	18°01.8'	-10.7'	106.5°	17°44.6'	-11.7'	106.8°	14
15	19°17.5'	-05.8'	105.9°	19°00.8'	-06.9'	106.2°	18°43.9'	-07.9'	106.6°	18°26.6'	-09.0'	106.9°	18°09.0'	-10.0'	107.2°	17°51.1'	-11.0'	107.5°	17°32.9'	-12.1'	107.8°	15
16	19°11.7'	-06.2'	107.0°	18°54.0'	-07.2'	107.3°	18°36.0'	-08.3'	107.6°	18°17.6'	-09.3'	107.9°	17°59.0'	-10.3'	108.3°	17°40.1'	-11.3'	108.6°	17°20.8'	-12.4'	108.9°	16
17	19°05.5'	-06.5'	108.0°	18°46.8'	-07.6'	108.3°	18°27.7'	-08.6'	108.7°	18°08.3'	-09.6'	109.0°	17°48.7'	-10.7'	109.3°	17°28.7'	-11.7'	109.6°	17°08.5'	-12.7'	109.9°	17
18	18°59.0'	-06.9'	109.1°	18°39.2'	-07.9'	109.4°	18°19.1'	-08.9'	109.7°	17°58.7'	-10.0'	110.0°	17°38.0'	-11.0'	110.3°	17°17.0'	-12.0'	110.6°	16°55.8'	-13.0'	110.9°	18
19	18°52.1'	-07.2'	110.1°	18°31.3'	-08.3'	110.4°	18°10.2'	-09.3'	110.8°	17°48.8'	-10.3'	111.1°	17°27.1'	-11.3'	111.4°	17°05.1'	-12.3'	111.6°	16°42.8'	-13.3'	111.9°	19
20	18°44.8'	-07.6'	111.2°	18°23.0'	-08.6'	111.5°	18°00.9'	-09.6'	111.8°	17°38.5'	-10.6'	112.1°	17°15.8'	-11.6'	112.4°	16°52.8'	-12.6'	112.7°	16°29.5'	-13.6'	112.9°	20
21	18°37.2'	-07.9'	112.2°	18°14.4'	-08.9'	112.5°	17°51.3'	-09.9'	112.8°	17°27.9'	-10.9'	113.1°	17°04.2'	-11.9'	113.4°	16°40.2'	-12.9'	113.7°	16°16.0'	-13.9'	114.0°	21
22	18°29.3'	-08.3'	113.3°	18°05.5'	-09.3'	113.6°	17°41.3'	-10.3'	113.9°	17°16.9'	-11.2'	114.2°	16°52.2'	-12.2'	114.4°	16°22.3'	-13.2'	114.7°	16°02.1'	-14.1'	115.0°	22
23	18°21.0'	-08.6'	114.3°	17°56.2'	-09.6'	114.6°	17°31.1'	-10.6'	114.9°	17°05.7'	-11.6'	115.2°	16°40.0'	-12.5'	115.5°	16°14.1'	-13.5'	115.7°	15°47.9'	-14.4'	116.0°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			Dec°

70° 290° LHA

Latitude CONTRARY to DECLINATION

70° 290° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

69° 291° LHA

Latitude CONTRARY to Declination

69° 291° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	21°00.0'	-00.2'	90.0°	20°59.8'	-01.3'	90.4°	20°59.2'	-02.4'	90.8°	20°58.2'	-03.6'	91.2°	20°56.8'	-04.7'	91.5°	20°55.0'	-05.8'	91.9°	20°52.8'	-06.9'	92.3°	0
1	20°59.7'	-00.6'	91.1°	20°58.5'	-01.7'	91.5°	20°56.8'	-02.8'	91.8°	20°54.6'	-04.0'	92.2°	20°52.1'	-05.1'	92.6°	20°49.2'	-06.2'	93.0°	20°45.9'	-07.3'	93.4°	1
2	20°59.1'	-01.0'	92.1°	20°56.8'	-02.1'	92.5°	20°53.9'	-03.2'	92.9°	20°50.7'	-04.4'	93.3°	20°47.0'	-05.5'	93.7°	20°43.0'	-06.6'	94.0°	20°38.6'	-07.7'	94.4°	2
3	20°58.2'	-01.4'	93.2°	20°54.6'	-02.5'	93.6°	20°50.7'	-03.6'	94.0°	20°46.3'	-04.8'	94.4°	20°41.6'	-05.9'	94.7°	20°36.4'	-07.0'	95.1°	20°30.9'	-08.1'	95.5°	3
4	20°56.8'	-01.8'	94.3°	20°52.1'	-02.9'	94.7°	20°47.0'	-04.0'	95.0°	20°41.6'	-05.1'	95.4°	20°35.7'	-06.3'	95.8°	20°29.4'	-07.4'	96.2°	20°22.8'	-08.5'	96.5°	4
5	20°55.0'	-02.2'	95.4°	20°49.2'	-03.3'	95.7°	20°43.0'	-04.4'	96.1°	20°36.4'	-05.5'	96.5°	20°29.4'	-06.6'	96.9°	20°22.1'	-07.7'	97.2°	20°14.3'	-08.8'	97.6°	5
6	20°52.8'	-02.6'	96.4°	20°45.9'	-03.7'	96.8°	20°38.6'	-04.8'	97.2°	20°30.9'	-05.9'	97.5°	20°22.8'	-07.0'	97.9°	20°14.3'	-08.1'	98.3°	20°05.5'	-09.2'	98.6°	6
7	20°50.2'	-03.0'	97.5°	20°42.1'	-04.1'	97.9°	20°33.7'	-05.2'	98.2°	20°25.0'	-06.3'	98.6°	20°15.8'	-07.4'	99.0°	20°06.2'	-08.5'	99.3°	19°56.3'	-09.6'	99.7°	7
8	20°47.2'	-03.4'	98.6°	20°38.0'	-04.5'	98.9°	20°28.5'	-05.6'	99.3°	20°18.6'	-06.7'	99.7°	20°08.4'	-07.8'	100.0°	19°57.7'	-08.9'	100.4°	19°46.7'	-09.9'	100.7°	8
9	20°43.8'	-03.8'	99.6°	20°33.5'	-04.9'	100.0°	20°22.9'	-06.0'	100.4°	20°11.9'	-07.1'	100.7°	20°00.6'	-08.2'	101.1°	19°48.9'	-09.2'	101.4°	19°36.8'	-10.3'	101.8°	9
10	20°40.0'	-04.2'	100.7°	20°28.6'	-05.3'	101.1°	20°16.9'	-06.4'	101.4°	20°04.9'	-07.5'	101.8°	19°52.4'	-08.5'	102.1°	19°39.6'	-09.6'	102.5°	19°26.5'	-10.7'	102.8°	10
11	20°35.8'	-04.6'	101.8°	20°23.4'	-05.7'	102.1°	20°10.6'	-06.7'	102.5°	19°57.4'	-07.8'	102.8°	19°43.9'	-08.9'	103.2°	19°30.0'	-10.0'	103.5°	19°15.8'	-11.0'	103.9°	11
12	20°31.2'	-05.0'	102.8°	20°17.7'	-06.0'	103.2°	20°03.8'	-07.1'	103.5°	19°49.6'	-08.2'	103.9°	19°35.0'	-09.3'	104.2°	19°20.1'	-10.3'	104.6°	19°04.8'	-11.4'	104.9°	12
13	20°26.2'	-05.4'	103.9°	20°11.7'	-06.4'	104.2°	19°56.7'	-07.5'	104.6°	19°41.4'	-08.6'	105.0°	19°25.7'	-09.6'	105.3°	19°09.7'	-10.7'	105.6°	18°53.4'	-11.7'	106.0°	13
14	20°20.9'	-05.7'	105.0°	20°05.2'	-06.8'	105.3°	19°49.2'	-07.9'	105.7°	19°32.8'	-08.9'	106.0°	19°16.1'	-10.0'	106.3°	18°59.1'	-11.0'	106.7°	18°41.7'	-12.1'	107.0°	14
15	20°15.1'	-06.1'	106.0°	19°58.4'	-07.2'	106.4°	19°41.3'	-08.2'	106.7°	19°23.9'	-09.3'	107.1°	19°06.2'	-10.3'	107.4°	18°48.1'	-11.4'	107.7°	18°29.6'	-12.4'	108.0°	15
16	20°09.0'	-06.5'	107.1°	19°51.2'	-07.6'	107.4°	19°33.1'	-08.6'	107.8°	19°14.6'	-09.6'	108.1°	18°55.8'	-10.7'	108.4°	18°36.7'	-11.7'	108.7°	18°17.3'	-12.7'	109.1°	16
17	20°02.5'	-06.9'	108.1°	19°43.7'	-07.9'	108.5°	19°24.5'	-09.0'	108.8°	19°05.0'	-10.0'	109.1°	18°45.1'	-11.0'	109.5°	18°25.0'	-12.0'	109.8°	18°04.5'	-13.0'	110.1°	17
18	19°55.6'	-07.3'	109.2°	19°35.8'	-08.3'	109.5°	19°15.5'	-09.3'	109.9°	18°55.0'	-10.3'	110.2°	18°34.1'	-11.4'	110.5°	18°13.0'	-12.4'	110.8°	17°51.5'	-13.4'	111.1°	18
19	19°48.4'	-07.6'	110.2°	19°27.5'	-08.7'	110.6°	19°06.2'	-09.7'	110.9°	18°44.6'	-10.7'	111.2°	18°22.8'	-11.7'	111.5°	18°00.6'	-12.7'	111.8°	17°38.1'	-13.7'	112.1°	19
20	19°40.8'	-08.0'	111.3°	19°18.8'	-09.0'	111.6°	18°56.5'	-10.0'	112.0°	18°34.0'	-11.0'	112.3°	18°11.1'	-12.0'	112.6°	17°47.9'	-13.0'	112.9°	17°24.4'	-14.0'	113.2°	20
21	19°32.8'	-08.4'	112.4°	19°09.8'	-09.4'	112.7°																

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

68° 292° LHA

Latitude CONTRARY to Declination

68° 292° LHA

Dec°	0			1			2			3			4			5			6			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	22°00.0'	-00.2'	90.0°	21°59.8'	-01.3'	90.4°	21°59.2'	-02.5'	90.8°	21°58.1'	-03.6'	91.2°	21°56.6'	-04.7'	91.6°	21°54.7'	-05.8'	92.0°	21°52.4'	-07.0'	92.4°	0			
1	21°59.7'	-00.6'	91.1°	21°58.4'	-01.8'	91.5°	21°56.7'	-02.9'	91.9°	21°54.5'	-04.0'	92.3°	21°51.9'	-05.1'	92.7°	21°48.9'	-06.3'	93.1°	21°45.4'	-07.4'	93.5°	1			
2	21°59.1'	-01.1'	92.2°	21°56.7'	-02.2'	92.6°	21°53.8'	-03.3'	93.0°	21°50.5'	-04.4'	93.4°	21°46.8'	-05.6'	93.8°	21°42.6'	-06.7'	94.2°	21°38.1'	-07.8'	94.6°	2			
3	21°58.1'	-01.5'	93.2°	21°54.5'	-02.6'	93.6°	21°50.5'	-03.7'	94.0°	21°46.1'	-04.8'	94.4°	21°41.2'	-06.0'	94.8°	21°35.9'	-07.1'	95.2°	21°30.3'	-08.2'	95.6°	3			
4	21°56.6'	-01.9'	94.3°	21°51.9'	-03.0'	94.7°	21°46.8'	-04.1'	95.1°	21°41.2'	-05.3'	95.5°	21°35.2'	-06.4'	95.9°	21°28.9'	-07.5'	96.3°	21°22.1'	-08.6'	96.7°	4			
5	21°54.7'	-02.3'	95.4°	21°48.9'	-03.4'	95.8°	21°42.6'	-04.6'	96.2°	21°35.9'	-05.7'	96.6°	21°28.9'	-06.8'	97.0°	21°21.4'	-07.9'	97.4°	21°13.5'	-09.0'	97.7°	5			
6	21°52.4'	-02.7'	96.5°	21°45.4'	-03.9'	96.9°	21°38.1'	-05.0'	97.3°	21°30.3'	-06.1'	97.7°	21°22.1'	-07.2'	98.0°	21°13.5'	-08.3'	98.4°	21°04.5'	-09.4'	98.8°	6			
7	21°49.7'	-03.2'	97.5°	21°41.6'	-04.3'	97.9°	21°33.1'	-05.4'	98.3°	21°24.2'	-06.5'	98.7°	21°14.9'	-07.6'	99.1°	21°05.2'	-08.7'	99.5°	20°55.1'	-09.8'	99.9°	7			
8	21°46.5'	-03.6'	98.6°	21°37.3'	-04.7'	99.0°	21°27.7'	-05.8'	99.4°	21°17.7'	-06.9'	99.8°	21°07.3'	-08.0'	100.2°	20°56.5'	-09.1'	100.5°	20°45.3'	-10.2'	100.9°	8			
9	21°42.9'	-04.0'	99.7°	21°32.6'	-05.1'	100.1°	21°21.9'	-06.2'	100.5°	21°10.8'	-07.3'	100.9°	20°59.3'	-08.4'	101.2°	20°47.4'	-09.5'	101.6°	20°35.2'	-10.5'	102.0°	9			
10	21°38.9'	-04.4'	100.8°	21°27.5'	-05.5'	101.2°	21°15.7'	-06.6'	101.5°	21°03.5'	-07.7'	101.9°	20°50.9'	-08.8'	102.3°	20°38.0'	-09.8'	102.7°	20°24.6'	-10.9'	103.0°	10			
11	21°34.5'	-04.8'	101.8°	21°22.0'	-05.9'	102.2°	21°09.1'	-07.0'	102.6°	20°55.8'	-08.1'	103.0°	20°42.2'	-09.2'	103.4°	20°28.1'	-10.2'	103.7°	20°13.7'	-11.3'	104.1°	11			
12	21°29.7'	-05.2'	102.9°	21°16.1'	-06.3'	103.3°	21°02.1'	-07.4'	103.7°	20°47.7'	-08.5'	104.0°	20°33.0'	-09.5'	104.4°	20°17.9'	-10.6'	104.8°	20°02.4'	-11.7'	105.1°	12			
13	21°24.5'	-05.6'	104.0°	21°09.8'	-06.7'	104.4°	20°54.7'	-07.8'	104.7°	20°39.3'	-08.9'	105.1°	20°23.5'	-09.9'	105.5°	20°07.3'	-11.0'	105.8°	19°50.8'	-12.0'	106.2°	13			
14	21°18.8'	-06.0'	105.1°	21°03.1'	-07.1'	105.4°	20°46.9'	-08.2'	105.8°	20°30.4'	-09.2'	106.2°	20°13.5'	-10.3'	106.5°	19°56.3'	-11.3'	106.9°	19°38.7'	-12.4'	107.2°	14			
15	21°12.8'	-06.4'	106.1°	20°56.0'	-07.5'	106.5°	20°38.7'	-08.6'	106.9°	20°21.2'	-09.6'	107.2°	20°03.2'	-10.7'	107.6°	19°45.0'	-11.7'	107.9°	19°26.4'	-12.7'	108.2°	15			
16	21°06.4'	-06.8'	107.2°	20°48.5'	-07.9'	107.6°	20°30.2'	-09.0'	107.9°	20°11.6'	-10.0'	108.3°	19°52.6'	-11.0'	108.6°	19°33.3'	-12.1'	108.9°	19°13.6'	-13.1'	109.3°	16			
17	20°59.5'	-07.2'	108.2°	20°40.6'	-08.3'	108.6°	20°21.2'	-09.3'	109.0°	20°01.6'	-10.4'	109.3°	19°41.5'	-11.4'	109.7°	19°21.2'	-12.4'	110.0°	19°00.5'	-13.4'	110.3°	17			
18	20°52.3'	-07.6'	109.3°	20°32.3'	-08.7'	109.7°	20°11.9'	-09.7'	110.0°	19°51.2'	-10.7'	110.4°	19°30.2'	-11.8'	110.7°	19°08.8'	-12.8'	111.0°	18°47.1'	-13.8'	111.3°	18			
19	20°44.7'	-08.0'	110.4°	20°23.6'	-09.1'	110.7°	20°02.2'	-10.1'	111.1°	19°40.5'	-11.1'	111.4°	19°18.4'	-12.1'	111.7°	18°56.0'	-13.1'	112.1°	18°33.3'	-14.1'	112.4°	19			
20	20°36.6'	-08.4'	111.4°	20°14.5'	-09.4'	111.8°	19°52.1'	-10.4'	112.1°	19°29.4'	-11.5'	112.4°	19°06.3'	-12.5'	112.8°	18°42.9'	-13.4'	113.1°	18°19.2'	-14.4'	113.4°	20			
21	20°28.2'	-08.8'	112.5°	20°05.1'	-09.8'	112.8°	19°41.7'	-10.8'	113.2°	19°17.9'	-11.8'	113.5°	18°53.8'	-12.8'	113.8°	18°29.5'	-13.8'	114.1°	18°04.8'	-14.7'	114.4°	21			
22	20°19.4'	-09.2'	113.5°	19°55.3'	-10.2'	113.9°	19°30.9'	-11.2'	114.2°	19°06.1'	-12.2'	114.5°	18°41.1'	-13.1'	114.8°	18°15.7'	-14.1'	115.1°	17°50.1'	-15.1'	115.4°	22			
23	20°10.3'	-09.5'	114.6°	19°45.1'	-10.5'	114.9°	19°19.7'	-11.5'	115.3°	18°54.0'	-12.5'	115.6°	18°27.9'	-13.5'	115.9°	18°01.6'	-14.4'	116.2°	17°35.0'	-15.4'	116.5°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6						

68° 292° LHA

Latitude CONTRARY to DECLINATION

68° 292° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

67° 293° LHA

Latitude CONTRARY to Declination

67° 293° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	23°00.0'	-00.2'	90.0°	22°59.8'	-01.4'	90.4°	22°59.1'	-02.5'	90.8°	22°58.0'	-03.6'	91.3°	22°56.4'	-04.8'	91.7°	22°54.4'	-05.9'	92.1°	22°52.0'	-07.0'	92.5°	0
1	22°59.7'	-00.7'	91.1°	22°58.4'	-01.8'	91.5°	22°56.6'	-02.9'	91.9°	22°54.4'	-04.1'	92.4°	22°51.7'	-05.2'	92.8°	22°48.6'	-06.3'	93.2°	22°45.0'	-07.5'	93.6°	1
2	22°59.1'	-01.1'	92.2°	22°56.6'	-02.2'	92.6°	22°53.7'	-03.4'	93.0°	22°50.3'	-04.5'	93.4°	22°46.5'	-05.6'	93.9°	22°42.2'	-06.8'	94.3°	22°37.5'	-07.9'	94.7°	2
3	22°58.0'	-01.6'	93.3°	22°54.4'	-02.7'	93.7°	22°50.3'	-03.8'	94.1°	22°45.8'	-04.9'	94.5°	22°40.8'	-06.1'	94.9°	22°35.5'	-07.2'	95.4°	22°29.6'	-08.3'	95.8°	3
4	22°56.4'	-02.0'	94.3°	22°51.7'	-03.1'	94.8°	22°46.5'	-04.3'	95.2°	22°40.8'	-05.4'	95.6°	22°34.8'	-06.5'	96.0°	22°28.3'	-07.6'	96.4°	22°21.3'	-08.7'	96.8°	4
5	22°54.4'	-02.4'	95.4°	22°48.6'	-03.6'	95.8°	22°42.2'	-04.7'	96.3°	22°35.5'	-05.8'	96.7°	22°28.3'	-06.9'	97.1°	22°20.6'	-08.0'	97.5°	22°12.6'	-09.2'	97.9°	5
6	22°52.0'	-02.9'	96.5°	22°45.0'	-04.0'	96.9°	22°37.5'	-05.1'	97.3°	22°29.6'	-06.2'	97.8°	22°21.3'	-07.4'	98.2°	22°12.6'	-08.5'	98.6°	22°03.4'	-09.6'	99.0°	6
7	22°49.1'	-03.3'	97.6°	22°41.0'	-04.4'	98.0°	22°32.4'	-05.6'	98.4°	22°23.4'	-06.7'	98.8°	22°14.0'	-07.8'	99.2°	22°04.1'	-08.9'	99.6°	21°53.9'	-10.0'	100.0°	7
8	22°45.8'	-03.8'	98.7°	22°36.5'	-04.9'	99.1°	22°26.8'	-06.0'	99.5°	22°16.7'	-07.1'	99.9°	22°06.2'	-08.2'	100.3°	21°55.3'	-09.3'	100.7°	21°43.9'	-10.4'	101.1°	8
9	22°42.1'	-04.2'	99.8°	22°31.7'	-05.3'	100.2°	22°20.9'	-06.4'	100.6°	22°09.6'	-07.5'	101.0°	21°58.0'	-08.6'	101.4°	21°46.0'	-09.7'	101.8°	21°33.5'	-10.8'	102.2°	9
10	22°37.9'	-04.6'	100.8°	22°26.4'	-05.7'	101.3°	22°14.4'	-06.8'	101.7°	22°02.1'	-07.9'	102.1°	21°49.4'	-09.0'	102.4°	21°36.3'	-10.1'	102.8°	21°22.7'	-11.2'	103.2°	10
11	22°33.2'	-05.1'	101.9°	22°20.6'	-06.2'	102.3°	22°07.6'	-07.3'	102.7°	21°54.2'	-08.3'	103.1°	21°40.4'	-09.4'	103.5°	21°26.2'	-10.5'	103.9°	21°11.6'	-11.6'	104.3°	11
12	22°28.2'	-05.5'	103.0°	22°14.5'	-06.6'	103.4°	22°00.4'	-07.7'	103.8°	21°45.9'	-08.8'	104.2°	21°31.0'	-09.8'	104.6°	21°15.7'	-10.9'	105.0°	20°60.0'	-12.0'	105.3°	12
13	22°22.7'	-05.9'	104.1°	22°07.9'	-07.0'	104.5°	21°52.7'	-08.1'	104.9°	21°37.1'	-09.2'	105.3°	21°21.1'	-10.2'	105.6°	21°04.8'	-11.3'	106.0°	20°48.0'	-12.3'	106.4°	13
14	22°16.8'	-06.3'	105.2°	22°00.9'	-07.4'	105.5°	21°44.6'	-08.5'	105.9°	21°27.9'	-09.6'	106.3°	21°10.9'	-10.6'	106.7°	20°53.5'	-11.7'	107.1°	20°35.7'	-12.7'	107.4°	14
15	22°10.4'	-06.8'	106.2°	21°53.5'	-07.8'	106.6°	21°36.1'	-08.9'	107.0°	21°18.4'	-10.0'	107.4°	21°00.3'	-11.0'	107.7°	20°41.8'	-12.1'	108.1°	20°23.0'	-13.1'	108.5°	15
16	22°03.7'	-07.2'	107.3°	21°45.6'	-08.2'	107.7°	21°27.2'	-09.3'	108.1°	21°08.4'	-10.4'	108.4°	20°49.3'	-11.4'	108.8°	20°29.8'	-12.4'	109.2°	20°09.9'	-13.5'	109.5°	16
17	21°56.5'	-07.6'	108.4°	21°37.4'	-08.7'	108.8°	21°17.9'	-09.7'	109.1°	20°58.1'	-10.7'	109.5°	20°37.9'	-11.8'	109.8°	20°17.3'	-12.8'	110.2°	19°56.5'	-13.8'	110.5°	17
18	21°48.9'	-08.0'	109.4°	21°28.7'	-09.1'	109.8°	21°08.2'	-10.1'	110.2°	20°47.3'	-11.1'	110.5°	20°26.1'	-12.1'	110.9°	20°04.5'	-13.2'	111.2°	19°42.6'	-14.2'	111.6°	18
19	21°40.9'	-08.4'	110.5°	21°19.7'	-09.5'	110.9°	20°58.1'	-10.5'	111.2°	20°36.2'	-11.5'	111.6°	20°14.0'	-12.5'	111.9°	19°51.4'	-13.5'	112.3°	19°28.5'	-14.5'	112.6°	19
20	21°32.5'	-08.8'	111.6°	21°10.2'	-09.8'	111.9°	20°47.6'	-10.9'	112.3°	20°24.7'	-11.9'	112.6°	20°01.4'	-12.9'	113.0°	19°37.9'	-13.9'	113.3°	19°14.0'	-14.9'	113.6°	20
21	21°23.6'																					

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

66° 294° LHA

Latitude CONTRARY to Declination

66° 294° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	24°00.0'	-00.2'	90.0°	23°59.8'	-01.4'	90.4°	23°59.1'	-02.5'	90.9°	23°57.9'	-03.7'	91.3°	23°56.3'	-04.8'	91.8°	23°54.2'	-05.9'	92.2°	23°51.6'	-07.1'	92.7°	0
1	23°59.7'	-00.7'	91.1°	23°58.4'	-01.8'	91.5°	23°56.5'	-03.0'	92.0°	23°54.2'	-04.1'	92.4°	23°51.5'	-05.3'	92.9°	23°48.2'	-06.4'	93.3°	23°44.5'	-07.5'	93.7°	1
2	23°59.0'	-01.2'	92.2°	23°56.5'	-02.3'	92.6°	23°53.6'	-03.5'	93.1°	23°50.1'	-04.6'	93.5°	23°46.2'	-05.7'	94.0°	23°41.8'	-06.9'	94.4°	23°37.0'	-08.0'	94.8°	2
3	23°57.9'	-01.6'	93.3°	23°54.2'	-02.8'	93.7°	23°50.1'	-03.9'	94.2°	23°45.5'	-05.0'	94.6°	23°40.5'	-06.2'	95.0°	23°35.0'	-07.3'	95.5°	23°29.0'	-08.4'	95.9°	3
4	23°56.3'	-02.1'	94.4°	23°51.5'	-03.2'	94.8°	23°46.2'	-04.4'	95.3°	23°40.5'	-05.5'	95.7°	23°34.3'	-06.6'	96.1°	23°27.7'	-07.8'	96.6°	23°20.6'	-08.9'	97.0°	4
5	23°54.2'	-02.6'	95.5°	23°48.2'	-03.7'	95.9°	23°41.8'	-04.8'	96.3°	23°35.0'	-06.0'	96.8°	23°27.7'	-07.1'	97.2°	23°19.9'	-08.2'	97.6°	23°11.7'	-09.3'	98.1°	5
6	23°51.6'	-03.0'	96.6°	23°44.5'	-04.2'	97.0°	23°37.0'	-05.3'	97.4°	23°29.0'	-06.4'	97.9°	23°20.6'	-07.5'	98.3°	23°11.7'	-08.6'	98.7°	23°02.4'	-09.8'	99.1°	6
7	23°48.6'	-03.5'	97.7°	23°40.4'	-04.6'	98.1°	23°31.7'	-05.7'	98.5°	23°22.6'	-06.9'	99.0°	23°13.0'	-08.0'	99.4°	23°03.0'	-09.1'	99.8°	22°52.6'	-10.2'	100.2°	7
8	23°45.1'	-03.9'	98.7°	23°35.8'	-05.1'	99.2°	23°26.0'	-06.2'	99.6°	23°15.7'	-07.3'	100.0°	23°05.1'	-08.4'	100.5°	22°54.0'	-09.5'	100.9°	22°42.4'	-10.6'	101.3°	8
9	23°41.2'	-04.4'	99.8°	23°30.7'	-05.5'	100.3°	23°19.8'	-06.6'	100.7°	23°08.4'	-07.7'	101.1°	22°56.7'	-08.8'	101.5°	22°44.5'	-09.9'	101.9°	22°31.8'	-11.0'	102.4°	9
10	23°36.8'	-04.9'	100.9°	23°25.2'	-06.0'	101.4°	23°13.2'	-07.1'	101.8°	23°00.7'	-08.2'	102.2°	22°47.8'	-09.3'	102.6°	22°34.5'	-10.4'	103.0°	22°20.8'	-11.4'	103.4°	10
11	23°31.9'	-05.3'	102.0°	23°19.2'	-06.4'	102.4°	23°06.1'	-07.5'	102.9°	22°52.5'	-08.6'	103.3°	22°38.6'	-09.7'	103.7°	22°24.2'	-10.8'	104.1°	22°09.4'	-11.9'	104.5°	11
12	23°26.6'	-05.8'	103.1°	23°12.8'	-06.9'	103.5°	22°58.6'	-08.0'	103.9°	22°43.9'	-09.0'	104.3°	22°28.9'	-10.1'	104.7°	22°13.4'	-11.2'	105.1°	21°57.5'	-12.3'	105.5°	12
13	23°20.9'	-06.2'	104.2°	23°06.0'	-07.3'	104.6°	22°50.6'	-08.4'	105.0°	22°34.9'	-09.5'	105.4°	22°18.7'	-10.5'	105.8°	22°02.2'	-11.6'	106.2°	21°45.3'	-12.7'	106.6°	13
14	23°14.7'	-06.6'	105.3°	22°58.7'	-07.7'	105.7°	22°42.2'	-08.8'	106.1°	22°25.4'	-09.9'	106.5°	22°08.2'	-10.9'	106.9°	21°50.6'	-12.0'	107.3°	21°32.6'	-13.1'	107.6°	14
15	23°08.0'	-07.1'	106.3°	22°50.9'	-08.2'	106.8°	22°33.4'	-09.2'	107.2°	22°15.5'	-10.3'	107.5°	21°57.3'	-11.4'	107.9°	21°38.6'	-12.4'	108.3°	21°19.5'	-13.4'	108.7°	15
16	23°00.9'	-07.5'	107.4°	22°42.8'	-08.6'	107.8°	22°24.2'	-09.7'	108.2°	22°05.2'	-10.7'	108.6°	21°45.9'	-11.8'	109.0°	21°26.2'	-12.8'	109.4°	21°06.1'	-13.8'	109.7°	16
17	22°53.4'	-08.0'	108.5°	22°34.2'	-09.0'	108.9°	22°14.5'	-10.1'	109.3°	21°54.5'	-11.1'	109.7°	21°34.1'	-12.2'	110.0°	21°13.4'	-13.2'	110.4°	20°52.3'	-14.2'	110.8°	17
18	22°45.4'	-08.4'	109.6°	22°25.1'	-09.4'	110.0°	22°04.5'	-10.5'	110.4°	21°43.4'	-11.5'	110.7°	21°22.0'	-12.5'	111.1°	21°00.2'	-13.6'	111.5°	20°38.1'	-14.6'	111.8°	18
19	22°37.0'	-08.8'	110.7°	22°15.7'	-09.9'	111.0°	21°54.0'	-10.9'	111.4°	21°31.9'	-11.9'	111.8°	21°09.4'	-12.9'	112.1°	20°46.6'	-13.9'	112.5°	20°23.5'	-14.9'	112.8°	19
20	22°28.2'	-09.2'	111.7°	22°05.8'	-10.3'	112.1°	21°43.1'	-11.3'	112.5°	21°20.0'	-12.3'	112.8°	20°56.5'	-13.3'	113.2°	20°32.7'	-14.3'	113.5°	20°08.6'	-15.3'	113.9°	20
21	22°19.0'	-09.7'	112.8°	21°55.6'	-10.7'	113.2°	21°31.8'	-11.7'	113.5°	21°07.7'	-12.7'	113.9°	20°43.2'	-13.7'	114.2°	20°18.4'	-14.7'	114.6°	19°53.3'	-15.7'	114.9°	21
22	22°09.3'	-10.1'	113.9°	21°44.9'	-11.1'	114.2°	21°20.1'	-12.1'	114.6°	20°55.0'	-13.1'	114.9°	20°29.5'	-14.1'	115.3°	20°03.7'	-15.0'	115.6°	19°37.6'	-16.0'	115.9°	22
23	21°59.2'	-10.5'	114.9°	21°33.8'	-11.5'	115.3°	21°08.0'	-12.5'	115.6°	20°41.9'	-13.5'	116.0°	20°15.4'	-14.4'	116.3°	19°48.7'	-15.4'	116.6°	19°21.6'	-16.3'	117.0°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

66° 294° LHA

Latitude CONTRARY to DECLINATION

66° 294° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

65° 295° LHA

Latitude CONTRARY to Declination

65° 295° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	25°00.0'	-00.2'	90.0°	24°59.8'	-01.4'	90.5°	24°59.0'	-02.6'	90.9°	24°57.8'	-03.7'	91.4°	24°56.1'	-04.9'	91.9°	24°53.9'	-06.0'	92.3°	24°51.2'	-07.2'	92.8°	0
1	24°59.7'	-00.7'	91.1°	24°58.4'	-01.9'	91.6°	24°56.5'	-03.0'	92.0°	24°54.1'	-04.2'	92.5°	24°51.2'	-05.3'	93.0°	24°47.9'	-06.5'	93.4°	24°44.1'	-07.6'	93.9°	1
2	24°59.0'	-01.2'	92.2°	24°56.5'	-02.4'	92.7°	24°53.4'	-03.5'	93.1°	24°49.9'	-04.7'	93.6°	24°45.9'	-05.8'	94.1°	24°41.4'	-07.0'	94.5°	24°36.4'	-08.1'	95.0°	2
3	24°57.8'	-01.7'	93.3°	24°54.1'	-02.9'	93.8°	24°49.9'	-04.0'	94.2°	24°45.2'	-05.2'	94.7°	24°40.1'	-06.3'	95.2°	24°34.5'	-07.4'	95.6°	24°28.4'	-08.6'	96.1°	3
4	24°56.1'	-02.2'	94.4°	24°51.2'	-03.3'	94.9°	24°45.9'	-04.5'	95.3°	24°40.1'	-05.6'	95.8°	24°33.8'	-06.8'	96.2°	24°27.0'	-07.9'	96.7°	24°19.8'	-09.0'	97.2°	4
5	24°53.9'	-02.7'	95.5°	24°47.9'	-03.8'	96.0°	24°41.4'	-05.0'	96.4°	24°34.5'	-06.1'	96.9°	24°27.0'	-07.2'	97.3°	24°19.1'	-08.4'	97.8°	24°10.8'	-09.5'	98.2°	5
6	24°51.2'	-03.2'	96.6°	24°44.1'	-04.3'	97.1°	24°36.4'	-05.4'	97.5°	24°28.4'	-06.6'	98.0°	24°19.8'	-07.7'	98.4°	24°10.8'	-08.8'	98.9°	24°01.3'	-09.9'	99.3°	6
7	24°48.1'	-03.6'	97.7°	24°39.8'	-04.8'	98.2°	24°31.0'	-05.9'	98.6°	24°21.8'	-07.0'	99.1°	24°12.1'	-08.2'	99.5°	24°01.9'	-09.3'	100.0°	23°51.3'	-10.4'	100.4°	7
8	24°44.4'	-04.1'	98.8°	24°35.0'	-05.3'	99.3°	24°25.1'	-06.4'	99.7°	24°14.7'	-07.5'	100.2°	24°03.9'	-08.6'	100.6°	23°52.7'	-09.7'	101.0°	23°40.9'	-10.8'	101.5°	8
9	24°40.3'	-04.6'	99.9°	24°29.7'	-05.7'	100.4°	24°18.7'	-06.9'	100.8°	24°07.2'	-08.0'	101.3°	23°55.3'	-09.1'	101.7°	23°42.9'	-10.2'	102.1°	23°30.1'	-11.3'	102.5°	9
10	24°35.7'	-05.1'	101.0°	24°24.0'	-06.2'	101.5°	24°11.9'	-07.3'	101.9°	23°59.3'	-08.4'	102.3°	23°46.2'	-09.5'	102.8°	23°32.7'	-10.6'	103.2°	23°18.8'	-11.7'	103.6°	10
11	24°30.6'	-05.6'	102.1°	24°17.8'	-06.7'	102.5°	24°04.5'	-07.8'	103.0°	23°50.8'	-08.9'	103.4°	23°36.7'	-10.0'	103.8°	23°22.1'	-11.1'	104.3°	23°07.1'	-12.1'	104.7°	11
12	24°25.1'	-06.0'	103.2°	24°11.1'	-07.1'	103.6°	23°56.8'	-08.2'	104.1°	23°42.0'	-09.3'	104.5°	23°26.7'	-10.4'	104.9°	23°11.1'	-11.5'	105.3°	22°55.0'	-12.6'	105.7°	12
13	24°19.0'	-06.5'	104.3°	24°04.0'	-07.6'	104.7°	23°48.5'	-08.7'	105.2°	23°32.6'	-09.8'	105.6°	23°16.3'	-10.9'	106.0°	22°59.6'	-11.9'	106.4°	22°42.4'	-13.0'	106.8°	13
14	24°12.5'	-07.0'	105.4°	23°56.4'	-08.1'	105.8°	23°39.8'	-09.1'	106.2°	23°22.9'	-10.2'	106.7°	23°05.5'	-11.3'	107.1°	22°47.6'	-12.3'	107.5°	22°29.4'	-13.4'	107.9°	14
15	24°05.6'	-07.4'	106.5°	23°48.4'	-08.5'	106.9°	23°30.7'	-09.6'	107.3°	23°12.6'	-10.6'	107.7°	22°54.2'	-11.7'	108.1°	22°35.3'	-12.8'	108.5°	22°16.0'	-13.8'	108.9°	15
16	23°58.2'	-07.9'	107.6°	23°39.8'	-09.0'	108.0°	23°21.1'	-10.0'	108.4°	23°02.0'	-11.1'	108.8°	22°42.5'	-12.1'	109.2°	22°22.5'	-13.2'	109.6°	22°02.2'	-14.2'	110.0°	16
17	23°50.3'	-08.3'	108.6°	23°30.9'	-09.4'	109.1°	23°11.1'	-10.5'	109.5°	22°50.9'	-11.5'	109.9°	22°30.3'	-12.5'	110.3°	22°09.4'	-13.6'	110.6°	21°48.0'	-14.6'	111.0°	17
18	23°41.9'	-08.8'	109.7°	23°21.5'	-09.8'	110.1°	23°00.6'	-10.9'	110.5°	22°39.4'	-11.9'	110.9°	22°17.8'	-13.0'	111.3°	21°55.8'	-14.0'	111.7°	21°33.4'	-15.0'	112.1°	18
19	23°33.2'	-09.2'	110.8°	23°11.7'	-10.3'	111.2°	22°49.8'	-11.3'	111.6°	22°27.5'	-12.3'	112.0°	22°04.8'	-13.4'	112.4°	21°41.8'	-14.4'	112.7°	21°18.5'	-15.4'	113.1°	19
20	23°23.9'	-09.7'	111.9°	23°01.4'	-10.7'	112.3°	22°38.4'	-11.7'	112.7°	22°15.1'	-12.7'	113.0°	21°51.5'	-13.8'	113.4°	21°27.5'	-14.8'	113.8°	21°03.1'	-15.7'	114.1°	20
21	23°14.3'	-10.1'	113.0°	22°50.7'	-11.1'	11																

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

64° 296° LHA

Latitude CONTRARY to Declination

64° 296° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°00.0'	-00.3'	90.0°	25°59.7'	-01.4'	90.5°	25°59.0'	-02.6'	91.0°	25°57.7'	-03.7'	91.5°	25°55.9'	-04.9'	91.9°	25°53.6'	-06.1'	92.4°	25°50.8'	-07.2'	92.9°	0
1	25°59.7'	-00.8'	91.1°	25°58.3'	-01.9'	91.6°	25°56.4'	-03.1'	92.1°	25°54.0'	-04.3'	92.6°	25°51.0'	-05.4'	93.1°	25°47.6'	-06.6'	93.5°	25°43.6'	-07.7'	94.0°	1
2	25°58.9'	-01.3'	92.2°	25°56.4'	-02.4'	92.7°	25°53.3'	-03.6'	93.2°	25°49.7'	-04.8'	93.7°	25°45.6'	-05.9'	94.2°	25°41.0'	-07.1'	94.6°	25°35.9'	-08.2'	95.1°	2
3	25°57.7'	-01.8'	93.3°	25°54.0'	-02.9'	93.8°	25°49.7'	-04.1'	94.3°	25°44.9'	-05.3'	94.8°	25°39.7'	-06.4'	95.3°	25°33.9'	-07.6'	95.7°	25°27.7'	-08.7'	96.2°	3
4	25°55.9'	-02.3'	94.4°	25°51.0'	-03.5'	94.9°	25°45.6'	-04.6'	95.4°	25°39.7'	-05.8'	95.9°	25°33.3'	-06.9'	96.4°	25°26.4'	-08.0'	96.8°	25°19.0'	-09.2'	97.3°	4
5	25°53.6'	-02.8'	95.6°	25°47.6'	-04.0'	96.0°	25°41.0'	-05.1'	96.5°	25°33.9'	-06.3'	97.0°	25°26.4'	-07.4'	97.5°	25°18.3'	-08.5'	97.9°	25°09.8'	-09.7'	98.4°	5
6	25°50.8'	-03.3'	96.7°	25°43.6'	-04.5'	97.1°	25°35.9'	-05.6'	97.6°	25°27.7'	-06.7'	98.1°	25°19.0'	-07.9'	98.6°	25°09.8'	-09.0'	99.0°	25°00.1'	-10.1'	99.5°	6
7	25°47.5'	-03.8'	97.8°	25°39.1'	-05.0'	98.3°	25°30.3'	-06.1'	98.7°	25°20.9'	-07.2'	99.2°	25°11.1'	-08.4'	99.7°	25°00.8'	-09.5'	100.1°	24°50.0'	-10.6'	100.6°	7
8	25°43.7'	-04.3'	98.9°	25°34.2'	-05.5'	99.4°	25°24.2'	-06.6'	99.8°	25°13.7'	-07.7'	100.3°	25°02.7'	-08.8'	100.8°	24°51.3'	-10.0'	101.2°	24°39.4'	-11.1'	101.7°	8
9	25°39.4'	-04.8'	100.0°	25°28.7'	-05.9'	100.5°	25°17.6'	-07.1'	100.9°	25°06.0'	-08.2'	101.4°	24°53.9'	-09.3'	101.8°	24°41.3'	-10.4'	102.3°	24°28.3'	-11.5'	102.7°	9
10	25°34.6'	-05.3'	101.1°	25°22.8'	-06.4'	101.6°	25°10.5'	-07.6'	102.0°	24°57.8'	-08.7'	102.5°	24°44.6'	-09.8'	102.9°	24°30.9'	-10.9'	103.4°	24°16.8'	-12.0'	103.8°	10
11	25°29.3'	-05.8'	102.2°	25°16.3'	-06.9'	102.7°	25°02.9'	-08.0'	103.1°	24°49.1'	-09.2'	103.6°	24°34.8'	-10.3'	104.0°	24°20.0'	-11.3'	104.5°	24°04.8'	-12.4'	104.9°	11
12	25°23.5'	-06.3'	103.3°	25°09.4'	-07.4'	103.8°	24°54.9'	-08.5'	104.2°	24°39.9'	-09.6'	104.7°	24°24.5'	-10.7'	105.1°	24°08.7'	-11.8'	105.5°	23°52.4'	-12.9'	106.0°	12
13	25°17.2'	-06.8'	104.4°	25°02.0'	-07.9'	104.9°	24°46.4'	-09.0'	105.3°	24°30.3'	-10.1'	105.8°	24°13.8'	-11.2'	106.2°	23°56.9'	-12.2'	106.6°	23°39.5'	-13.3'	107.0°	13
14	25°10.4'	-07.3'	105.5°	24°54.1'	-08.4'	106.0°	24°37.4'	-09.5'	106.4°	24°20.2'	-10.5'	106.8°	24°02.6'	-11.6'	107.3°	23°44.6'	-12.7'	107.7°	23°26.2'	-13.7'	108.1°	14
15	25°03.1'	-07.8'	106.6°	24°45.7'	-08.8'	107.0°	24°27.9'	-09.9'	107.5°	24°09.7'	-11.0'	107.9°	23°51.0'	-12.1'	108.3°	23°31.9'	-13.1'	108.8°	23°12.4'	-14.2'	109.2°	15
16	24°55.3'	-08.2'	107.7°	24°36.9'	-09.3'	108.1°	24°18.0'	-10.4'	108.6°	23°58.7'	-11.5'	109.0°	23°39.0'	-12.5'	109.4°	23°18.8'	-13.6'	109.8°	22°58.3'	-14.6'	110.2°	16
17	24°47.1'	-08.7'	108.8°	24°27.6'	-09.8'	109.2°	24°07.6'	-10.8'	109.6°	23°47.2'	-11.9'	110.1°	23°26.4'	-12.9'	110.5°	23°05.3'	-14.0'	110.9°	22°43.7'	-15.0'	111.3°	17
18	24°38.4'	-09.2'	109.9°	24°17.8'	-10.2'	110.3°	23°56.8'	-11.3'	110.7°	23°35.3'	-12.3'	111.1°	23°13.5'	-13.4'	111.5°	22°51.3'	-14.4'	111.9°	22°28.7'	-15.4'	112.3°	18
19	24°29.2'	-09.6'	111.0°	24°07.6'	-10.7'	111.4°	23°45.5'	-11.7'	111.8°	23°23.0'	-12.8'	112.2°	23°00.1'	-13.8'	112.6°	22°36.9'	-14.8'	113.0°	22°13.3'	-15.8'	113.4°	19
20	24°19.6'	-10.1'	112.0°	23°56.9'	-11.1'	112.5°	23°33.7'	-12.2'	112.9°	23°10.2'	-13.2'	113.3°	22°46.3'	-14.2'	113.7°	22°22.1'	-15.2'	114.0°	21°57.5'	-16.2'	114.4°	20
21	24°09.5'	-10.6'	113.1°	23°45.7'	-11.6'	113.5°	23°21.6'	-12.6'	113.9°	22°57.0'	-13.6'	114.3°	22°32.1'	-14.6'	114.7°	22°06.9'	-15.6'	115.1°	21°41.3'	-16.6'	115.4°	21
22	23°58.9'	-11.0'	114.2°	23°34.1'	-12.0'	114.6°	23°09.0'	-13.0'	115.0°	22°43.4'	-14.0'	115.4°	22°17.5'	-15.0'	115.8°	21°51.3'	-16.0'	116.1°	21°24.7'	-17.0'	116.5°	22
23	23°47.9'	-11.5'	115.3°	23°22.1'	-12.5'	115.7°	22°55.9'	-13.5'	116.1°	22°29.4'	-14.4'	116.4°	22°02.5'	-15.4'	116.8°	21°35.3'	-16.4'	117.2°	21°07.7'	-17.3'	117.5°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			Dec°

64° 296° LHA

Latitude CONTRARY to DECLINATION

64° 296° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

63° 297° LHA

Latitude CONTRARY to Declination

63° 297° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	27°00.0'	-00.3'	90.0°	26°59.7'	-01.4'	90.5°	26°58.9'	-02.6'	91.0°	26°57.6'	-03.8'	91.5°	26°55.7'	-05.0'	92.0°	26°53.3'	-06.1'	92.5°	26°50.4'	-07.3'	93.0°	0
1	26°59.7'	-00.8'	91.1°	26°58.3'	-02.0'	91.6°	26°56.3'	-03.1'	92.1°	26°53.8'	-04.3'	92.6°	26°50.8'	-05.5'	93.2°	26°47.2'	-06.6'	93.7°	26°43.1'	-07.8'	94.2°	1
2	26°58.9'	-01.3'	92.2°	26°56.3'	-02.5'	92.8°	26°53.2'	-03.7'	93.3°	26°49.5'	-04.8'	93.8°	26°45.3'	-06.0'	94.3°	26°40.6'	-07.2'	94.8°	26°35.3'	-08.3'	95.3°	2
3	26°57.6'	-01.9'	93.4°	26°53.8'	-03.0'	93.9°	26°49.5'	-04.2'	94.4°	26°44.7'	-05.4'	94.9°	26°39.3'	-06.5'	95.4°	26°33.4'	-07.7'	95.9°	26°27.0'	-08.8'	96.4°	3
4	26°55.7'	-02.4'	94.5°	26°50.8'	-03.6'	95.0°	26°45.3'	-04.7'	95.5°	26°39.3'	-05.9'	96.0°	26°32.8'	-07.0'	96.5°	26°25.7'	-08.2'	97.0°	26°18.2'	-09.3'	97.5°	4
5	26°53.3'	-02.9'	95.6°	26°47.2'	-04.1'	96.1°	26°40.6'	-05.3'	96.6°	26°33.4'	-06.4'	97.1°	26°25.7'	-07.6'	97.6°	26°17.5'	-08.7'	98.1°	26°08.8'	-09.8'	98.6°	5
6	26°50.4'	-03.5'	96.7°	26°43.1'	-04.6'	97.2°	26°35.3'	-05.8'	97.7°	26°27.0'	-06.9'	98.2°	26°18.2'	-08.1'	98.7°	26°08.8'	-09.2'	99.2°	25°59.0'	-10.3'	99.7°	6
7	26°47.0'	-04.0'	97.8°	26°38.5'	-05.1'	98.3°	26°29.5'	-06.3'	98.8°	26°20.1'	-07.4'	99.3°	26°10.1'	-08.6'	99.8°	25°59.6'	-09.7'	100.3°	25°48.6'	-10.8'	100.8°	7
8	26°43.0'	-04.5'	99.0°	26°33.4'	-05.7'	99.5°	26°23.3'	-06.8'	99.9°	26°12.6'	-07.9'	100.4°	26°01.5'	-09.1'	100.9°	25°49.9'	-10.2'	101.4°	25°37.8'	-11.3'	101.9°	8
9	26°38.5'	-05.0'	100.1°	26°27.7'	-06.2'	100.6°	26°16.5'	-07.3'	101.1°	26°04.7'	-08.4'	101.5°	25°52.5'	-09.6'	102.0°	25°39.7'	-10.7'	102.5°	25°26.5'	-11.8'	103.0°	9
10	26°33.4'	-05.5'	101.2°	26°21.5'	-06.7'	101.7°	26°09.1'	-07.8'	102.2°	25°56.3'	-08.9'	102.6°	25°42.9'	-10.1'	103.1°	25°29.0'	-11.2'	103.6°	25°14.7'	-12.3'	104.0°	10
11	26°27.9'	-06.1'	102.3°	26°14.9'	-07.2'	102.8°	26°01.3'	-08.3'	103.3°	25°47.3'	-09.4'	103.7°	25°32.8'	-10.5'	104.2°	25°17.9'	-11.6'	104.7°	25°02.4'	-12.7'	105.1°	11
12	26°21.8'	-06.6'	103.4°	26°07.7'	-07.7'	103.9°	25°53.0'	-08.8'	104.4°	25°37.9'	-09.9'	104.8°	25°22.3'	-11.0'	105.3°	25°06.2'	-12.1'	105.8°	24°49.7'	-13.2'	106.2°	12
13	26°15.3'	-07.1'	104.5°	25°60.0'	-08.2'	105.0°	25°44.2'	-09.3'	105.5°	25°28.0'	-10.4'	105.9°	25°11.3'	-11.5'	106.4°	24°54.1'	-12.6'	106.8°	24°36.5'	-13.7'	107.3°	13
14	26°08.2'	-07.6'	105.6°	25°51.8'	-08.7'	106.1°	25°34.9'	-09.8'	106.6°	25°17.6'	-10.9'	107.0°	24°59.8'	-12.0'	107.5°	24°41.5'	-13.0'	107.9°	24°22.9'	-14.1'	108.3°	14
15	26°00.6'	-08.1'	106.7°	25°43.1'	-09.2'	107.2°	25°25.1'	-10.3'	107.7°	25°06.7'	-11.4'	108.1°	24°47.8'	-12.4'	108.5°	24°28.5'	-13.5'	109.0°	24°08.8'	-14.5'	109.4°	15
16	25°52.5'	-08.6'	107.8°	25°33.9'	-09.7'	108.3°	25°14.8'	-10.8'	108.7°	24°55.3'	-11.8'	109.2°	24°35.4'	-12.9'	109.6°	24°15.0'	-13.9'	110.1°	23°54.2'	-15.0'	110.5°	16
17	25°43.9'	-09.1'	108.9°	25°24.2'	-10.2'	109.4°	25°04.0'	-11.2'	109.8°	24°43.5'	-12.3'	110.3°	24°22.5'	-13.3'	110.7°	24°01.1'	-14.4'	111.1°	23°39.2'	-15.4'	111.5°	17
18	25°34.8'	-09.6'	110.0°	25°14.0'	-10.6'	110.5°	24°52.8'	-11.7'	110.9°	24°31.2'	-12.7'	111.3°	24°09.1'	-13.8'	111.8°	23°46.7'	-14.8'	112.2°	23°23.8'	-15.8'	112.6°	18
19	25°25.2'	-10.1'	111.1°	25°03.4'	-11.1'	111.6°	24°41.1'	-12.2'	112.0°	24°18.4'	-13.2'	112.4°	23°55.3'	-14.2'	112.8°	23°31.9'	-15.2'	113.2°	23°08.0'	-16.2'	113.6°	19
20	25°15.2'	-10.5'	112.2°	24°52.3'	-11.6'	112.7°	24°29.0'	-12.6'	113.1°	24°05.2'	-13.6'	113.5°	23°41.1'	-14.7'	113.9°	23°16.6'	-15.7'	114.3°	22°51.8'	-16.7'	114.7°	20
21	25°04.6'	-11.0'	113.3°	24°40.7'	-12.0'</																	

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

62° 298° LHA

Latitude CONTRARY to Declination

62° 298° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	28°00.0'	-00.3'	90.0°	27°59.7'	-01.5'	90.5°	27°58.9'	-02.6'	91.1°	27°57.5'	-03.8'	91.6°	27°55.5'	-05.0'	92.1°	27°53.0'	-06.2'	92.7°	27°50.0'	-07.4'	93.2°	0
1	27°59.7'	-00.8'	91.1°	27°58.3'	-02.0'	91.7°	27°56.2'	-03.2'	92.2°	27°53.7'	-04.4'	92.7°	27°50.5'	-05.6'	93.3°	27°46.9'	-06.7'	93.8°	27°42.6'	-07.9'	94.3°	1
2	27°58.8'	-01.4'	92.3°	27°56.2'	-02.6'	92.8°	27°53.0'	-03.8'	93.3°	27°49.3'	-04.9'	93.9°	27°45.0'	-06.1'	94.4°	27°40.1'	-07.3'	94.9°	27°34.7'	-08.4'	95.4°	2
3	27°57.5'	-01.9'	93.4°	27°53.7'	-03.1'	93.9°	27°49.3'	-04.3'	94.5°	27°44.3'	-05.5'	95.0°	27°38.9'	-06.6'	95.5°	27°32.8'	-07.8'	96.0°	27°26.3'	-09.0'	96.5°	3
4	27°55.5'	-02.5'	94.5°	27°50.5'	-03.7'	95.1°	27°45.0'	-04.9'	95.6°	27°38.9'	-06.0'	96.1°	27°32.2'	-07.2'	96.6°	27°25.0'	-08.3'	97.1°	27°17.3'	-09.5'	97.7°	4
5	27°53.0'	-03.1'	95.7°	27°46.9'	-04.2'	96.2°	27°40.1'	-05.4'	96.7°	27°32.8'	-06.6'	97.2°	27°25.0'	-07.7'	97.7°	27°16.7'	-08.9'	98.3°	27°07.8'	-10.0'	98.8°	5
6	27°50.0'	-03.6'	96.8°	27°42.6'	-04.8'	97.3°	27°34.7'	-05.9'	97.8°	27°26.3'	-07.1'	98.3°	27°17.3'	-08.3'	98.9°	27°07.8'	-09.4'	99.4°	26°57.8'	-10.5'	99.9°	6
7	27°46.4'	-04.2'	97.9°	27°37.9'	-05.3'	98.4°	27°28.8'	-06.5'	99.0°	27°19.2'	-07.6'	99.5°	27°09.1'	-08.8'	100.0°	26°58.4'	-09.9'	100.5°	26°47.2'	-11.1'	101.0°	7
8	27°42.2'	-04.7'	99.0°	27°32.5'	-05.9'	99.6°	27°22.3'	-07.0'	100.1°	27°11.6'	-08.2'	100.6°	27°00.3'	-09.3'	101.1°	26°48.5'	-10.4'	101.6°	26°36.2'	-11.6'	102.1°	8
9	27°37.5'	-05.2'	100.2°	27°26.7'	-06.4'	100.7°	27°15.3'	-07.5'	101.2°	27°03.4'	-08.7'	101.7°	26°51.0'	-09.8'	102.2°	26°38.1'	-10.9'	102.7°	26°24.6'	-12.1'	103.2°	9
10	27°32.3'	-05.8'	101.3°	27°20.3'	-06.9'	101.8°	27°07.7'	-08.1'	102.3°	26°54.7'	-09.2'	102.8°	26°41.2'	-10.3'	103.3°	26°27.1'	-11.4'	103.8°	26°12.6'	-12.6'	104.3°	10
11	27°26.5'	-06.3'	102.4°	27°13.3'	-07.5'	102.9°	26°59.7'	-08.6'	103.4°	26°45.5'	-09.7'	103.9°	26°30.8'	-10.8'	104.4°	26°15.7'	-11.9'	104.9°	26°00.0'	-13.0'	105.4°	11
12	27°20.2'	-06.9'	103.5°	27°05.9'	-08.0'	104.0°	26°51.1'	-09.1'	104.5°	26°35.8'	-10.2'	105.0°	26°20.0'	-11.3'	105.5°	26°03.7'	-12.4'	106.0°	25°47.0'	-13.5'	106.4°	12
13	27°13.3'	-07.4'	104.7°	26°57.9'	-08.5'	105.1°	26°42.0'	-09.6'	105.6°	26°25.6'	-10.7'	106.1°	26°08.7'	-11.8'	106.6°	25°51.3'	-12.9'	107.1°	25°33.5'	-14.0'	107.5°	13
14	27°05.9'	-07.9'	105.8°	26°49.4'	-09.0'	106.3°	26°32.3'	-10.1'	106.7°	26°14.8'	-11.2'	107.2°	25°56.8'	-12.3'	107.7°	25°38.4'	-13.4'	108.1°	25°19.5'	-14.5'	108.6°	14
15	26°58.0'	-08.4'	106.9°	26°40.3'	-09.5'	107.4°	26°22.2'	-10.6'	107.8°	26°03.6'	-11.7'	108.3°	25°44.5'	-12.8'	108.8°	25°25.0'	-13.9'	109.2°	25°05.0'	-14.9'	109.7°	15
16	26°49.6'	-09.0'	108.0°	26°30.8'	-10.1'	108.5°	26°11.6'	-11.1'	108.9°	25°51.9'	-12.2'	109.4°	25°31.7'	-13.3'	109.9°	25°11.1'	-14.3'	110.3°	24°50.1'	-15.4'	110.7°	16
17	26°40.6'	-09.5'	109.1°	26°20.7'	-10.6'	109.6°	26°00.4'	-11.6'	110.0°	25°39.6'	-12.7'	110.5°	25°18.4'	-13.7'	110.9°	24°56.8'	-14.8'	111.4°	24°34.7'	-15.8'	111.8°	17
18	26°31.1'	-10.0'	110.2°	26°10.2'	-11.1'	110.7°	25°48.8'	-12.1'	111.1°	25°26.9'	-13.2'	111.6°	25°04.7'	-14.2'	112.0°	24°42.0'	-15.2'	112.4°	24°18.9'	-16.3'	112.9°	18
19	26°21.2'	-10.5'	111.3°	25°59.1'	-11.5'	111.8°	25°36.7'	-12.6'	112.2°	25°13.8'	-13.6'	112.6°	24°50.5'	-14.7'	113.1°	24°26.7'	-15.7'	113.5°	24°02.6'	-16.7'	113.9°	19
20	26°10.7'	-11.0'	112.4°	25°47.6'	-12.0'	112.9°	25°24.1'	-13.1'	113.3°	25°00.1'	-14.1'	113.7°	24°35.8'	-15.1'	114.1°	24°11.1'	-16.1'	114.6°	23°45.9'	-17.1'	115.0°	20
21	25°59.7'	-11.5'	113.5°	25°35.6'	-12.5'	113.9°	25°11.0'	-13.5'	114.4°	24°46.0'	-14.6'	114.8°	24°20.7'	-15.6'	115.2°	23°54.9'	-16.6'	115.6°	23°28.8'	-17.5'	116.0°	21
22	25°48.2'	-12.0'	114.6°	25°23.0'	-13.0'	115.0°	24°57.5'	-14.0'	115.4°	24°31.5'	-15.0'	115.9°	24°05.1'	-16.0'	116.3°	23°38.4'	-17.0'	116.7°	23°11.3'	-17.9'	117.1°	22
23	25°36.2'	-12.4'	115.7°	25°10.0'	-13.5'	116.1°	24°43.5'	-14.5'	116.5°	24°16.5'	-15.4'	116.9°	23°49.1'	-16.4'	117.3°	23°21.4'	-17.4'	117.7°	22°53.3'	-18.3'	118.1°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

62° 298° LHA

Latitude CONTRARY to DECLINATION

62° 298° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

61° 299° LHA

Latitude CONTRARY to Declination

61° 299° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	29°00.0'	-00.3'	90.0°	28°59.7'	-01.5'	90.6°	28°58.8'	-02.7'	91.1°	28°57.4'	-03.9'	91.7°	28°55.4'	-05.1'	92.2°	28°52.8'	-06.3'	92.8°	28°49.6'	-07.4'	93.3°	0
1	28°59.7'	-00.9'	91.1°	28°58.2'	-02.1'	91.7°	28°56.2'	-03.3'	92.3°	28°53.5'	-04.5'	92.8°	28°50.3'	-05.6'	93.4°	28°46.5'	-06.8'	93.9°	28°42.1'	-08.0'	94.4°	1
2	28°58.8'	-01.5'	92.3°	28°56.2'	-02.6'	92.8°	28°52.9'	-03.8'	93.4°	28°49.1'	-05.0'	93.9°	28°44.7'	-06.2'	94.5°	28°39.7'	-07.4'	95.0°	28°34.1'	-08.6'	95.6°	2
3	28°57.4'	-02.0'	93.4°	28°53.5'	-03.2'	94.0°	28°49.1'	-04.4'	94.5°	28°44.0'	-05.6'	95.1°	28°38.4'	-06.8'	95.6°	28°32.3'	-08.0'	96.2°	28°25.6'	-09.1'	96.7°	3
4	28°55.4'	-02.6'	94.6°	28°50.3'	-03.8'	95.1°	28°44.7'	-05.0'	95.7°	28°38.4'	-06.2'	96.2°	28°31.7'	-07.3'	96.8°	28°24.3'	-08.5'	97.3°	28°16.4'	-09.7'	97.8°	4
5	28°52.8'	-03.2'	95.7°	28°46.5'	-04.4'	96.3°	28°39.7'	-05.5'	96.8°	28°32.3'	-06.7'	97.3°	28°24.3'	-07.9'	97.9°	28°15.8'	-09.1'	98.4°	28°06.8'	-10.2'	98.9°	5
6	28°49.6'	-03.8'	96.9°	28°42.1'	-04.9'	97.4°	28°34.1'	-06.1'	97.9°	28°25.6'	-07.3'	98.5°	28°16.4'	-08.4'	99.0°	28°06.8'	-09.6'	99.5°	27°56.6'	-10.8'	100.1°	6
7	28°45.8'	-04.3'	98.0°	28°37.2'	-05.5'	98.5°	28°28.0'	-06.7'	99.1°	28°18.3'	-07.8'	99.6°	28°08.0'	-09.0'	100.1°	27°57.2'	-10.1'	100.7°	27°45.8'	-11.3'	101.2°	7
8	28°41.5'	-04.9'	99.1°	28°31.7'	-06.1'	99.7°	28°21.3'	-07.2'	100.2°	28°10.4'	-08.4'	100.7°	27°59.0'	-09.5'	101.3°	27°47.0'	-10.7'	101.8°	27°34.5'	-11.8'	102.3°	8
9	28°36.6'	-05.5'	100.3°	28°25.6'	-06.6'	100.8°	28°14.1'	-07.8'	101.3°	28°02.0'	-08.9'	101.9°	27°49.5'	-10.1'	102.4°	27°36.3'	-11.2'	102.9°	27°22.7'	-12.3'	103.4°	9
10	28°31.1'	-06.0'	101.4°	28°19.0'	-07.2'	101.9°	28°06.3'	-08.3'	102.5°	27°53.1'	-09.5'	103.0°	27°39.4'	-10.6'	103.5°	27°25.1'	-11.7'	104.0°	27°10.4'	-12.8'	104.5°	10
11	28°25.1'	-06.6'	102.5°	28°11.8'	-07.7'	103.1°	27°58.0'	-08.9'	103.6°	27°43.6'	-10.0'	104.1°	27°28.8'	-11.1'	104.6°	27°13.4'	-12.2'	105.1°	26°57.5'	-13.4'	105.6°	11
12	28°18.5'	-07.1'	103.7°	28°04.1'	-08.3'	104.2°	27°49.1'	-09.4'	104.7°	27°33.6'	-10.5'	105.2°	27°17.6'	-11.7'	105.7°	27°01.2'	-12.8'	106.2°	26°44.2'	-13.9'	106.7°	12
13	28°11.3'	-07.7'	104.8°	27°55.8'	-08.8'	105.3°	27°39.7'	-10.0'	105.8°	27°23.1'	-11.1'	106.3°	27°06.0'	-12.2'	106.8°	26°48.4'	-13.3'	107.3°	26°30.3'	-14.3'	107.8°	13
14	28°03.6'	-08.2'	105.9°	27°46.9'	-09.4'	106.4°	27°29.7'	-10.5'	106.9°	27°12.0'	-11.6'	107.4°	26°53.8'	-12.7'	107.9°	26°35.1'	-13.8'	108.4°	26°16.0'	-14.8'	108.9°	14
15	27°55.4'	-08.8'	107.0°	27°37.6'	-09.9'	107.5°	27°19.2'	-11.0'	108.0°	27°00.4'	-12.1'	108.5°	26°41.1'	-13.2'	109.0°	26°21.4'	-14.3'	109.5°	26°01.1'	-15.3'	109.9°	15
16	27°46.6'	-09.3'	108.2°	27°27.7'	-10.4'	108.6°	27°08.2'	-11.5'	109.1°	26°48.3'	-12.6'	109.6°	26°28.0'	-13.7'	110.1°	26°07.1'	-14.7'	110.6°	25°45.8'	-15.8'	111.0°	16
17	27°37.3'	-09.9'	109.3°	27°17.2'	-11.0'	109.8°	26°56.7'	-12.0'	110.2°	26°35.7'	-13.1'	110.7°	26°14.3'	-14.2'	111.2°	25°52.4'	-15.2'	111.6°	25°30.1'	-16.2'	112.1°	17
18	27°27.4'	-10.4'	110.4°	27°06.3'	-11.5'	110.9°	26°44.7'	-12.5'	111.3°	26°22.6'	-13.6'	111.8°	26°00.1'	-14.6'	112.3°	25°37.2'	-15.7'	112.7°	25°13.8'	-16.7'	113.1°	18
19	27°17.0'	-10.9'	111.5°	26°54.8'	-12.0'	112.0°	26°32.1'	-13.0'	112.4°	26°09.0'	-14.1'	112.9°	25°45.5'	-15.1'	113.3°	25°21.5'	-16.1'	113.8°	24°57.1'	-17.2'	114.2°	19
20	27°06.1'	-11.4'	112.6°	26°42.8'	-12.5'	113.1°	26°19.1'	-13.5'	113.5°	25°54.9'	-14.6'	114.0°	25°30.4'	-15.6'	114.4°	25°05.4'	-16.6'	114.8°	24°40.0'	-17.6'	115.3°	20
21	26°54.7'	-11.9'	113.7°	26°																		

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

60° 300° LHA

Latitude CONTRARY to Declination

60° 300° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	30°00.0'	-00.3'	90.0°	29°59.7'	-01.5'	90.6°	29°58.8'	-02.7'	91.2°	29°57.3'	-03.9'	91.7°	29°55.2'	-05.1'	92.3°	29°52.5'	-06.3'	92.9°	29°49.1'	-07.5'	93.5°	0
1	29°59.6'	-00.9'	91.2°	29°58.2'	-02.1'	91.7°	29°56.1'	-03.3'	92.3°	29°53.4'	-04.5'	92.9°	29°50.0'	-05.7'	93.5°	29°46.1'	-06.9'	94.0°	29°41.6'	-08.1'	94.6°	1
2	29°58.7'	-01.5'	92.3°	29°56.1'	-02.7'	92.9°	29°52.8'	-03.9'	93.5°	29°48.8'	-05.1'	94.0°	29°44.3'	-06.3'	94.6°	29°39.2'	-07.5'	95.2°	29°33.5'	-08.7'	95.7°	2
3	29°57.3'	-02.1'	93.5°	29°53.4'	-03.3'	94.0°	29°48.8'	-04.5'	94.6°	29°43.7'	-05.7'	95.2°	29°38.0'	-06.9'	95.7°	29°31.7'	-08.1'	96.3°	29°24.8'	-09.3'	96.9°	3
4	29°55.2'	-02.7'	94.6°	29°50.0'	-03.9'	95.2°	29°44.3'	-05.1'	95.8°	29°38.0'	-06.3'	96.3°	29°31.1'	-07.5'	96.9°	29°23.6'	-08.7'	97.4°	29°15.5'	-09.8'	98.0°	4
5	29°52.5'	-03.3'	95.8°	29°46.1'	-04.5'	96.3°	29°39.2'	-05.7'	96.9°	29°31.7'	-06.9'	97.5°	29°23.6'	-08.1'	98.0°	29°14.9'	-09.2'	98.6°	29°05.7'	-10.4'	99.1°	5
6	29°49.1'	-03.9'	96.9°	29°41.6'	-05.1'	97.5°	29°33.5'	-06.3'	98.1°	29°24.8'	-07.5'	98.6°	29°15.5'	-08.6'	99.2°	29°05.7'	-09.8'	99.7°	28°55.3'	-11.0'	100.3°	6
7	29°45.2'	-04.5'	98.1°	29°36.5'	-05.7'	98.6°	29°27.2'	-06.9'	99.2°	29°17.3'	-08.0'	99.7°	29°06.9'	-09.2'	100.3°	28°55.9'	-10.4'	100.8°	28°44.3'	-11.5'	101.4°	7
8	29°40.7'	-05.1'	99.2°	29°30.8'	-06.3'	99.8°	29°20.3'	-07.5'	100.3°	29°09.3'	-08.6'	100.9°	28°57.7'	-09.8'	101.4°	28°45.5'	-10.9'	102.0°	28°32.8'	-12.1'	102.5°	8
9	29°35.6'	-05.7'	100.4°	29°24.5'	-06.9'	100.9°	29°12.9'	-08.0'	101.5°	29°00.7'	-09.2'	102.0°	28°47.9'	-10.3'	102.6°	28°34.6'	-11.5'	103.1°	28°20.7'	-12.6'	103.6°	9
10	29°29.9'	-06.3'	101.5°	29°17.7'	-07.4'	102.1°	29°04.9'	-08.6'	102.6°	28°51.5'	-09.8'	103.1°	28°37.6'	-10.9'	103.7°	28°23.1'	-12.0'	104.2°	28°08.1'	-13.1'	104.7°	10
11	29°23.6'	-06.9'	102.7°	29°10.2'	-08.0'	103.2°	28°56.3'	-09.2'	103.7°	28°41.7'	-10.3'	104.3°	28°26.7'	-11.4'	104.8°	28°11.1'	-12.6'	105.3°	27°55.0'	-13.7'	105.8°	11
12	29°16.8'	-07.4'	103.8°	29°02.2'	-08.6'	104.3°	28°47.1'	-09.7'	104.9°	28°31.4'	-10.9'	105.4°	28°15.2'	-12.0'	105.9°	27°58.5'	-13.1'	106.4°	27°41.3'	-14.2'	106.9°	12
13	29°09.3'	-08.0'	104.9°	28°53.6'	-09.2'	105.5°	28°37.4'	-10.3'	106.0°	28°20.6'	-11.4'	106.5°	28°03.3'	-12.5'	107.0°	27°45.4'	-13.6'	107.5°	27°27.1'	-14.7'	108.0°	13
14	29°01.3'	-08.6'	106.1°	28°44.5'	-09.7'	106.6°	28°27.1'	-10.8'	107.1°	28°09.2'	-11.9'	107.6°	27°50.7'	-13.0'	108.1°	27°31.8'	-14.1'	108.6°	27°12.4'	-15.2'	109.1°	14
15	28°52.7'	-09.1'	107.2°	28°34.7'	-10.3'	107.7°	28°16.2'	-11.4'	108.2°	27°57.2'	-12.5'	108.7°	27°37.7'	-13.6'	109.2°	27°17.7'	-14.6'	109.7°	26°57.2'	-15.7'	110.2°	15
16	28°43.6'	-09.7'	108.3°	28°24.5'	-10.8'	108.8°	28°04.9'	-11.9'	109.3°	27°44.7'	-13.0'	109.8°	27°24.1'	-14.1'	110.3°	27°03.0'	-15.1'	110.8°	26°41.5'	-16.2'	111.3°	16
17	28°33.9'	-10.3'	109.4°	28°13.7'	-11.4'	110.0°	27°52.9'	-12.4'	110.5°	27°31.7'	-13.5'	110.9°	27°10.0'	-14.6'	111.4°	26°47.9'	-15.6'	111.9°	26°25.3'	-16.7'	112.4°	17
18	28°23.6'	-10.8'	110.6°	28°02.3'	-11.9'	111.1°	27°40.5'	-13.0'	111.6°	27°18.2'	-14.0'	112.0°	26°55.5'	-15.1'	112.5°	26°32.3'	-16.1'	113.0°	26°08.6'	-17.2'	113.4°	18
19	28°12.8'	-11.4'	111.7°	27°50.4'	-12.4'	112.2°	27°27.5'	-13.5'	112.7°	27°04.2'	-14.5'	113.1°	26°40.4'	-15.6'	113.6°	26°16.1'	-16.6'	114.1°	25°51.5'	-17.6'	114.5°	19
20	28°01.5'	-11.9'	112.8°	27°38.0'	-13.0'	113.3°	27°14.0'	-14.0'	113.8°	26°49.6'	-15.0'	114.2°	26°24.8'	-16.1'	114.7°	25°59.5'	-17.1'	115.1°	25°33.8'	-18.1'	115.6°	20
21	27°49.6'	-12.4'	113.9°	27°25.0'	-13.5'	114.4°	27°00.0'	-14.5'	114.9°	26°34.6'	-15.5'	115.3°	26°08.7'	-16.5'	115.8°	25°42.5'	-17.5'	116.2°	25°15.8'	-18.5'	116.6°	21
22	27°37.1'	-12.9'	115.0°	27°11.6'	-14.0'	115.5°	26°45.5'	-15.0'	115.9°	26°19.1'	-16.0'	116.4°	25°52.2'	-17.0'	116.8°	25°24.9'	-18.0'	117.3°	24°57.3'	-19.0'	117.7°	22
23	27°24.2'	-13.5'	116.1°	26°57.6'	-14.5'	116.6°	26°30.5'	-15.5'	117.0°	26°03.1'	-16.5'	117.5°	25°35.2'	-17.5'	117.9°	25°06.9'	-18.4'	118.3°	24°38.3'	-19.4'	118.7°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

60° 300° LHA

Latitude CONTRARY to DECLINATION

60° 300° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

59° 301° LHA

Latitude CONTRARY to Declination

59° 301° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	31°00.0'	-00.3'	90.0°	30°59.7'	-01.5'	90.6°	30°58.7'	-02.8'	91.2°	30°57.2'	-04.0'	91.8°	30°55.0'	-05.2'	92.4°	30°52.1'	-06.4'	93.0°	30°48.7'	-07.6'	93.6°	0
1	30°59.6'	-00.9'	91.2°	30°58.1'	-02.2'	91.8°	30°56.0'	-03.4'	92.4°	30°53.2'	-04.6'	93.0°	30°49.8'	-05.8'	93.6°	30°45.7'	-07.0'	94.2°	30°41.1'	-08.2'	94.7°	1
2	30°58.7'	-01.5'	92.3°	30°56.0'	-02.8'	92.9°	30°52.6'	-04.0'	93.5°	30°48.6'	-05.2'	94.1°	30°44.0'	-06.4'	94.7°	30°38.7'	-07.6'	95.3°	30°32.9'	-08.8'	95.9°	2
3	30°57.3'	-02.1'	93.5°	30°53.2'	-03.4'	94.1°	30°48.6'	-04.6'	94.7°	30°43.4'	-05.8'	95.3°	30°37.5'	-07.0'	95.9°	30°31.1'	-08.2'	96.5°	30°24.0'	-09.4'	97.0°	3
4	30°55.0'	-02.7'	94.7°	30°49.8'	-04.0'	95.3°	30°44.0'	-05.2'	95.9°	30°37.5'	-06.4'	96.4°	30°30.5'	-07.6'	97.0°	30°22.9'	-08.8'	97.6°	30°14.6'	-10.0'	98.2°	4
5	30°52.1'	-03.4'	95.8°	30°45.7'	-04.7'	96.4°	30°38.7'	-05.9'	97.0°	30°31.1'	-07.1'	97.6°	30°22.9'	-08.2'	98.2°	30°14.0'	-09.4'	98.8°	30°04.6'	-10.6'	99.3°	5
6	30°48.7'	-04.1'	97.0°	30°41.1'	-05.3'	97.6°	30°32.9'	-06.5'	98.2°	30°24.0'	-07.7'	98.7°	30°14.6'	-08.8'	99.3°	30°04.6'	-10.0'	99.9°	29°54.0'	-11.2'	100.5°	6
7	30°44.6'	-04.7'	98.2°	30°35.8'	-05.9'	98.7°	30°26.4'	-07.1'	99.3°	30°16.4'	-08.3'	99.9°	30°05.8'	-09.4'	100.5°	29°54.6'	-10.6'	101.0°	29°42.8'	-11.8'	101.6°	7
8	30°39.9'	-05.3'	99.3°	30°29.9'	-06.5'	99.9°	30°19.3'	-07.7'	100.5°	30°08.1'	-08.9'	101.0°	29°56.3'	-10.0'	101.6°	29°44.0'	-11.2'	102.2°	29°31.0'	-12.3'	102.7°	8
9	30°34.6'	-05.9'	100.5°	30°23.4'	-07.1'	101.0°	30°11.6'	-08.3'	101.6°	29°59.3'	-09.4'	102.2°	29°46.3'	-10.6'	102.7°	29°32.8'	-11.8'	103.3°	29°18.7'	-12.9'	103.9°	9
10	30°28.7'	-06.5'	101.6°	30°16.3'	-07.7'	102.2°	30°03.4'	-08.9'	102.8°	29°49.8'	-10.0'	103.3°	29°35.7'	-11.2'	103.9°	29°21.0'	-12.3'	104.4°	29°05.8'	-13.5'	105.0°	10
11	30°22.2'	-07.1'	102.8°	30°08.6'	-08.3'	103.3°	29°54.5'	-09.5'	103.9°	29°39.8'	-10.6'	104.5°	29°24.5'	-11.8'	105.0°	29°08.7'	-12.9'	105.6°	28°52.3'	-14.0'	106.1°	11
12	30°15.0'	-07.7'	103.9°	30°00.3'	-08.9'	104.5°	29°45.0'	-10.0'	105.0°	29°29.2'	-11.2'	105.6°	29°12.8'	-12.3'	106.1°	28°55.8'	-13.4'	106.7°	28°38.3'	-14.5'	107.2°	12
13	30°07.3'	-08.3'	105.1°	29°51.4'	-09.5'	105.6°	29°35.0'	-10.6'	106.2°	29°18.0'	-11.8'	106.7°	29°00.4'	-12.9'	107.3°	28°42.4'	-14.0'	107.8°	28°23.8'	-15.1'	108.3°	13
14	29°59.0'	-08.9'	106.2°	29°41.9'	-10.1'	106.8°	29°24.3'	-11.2'	107.3°	29°06.2'	-12.3'	107.8°	28°47.6'	-13.4'	108.4°	28°28.4'	-14.5'	108.9°	28°08.7'	-15.6'	109.4°	14
15	29°50.0'	-09.5'	107.4°	29°31.9'	-10.6'	107.9°	29°13.2'	-11.8'	108.4°	28°53.9'	-12.9'	109.0°	28°34.2'	-14.0'	109.5°	28°13.9'	-15.0'	110.0°	27°53.1'	-16.1'	110.5°	15
16	29°40.5'	-10.1'	108.5°	29°21.2'	-11.2'	109.0°	29°01.4'	-12.3'	109.6°	28°41.1'	-13.4'	110.1°	28°20.2'	-14.5'	110.6°	27°58.9'	-15.6'	111.1°	27°37.0'	-16.6'	111.6°	16
17	29°30.4'	-10.7'	109.6°	29°10.0'	-11.8'	110.2°	28°49.1'	-12.9'	110.7°	28°27.6'	-13.9'	111.2°	28°05.7'	-15.0'	111.7°	27°43.3'	-16.1'	112.2°	27°20.4'	-17.1'	112.7°	17
18	29°19.8'	-11.2'	110.8°	28°58.2'	-12.3'	111.3°	28°36.2'	-13.4'	111.8°	28°13.7'	-14.5'	112.3°	27°50.7'	-15.5'	112.8°	27°27.2'	-16.6'	113.3°	27°03.3'	-17.6'	113.7°	18
19	29°08.5'	-11.8'	111.9°	28°45.9'	-12.9'	112.4°	28°22.8'	-13.9'	112.9°	27°59.2'	-15.0'	113.4°	27°35.2'	-16.0'	113.9°	27°10.7'	-17.1'	114.3°	26°45.7'	-18.1'	114.8°	19
20	28°56.7'	-12.4'	113.0°	28°33.0'	-13.4'	113.5°	28°08.9'	-14.5'	114.0°	27°44.2'	-15.5'	114.5°	27°19.1'	-16.5'	115.0°	26°53.6'	-17.6'	115.4°	26°27.7'	-18.6'	115.9°	20
21	28°44.4'	-12.9'	114.1°	28																		

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

58° 302° LHA

Latitude CONTRARY to Declination

58° 302° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	32°00.0'	-00.3'	90.0°	31°59.7'	-01.6'	90.6°	31°58.7'	-02.8'	91.2°	31°57.1'	-04.0'	91.9°	31°54.8'	-05.3'	92.5°	31°51.8'	-06.5'	93.1°	31°48.2'	-07.7'	93.7°	0
1	31°59.6'	-01.0'	91.2°	31°58.1'	-02.2'	91.8°	31°55.9'	-03.4'	92.4°	31°53.0'	-04.7'	93.0°	31°49.5'	-05.9'	93.7°	31°45.4'	-07.1'	94.3°	31°40.5'	-08.3'	94.9°	1
2	31°58.6'	-01.6'	92.4°	31°55.9'	-02.9'	93.0°	31°52.5'	-04.1'	93.6°	31°48.4'	-05.3'	94.2°	31°43.6'	-06.5'	94.8°	31°38.2'	-07.8'	95.5°	31°32.2'	-09.0'	96.1°	2
3	31°57.1'	-02.3'	93.5°	31°53.0'	-03.5'	94.2°	31°48.4'	-04.7'	94.8°	31°43.0'	-06.0'	95.4°	31°37.1'	-07.2'	96.0°	31°30.5'	-08.4'	96.6°	31°23.3'	-09.6'	97.2°	3
4	31°54.8'	-02.9'	94.7°	31°49.5'	-04.2'	95.3°	31°43.6'	-05.4'	95.9°	31°37.1'	-06.6'	96.6°	31°29.9'	-07.8'	97.2°	31°22.1'	-09.0'	97.8°	31°13.7'	-10.2'	98.4°	4
5	31°51.8'	-03.6'	95.9°	31°45.4'	-04.8'	96.5°	31°38.2'	-06.0'	97.1°	31°30.5'	-07.2'	97.7°	31°22.1'	-08.4'	98.3°	31°13.1'	-09.6'	98.9°	31°03.5'	-10.8'	99.5°	5
6	31°48.2'	-04.2'	97.1°	31°40.5'	-05.4'	97.7°	31°32.2'	-06.7'	98.3°	31°23.3'	-07.9'	98.9°	31°13.7'	-09.1'	99.5°	31°03.5'	-10.2'	100.1°	30°52.6'	-11.4'	100.7°	6
7	31°44.0'	-04.9'	98.2°	31°35.1'	-06.1'	98.8°	31°25.6'	-07.3'	99.5°	31°15.4'	-08.5'	100.1°	31°04.6'	-09.7'	100.6°	30°53.2'	-10.8'	101.2°	30°41.2'	-12.0'	101.8°	7
8	31°39.1'	-05.5'	99.4°	31°29.0'	-06.7'	100.0°	31°18.3'	-07.9'	100.6°	31°06.9'	-09.1'	101.2°	30°54.9'	-10.3'	101.8°	30°42.4'	-11.4'	102.4°	30°29.2'	-12.6'	103.0°	8
9	31°33.6'	-06.2'	100.6°	31°22.3'	-07.4'	101.2°	31°10.4'	-08.5'	101.8°	30°57.8'	-09.7'	102.4°	30°44.7'	-10.9'	102.9°	30°30.9'	-12.0'	103.5°	30°16.6'	-13.2'	104.1°	9
10	31°27.5'	-06.8'	101.7°	31°14.9'	-08.0'	102.3°	31°01.8'	-09.2'	102.9°	30°48.1'	-10.3'	103.5°	30°33.8'	-11.5'	104.1°	30°18.9'	-12.6'	104.7°	30°03.4'	-13.8'	105.2°	10
11	31°20.7'	-07.4'	102.9°	31°07.0'	-08.6'	103.5°	30°52.7'	-09.8'	104.1°	30°37.8'	-10.9'	104.7°	30°22.3'	-12.1'	105.2°	30°06.2'	-13.2'	105.8°	29°49.6'	-14.3'	106.3°	11
12	31°13.3'	-08.0'	104.1°	30°58.4'	-09.2'	104.7°	30°42.9'	-10.4'	105.2°	30°26.8'	-11.5'	105.8°	30°10.2'	-12.7'	106.4°	29°53.0'	-13.8'	106.9°	29°35.3'	-14.9'	107.5°	12
13	31°05.2'	-08.7'	105.2°	30°49.2'	-09.8'	105.8°	30°32.5'	-11.0'	106.4°	30°15.3'	-12.1'	106.9°	29°57.6'	-13.2'	107.5°	29°39.3'	-14.3'	108.0°	29°20.4'	-15.4'	108.6°	13
14	30°56.6'	-09.3'	106.4°	30°39.3'	-10.4'	107.0°	30°21.6'	-11.6'	107.5°	30°03.2'	-12.7'	108.1°	29°44.3'	-13.8'	108.6°	29°24.9'	-14.9'	109.2°	29°05.0'	-16.0'	109.7°	14
15	30°47.3'	-09.9'	107.5°	30°28.9'	-11.0'	108.1°	30°10.0'	-12.1'	108.7°	29°50.5'	-13.3'	109.2°	29°30.5'	-14.4'	109.7°	29°10.0'	-15.4'	110.3°	28°49.0'	-16.5'	110.8°	15
16	30°37.4'	-10.5'	108.7°	30°17.9'	-11.6'	109.2°	29°57.9'	-12.7'	109.8°	29°37.3'	-13.8'	110.3°	29°16.2'	-14.9'	110.9°	28°54.6'	-16.0'	111.4°	28°32.5'	-17.0'	111.9°	16
17	30°26.9'	-11.1'	109.8°	30°06.3'	-12.2'	110.4°	29°45.1'	-13.3'	110.9°	29°23.5'	-14.4'	111.4°	29°01.3'	-15.5'	112.0°	28°38.6'	-16.5'	112.5°	28°15.4'	-17.6'	113.0°	17
18	30°15.8'	-11.7'	111.0°	29°54.1'	-12.8'	111.5°	29°31.8'	-13.9'	112.0°	29°09.1'	-14.9'	112.6°	28°45.8'	-16.0'	113.1°	28°22.1'	-17.0'	113.6°	27°57.9'	-18.1'	114.1°	18
19	30°04.2'	-12.3'	112.1°	29°41.3'	-13.3'	112.6°	29°18.0'	-14.4'	113.2°	28°54.2'	-15.5'	113.7°	28°29.8'	-16.5'	114.2°	28°05.0'	-17.5'	114.7°	27°39.8'	-18.6'	115.1°	19
20	29°51.9'	-12.8'	113.2°	29°28.0'	-13.9'	113.8°	29°03.6'	-15.0'	114.3°	28°38.7'	-16.0'	114.8°	28°13.3'	-17.0'	115.3°	27°47.5'	-18.1'	115.7°	27°21.2'	-19.1'	116.2°	20
21	29°39.1'	-13.4'	114.4°	29°14.1'	-14.5'	114.9°	28°48.6'	-15.5'	115.4°	28°22.7'	-16.5'	115.9°	27°56.3'	-17.5'	116.3°	27°29.4'	-18.5'	116.8°	27°02.2'	-19.5'	117.3°	21
22	29°25.7'	-14.0'	115.5°	28°59.6'	-15.0'	116.0°	28°33.1'	-16.0'	116.5°	28°06.2'	-17.0'	117.0°	27°38.7'	-18.0'	117.4°	27°10.9'	-19.0'	117.9°	26°42.6'	-20.0'	118.3°	22
23	29°11.7'	-14.5'	116.6°	28°44.7'	-15.5'	117.1°	28°17.1'	-16.5'	117.6°	27°49.1'	-17.5'	118.0°	27°20.7'	-18.5'	118.5°	26°51.9'	-19.5'	118.9°	26°22.6'	-20.5'	119.4°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

58° 302° LHA

Latitude CONTRARY to DECLINATION

58° 302° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

57° 303° LHA

Latitude CONTRARY to Declination

57° 303° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	33°00.0'	-00.3'	90.0°	32°59.7'	-01.6'	90.6°	32°58.6'	-02.8'	91.3°	32°56.9'	-04.1'	91.9°	32°54.6'	-05.3'	92.6°	32°51.5'	-06.6'	93.2°	32°47.8'	-07.8'	93.9°	0
1	32°59.6'	-01.0'	91.2°	32°58.1'	-02.3'	91.8°	32°55.8'	-03.5'	92.5°	32°52.9'	-04.8'	93.1°	32°49.2'	-06.0'	93.8°	32°45.0'	-07.2'	94.4°	32°40.0'	-08.5'	95.1°	1
2	32°58.6'	-01.7'	92.4°	32°55.8'	-02.9'	93.0°	32°52.3'	-04.2'	93.7°	32°48.1'	-05.4'	94.3°	32°43.3'	-06.7'	95.0°	32°37.7'	-07.9'	95.6°	32°31.5'	-09.1'	96.2°	2
3	32°56.9'	-02.4'	93.6°	32°52.9'	-03.6'	94.2°	32°48.1'	-04.9'	94.9°	32°42.7'	-06.1'	95.5°	32°36.6'	-07.3'	96.1°	32°29.8'	-08.5'	96.8°	32°22.4'	-09.8'	97.4°	3
4	32°54.6'	-03.1'	94.8°	32°49.2'	-04.3'	95.4°	32°43.3'	-05.5'	96.1°	32°36.6'	-06.8'	96.7°	32°29.3'	-08.0'	97.3°	32°21.3'	-09.2'	98.0°	32°12.7'	-10.4'	98.6°	4
5	32°51.5'	-03.7'	96.0°	32°45.0'	-05.0'	96.6°	32°37.7'	-06.2'	97.2°	32°29.8'	-07.4'	97.9°	32°21.3'	-08.6'	98.5°	32°12.1'	-09.8'	99.1°	32°02.3'	-11.0'	99.7°	5
6	32°47.8'	-04.4'	97.1°	32°40.0'	-05.6'	97.8°	32°31.5'	-06.8'	98.4°	32°22.4'	-08.1'	99.0°	32°12.7'	-09.3'	99.7°	32°02.3'	-10.5'	100.3°	31°51.3'	-11.7'	100.9°	6
7	32°43.4'	-05.1'	98.3°	32°34.4'	-06.3'	99.0°	32°24.7'	-07.5'	99.6°	32°14.4'	-08.7'	100.2°	32°03.4'	-09.9'	100.8°	31°51.8'	-11.1'	101.4°	31°39.6'	-12.3'	102.1°	7
8	32°38.3'	-05.7'	99.5°	32°28.1'	-06.9'	100.1°	32°17.2'	-08.2'	100.8°	32°05.7'	-09.4'	101.4°	31°53.5'	-10.5'	102.0°	31°40.7'	-11.7'	102.6°	31°27.3'	-12.9'	103.2°	8
9	32°32.6'	-06.4'	100.7°	32°21.1'	-07.6'	101.3°	32°09.0'	-08.8'	101.9°	31°56.3'	-10.0'	102.5°	31°43.0'	-11.2'	103.2°	31°29.0'	-12.3'	103.8°	31°14.4'	-13.5'	104.3°	9
10	32°26.2'	-07.1'	101.9°	32°13.5'	-08.2'	102.5°	32°00.2'	-09.4'	103.1°	31°46.3'	-10.6'	103.7°	31°31.8'	-11.8'	104.3°	31°16.7'	-12.9'	104.9°	31°01.0'	-14.1'	105.5°	10
11	32°19.1'	-07.7'	103.0°	32°05.3'	-08.9'	103.7°	31°50.8'	-10.1'	104.3°	31°35.7'	-11.2'	104.9°	31°20.0'	-12.4'	105.5°	31°03.7'	-13.5'	106.0°	30°46.9'	-14.7'	106.6°	11
12	32°11.4'	-08.4'	104.2°	31°56.4'	-09.5'	104.8°	31°40.7'	-10.7'	105.4°	31°24.5'	-11.9'	106.0°	31°07.6'	-13.0'	106.6°	30°50.2'	-14.1'	107.2°	30°32.2'	-15.3'	107.7°	12
13	32°03.1'	-09.0'	105.4°	31°46.9'	-10.2'	106.0°	31°30.0'	-11.3'	106.6°	31°12.6'	-12.5'	107.2°	30°54.6'	-13.6'	107.7°	30°36.1'	-14.7'	108.3°	30°16.9'	-15.8'	108.9°	13
14	31°54.1'	-09.6'	106.6°	31°36.7'	-10.8'	107.1°	31°18.7'	-11.9'	107.7°	31°00.2'	-13.1'	108.3°	30°41.0'	-14.2'	108.9°	30°21.3'	-15.3'	109.4°	30°01.1'	-16.4'	110.0°	14
15	31°44.5'	-10.3'	107.7°	31°25.9'	-11.4'	108.3°	31°06.8'	-12.5'	108.9°	30°47.1'	-13.7'	109.4°	30°26.8'	-14.8'	110.0°	30°06.0'	-15.9'	110.5°	29°44.7'	-16.9'	111.1°	15
16	31°34.2'	-10.9'	108.9°	31°14.5'	-12.0'	109.5°	30°54.2'	-13.1'	110.0°	30°33.4'	-14.2'	110.6°	30°12.1'	-15.3'	111.1°	29°50.2'	-16.4'	111.7°	29°27.8'	-17.5'	112.2°	16
17	31°23.3'	-11.5'	110.0°	31°02.5'	-12.6'	110.6°	30°41.1'	-13.7'	111.2°	30°19.2'	-14.8'	111.7°	29°56.7'	-15.9'	112.2°	29°33.8'	-17.0'	112.8°	29°10.3'	-18.0'	113.3°	17
18	31°11.8'	-12.1'	111.2°	30°49.9'	-13.2'	111.7°	30°27.4'	-14.3'	112.3°	30°04.4'	-15.4'	112.8°	29°40.8'	-16.5'	113.4°	29°16.8'	-17.5'	113.9°	28°52.3'	-18.5'	114.4°	18
19	30°59.7'	-12.7'	112.3°	30°36.7'	-13.8'	112.9°	30°13.1'	-14.9'	113.4°	29°49.0'	-15.9'	113.9°	29°24.4'	-17.0'	114.5°	28°59.3'	-18.0'	115.0°	28°33.7'	-19.1'	115.5°	19
20	30°47.0'	-13.3'	113.5°	30°22.9'	-14.4'	114.0°	29°58.2'	-15.4'	114.5°	29°33.0'	-16.5'	115.1°	29°07.4'	-17.5'	115.6°	28°41.3'	-18.6'	116.1°	28°14.7'	-19.6'	116.5°	20
21	30°33.7'	-13.9'	114.6°	30°08.5'</																		

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

56° 304° LHA

Latitude CONTRARY to Declination

56° 304° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	34°00.0'	-00.4'	90.0°	33°59.6'	-01.6'	90.7°	33°58.6'	-02.9'	91.3°	33°56.8'	-04.1'	92.0°	33°54.4'	-05.4'	92.7°	33°51.2'	-06.6'	93.4°	33°47.3'	-07.9'	94.0°	0
1	33°59.6'	-01.1'	91.2°	33°58.0'	-02.3'	91.9°	33°55.7'	-03.6'	92.6°	33°52.7'	-04.8'	93.2°	33°49.0'	-06.1'	93.9°	33°44.5'	-07.3'	94.6°	33°39.4'	-08.6'	95.2°	1
2	33°58.5'	-01.8'	92.4°	33°55.7'	-03.0'	93.1°	33°52.1'	-04.3'	93.8°	33°47.9'	-05.5'	94.4°	33°42.9'	-06.8'	95.1°	33°37.2'	-08.0'	95.8°	33°30.8'	-09.3'	96.4°	2
3	33°56.8'	-02.5'	93.6°	33°52.7'	-03.7'	94.3°	33°47.9'	-05.0'	95.0°	33°42.3'	-06.2'	95.6°	33°36.1'	-07.5'	96.3°	33°29.2'	-08.7'	96.9°	33°21.6'	-09.9'	97.6°	3
4	33°54.4'	-03.2'	94.8°	33°49.0'	-04.4'	95.5°	33°42.9'	-05.7'	96.2°	33°36.1'	-06.9'	96.8°	33°28.6'	-08.1'	97.5°	33°20.5'	-09.4'	98.1°	33°11.7'	-10.6'	98.8°	4
5	33°51.2'	-03.9'	96.0°	33°44.5'	-05.1'	96.7°	33°37.2'	-06.4'	97.4°	33°29.2'	-07.6'	98.0°	33°20.5'	-08.8'	98.7°	33°11.1'	-10.0'	99.3°	33°01.1'	-11.2'	100.0°	5
6	33°47.3'	-04.6'	97.2°	33°39.4'	-05.8'	97.9°	33°30.8'	-07.0'	98.5°	33°21.6'	-08.3'	99.2°	33°11.7'	-09.5'	99.8°	33°01.1'	-10.7'	100.5°	32°49.8'	-11.9'	101.1°	6
7	33°42.7'	-05.3'	98.4°	33°33.6'	-06.5'	99.1°	33°23.8'	-07.7'	99.7°	33°13.3'	-08.9'	100.4°	33°02.2'	-10.2'	101.0°	32°50.4'	-11.4'	101.7°	32°37.9'	-12.5'	102.3°	7
8	33°37.5'	-06.0'	99.6°	33°27.1'	-07.2'	100.3°	33°16.1'	-08.4'	100.9°	33°04.4'	-09.6'	101.6°	32°52.0'	-10.8'	102.2°	32°39.0'	-12.0'	102.8°	32°25.4'	-13.2'	103.4°	8
9	33°31.5'	-06.6'	100.8°	33°19.9'	-07.9'	101.5°	33°07.7'	-09.1'	102.1°	32°54.8'	-10.3'	102.7°	32°41.2'	-11.5'	103.4°	32°27.0'	-12.6'	104.0°	32°12.2'	-13.8'	104.6°	9
10	33°24.9'	-07.3'	102.0°	33°12.1'	-08.5'	102.6°	32°58.6'	-09.7'	103.3°	32°44.5'	-10.9'	103.9°	32°29.8'	-12.1'	104.5°	32°14.4'	-13.3'	105.1°	31°58.4'	-14.4'	105.7°	10
11	33°17.6'	-08.0'	103.2°	33°03.6'	-09.2'	103.8°	32°48.9'	-10.4'	104.5°	32°33.6'	-11.6'	105.1°	32°17.7'	-12.7'	105.7°	32°01.1'	-13.9'	106.3°	31°44.0'	-15.0'	106.9°	11
12	33°09.6'	-08.7'	104.4°	32°54.4'	-09.9'	105.0°	32°38.5'	-11.0'	105.6°	32°22.0'	-12.2'	106.2°	32°04.9'	-13.4'	106.8°	31°47.3'	-14.5'	107.4°	31°29.0'	-15.6'	108.0°	12
13	33°00.9'	-09.3'	105.6°	32°44.5'	-10.5'	106.2°	32°27.5'	-11.7'	106.8°	32°09.8'	-12.8'	107.4°	31°51.6'	-14.0'	108.0°	31°32.8'	-15.1'	108.6°	31°13.3'	-16.2'	109.2°	13
14	32°51.6'	-10.0'	106.7°	32°34.0'	-11.2'	107.4°	32°15.8'	-12.3'	108.0°	31°57.0'	-13.5'	108.6°	31°37.6'	-14.6'	109.1°	31°17.7'	-15.7'	109.7°	30°57.1'	-16.8'	110.3°	14
15	32°41.6'	-10.6'	107.9°	32°22.8'	-11.8'	108.5°	32°03.5'	-12.9'	109.1°	31°43.5'	-14.1'	109.7°	31°23.0'	-15.2'	110.3°	31°02.0'	-16.3'	110.8°	30°40.3'	-17.4'	111.4°	15
16	32°30.9'	-11.3'	109.1°	32°11.0'	-12.4'	109.7°	31°50.5'	-13.6'	110.3°	31°29.5'	-14.7'	110.8°	31°07.8'	-15.8'	111.4°	30°45.7'	-16.9'	112.0°	30°23.0'	-17.9'	112.5°	16
17	32°19.7'	-11.9'	110.2°	31°58.6'	-13.1'	110.8°	31°37.0'	-14.2'	111.4°	31°14.8'	-15.3'	112.0°	30°52.1'	-16.4'	112.5°	30°28.8'	-17.4'	113.1°	30°05.0'	-18.5'	113.6°	17
18	32°07.7'	-12.6'	111.4°	31°45.6'	-13.7'	112.0°	31°22.8'	-14.8'	112.5°	30°59.5'	-15.9'	113.1°	30°35.7'	-16.9'	113.7°	30°11.4'	-18.0'	114.2°	29°46.6'	-19.0'	114.7°	18
19	31°55.2'	-13.2'	112.6°	31°31.9'	-14.3'	113.1°	31°08.0'	-15.4'	113.7°	30°43.7'	-16.4'	114.2°	30°18.8'	-17.5'	114.8°	29°53.4'	-18.5'	115.3°	29°27.5'	-19.6'	115.8°	19
20	31°42.0'	-13.8'	113.7°	31°17.6'	-14.9'	114.3°	30°52.7'	-15.9'	114.8°	30°27.3'	-17.0'	115.3°	30°01.3'	-18.0'	115.9°	29°34.9'	-19.1'	116.4°	29°08.0'	-20.1'	116.9°	20
21	31°28.2'	-14.4'	114.8°	31°02.7'	-15.5'	115.4°	30°36.7'	-16.5'	115.9°	30°10.3'	-17.6'	116.5°	29°43.3'	-18.6'	117.0°	29°15.8'	-19.6'	117.5°	28°47.9'	-20.6'	118.0°	21
22	31°13.8'	-15.0'	116.0°	30°47.3'	-16.0'	116.5°	30°20.2'	-17.1'	117.0°	29°52.7'	-18.1'	117.6°	29°24.7'	-19.1'	118.1°	28°56.2'	-20.1'	118.6°	28°27.3'	-21.1'	119.0°	22
23	30°58.8'	-15.6'	117.1°	30°31.2'	-16.6'	117.6°	30°03.1'	-17.6'	118.2°	29°34.6'	-18.6'	118.7°	29°05.6'	-19.6'	119.2°	28°36.1'	-20.6'	119.6°	28°06.3'	-21.6'	120.1°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

56° 304° LHA

Latitude CONTRARY to DECLINATION

56° 304° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

55° 305° LHA

Latitude CONTRARY to Declination

55° 305° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	35°00.0'	-00.4'	90.0°	34°59.6'	-01.6'	90.7°	34°58.5'	-02.9'	91.4°	34°56.7'	-04.2'	92.1°	34°54.1'	-05.5'	92.8°	34°50.8'	-06.7'	93.5°	34°46.8'	-08.0'	94.2°	0
1	34°59.6'	-01.1'	91.2°	34°58.0'	-02.4'	91.9°	34°55.6'	-03.6'	92.6°	34°52.5'	-04.9'	93.3°	34°48.7'	-06.2'	94.0°	34°44.1'	-07.4'	94.7°	34°38.8'	-08.7'	95.4°	1
2	34°58.5'	-01.8'	92.4°	34°55.6'	-03.1'	93.1°	34°52.0'	-04.4'	93.8°	34°47.6'	-05.6'	94.5°	34°42.5'	-06.9'	95.2°	34°36.7'	-08.2'	95.9°	34°30.1'	-09.4'	96.6°	2
3	34°56.7'	-02.6'	93.7°	34°52.5'	-03.8'	94.4°	34°47.6'	-05.1'	95.1°	34°41.9'	-06.4'	95.7°	34°35.6'	-07.6'	96.4°	34°28.5'	-08.9'	97.1°	34°20.7'	-10.1'	97.8°	3
4	34°54.1'	-03.3'	94.9°	34°48.7'	-04.6'	95.6°	34°42.5'	-05.8'	96.3°	34°35.6'	-07.1'	96.9°	34°28.0'	-08.3'	97.6°	34°19.6'	-09.6'	98.3°	34°10.6'	-10.8'	99.0°	4
5	34°50.8'	-04.0'	96.1°	34°44.1'	-05.3'	96.8°	34°36.7'	-06.5'	97.5°	34°28.5'	-07.8'	98.2°	34°19.6'	-09.0'	98.8°	34°10.1'	-10.3'	99.5°	33°59.8'	-11.5'	100.2°	5
6	34°46.8'	-04.7'	97.3°	34°38.8'	-06.0'	98.0°	34°30.1'	-07.2'	98.7°	34°20.7'	-08.5'	99.4°	34°10.6'	-09.7'	100.0°	33°59.8'	-10.9'	100.7°	33°48.4'	-12.1'	101.4°	6
7	34°42.1'	-05.5'	98.5°	34°32.8'	-06.7'	99.2°	34°22.9'	-07.9'	99.9°	34°12.2'	-09.2'	100.6°	34°00.9'	-10.4'	101.2°	33°48.9'	-11.6'	101.9°	33°36.2'	-12.8'	102.5°	7
8	34°36.6'	-06.2'	99.7°	34°26.1'	-07.4'	100.4°	34°14.9'	-08.6'	101.1°	34°03.1'	-09.9'	101.7°	33°50.5'	-11.1'	102.4°	33°37.3'	-12.3'	103.1°	33°23.4'	-13.5'	103.7°	8
9	34°30.5'	-06.9'	100.9°	34°18.7'	-08.1'	101.6°	34°06.3'	-09.3'	102.3°	33°53.2'	-10.6'	102.9°	33°39.4'	-11.8'	103.6°	33°25.0'	-12.9'	104.2°	33°09.9'	-14.1'	104.9°	9
10	34°23.6'	-07.6'	102.1°	34°10.6'	-08.8'	102.8°	33°57.0'	-10.0'	103.5°	33°42.6'	-11.2'	104.1°	33°27.7'	-12.4'	104.8°	33°12.1'	-13.6'	105.4°	32°55.8'	-14.8'	106.0°	10
11	34°16.0'	-08.3'	103.3°	34°01.8'	-09.5'	104.0°	33°46.9'	-10.7'	104.7°	33°31.4'	-11.9'	105.3°	33°15.3'	-13.1'	105.9°	32°58.5'	-14.2'	106.6°	32°41.1'	-15.4'	107.2°	11
12	34°07.7'	-09.0'	104.5°	33°52.3'	-10.2'	105.2°	33°36.2'	-11.4'	105.8°	33°19.5'	-12.6'	106.5°	33°02.2'	-13.7'	107.1°	32°44.2'	-14.9'	107.7°	32°25.7'	-16.0'	108.3°	12
13	33°58.7'	-09.7'	105.7°	33°42.1'	-10.9'	106.4°	33°24.8'	-12.0'	107.0°	33°07.0'	-13.2'	107.6°	32°48.5'	-14.4'	108.3°	32°29.4'	-15.5'	108.9°	32°09.7'	-16.6'	109.5°	13
14	33°49.0'	-10.4'	106.9°	33°31.2'	-11.5'	107.6°	33°12.8'	-12.7'	108.2°	32°53.8'	-13.9'	108.8°	32°34.1'	-15.0'	109.4°	32°13.9'	-16.1'	110.0°	31°53.0'	-17.2'	110.6°	14
15	33°38.6'	-11.0'	108.1°	33°19.7'	-12.2'	108.7°	33°00.1'	-13.3'	109.4°	32°39.9'	-14.5'	110.0°	32°19.1'	-15.6'	110.6°	31°57.8'	-16.7'	111.2°	31°35.8'	-17.8'	111.7°	15
16	33°27.6'	-11.7'	109.3°	33°07.5'	-12.9'	109.9°	32°46.7'	-14.0'	110.5°	32°25.4'	-15.1'	111.1°	32°03.5'	-16.2'	111.7°	31°41.0'	-17.3'	112.3°	31°18.0'	-18.4'	112.8°	16
17	33°15.9'	-12.4'	110.5°	32°54.6'	-13.5'	111.1°	32°32.8'	-14.6'	111.7°	32°10.3'	-15.7'	112.3°	31°47.3'	-16.8'	112.8°	31°23.7'	-17.9'	113.4°	30°59.6'	-19.0'	114.0°	17
18	33°03.5'	-13.0'	111.6°	32°41.1'	-14.1'	112.2°	32°18.1'	-15.2'	112.8°	31°54.6'	-16.3'	113.4°	31°30.5'	-17.4'	114.0°	31°05.8'	-18.5'	114.5°	30°40.7'	-19.5'	115.0°	18
19	32°50.5'	-13.7'	112.8°	32°27.0'	-14.8'	113.4°	32°02.9'	-15.9'	114.0°	31°38.3'	-16.9'	114.5°	31°13.1'	-18.0'	115.1°	30°47.4'	-19.0'	115.6°	30°21.2'	-20.1'	116.2°	19
20	32°36.9'	-14.3'	114.0°	32°12.2'	-15.4'	114.5°	31°47.0'	-16.5'	115.1°	31°21.3'	-17.5'	115.7°	30°55.1'	-18.6'	116.2°	30°28.4'	-19.6'	116.7°	30°01.1'	-20.6'	117.3°	20
21	32°22.6'	-14.9'	115.1°	31°56																		

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

54° 306° LHA

Latitude CONTRARY to Declination

54° 306° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	36°00.0'	-00.4'	90.0°	35°59.6'	-01.7'	90.7°	35°58.5'	-03.0'	91.5°	35°56.6'	-04.3'	92.2°	35°53.9'	-05.5'	92.9°	35°50.5'	-06.8'	93.6°	35°46.3'	-08.1'	94.3°	0
1	35°59.6'	-01.1'	91.2°	35°57.9'	-02.4'	92.0°	35°55.5'	-03.7'	92.7°	35°52.3'	-05.0'	93.4°	35°48.4'	-06.3'	94.1°	35°43.7'	-07.6'	94.8°	35°38.2'	-08.8'	95.6°	1
2	35°58.4'	-01.9'	92.5°	35°55.5'	-03.2'	93.2°	35°51.8'	-04.5'	93.9°	35°47.3'	-05.8'	94.6°	35°42.1'	-07.0'	95.4°	35°36.1'	-08.3'	96.1°	35°29.4'	-09.6'	96.8°	2
3	35°56.6'	-02.7'	93.7°	35°52.3'	-03.9'	94.4°	35°47.3'	-05.2'	95.1°	35°41.6'	-06.5'	95.9°	35°35.1'	-07.8'	96.6°	35°27.8'	-09.0'	97.3°	35°19.8'	-10.3'	98.0°	3
4	35°53.9'	-03.4'	94.9°	35°48.4'	-04.7'	95.7°	35°42.1'	-06.0'	96.4°	35°35.1'	-07.2'	97.1°	35°27.3'	-08.5'	97.8°	35°18.8'	-09.8'	98.5°	35°09.5'	-11.0'	99.2°	4
5	35°50.5'	-04.2'	96.2°	35°43.7'	-05.4'	96.9°	35°36.1'	-06.7'	97.6°	35°27.8'	-08.0'	98.3°	35°18.8'	-09.2'	99.0°	35°09.0'	-10.5'	99.7°	34°58.5'	-11.7'	100.4°	5
6	35°46.3'	-04.9'	97.4°	35°38.2'	-06.2'	98.1°	35°29.4'	-07.4'	98.8°	35°19.8'	-08.7'	99.5°	35°09.5'	-09.9'	100.2°	34°58.5'	-11.2'	100.9°	34°46.8'	-12.4'	101.6°	6
7	35°41.4'	-05.7'	98.6°	35°32.0'	-06.9'	99.3°	35°22.0'	-08.2'	100.0°	35°11.1'	-09.4'	100.7°	34°59.6'	-10.7'	101.4°	34°47.4'	-11.9'	102.1°	34°34.4'	-13.1'	102.8°	7
8	35°35.8'	-06.4'	99.9°	35°25.1'	-07.7'	100.6°	35°13.8'	-08.9'	101.3°	35°01.7'	-10.1'	101.9°	34°48.9'	-11.4'	102.6°	34°35.5'	-12.6'	103.3°	34°21.3'	-13.8'	104.0°	8
9	35°29.3'	-07.1'	101.1°	35°17.5'	-08.4'	101.8°	35°04.9'	-09.6'	102.5°	34°51.6'	-10.8'	103.1°	34°37.6'	-12.1'	103.8°	34°22.9'	-13.3'	104.5°	34°07.6'	-14.4'	105.1°	9
10	35°22.2'	-07.9'	102.3°	35°09.1'	-09.1'	103.0°	34°55.2'	-10.3'	103.7°	34°40.7'	-11.5'	104.3°	34°25.5'	-12.7'	105.0°	34°09.7'	-13.9'	105.7°	33°53.1'	-15.1'	106.3°	10
11	35°14.3'	-08.6'	103.5°	34°60.0'	-09.8'	104.2°	34°44.9'	-11.0'	104.9°	34°29.2'	-12.2'	105.5°	34°12.8'	-13.4'	106.2°	33°55.7'	-14.6'	106.8°	33°38.0'	-15.8'	107.5°	11
12	35°05.7'	-09.3'	104.7°	34°50.1'	-10.5'	105.4°	34°33.9'	-11.7'	106.1°	34°16.9'	-12.9'	106.7°	33°59.4'	-14.1'	107.4°	33°41.1'	-15.3'	108.0°	33°22.3'	-16.4'	108.6°	12
13	34°56.4'	-10.0'	105.9°	34°39.6'	-11.2'	106.6°	34°22.1'	-12.4'	107.3°	34°04.0'	-13.6'	107.9°	33°45.3'	-14.8'	108.5°	33°25.9'	-15.9'	109.2°	33°05.9'	-17.0'	109.8°	13
14	34°46.4'	-10.7'	107.1°	34°28.4'	-11.9'	107.8°	34°09.7'	-13.1'	108.4°	33°50.4'	-14.3'	109.1°	33°30.5'	-15.4'	109.7°	33°10.0'	-16.5'	110.3°	32°48.8'	-17.6'	110.9°	14
15	34°35.6'	-11.4'	108.3°	34°16.4'	-12.6'	109.0°	33°56.6'	-13.8'	109.6°	33°36.2'	-14.9'	110.2°	33°15.1'	-16.0'	110.9°	32°53.4'	-17.2'	111.5°	32°31.2'	-18.3'	112.1°	15
16	34°24.2'	-12.1'	109.5°	34°03.8'	-13.3'	110.2°	33°42.9'	-14.4'	110.8°	33°21.3'	-15.6'	111.4°	32°59.1'	-16.7'	112.0°	32°36.3'	-17.8'	112.6°	32°12.9'	-18.8'	113.2°	16
17	34°12.1'	-12.8'	110.7°	33°50.6'	-13.9'	111.3°	33°28.4'	-15.1'	112.0°	33°05.7'	-16.2'	112.6°	32°42.4'	-17.3'	113.2°	32°18.5'	-18.4'	113.7°	31°54.1'	-19.4'	114.3°	17
18	33°59.3'	-13.5'	111.9°	33°36.6'	-14.6'	112.5°	33°13.4'	-15.7'	113.1°	32°49.5'	-16.8'	113.7°	32°25.1'	-17.9'	114.3°	32°00.2'	-19.0'	114.9°	31°34.7'	-20.0'	115.4°	18
19	33°45.8'	-14.1'	113.1°	33°22.0'	-15.3'	113.7°	32°57.6'	-16.3'	114.3°	32°32.7'	-17.4'	114.8°	32°07.2'	-18.5'	115.4°	31°41.2'	-19.5'	116.0°	31°14.6'	-20.6'	116.5°	19
20	33°31.7'	-14.8'	114.2°	33°06.7'	-15.9'	114.8°	32°41.3'	-17.0'	115.4°	32°15.3'	-18.0'	116.0°	31°48.7'	-19.1'	116.5°	31°21.7'	-20.1'	117.1°	30°54.1'	-21.1'	117.6°	20
21	33°16.9'	-15.4'	115.4°	32°50.9'	-16.5'	116.0°	32°24.3'	-17.6'	116.5°	31°57.2'	-18.6'	117.1°	31°29.6'	-19.7'	117.7°	31°01.5'	-20.7'	118.2°	30°33.0'	-21.7'	118.7°	21
22	33°01.4'	-16.1'	116.5°	32°34.3'	-17.1'	117.1°	32°06.7'	-18.2'	117.7°	31°38.6'	-19.2'	118.2°	31°10.0'	-20.2'	118.8°	30°40.9'	-21.2'	119.3°	30°11.3'	-22.2'	119.8°	22
23	32°45.3'	-16.7'	117.7°	32°17.2'	-17.7'	118.2°	31°48.6'	-18.8'	118.8°	31°19.4'	-19.8'	119.3°	30°49.8'	-20.8'	119.9°	30°19.7'	-21.7'	120.4°	29°49.1'	-22.7'	120.9°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			Dec°

54° 306° LHA

Latitude CONTRARY to DECLINATION

54° 306° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

53° 307° LHA

Latitude CONTRARY to Declination

53° 307° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	37°00.0'	-00.4'	90.0°	36°59.6'	-01.7'	90.8°	36°58.4'	-03.0'	91.5°	36°56.5'	-04.3'	92.3°	36°53.7'	-05.6'	93.0°	36°50.2'	-06.9'	93.8°	36°45.8'	-08.2'	94.5°	0
1	36°59.6'	-01.2'	91.3°	36°57.9'	-02.5'	92.0°	36°55.4'	-03.8'	92.8°	36°52.1'	-05.1'	93.5°	36°48.1'	-06.4'	94.3°	36°43.2'	-07.7'	95.0°	36°37.6'	-09.0'	95.7°	1
2	36°58.4'	-02.0'	92.5°	36°55.4'	-03.3'	93.3°	36°51.6'	-04.6'	94.0°	36°47.0'	-05.9'	94.8°	36°41.7'	-07.2'	95.5°	36°35.5'	-08.5'	96.2°	36°28.6'	-09.7'	97.0°	2
3	36°56.5'	-02.8'	93.8°	36°52.1'	-04.1'	94.5°	36°47.0'	-05.4'	95.2°	36°41.2'	-06.6'	96.0°	36°34.5'	-07.9'	96.7°	36°27.1'	-09.2'	97.5°	36°18.9'	-10.5'	98.2°	3
4	36°53.7'	-03.5'	95.0°	36°48.1'	-04.8'	95.8°	36°41.7'	-06.1'	96.5°	36°34.5'	-07.4'	97.2°	36°26.6'	-08.7'	98.0°	36°17.9'	-10.0'	98.7°	36°08.4'	-11.2'	99.4°	4
5	36°50.2'	-04.3'	96.3°	36°43.2'	-05.6'	97.0°	36°35.5'	-06.9'	97.7°	36°27.1'	-08.2'	98.5°	36°17.9'	-09.4'	99.2°	36°07.9'	-10.7'	99.9°	35°57.2'	-11.9'	100.6°	5
6	36°45.8'	-05.1'	97.5°	36°37.6'	-06.4'	98.2°	36°28.6'	-07.7'	99.0°	36°18.9'	-08.9'	99.7°	36°08.4'	-10.2'	100.4°	35°57.2'	-11.4'	101.1°	35°45.3'	-12.7'	101.8°	6
7	36°40.7'	-05.9'	98.7°	36°31.2'	-07.2'	99.5°	36°21.0'	-08.4'	100.2°	36°10.0'	-09.7'	100.9°	35°58.2'	-10.9'	101.6°	35°45.8'	-12.2'	102.3°	35°32.6'	-13.4'	103.0°	7
8	36°34.9'	-06.6'	100.0°	36°24.1'	-07.9'	100.7°	36°12.6'	-09.2'	101.4°	36°00.3'	-10.4'	102.1°	35°47.3'	-11.7'	102.9°	35°33.6'	-12.9'	103.5°	35°19.2'	-14.1'	104.2°	8
9	36°28.2'	-07.4'	101.2°	36°16.2'	-08.7'	101.9°	36°03.4'	-09.9'	102.7°	35°49.9'	-11.1'	103.4°	35°35.7'	-12.4'	104.1°	35°20.7'	-13.6'	104.7°	35°05.1'	-14.8'	105.4°	9
10	36°20.8'	-08.2'	102.5°	36°07.5'	-09.4'	103.2°	35°53.5'	-10.6'	103.9°	35°38.7'	-11.9'	104.6°	35°23.3'	-13.1'	105.3°	35°07.2'	-14.3'	105.9°	34°50.3'	-15.5'	106.6°	10
11	36°12.6'	-08.9'	103.7°	35°58.1'	-10.2'	104.4°	35°42.8'	-11.4'	105.1°	35°26.9'	-12.6'	105.8°	35°10.2'	-13.8'	106.5°	34°52.9'	-15.0'	107.1°	34°34.9'	-16.1'	107.8°	11
12	36°03.7'	-09.7'	104.9°	35°47.9'	-10.9'	105.6°	35°31.5'	-12.1'	106.3°	35°14.3'	-13.3'	107.0°	34°56.4'	-14.5'	107.6°	34°37.9'	-15.6'	108.3°	34°18.8'	-16.8'	109.0°	12
13	35°54.1'	-10.4'	106.1°	35°37.1'	-11.6'	106.8°	35°19.4'	-12.8'	107.5°	35°01.0'	-14.0'	108.2°	34°42.0'	-15.2'	108.8°	34°22.3'	-16.3'	109.5°	34°02.0'	-17.4'	110.1°	13
14	35°43.7'	-11.1'	107.3°	35°25.5'	-12.3'	108.0°	35°06.6'	-13.5'	108.7°	34°47.0'	-14.7'	109.4°	34°26.8'	-15.8'	110.0°	34°06.0'	-17.0'	110.6°	33°44.5'	-18.1'	111.3°	14
15	35°32.6'	-11.8'	108.5°	35°13.1'	-13.0'	109.2°	34°53.1'	-14.2'	109.9°	34°32.3'	-15.3'	110.5°	34°11.0'	-16.5'	111.2°	33°49.0'	-17.6'	111.8°	33°26.4'	-18.7'	112.4°	15
16	35°20.7'	-12.6'	109.8°	35°00.1'	-13.7'	110.4°	34°38.9'	-14.9'	111.1°	34°17.0'	-16.0'	111.7°	33°54.5'	-17.1'	112.3°	33°31.4'	-18.2'	112.9°	33°07.7'	-19.3'	113.5°	16
17	35°08.2'	-13.3'	110.9°	34°46.4'	-14.4'	111.6°	34°24.0'	-15.5'	112.2°	34°01.0'	-16.7'	112.9°	33°37.4'	-17.8'	113.5°	33°13.2'	-18.9'	114.1°	32°48.4'	-19.9'	114.7°	17
18	34°54.9'	-14.0'	112.1°	34°32.0'	-15.1'	112.8°	34°08.4'	-16.2'	113.4°	33°44.3'	-17.3'	114.0°	33°19.6'	-18.4'	114.6°	32°54.3'	-19.5'	115.2°	32°28.5'	-20.5'	115.8°	18
19	34°40.9'	-14.6'	113.3°	34°16.9'	-15.8'	114.0°	33°52.2'	-16.9'	114.6°	33°27.0'	-17.9'	115.2°	33°01.2'	-19.0'	115.8°	32°34.8'	-20.1'	116.3°	32°07.9'	-21.1'	116.9°	19
20	34°26.3'	-15.3'	114.5°	34°01.1'	-16.4'	115.1°	33°35.4'	-17.5'	115.7°	33°09.1'	-18.6'	116.3°	32°42.2'	-19.6'	116.9°	32°14.8'	-20.6'	117.5°	31°46.9'	-21.7'	118.0°	20
21	34°11.0'	-16.0'																				

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

52° 308° LHA

Latitude CONTRARY to Declination

52° 308° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	38°00.0'	-00.4'	90.0°	37°59.6'	-01.7'	90.8°	37°58.4'	-03.1'	91.6°	37°56.3'	-04.4'	92.3°	37°53.5'	-05.7'	93.1°	37°49.8'	-07.0'	93.9°	37°45.3'	-08.3'	94.7°	0
1	37°59.5'	-01.2'	91.3°	37°57.9'	-02.6'	92.0°	37°55.3'	-03.9'	92.8°	37°51.9'	-05.2'	93.6°	37°47.8'	-06.5'	94.4°	37°42.8'	-07.8'	95.2°	37°37.0'	-09.1'	95.9°	1
2	37°58.3'	-02.0'	92.5°	37°55.3'	-03.4'	93.3°	37°51.4'	-04.7'	94.1°	37°46.7'	-06.0'	94.9°	37°41.2'	-07.3'	95.6°	37°35.0'	-08.6'	96.4°	37°27.9'	-09.9'	97.2°	2
3	37°56.3'	-02.9'	93.8°	37°51.9'	-04.2'	94.6°	37°46.7'	-05.5'	95.4°	37°40.7'	-06.8'	96.1°	37°33.9'	-08.1'	96.9°	37°26.3'	-09.4'	97.7°	37°18.0'	-10.7'	98.4°	3
4	37°53.5'	-03.7'	95.1°	37°47.8'	-05.0'	95.8°	37°41.2'	-06.3'	96.6°	37°33.9'	-07.6'	97.4°	37°25.8'	-08.9'	98.1°	37°16.9'	-10.2'	98.9°	37°07.3'	-11.4'	99.6°	4
5	37°49.8'	-04.5'	96.3°	37°42.8'	-05.8'	97.1°	37°35.0'	-07.1'	97.9°	37°26.3'	-08.4'	98.6°	37°16.9'	-09.7'	99.4°	37°06.8'	-10.9'	100.1°	36°55.8'	-12.2'	100.9°	5
6	37°45.3'	-05.3'	97.6°	37°37.0'	-06.6'	98.4°	37°27.9'	-07.9'	99.1°	37°18.0'	-09.2'	99.9°	37°07.3'	-10.4'	100.6°	36°55.8'	-11.7'	101.4°	36°43.6'	-12.9'	102.1°	6
7	37°40.0'	-06.1'	98.9°	37°30.4'	-07.4'	99.6°	37°20.0'	-08.7'	100.4°	37°08.8'	-09.9'	101.1°	36°56.8'	-11.2'	101.9°	36°44.1'	-12.4'	102.6°	36°30.7'	-13.7'	103.3°	7
8	37°33.9'	-06.9'	100.1°	37°23.0'	-08.2'	100.9°	37°11.3'	-09.4'	101.6°	36°58.9'	-10.7'	102.4°	36°45.7'	-11.9'	103.1°	36°31.7'	-13.2'	103.8°	36°17.0'	-14.4'	104.5°	8
9	37°27.1'	-07.7'	101.4°	37°14.8'	-08.9'	102.1°	37°01.9'	-10.2'	102.9°	36°48.2'	-11.5'	103.6°	36°33.7'	-12.7'	104.3°	36°18.5'	-13.9'	105.0°	36°02.6'	-15.1'	105.7°	9
10	37°19.4'	-08.5'	102.6°	37°05.9'	-09.7'	103.4°	36°51.7'	-11.0'	104.1°	36°36.7'	-12.2'	104.8°	36°21.0'	-13.4'	105.5°	36°04.6'	-14.6'	106.2°	35°47.5'	-15.8'	106.9°	10
11	37°10.9'	-09.2'	103.9°	36°56.2'	-10.5'	104.6°	36°40.7'	-11.7'	105.3°	36°24.5'	-12.9'	106.0°	36°07.6'	-14.2'	106.7°	35°50.0'	-15.3'	107.4°	35°31.7'	-16.5'	108.1°	11
12	37°01.7'	-10.0'	105.1°	36°45.7'	-11.2'	105.8°	36°29.0'	-12.5'	106.5°	36°11.6'	-13.7'	107.2°	35°53.4'	-14.9'	107.9°	35°34.6'	-16.0'	108.6°	35°15.1'	-17.2'	109.3°	12
13	36°51.7'	-10.8'	106.3°	36°34.5'	-12.0'	107.0°	36°16.5'	-13.2'	107.7°	35°57.9'	-14.4'	108.4°	35°38.6'	-15.6'	109.1°	35°18.6'	-16.7'	109.8°	34°57.9'	-17.9'	110.5°	13
14	36°40.9'	-11.5'	107.6°	36°22.5'	-12.7'	108.3°	36°03.3'	-13.9'	109.0°	35°43.5'	-15.1'	109.6°	35°23.0'	-16.3'	110.3°	35°01.8'	-17.4'	111.0°	34°40.1'	-18.5'	111.6°	14
15	36°29.4'	-12.3'	108.8°	36°09.7'	-13.5'	109.5°	35°49.4'	-14.6'	110.2°	35°28.4'	-15.8'	110.8°	35°06.7'	-16.9'	111.5°	34°44.4'	-18.1'	112.1°	34°21.5'	-19.2'	112.8°	15
16	36°17.1'	-13.0'	110.0°	35°56.3'	-14.2'	110.7°	35°34.8'	-15.3'	111.4°	35°12.6'	-16.5'	112.0°	34°49.8'	-17.6'	112.7°	34°26.4'	-18.7'	113.3°	34°02.3'	-19.8'	113.9°	16
17	36°04.1'	-13.7'	111.2°	35°42.1'	-14.9'	111.9°	35°19.4'	-16.0'	112.5°	34°56.1'	-17.2'	113.2°	34°32.2'	-18.3'	113.8°	34°07.7'	-19.4'	114.4°	33°42.5'	-20.4'	115.1°	17
18	35°50.4'	-14.4'	112.4°	35°27.2'	-15.6'	113.1°	35°03.4'	-16.7'	113.7°	34°39.0'	-17.8'	114.4°	34°13.9'	-18.9'	115.0°	33°48.3'	-20.0'	115.6°	33°22.1'	-21.0'	116.2°	18
19	35°36.0'	-15.1'	113.6°	35°11.6'	-16.3'	114.3°	34°46.7'	-17.4'	114.9°	34°21.1'	-18.5'	115.5°	33°55.0'	-19.5'	116.1°	33°28.3'	-20.6'	116.7°	33°01.1'	-21.6'	117.3°	19
20	35°20.8'	-15.8'	114.8°	34°55.4'	-16.9'	115.4°	34°29.3'	-18.0'	116.1°	34°02.7'	-19.1'	116.7°	33°35.5'	-20.2'	117.3°	33°07.7'	-21.2'	117.8°	32°39.4'	-22.2'	118.4°	20
21	35°05.0'	-16.5'	116.0°	34°38.4'	-17.6'	116.6°	34°11.3'	-18.7'	117.2°	33°43.6'	-19.7'	117.8°	33°15.3'	-20.8'	118.4°	32°46.5'	-21.8'	119.0°	32°17.2'	-22.8'	119.5°	21
22	34°48.5'	-17.2'	117.1°	34°20.8'	-18.3'	117.8°	33°52.6'	-19.3'	118.4°	33°23.8'	-20.3'	118.9°	32°54.6'	-21.4'	119.5°	32°24.7'	-22.4'	120.1°	31°54.4'	-23.3'	120.6°	22
23	34°31.3'	-17.8'	118.3°	34°02.6'	-18.9'	118.9°	33°33.3'	-19.9'	119.5°	33°03.5'	-20.9'	120.1°	32°33.2'	-21.9'	120.6°	32°02.4'	-22.9'	121.2°	31°31.1'	-23.9'	121.7°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			Dec°

52° 308° LHA

Latitude CONTRARY to DECLINATION

52° 308° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

51° 309° LHA

Latitude CONTRARY to Declination

51° 309° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	39°00.0'	-00.4'	90.0°	38°59.6'	-01.8'	90.8°	38°58.3'	-03.1'	91.6°	38°56.2'	-04.5'	92.4°	38°53.2'	-05.8'	93.2°	38°49.4'	-07.1'	94.0°	38°44.8'	-08.5'	94.8°	0
1	38°59.5'	-01.3'	91.3°	38°57.8'	-02.6'	92.1°	38°55.2'	-04.0'	92.9°	38°51.7'	-05.3'	93.7°	38°47.4'	-06.6'	94.5°	38°42.3'	-08.0'	95.3°	38°36.3'	-09.3'	96.1°	1
2	38°58.3'	-02.1'	92.6°	38°55.2'	-03.5'	93.4°	38°51.2'	-04.8'	94.2°	38°46.4'	-06.1'	95.0°	38°40.8'	-07.5'	95.8°	38°34.3'	-08.8'	96.6°	38°27.1'	-10.1'	97.4°	2
3	38°56.2'	-03.0'	93.9°	38°51.7'	-04.3'	94.7°	38°46.4'	-05.6'	95.5°	38°40.3'	-07.0'	96.3°	38°33.3'	-08.3'	97.1°	38°25.6'	-09.6'	97.8°	38°17.0'	-10.9'	98.6°	3
4	38°53.2'	-03.8'	95.1°	38°47.4'	-05.1'	95.9°	38°40.8'	-06.5'	96.7°	38°33.3'	-07.8'	97.5°	38°25.1'	-09.1'	98.3°	38°16.0'	-10.4'	99.1°	38°06.1'	-11.7'	99.9°	4
5	38°49.4'	-04.6'	96.4°	38°42.3'	-06.0'	97.2°	38°34.3'	-07.3'	98.0°	38°25.6'	-08.6'	98.8°	38°16.0'	-09.9'	99.6°	38°05.6'	-11.2'	100.4°	37°54.4'	-12.5'	101.1°	5
6	38°44.8'	-05.5'	97.7°	38°36.3'	-06.8'	98.5°	38°27.1'	-08.1'	99.3°	38°17.0'	-09.4'	100.1°	38°06.1'	-10.7'	100.8°	37°54.4'	-12.0'	101.6°	37°42.0'	-13.2'	102.4°	6
7	38°39.3'	-06.3'	99.0°	38°29.5'	-07.6'	99.8°	38°18.9'	-08.9'	100.5°	38°07.6'	-10.2'	101.3°	37°55.4'	-11.5'	102.1°	37°42.5'	-12.7'	102.8°	37°28.7'	-14.0'	103.6°	7
8	38°33.0'	-07.1'	100.3°	38°21.9'	-08.4'	101.0°	38°10.0'	-09.7'	101.8°	37°57.4'	-11.0'	102.6°	37°43.9'	-12.3'	103.3°	37°29.7'	-13.5'	104.1°	37°14.7'	-14.7'	104.8°	8
9	38°25.9'	-07.9'	101.5°	38°13.5'	-09.2'	102.3°	38°00.3'	-10.5'	103.1°	37°46.4'	-11.8'	103.8°	37°31.7'	-13.0'	104.6°	37°16.2'	-14.3'	105.3°	37°00.0'	-15.5'	106.0°	9
10	38°17.9'	-08.8'	102.8°	38°04.2'	-10.0'	103.5°	37°49.8'	-11.3'	104.3°	37°34.6'	-12.5'	105.1°	37°18.6'	-13.8'	105.8°	37°01.9'	-15.0'	106.5°	36°44.5'	-16.2'	107.2°	10
11	38°09.2'	-09.6'	104.0°	37°54.2'	-10.8'	104.8°	37°38.5'	-12.1'	105.5°	37°22.1'	-13.3'	106.3°	37°04.9'	-14.5'	107.0°	36°46.9'	-15.7'	107.7°	36°28.3'	-16.9'	108.4°	11
12	37°59.6'	-10.4'	105.3°	37°43.4'	-11.6'	106.0°	37°26.4'	-12.8'	106.8°	37°08.7'	-14.1'	107.5°	36°50.3'	-15.3'	108.2°	36°31.2'	-16.5'	108.9°	36°11.4'	-17.6'	109.6°	12
13	37°49.2'	-11.1'	106.5°	37°31.8'	-12.4'	107.3°	37°13.6'	-13.6'	108.0°	36°54.7'	-14.8'	108.7°	36°35.1'	-16.0'	109.4°	36°14.8'	-17.2'	110.1°	35°53.8'	-18.3'	110.8°	13
14	37°38.1'	-11.9'	107.8°	37°19.4'	-13.1'	108.5°	36°60.0'	-14.3'	109.2°	36°39.9'	-15.5'	109.9°	36°19.1'	-16.7'	110.6°	35°57.6'	-17.9'	111.3°	35°35.5'	-19.0'	112.0°	14
15	37°26.2'	-12.7'	109.0°	37°06.3'	-13.9'	109.7°	36°45.6'	-15.1'	110.4°	36°24.3'	-16.3'	111.1°	36°02.4'	-17.4'	111.8°	35°39.7'	-18.5'	112.5°	35°16.5'	-19.7'	113.1°	15
16	37°13.5'	-13.4'	110.3°	36°52.4'	-14.6'	111.0°	36°30.6'	-15.8'	111.7°	36°08.1'	-17.0'	112.3°	35°45.0'	-18.1'	113.0°	35°21.2'	-19.2'	113.7°	34°56.8'	-20.3'	114.3°	16
17	37°00.0'	-14.2'	111.5°	36°37.7'	-15.4'	112.2°	36°14.8'	-16.5'	112.9°	35°51.1'	-17.7'	113.5°	35°26.9'	-18.8'	114.2°	35°02.0'	-19.9'	114.8°	34°36.5'	-20.9'	115.4°	17
18	36°45.8'	-14.9'	112.7°	36°22.4'	-16.1'	113.4°	35°58.2'	-17.2'	114.0°	35°33.5'	-18.3'	114.7°	35°08.1'	-19.4'	115.3°	34°42.1'	-20.5'	116.0°	34°15.6'	-21.6'	116.6°	18
19	36°30.9'	-15.7'	113.9°	36°06.3'	-16.8'	114.6°	35°41.0'	-17.9'	115.2°	35°15.1'	-19.0'	115.9°	34°48.7'	-20.1'	116.5°	34°21.6'	-21.1'	117.1°	33°54.0'	-22.2'	117.7°	19
20	36°15.2'	-16.4'	115.1°	35°49.5'	-17.5'	115.8°	35°23.1'	-18.6'	116.4°	34°56.1'	-19.7'	117.0°	34°28.6'	-20.7'	117.6°	34°00.5'	-21.8'	118.2°	33°31.8'	-22.8'	118.8°	20
21	35°58.9'	-17.1'	116.3																			

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

50° 310° LHA

Latitude CONTRARY to Declination

50° 310° LHA

Dec°	0			1			2			3			4			5			6			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	40°00.0'	-00.4'	90.0°	39°59.6'	-01.8'	90.8°	39°58.2'	-03.2'	91.7°	39°56.0'	-04.5'	92.5°	39°53.0'	-05.9'	93.3°	39°49.0'	-07.2'	94.2°	39°44.2'	-08.6'	95.0°	0			
1	39°59.5'	-01.3'	91.3°	39°57.8'	-02.7'	92.1°	39°55.1'	-04.0'	93.0°	39°51.5'	-05.4'	93.8°	39°47.1'	-06.7'	94.6°	39°41.8'	-08.1'	95.5°	39°35.6'	-09.4'	96.3°	1			
2	39°58.2'	-02.2'	92.6°	39°55.1'	-03.6'	93.4°	39°51.0'	-04.9'	94.3°	39°46.1'	-06.3'	95.1°	39°40.3'	-07.6'	95.9°	39°33.7'	-08.9'	96.8°	39°26.2'	-10.3'	97.6°	2			
3	39°56.0'	-03.1'	93.9°	39°51.5'	-04.4'	94.7°	39°46.1'	-05.8'	95.6°	39°39.9'	-07.1'	96.4°	39°32.7'	-08.5'	97.2°	39°24.8'	-09.8'	98.0°	39°16.0'	-11.1'	98.9°	3			
4	39°53.0'	-03.9'	95.2°	39°47.1'	-05.3'	96.0°	39°40.3'	-06.6'	96.9°	39°32.7'	-08.0'	97.7°	39°24.3'	-09.3'	98.5°	39°15.0'	-10.6'	99.3°	39°04.9'	-11.9'	100.1°	4			
5	39°49.0'	-04.8'	96.5°	39°41.8'	-06.2'	97.3°	39°33.7'	-07.5'	98.2°	39°24.8'	-08.8'	99.0°	39°15.0'	-10.1'	99.8°	39°04.4'	-11.4'	100.6°	38°52.9'	-12.7'	101.4°	5			
6	39°44.2'	-05.7'	97.8°	39°35.6'	-07.0'	98.6°	39°26.2'	-08.3'	99.4°	39°16.0'	-09.7'	100.3°	39°04.9'	-11.0'	101.1°	38°52.9'	-12.2'	101.8°	38°40.2'	-13.5'	102.6°	6			
7	39°38.6'	-06.5'	99.1°	39°28.6'	-07.9'	99.9°	39°17.9'	-09.2'	100.7°	39°06.3'	-10.5'	101.5°	38°53.9'	-11.8'	102.3°	38°40.7'	-13.0'	103.1°	38°26.7'	-14.3'	103.9°	7			
8	39°32.0'	-07.4'	100.4°	39°20.8'	-08.7'	101.2°	39°08.7'	-10.0'	102.0°	38°55.8'	-11.3'	102.8°	38°42.1'	-12.6'	103.6°	38°27.7'	-13.8'	104.4°	38°12.4'	-15.1'	105.1°	8			
9	39°24.6'	-08.2'	101.7°	39°12.1'	-09.5'	102.5°	38°58.7'	-10.8'	103.3°	38°44.5'	-12.1'	104.1°	38°29.6'	-13.4'	104.8°	38°13.8'	-14.6'	105.6°	37°57.3'	-15.8'	106.3°	9			
10	39°16.4'	-09.1'	103.0°	39°02.5'	-10.4'	103.8°	38°47.9'	-11.6'	104.5°	38°32.4'	-12.9'	105.3°	38°16.2'	-14.1'	106.1°	37°59.2'	-15.4'	106.8°	37°41.5'	-16.6'	107.6°	10			
11	39°07.3'	-09.9'	104.2°	38°52.2'	-11.2'	105.0°	38°36.2'	-12.4'	105.8°	38°19.5'	-13.7'	106.6°	38°02.0'	-14.9'	107.3°	37°43.8'	-16.1'	108.1°	37°24.9'	-17.3'	108.8°	11			
12	38°57.4'	-10.7'	105.5°	38°41.0'	-12.0'	106.3°	38°23.8'	-13.2'	107.0°	38°05.8'	-14.5'	107.8°	37°47.1'	-15.7'	108.5°	37°27.7'	-16.9'	109.3°	37°07.5'	-18.1'	110.0°	12			
13	38°46.7'	-11.5'	106.8°	38°29.0'	-12.8'	107.5°	38°10.6'	-14.0'	108.3°	37°51.4'	-15.2'	109.0°	37°31.4'	-16.4'	109.8°	37°10.8'	-17.6'	110.5°	36°49.5'	-18.8'	111.2°	13			
14	38°35.2'	-12.3'	108.0°	38°16.2'	-13.6'	108.8°	37°56.6'	-14.8'	109.5°	37°36.1'	-16.0'	110.3°	37°15.0'	-17.2'	111.0°	36°53.2'	-18.3'	111.7°	36°30.7'	-19.5'	112.4°	14			
15	38°22.8'	-13.1'	109.3°	38°02.7'	-14.3'	110.0°	37°41.8'	-15.5'	110.7°	37°20.2'	-16.7'	111.5°	36°57.9'	-17.9'	112.2°	36°34.9'	-19.0'	112.9°	36°11.3'	-20.1'	113.5°	15			
16	38°09.7'	-13.9'	110.5°	37°48.3'	-15.1'	111.3°	37°26.2'	-16.3'	112.0°	37°03.4'	-17.4'	112.7°	36°40.0'	-18.6'	113.4°	36°15.9'	-19.7'	114.0°	35°51.1'	-20.8'	114.7°	16			
17	37°55.8'	-14.7'	111.8°	37°33.2'	-15.9'	112.5°	37°09.9'	-17.0'	113.2°	36°46.0'	-18.2'	113.9°	36°21.4'	-19.3'	114.5°	35°56.2'	-20.4'	115.2°	35°30.3'	-21.5'	115.9°	17			
18	37°41.1'	-15.4'	113.0°	37°17.4'	-16.6'	113.7°	36°52.9'	-17.7'	114.4°	36°27.8'	-18.9'	115.1°	36°02.1'	-20.0'	115.7°	35°35.8'	-21.0'	116.4°	35°08.8'	-22.1'	117.0°	18			
19	37°25.7'	-16.2'	114.2°	37°00.8'	-17.3'	114.9°	36°35.2'	-18.4'	115.6°	36°09.0'	-19.5'	116.2°	35°42.2'	-20.6'	116.9°	35°14.7'	-21.7'	117.5°	34°46.7'	-22.7'	118.1°	19			
20	37°09.5'	-16.9'	115.4°	36°43.4'	-18.0'	116.1°	36°16.7'	-19.1'	116.8°	35°49.4'	-20.2'	117.4°	35°21.5'	-21.3'	118.0°	34°53.0'	-22.3'	118.7°	34°24.0'	-23.3'	119.3°	20			
21	36°52.6'	-17.6'	116.6°	36°25.4'	-18.7'	117.3°	35°57.6'	-19.8'	117.9°	35°29.2'	-20.9'	118.6°	35°00.2'	-21.9'	119.2°	34°30.7'	-22.9'	119.8°	34°00.6'	-23.9'	120.4°	21			
22	36°35.0'	-18.3'	117.8°	36°06.7'	-19.4'	118.5°	35°37.8'	-20.5'	119.1°	35°08.3'	-21.5'	119.7°	34°38.3'	-22.5'	120.3°	34°07.8'	-23.5'	120.9°	33°36.7'	-24.5'	121.5°	22			
23	36°16.6'	-19.0'	119.0°	35°47.2'	-20.1'	119.6°	35°17.3'	-21.1'	120.2°	34°46.8'	-22.2'	120.8°	34°15.8'	-23.2'	121.4°	33°44.2'	-24.1'	122.0°	33°12.2'	-25.1'	122.6°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6					Dec°	

50° 310° LHA

Latitude CONTRARY to DECLINATION

50° 310° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

49° 311° LHA

Latitude CONTRARY to Declination

49° 311° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	41°00.0'	-00.5'	90.0°	40°59.5'	-01.8'	90.9°	40°58.2'	-03.2'	91.7°	40°55.9'	-04.6'	92.6°	40°52.7'	-06.0'	93.5°	40°48.6'	-07.4'	94.3°	40°43.7'	-08.7'	95.2°	0
1	40°59.5'	-01.4'	91.3°	40°57.7'	-02.7'	92.2°	40°55.0'	-04.1'	93.1°	40°51.3'	-05.5'	93.9°	40°46.7'	-06.9'	94.8°	40°41.3'	-08.2'	95.6°	40°34.9'	-09.6'	96.5°	1
2	40°58.1'	-02.3'	92.6°	40°55.0'	-03.7'	93.5°	40°50.8'	-05.0'	94.4°	40°45.8'	-06.4'	95.2°	40°39.9'	-07.8'	96.1°	40°33.1'	-09.1'	96.9°	40°25.4'	-10.5'	97.8°	2
3	40°55.9'	-03.2'	94.0°	40°51.3'	-04.6'	94.8°	40°45.8'	-05.9'	95.7°	40°39.4'	-07.3'	96.6°	40°32.1'	-08.6'	97.4°	40°23.9'	-10.0'	98.2°	40°14.9'	-11.3'	99.1°	3
4	40°52.7'	-04.1'	95.3°	40°46.7'	-05.5'	96.2°	40°39.9'	-06.8'	97.0°	40°32.1'	-08.2'	97.9°	40°23.5'	-09.5'	98.7°	40°13.9'	-10.8'	99.5°	40°03.6'	-12.2'	100.4°	4
5	40°48.6'	-05.0'	96.6°	40°41.3'	-06.3'	97.5°	40°33.1'	-07.7'	98.3°	40°23.9'	-09.0'	99.2°	40°13.9'	-10.4'	100.0°	40°03.1'	-11.7'	100.8°	39°51.4'	-13.0'	101.6°	5
6	40°43.7'	-05.9'	97.9°	40°34.9'	-07.2'	98.8°	40°25.4'	-08.6'	99.6°	40°14.9'	-09.9'	100.5°	40°03.6'	-11.2'	101.3°	39°51.4'	-12.5'	102.1°	39°38.4'	-13.8'	102.9°	6
7	40°37.8'	-06.8'	99.2°	40°27.7'	-08.1'	100.1°	40°16.8'	-09.4'	100.9°	40°05.0'	-10.8'	101.7°	39°52.4'	-12.1'	102.6°	39°38.9'	-13.4'	103.4°	39°24.6'	-14.6'	104.2°	7
8	40°31.0'	-07.6'	100.5°	40°19.6'	-09.0'	101.4°	40°07.3'	-10.3'	102.2°	39°54.2'	-11.6'	103.0°	39°40.3'	-12.9'	103.8°	39°25.5'	-14.2'	104.6°	39°10.0'	-15.4'	105.4°	8
9	40°23.4'	-08.5'	101.9°	40°10.6'	-09.8'	102.7°	39°57.0'	-11.1'	103.5°	39°42.6'	-12.4'	104.3°	39°27.4'	-13.7'	105.1°	39°11.3'	-15.0'	105.9°	38°54.5'	-16.2'	106.7°	9
10	40°14.9'	-09.4'	103.2°	40°00.8'	-10.7'	104.0°	39°45.9'	-12.0'	104.8°	39°30.2'	-13.3'	105.6°	39°13.7'	-14.5'	106.4°	38°56.4'	-15.8'	107.1°	38°38.3'	-17.0'	107.9°	10
11	40°05.5'	-10.2'	104.4°	39°50.1'	-11.5'	105.3°	39°33.9'	-12.8'	106.1°	39°16.9'	-14.1'	106.8°	38°59.1'	-15.3'	107.6°	38°40.6'	-16.5'	108.4°	38°21.3'	-17.8'	109.1°	11
12	39°55.2'	-11.1'	105.7°	39°38.6'	-12.4'	106.5°	39°21.1'	-13.6'	107.3°	39°02.8'	-14.9'	108.1°	38°43.8'	-16.1'	108.9°	38°24.1'	-17.3'	109.6°	38°03.5'	-18.5'	110.4°	12
13	39°44.1'	-11.9'	107.0°	39°26.2'	-13.2'	107.8°	39°07.5'	-14.4'	108.6°	38°48.0'	-15.7'	109.3°	38°27.7'	-16.9'	110.1°	38°06.7'	-18.1'	110.8°	37°45.0'	-19.2'	111.6°	13
14	39°32.2'	-12.8'	108.3°	39°13.0'	-14.0'	109.1°	38°53.0'	-15.2'	109.8°	38°32.3'	-16.4'	110.6°	38°10.8'	-17.6'	111.3°	37°48.7'	-18.8'	112.0°	37°25.8'	-19.9'	112.8°	14
15	39°19.4'	-13.6'	109.5°	38°59.0'	-14.8'	110.3°	38°37.8'	-16.0'	111.1°	38°15.9'	-17.2'	111.8°	37°53.2'	-18.4'	112.5°	37°29.9'	-19.5'	113.2°	37°05.9'	-20.6'	113.9°	15
16	39°05.9'	-14.4'	110.8°	38°44.2'	-15.6'	111.6°	38°21.8'	-16.8'	112.3°	37°58.7'	-17.9'	113.0°	37°34.9'	-19.1'	113.7°	37°10.4'	-20.2'	114.4°	36°45.2'	-21.3'	115.1°	16
17	38°51.5'	-15.2'	112.1°	38°28.6'	-16.4'	112.8°	38°05.0'	-17.5'	113.5°	37°40.7'	-18.7'	114.2°	37°15.8'	-19.8'	114.9°	36°50.1'	-20.9'	115.6°	36°23.9'	-22.0'	116.3°	17
18	38°36.3'	-16.0'	113.3°	38°12.2'	-17.1'	114.0°	37°47.5'	-18.3'	114.7°	37°22.0'	-19.4'	115.4°	36°55.9'	-20.5'	116.1°	36°29.2'	-21.6'	116.8°	36°01.9'	-22.7'	117.4°	18
19	38°20.4'	-16.7'	114.5°	37°55.1'	-17.9'	115.2°	37°29.2'	-19.0'	115.9°	37°02.6'	-20.1'	116.6°	36°35.4'	-21.2'	117.3°	36°07.6'	-22.3'	117.9°	35°39.2'	-23.3'	118.6°	19
20	38°03.6'	-17.5'	115.7°	37°37.2'	-18.6'	116.4°	37°10.2'	-19.7'	117.1°	36°42.5'	-20.8'	117.8°	36°14.3'	-21.9'	118.4°	35°45.4'	-22.9'	119.1°	35°15.9'	-23.9'	119.7°	

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

48° 312° LHA

Latitude CONTRARY to Declination

48° 312° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	42°00.0'	-00.5'	90.0°	41°59.5'	-01.9'	90.9°	41°58.1'	-03.3'	91.8°	41°55.8'	-04.7'	92.7°	41°52.5'	-06.1'	93.6°	41°48.2'	-07.5'	94.5°	41°43.1'	-08.9'	95.4°	0
1	41°59.5'	-01.4'	91.3°	41°57.6'	-02.8'	92.2°	41°54.8'	-04.2'	93.1°	41°51.1'	-05.6'	94.0°	41°46.4'	-07.0'	94.9°	41°40.8'	-08.4'	95.8°	41°34.2'	-09.8'	96.7°	1
2	41°58.1'	-02.4'	92.7°	41°54.8'	-03.8'	93.6°	41°50.6'	-05.2'	94.5°	41°45.5'	-06.5'	95.4°	41°39.4'	-07.9'	96.3°	41°32.4'	-09.3'	97.1°	41°24.5'	-10.7'	98.0°	2
3	41°55.8'	-03.3'	94.0°	41°51.1'	-04.7'	94.9°	41°45.5'	-06.1'	95.8°	41°38.9'	-07.5'	96.7°	41°31.4'	-08.8'	97.6°	41°23.1'	-10.2'	98.5°	41°13.8'	-11.5'	99.3°	3
4	41°52.5'	-04.2'	95.4°	41°46.4'	-05.6'	96.3°	41°39.4'	-07.0'	97.2°	41°31.4'	-08.4'	98.0°	41°22.6'	-09.7'	98.9°	41°12.9'	-11.1'	99.8°	41°02.2'	-12.4'	100.6°	4
5	41°48.2'	-05.2'	96.7°	41°40.8'	-06.5'	97.6°	41°32.4'	-07.9'	98.5°	41°23.1'	-09.3'	99.4°	41°12.9'	-10.6'	100.2°	41°01.8'	-12.0'	101.1°	40°49.8'	-13.3'	101.9°	5
6	41°43.1'	-06.1'	98.1°	41°34.2'	-07.5'	98.9°	41°24.5'	-08.8'	99.8°	41°13.8'	-10.2'	100.7°	41°02.2'	-11.5'	101.5°	40°49.8'	-12.8'	102.4°	40°36.5'	-14.1'	103.2°	6
7	41°37.0'	-07.0'	99.4°	41°26.8'	-08.4'	100.3°	41°15.6'	-09.7'	101.1°	41°03.6'	-11.1'	102.0°	40°50.7'	-12.4'	102.8°	40°37.0'	-13.7'	103.7°	40°22.4'	-15.0'	104.5°	7
8	41°30.0'	-07.9'	100.7°	41°18.4'	-09.3'	101.6°	41°05.9'	-10.6'	102.4°	40°52.6'	-11.9'	103.3°	40°38.4'	-13.2'	104.1°	40°23.3'	-14.5'	104.9°	40°07.4'	-15.8'	105.8°	8
9	41°22.1'	-08.8'	102.0°	41°09.1'	-10.2'	102.9°	40°55.3'	-11.5'	103.7°	40°40.6'	-12.8'	104.6°	40°25.1'	-14.1'	105.4°	40°08.8'	-15.4'	106.2°	39°51.6'	-16.6'	107.0°	9
10	41°13.3'	-09.7'	103.3°	40°59.0'	-11.0'	104.2°	40°43.8'	-12.3'	105.0°	40°27.9'	-13.6'	105.9°	40°11.1'	-14.9'	106.7°	39°53.4'	-16.2'	107.5°	39°35.0'	-17.4'	108.3°	10
11	41°03.5'	-10.6'	104.7°	40°47.9'	-11.9'	105.5°	40°31.5'	-13.2'	106.3°	40°14.2'	-14.5'	107.1°	39°56.1'	-15.7'	107.9°	39°37.3'	-17.0'	108.7°	39°17.6'	-18.2'	109.5°	11
12	40°52.9'	-11.5'	106.0°	40°36.0'	-12.8'	106.8°	40°18.3'	-14.0'	107.6°	39°59.7'	-15.3'	108.4°	39°40.4'	-16.5'	109.2°	39°20.3'	-17.8'	110.0°	38°59.4'	-19.0'	110.7°	12
13	40°41.5'	-12.3'	107.3°	40°23.3'	-13.6'	108.1°	40°04.2'	-14.9'	108.9°	39°44.4'	-16.1'	109.7°	39°23.9'	-17.3'	110.4°	39°02.5'	-18.5'	111.2°	38°40.5'	-19.7'	112.0°	13
14	40°29.1'	-13.2'	108.5°	40°09.6'	-14.5'	109.3°	39°49.4'	-15.7'	110.1°	39°28.3'	-16.9'	110.9°	39°06.5'	-18.1'	111.7°	38°44.0'	-19.3'	112.4°	38°20.8'	-20.4'	113.2°	14
15	40°15.9'	-14.0'	109.8°	39°55.2'	-15.3'	110.6°	39°33.7'	-16.5'	111.4°	39°11.4'	-17.7'	112.2°	38°48.4'	-18.9'	112.9°	38°24.7'	-20.0'	113.6°	38°00.3'	-21.2'	114.4°	15
16	40°01.9'	-14.9'	111.1°	39°39.9'	-16.1'	111.9°	39°17.2'	-17.3'	112.6°	38°53.7'	-18.5'	113.4°	38°29.6'	-19.6'	114.1°	38°04.7'	-20.8'	114.8°	37°39.2'	-21.9'	115.5°	16
17	39°47.0'	-15.7'	112.4°	39°23.8'	-16.9'	113.1°	38°59.9'	-18.1'	113.9°	38°35.3'	-19.2'	114.6°	38°09.9'	-20.3'	115.3°	37°44.0'	-21.5'	116.0°	37°17.3'	-22.6'	116.7°	17
18	39°31.3'	-16.5'	113.6°	39°07.0'	-17.7'	114.4°	38°41.9'	-18.8'	115.1°	38°16.1'	-20.0'	115.8°	37°49.6'	-21.1'	116.5°	37°22.5'	-22.2'	117.2°	36°54.7'	-23.2'	117.9°	18
19	39°14.9'	-17.3'	114.9°	38°49.3'	-18.4'	115.6°	38°23.0'	-19.6'	116.3°	37°56.1'	-20.7'	117.0°	37°28.5'	-21.8'	117.7°	37°00.3'	-22.8'	118.4°	36°31.5'	-23.9'	119.0°	19
20	38°57.6'	-18.0'	116.1°	38°30.9'	-19.2'	116.8°	38°03.5'	-20.3'	117.5°	37°35.4'	-21.4'	118.2°	37°06.8'	-22.4'	118.9°	36°37.5'	-23.5'	119.5°	36°07.6'	-24.5'	120.2°	20
21	38°39.6'	-18.8'	117.3°	38°11.7'	-19.9'	118.0°	37°43.2'	-21.0'	118.7°	37°14.1'	-22.1'	119.4°	36°44.3'	-23.1'	120.0°	36°14.0'	-24.1'	120.7°	35°43.1'	-25.1'	121.3°	21
22	38°20.8'	-19.5'	118.5°	37°51.8'	-20.6'	119.2°	37°22.2'	-21.7'	119.9°	36°52.0'	-22.7'	120.5°	36°21.2'	-23.8'	121.2°	35°49.9'	-24.8'	121.8°	35°18.0'	-25.8'	122.4°	22
23	38°01.2'	-20.3'	119.7°	37°31.1'	-21.3'	120.4°	37°00.5'	-22.4'	121.1°	36°29.2'	-23.4'	121.7°	35°57.4'	-24.4'	122.3°	35°25.1'	-25.4'	122.9°	34°52.2'	-26.3'	123.5°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

48° 312° LHA

Latitude CONTRARY to DECLINATION

48° 312° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

47° 313° LHA

Latitude CONTRARY to Declination

47° 313° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	43°00.0'	-00.5'	90.0°	42°59.5'	-01.9'	90.9°	42°58.0'	-03.3'	91.9°	42°55.6'	-04.8'	92.8°	42°52.2'	-06.2'	93.7°	42°47.8'	-07.6'	94.6°	42°42.5'	-09.0'	95.6°	0
1	42°59.5'	-01.5'	91.4°	42°57.6'	-02.9'	92.3°	42°54.7'	-04.3'	93.2°	42°50.8'	-05.7'	94.2°	42°46.0'	-07.1'	95.1°	42°40.2'	-08.6'	96.0°	42°33.5'	-09.9'	96.9°	1
2	42°58.0'	-02.4'	92.7°	42°54.7'	-03.9'	93.7°	42°50.4'	-05.3'	94.6°	42°45.1'	-06.7'	95.5°	42°38.9'	-08.1'	96.4°	42°31.7'	-09.5'	97.3°	42°23.5'	-10.9'	98.2°	2
3	42°55.6'	-03.4'	94.1°	42°50.8'	-04.8'	95.0°	42°45.1'	-06.2'	95.9°	42°38.4'	-07.6'	96.9°	42°30.8'	-09.0'	97.8°	42°22.2'	-10.4'	98.7°	42°12.7'	-11.8'	99.6°	3
4	42°52.2'	-04.4'	95.5°	42°46.0'	-05.8'	96.4°	42°38.9'	-07.2'	97.3°	42°30.8'	-08.6'	98.2°	42°21.7'	-10.0'	99.1°	42°11.8'	-11.3'	100.0°	42°00.9'	-12.7'	100.9°	4
5	42°47.8'	-05.3'	96.8°	42°40.2'	-06.7'	97.7°	42°31.7'	-08.1'	98.6°	42°22.2'	-09.5'	99.6°	42°11.8'	-10.9'	100.4°	42°00.4'	-12.2'	101.3°	41°48.2'	-13.6'	102.2°	5
6	42°42.5'	-06.3'	98.2°	42°33.5'	-07.7'	99.1°	42°23.5'	-09.1'	100.0°	42°12.7'	-10.4'	100.9°	42°00.9'	-11.8'	101.8°	41°48.2'	-13.1'	102.6°	41°34.6'	-14.5'	103.5°	6
7	42°36.2'	-07.2'	99.5°	42°25.8'	-08.6'	100.4°	42°14.5'	-10.0'	101.3°	42°02.2'	-11.4'	102.2°	41°49.1'	-12.7'	103.1°	41°35.0'	-14.0'	104.0°	41°20.1'	-15.3'	104.8°	7
8	42°28.9'	-08.2'	100.9°	42°17.1'	-09.6'	101.8°	42°04.5'	-10.9'	102.7°	41°50.9'	-12.3'	103.5°	41°36.4'	-13.6'	104.4°	41°21.0'	-14.9'	105.3°	41°04.8'	-16.2'	106.1°	8
9	42°20.7'	-09.1'	102.2°	42°07.6'	-10.5'	103.1°	41°53.5'	-11.8'	104.0°	41°38.6'	-13.1'	104.8°	41°22.8'	-14.5'	105.7°	41°06.1'	-15.7'	106.5°	40°48.6'	-17.0'	107.4°	9
10	42°11.6'	-10.1'	103.6°	41°57.1'	-11.4'	104.4°	41°41.7'	-12.7'	105.3°	41°25.5'	-14.0'	106.1°	41°08.3'	-15.3'	107.0°	40°50.4'	-16.6'	107.8°	40°31.6'	-17.8'	108.6°	10
11	42°01.6'	-11.0'	104.9°	41°45.7'	-12.3'	105.7°	41°29.0'	-13.6'	106.6°	41°11.4'	-14.9'	107.4°	40°53.0'	-16.2'	108.3°	40°33.8'	-17.4'	109.1°	40°13.8'	-18.6'	109.9°	11
12	41°50.6'	-11.9'	106.2°	41°33.4'	-13.2'	107.1°	41°15.4'	-14.5'	107.9°	40°56.5'	-15.7'	108.7°	40°36.9'	-17.0'	109.5°	40°16.4'	-18.2'	110.3°	39°55.2'	-19.4'	111.1°	12
13	41°38.7'	-12.8'	107.5°	41°20.2'	-14.1'	108.4°	41°00.9'	-15.3'	109.2°	40°40.8'	-16.6'	110.0°	40°19.9'	-17.8'	110.8°	39°58.2'	-19.0'	111.6°	39°35.7'	-20.2'	112.4°	13
14	41°26.0'	-13.6'	108.8°	41°06.2'	-14.9'	109.7°	40°45.6'	-16.2'	110.5°	40°24.2'	-17.4'	111.3°	40°02.1'	-18.6'	112.1°	39°39.2'	-19.8'	112.8°	39°15.5'	-20.9'	113.6°	14
15	41°12.3'	-14.5'	110.1°	40°51.3'	-15.8'	110.9°	40°29.4'	-17.0'	111.7°	40°06.8'	-18.2'	112.5°	39°43.5'	-19.4'	113.3°	39°19.4'	-20.5'	114.0°	38°54.6'	-21.7'	114.8°	15
16	40°57.8'	-15.4'	111.4°	40°35.5'	-16.6'	112.2°	40°12.5'	-17.8'	113.0°	39°48.6'	-19.0'	113.8°	39°24.1'	-20.1'	114.5°	38°58.9'	-21.3'	115.3°	38°32.9'	-22.4'	116.0°	16
17	40°42.5'	-16.2'	112.7°	40°18.9'	-17.4'	113.5°	39°54.7'	-18.6'	114.2°	39°29.7'	-19.8'	115.0°	39°04.0'	-20.9'	115.7°	38°37.6'	-22.0'	116.5°	38°10.5'	-23.1'	117.2°	17
18	40°26.3'	-17.0'	114.0°	40°01.5'	-18.2'	114.7°	39°36.1'	-19.4'	115.5°	39°09.9'	-20.5'	116.2°	38°43.1'	-21.6'	116.9°	38°15.5'	-22.7'	117.6°	37°47.4'	-23.8'	118.3°	18
19	40°09.2'	-17.8'	115.2°	39°43.3'	-19.0'	116.0°	39°16.7'	-20.1'	116.7°	38°49.4'	-21.3'	117.4°	38°21.4'	-22.4'	118.1°	37°52.8'	-23.4'	118.8°	37°23.6'	-24.5'	119.5°	19
20	39°51.4'	-18.6'	116.5°	39°24.3'	-19.8'	117.2°	38°56.6'	-20.9'	117.9°	38°28.1'	-22.0'	118.6°	37°59.1'	-23.1'	119.3°	37°29.4'	-24.1'	120.0°	36°59.1'	-25.1'	120.6°	20
21	39°32.8'</																					

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

46° 314° LHA

Latitude CONTRARY to Declination

46° 314° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	44°00.0'	-00.5'	90.0°	43°59.5'	-02.0'	91.0°	43°58.0'	-03.4'	91.9°	43°55.5'	-04.9'	92.9°	43°51.9'	-06.3'	93.9°	43°47.4'	-07.7'	94.8°	43°41.9'	-09.2'	95.8°	0
1	43°59.4'	-01.5'	91.4°	43°57.5'	-03.0'	92.4°	43°54.6'	-04.4'	93.3°	43°50.6'	-05.9'	94.3°	43°45.6'	-07.3'	95.2°	43°39.7'	-08.7'	96.2°	43°32.7'	-10.1'	97.1°	1
2	43°57.9'	-02.5'	92.8°	43°54.6'	-04.0'	93.7°	43°50.1'	-05.4'	94.7°	43°44.7'	-06.8'	95.7°	43°38.3'	-08.3'	96.6°	43°30.9'	-09.7'	97.5°	43°22.6'	-11.1'	98.5°	2
3	43°55.5'	-03.5'	94.2°	43°50.6'	-05.0'	95.1°	43°44.7'	-06.4'	96.1°	43°37.9'	-07.8'	97.0°	43°30.1'	-09.2'	98.0°	43°21.2'	-10.6'	98.9°	43°11.5'	-12.0'	99.8°	3
4	43°51.9'	-04.5'	95.6°	43°45.6'	-06.0'	96.5°	43°38.3'	-07.4'	97.5°	43°30.1'	-08.8'	98.4°	43°20.8'	-10.2'	99.3°	43°10.6'	-11.6'	100.3°	42°59.4'	-13.0'	101.2°	4
5	43°47.4'	-05.5'	96.9°	43°39.7'	-07.0'	97.9°	43°30.9'	-08.4'	98.8°	43°21.2'	-09.8'	99.8°	43°10.6'	-11.2'	100.7°	42°59.0'	-12.5'	101.6°	42°46.5'	-13.9'	102.5°	5
6	43°41.9'	-06.5'	98.3°	43°32.7'	-07.9'	99.3°	43°22.6'	-09.3'	100.2°	43°11.5'	-10.7'	101.1°	42°59.4'	-12.1'	102.0°	42°46.5'	-13.5'	102.9°	42°32.6'	-14.8'	103.8°	6
7	43°35.3'	-07.5'	99.7°	43°24.8'	-08.9'	100.6°	43°13.2'	-10.3'	101.5°	43°00.7'	-11.7'	102.5°	42°47.3'	-13.0'	103.4°	42°33.0'	-14.4'	104.3°	42°17.8'	-15.7'	105.1°	7
8	43°27.8'	-08.5'	101.1°	43°15.9'	-09.9'	102.0°	43°02.9'	-11.2'	102.9°	42°49.1'	-12.6'	103.8°	42°34.3'	-13.9'	104.7°	42°18.6'	-15.3'	105.6°	42°02.1'	-16.6'	106.4°	8
9	43°19.4'	-09.4'	102.4°	43°06.0'	-10.8'	103.3°	42°51.7'	-12.2'	104.2°	42°36.5'	-13.5'	105.1°	42°20.4'	-14.8'	106.0°	42°03.4'	-16.1'	106.9°	41°45.5'	-17.4'	107.7°	9
10	43°09.9'	-10.4'	103.8°	42°55.2'	-11.8'	104.7°	42°39.5'	-13.1'	105.6°	42°23.0'	-14.4'	106.5°	42°05.5'	-15.7'	107.3°	41°47.2'	-17.0'	108.2°	41°28.1'	-18.3'	109.0°	10
11	42°59.5'	-11.3'	105.1°	42°43.4'	-12.7'	106.0°	42°26.4'	-14.0'	106.9°	42°08.5'	-15.3'	107.8°	41°49.8'	-16.6'	108.6°	41°30.2'	-17.9'	109.5°	41°09.8'	-19.1'	110.3°	11
12	42°48.2'	-12.3'	106.5°	42°30.7'	-13.6'	107.3°	42°12.4'	-14.9'	108.2°	41°53.2'	-16.2'	109.1°	41°33.2'	-17.4'	109.9°	41°12.4'	-18.7'	110.7°	40°50.7'	-19.9'	111.5°	12
13	42°35.9'	-13.2'	107.8°	42°17.1'	-14.5'	108.7°	41°57.5'	-15.8'	109.5°	41°37.0'	-17.0'	110.4°	41°15.8'	-18.3'	111.2°	40°53.7'	-19.5'	112.0°	40°30.8'	-20.7'	112.8°	13
14	42°22.7'	-14.1'	109.1°	42°02.6'	-15.4'	110.0°	41°41.7'	-16.6'	110.8°	41°20.0'	-17.9'	111.6°	40°57.5'	-19.1'	112.4°	40°34.2'	-20.3'	113.2°	40°10.1'	-21.5'	114.0°	14
15	42°08.6'	-15.0'	110.4°	41°47.2'	-16.3'	111.3°	41°25.1'	-17.5'	112.1°	41°02.1'	-18.7'	112.9°	40°38.4'	-19.9'	113.7°	40°13.9'	-21.1'	114.5°	39°48.7'	-22.2'	115.2°	15
16	41°53.6'	-15.9'	111.7°	41°31.0'	-17.1'	112.6°	41°07.6'	-18.3'	113.4°	40°43.4'	-19.5'	114.2°	40°18.5'	-20.7'	114.9°	39°52.8'	-21.8'	115.7°	39°26.4'	-23.0'	116.4°	16
17	41°37.7'	-16.7'	113.0°	41°13.9'	-17.9'	113.8°	40°49.3'	-19.1'	114.6°	40°23.9'	-20.3'	115.4°	39°57.8'	-21.5'	116.2°	39°31.0'	-22.6'	116.9°	39°03.5'	-23.7'	117.6°	17
18	41°21.0'	-17.6'	114.3°	40°55.9'	-18.8'	115.1°	40°30.1'	-19.9'	115.9°	40°03.6'	-21.1'	116.6°	39°36.3'	-22.2'	117.4°	39°08.4'	-23.3'	118.1°	38°39.8'	-24.4'	118.8°	18
19	41°03.4'	-18.4'	115.6°	40°37.2'	-19.6'	116.4°	40°10.2'	-20.7'	117.1°	39°42.5'	-21.8'	117.9°	39°14.1'	-22.9'	118.6°	38°45.1'	-24.0'	119.3°	38°15.4'	-25.1'	120.0°	19
20	40°45.0'	-19.2'	116.8°	40°17.6'	-20.4'	117.6°	39°49.4'	-21.5'	118.3°	39°20.6'	-22.6'	119.1°	38°51.1'	-23.7'	119.8°	38°21.0'	-24.7'	120.5°	37°50.3'	-25.7'	121.1°	20
21	40°25.8'	-20.0'	118.1°	39°57.2'	-21.1'	118.8°	39°27.9'	-22.2'	119.6°	38°58.0'	-23.3'	120.3°	38°27.5'	-24.4'	121.0°	37°56.3'	-25.4'	121.6°	37°24.6'	-26.4'	122.3°	21
22	40°05.8'	-2405.8'	119.3°	39°36.1'	-2400.5'	120.0°	39°05.7'	-2394.5'	120.8°	38°34.7'	-2387.9'	121.4°	38°03.1'	-2380.7'	122.1°	37°30.9'	-2372.8'	122.8°	36°58.2'	-2364.4'	123.4°	22
23	39°45.0'	+315.0'	120.5°	39°14.2'	+345.3'	121.3°	38°42.7'	+375.2'	121.9°	38°10.7'	+404.6'	122.6°	37°38.1'	+433.6'	123.3°	37°04.9'	+462.1'	123.9°	36°31.1'	+490.1'	124.5°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			Dec°

134° 226° LHA

Latitude SAME as DECLINATION

134° 226° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

45° 315° LHA

Latitude CONTRARY to Declination

45° 315° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	45°00.0'	-00.5'	90.0°	44°59.5'	-02.0'	91.0°	44°57.9'	-03.5'	92.0°	44°55.3'	-05.0'	93.0°	44°51.6'	-06.4'	94.0°	44°46.9'	-07.9'	95.0°	44°41.2'	-09.3'	96.0°	0
1	44°59.4'	-01.6'	91.4°	44°57.5'	-03.0'	92.4°	44°54.4'	-04.5'	93.4°	44°50.3'	-06.0'	94.4°	44°45.2'	-07.4'	95.4°	44°39.1'	-08.9'	96.4°	44°31.9'	-10.3'	97.4°	1
2	44°57.9'	-02.6'	92.8°	44°54.4'	-04.1'	93.8°	44°49.9'	-05.6'	94.8°	44°44.4'	-07.0'	95.8°	44°37.8'	-08.5'	96.8°	44°30.2'	-09.9'	97.8°	44°21.6'	-11.3'	98.7°	2
3	44°55.3'	-03.7'	94.2°	44°50.3'	-05.1'	95.2°	44°44.4'	-06.6'	96.2°	44°37.3'	-08.0'	97.2°	44°29.3'	-09.5'	98.2°	44°20.3'	-10.9'	99.1°	44°10.2'	-12.3'	100.1°	3
4	44°51.6'	-04.7'	95.6°	44°45.2'	-06.2'	96.6°	44°37.8'	-07.6'	97.6°	44°29.3'	-09.0'	98.6°	44°19.8'	-10.5'	99.6°	44°09.4'	-11.9'	100.5°	43°57.9'	-13.3'	101.5°	4
5	44°46.9'	-05.7'	97.1°	44°39.1'	-07.2'	98.0°	44°30.2'	-08.6'	99.0°	44°20.3'	-10.0'	100.0°	44°09.4'	-11.4'	100.9°	43°57.5'	-12.8'	101.9°	43°44.7'	-14.2'	102.8°	5
6	44°41.2'	-06.7'	98.5°	44°31.9'	-08.2'	99.4°	44°21.6'	-09.6'	100.4°	44°10.2'	-11.0'	101.4°	43°57.9'	-12.4'	102.3°	43°44.7'	-13.8'	103.2°	43°30.5'	-15.1'	104.2°	6
7	44°34.5'	-07.8'	99.9°	44°23.7'	-09.2'	100.8°	44°12.0'	-10.6'	101.8°	43°59.2'	-12.0'	102.7°	43°45.5'	-13.4'	103.7°	43°30.9'	-14.7'	104.6°	43°15.3'	-16.1'	105.5°	7
8	44°26.7'	-08.8'	101.2°	44°14.5'	-10.2'	102.2°	44°01.4'	-11.6'	103.1°	43°47.2'	-13.0'	104.1°	43°32.2'	-14.3'	105.0°	43°16.2'	-15.6'	105.9°	42°59.3'	-17.0'	106.8°	8
9	44°17.9'	-09.8'	102.6°	44°04.3'	-11.2'	103.6°	43°49.8'	-12.5'	104.5°	43°34.3'	-13.9'	105.4°	43°17.9'	-15.2'	106.3°	43°00.5'	-16.6'	107.2°	42°42.3'	-17.9'	108.1°	9
10	44°08.2'	-10.8'	104.0°	43°53.2'	-12.1'	104.9°	43°37.2'	-13.5'	105.9°	43°20.4'	-14.8'	106.8°	43°02.6'	-16.1'	107.7°	42°44.0'	-17.4'	108.6°	42°24.4'	-18.7'	109.4°	10
11	43°57.4'	-11.7'	105.4°	43°41.0'	-13.1'	106.3°	43°23.7'	-14.4'	107.2°	43°05.5'	-15.7'	108.1°	42°46.5'	-17.0'	109.0°	42°26.5'	-18.3'	109.8°	42°05.7'	-19.6'	110.7°	11
12	43°45.7'	-12.7'	106.7°	43°27.9'	-14.0'	107.6°	43°09.3'	-15.4'	108.5°	42°49.8'	-16.6'	109.4°	42°29.4'	-17.9'	110.3°	42°08.2'	-19.2'	111.1°	41°46.2'	-20.4'	112.0°	12
13	43°33.0'	-13.6'	108.1°	43°13.9'	-15.0'	109.0°	42°54.0'	-16.3'	109.9°	42°33.2'	-17.5'	110.7°	42°11.5'	-18.8'	111.6°	41°49.0'	-20.0'	112.4°	41°25.8'	-21.2'	113.2°	13
14	43°19.3'	-14.6'	109.4°	42°59.0'	-15.9'	110.3°	42°37.7'	-17.1'	111.2°	42°15.6'	-18.4'	112.0°	41°52.7'	-19.6'	112.9°	41°29.0'	-20.8'	113.7°	41°04.5'	-22.0'	114.5°	14
15	43°04.8'	-15.5'	110.8°	42°43.1'	-16.8'	111.6°	42°20.6'	-18.0'	112.5°	41°57.2'	-19.2'	113.3°	41°33.1'	-20.4'	114.1°	41°08.2'	-21.6'	114.9°	40°42.5'	-22.8'	115.7°	15
16	42°49.3'	-16.4'	112.1°	42°26.3'	-17.6'	112.9°	42°02.5'	-18.9'	113.8°	41°38.0'	-20.1'	114.6°	41°12.6'	-21.3'	115.4°	40°46.6'	-22.4'	116.2°	40°19.8'	-23.5'	116.9°	16
17	42°32.9'	-17.3'	113.4°	42°08.7'	-18.5'	114.2°	41°43.7'	-19.7'	115.0°	41°17.9'	-20.9'	115.8°	40°51.4'	-22.0'	116.6°	40°24.2'	-23.2'	117.4°	39°56.2'	-24.3'	118.1°	17
18	42°15.6'	-18.1'	114.7°	41°50.2'	-19.3'	115.5°	41°24.0'	-20.5'	116.3°	40°57.0'	-21.7'	117.1°	40°29.4'	-22.8'	117.8°	40°01.0'	-23.9'	118.6°	39°31.9'	-25.0'	119.3°	18
19	41°57.5'	-19.0'	116.0°	41°30.8'	-20.2'	116.8°	41°03.4'	-21.3'	117.5°	40°35.3'	-22.5'	118.3°	40°06.5'	-23.6'	119.1°	39°37.1'	-24.6'	119.8°	39°06.9'	-25.7'	120.5°	19
20	41°38.5'	-19.8'	117.2°	41°10.6'	-21.0'	118.0°	40°42.1'	-22.1'	118.8°	40°12.9'	-23.2'	119.5°	39°43.0'	-24.3'	120.3°	39°12.4'	-25.3'	121.0°	38°41.2'	-26.4'	121.7°	20

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

44° 316° LHA

Latitude CONTRARY to Declination

44° 316° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	46°00.0'	-00.5'	90.0°	45°59.5'	-02.0'	91.0°	45°57.8'	-03.6'	92.1°	45°55.1'	-05.1'	93.1°	45°51.3'	-06.5'	94.1°	45°46.5'	-08.0'	95.2°	45°40.6'	-09.5'	96.2°	0
1	45°59.4'	-01.6'	91.4°	45°57.4'	-03.1'	92.5°	45°54.3'	-04.6'	93.5°	45°50.1'	-06.1'	94.5°	45°44.8'	-07.6'	95.6°	45°38.5'	-09.1'	96.6°	45°31.1'	-10.5'	97.6°	1
2	45°57.8'	-02.7'	92.9°	45°54.3'	-04.2'	93.9°	45°49.7'	-05.7'	94.9°	45°44.0'	-07.2'	96.0°	45°37.2'	-08.7'	97.0°	45°29.4'	-10.1'	98.0°	45°20.5'	-11.6'	99.0°	2
3	45°55.1'	-03.8'	94.3°	45°50.1'	-05.3'	95.3°	45°44.0'	-06.8'	96.4°	45°36.8'	-08.2'	97.4°	45°28.5'	-09.7'	98.4°	45°19.3'	-11.1'	99.4°	45°09.0'	-12.6'	100.4°	3
4	45°51.3'	-04.9'	95.7°	45°44.8'	-06.3'	96.8°	45°37.2'	-07.8'	97.8°	45°28.5'	-09.3'	98.8°	45°18.9'	-10.7'	99.8°	45°08.1'	-12.2'	100.8°	44°56.4'	-13.6'	101.8°	4
5	45°46.5'	-05.9'	97.2°	45°38.5'	-07.4'	98.2°	45°29.4'	-08.9'	99.2°	45°19.3'	-10.3'	100.2°	45°08.1'	-11.7'	101.2°	44°56.0'	-13.1'	102.2°	44°42.8'	-14.5'	103.1°	5
6	45°40.6'	-07.0'	98.6°	45°31.1'	-08.4'	99.6°	45°20.5'	-09.9'	100.6°	45°09.0'	-11.3'	101.6°	44°56.4'	-12.7'	102.6°	44°42.8'	-14.1'	103.5°	44°28.3'	-15.5'	104.5°	6
7	45°33.6'	-08.0'	100.0°	45°22.6'	-09.5'	101.0°	45°10.6'	-10.9'	102.0°	44°57.6'	-12.3'	103.0°	44°43.7'	-13.7'	104.0°	44°28.7'	-15.1'	104.9°	44°12.8'	-16.5'	105.9°	7
8	45°25.5'	-09.1'	101.4°	45°13.1'	-10.5'	102.4°	44°59.7'	-11.9'	103.4°	44°45.3'	-13.3'	104.4°	44°29.9'	-14.7'	105.3°	44°13.6'	-16.0'	106.3°	43°56.3'	-17.4'	107.2°	8
9	45°16.5'	-10.1'	102.8°	45°02.6'	-11.5'	103.8°	44°47.8'	-12.9'	104.8°	44°32.0'	-14.3'	105.7°	44°15.2'	-15.6'	106.7°	43°57.6'	-17.0'	107.6°	43°38.9'	-18.3'	108.5°	9
10	45°06.3'	-11.1'	104.2°	44°51.1'	-12.5'	105.2°	44°34.9'	-13.9'	106.2°	44°17.7'	-15.3'	107.1°	43°59.6'	-16.6'	108.0°	43°40.6'	-17.9'	108.9°	43°20.7'	-19.2'	109.8°	10
11	44°55.2'	-12.1'	105.6°	44°38.6'	-13.5'	106.6°	44°21.0'	-14.9'	107.5°	44°02.4'	-16.2'	108.5°	43°43.0'	-17.5'	109.4°	43°22.7'	-18.8'	110.3°	43°01.5'	-20.1'	111.1°	11
12	44°43.1'	-13.1'	107.0°	44°25.1'	-14.5'	108.0°	44°06.1'	-15.8'	108.9°	43°46.2'	-17.1'	109.8°	43°25.5'	-18.4'	110.7°	43°03.9'	-19.7'	111.6°	42°41.4'	-20.9'	112.4°	12
13	44°30.0'	-14.1'	108.4°	44°10.6'	-15.4'	109.3°	43°50.3'	-16.7'	110.2°	43°29.1'	-18.0'	111.1°	43°07.1'	-19.3'	112.0°	42°44.2'	-20.5'	112.8°	42°20.5'	-21.7'	113.7°	13
14	44°15.9'	-15.1'	109.7°	43°55.2'	-16.4'	110.7°	43°33.6'	-17.7'	111.5°	43°11.1'	-18.9'	112.4°	42°47.8'	-20.2'	113.3°	42°23.7'	-21.4'	114.1°	41°58.8'	-22.6'	114.9°	14
15	44°00.8'	-16.0'	111.1°	43°38.8'	-17.3'	112.0°	43°15.9'	-18.6'	112.9°	42°52.2'	-19.8'	113.7°	42°27.6'	-21.0'	114.6°	42°02.3'	-22.2'	115.4°	41°36.2'	-23.4'	116.2°	15
16	43°44.8'	-16.9'	112.4°	43°21.5'	-18.2'	113.3°	42°57.3'	-19.4'	114.2°	42°32.4'	-20.6'	115.0°	42°06.6'	-21.8'	115.8°	41°40.1'	-23.0'	116.6°	41°12.8'	-24.1'	117.4°	16
17	43°27.9'	-17.8'	113.8°	43°03.3'	-19.1'	114.6°	42°37.9'	-20.3'	115.5°	42°11.7'	-21.5'	116.3°	41°44.8'	-22.6'	117.1°	41°17.1'	-23.8'	117.9°	40°48.7'	-24.9'	118.6°	17
18	43°10.0'	-18.7'	115.1°	42°44.2'	-19.9'	115.9°	42°17.6'	-21.1'	116.7°	41°50.3'	-22.3'	117.5°	41°22.2'	-23.4'	118.3°	40°53.3'	-24.5'	119.1°	40°23.8'	-25.6'	119.8°	18
19	42°51.3'	-19.6'	116.4°	42°24.3'	-20.8'	117.2°	41°56.5'	-21.9'	118.0°	41°28.0'	-23.1'	118.8°	40°58.7'	-24.2'	119.5°	40°28.8'	-25.3'	120.3°	39°58.2'	-26.3'	121.0°	19
20	42°31.7'	-20.5'	117.7°	42°03.5'	-21.6'	118.5°	41°34.5'	-22.7'	119.2°	41°04.9'	-23.9'	120.0°	40°34.5'	-24.9'	120.7°	40°03.5'	-26.0'	121.5°	39°31.9'	-27.0'	122.2°	20
21	42°11.3'	-21.3'	118.9°	41°41.9'	-22.4'	119.7°	41°11.8'	-23.5'	120.5°	40°41.0'	-24.6'	121.2°	40°09.6'	-25.7'	121.9°	39°37.6'	-26.7'	122.6°	39°04.9'	-27.7'	123.3°	21
22	41°50.0'	-22.1'	120.2°	41°19.5'	-23.2'	120.9°	40°48.3'	-24.3'	121.7°	40°16.4'	-25.3'	122.4°	39°44.0'	-26.4'	123.1°	39°10.9'	-27.4'	123.8°	38°37.2'	-28.3'	124.5°	22
23	41°27.9'	-22.9'	121.4°	40°56.3'	-24.0'	122.2°	40°24.0'	-25.0'	122.9°	39°51.1'	-26.1'	123.6°	39°17.6'	-27.1'	124.3°	38°43.5'	-28.0'	125.0°	38°08.8'	-29.0'	125.6°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

44° 316° LHA

Latitude CONTRARY to DECLINATION

44° 316° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

43° 317° LHA

Latitude CONTRARY to Declination

43° 317° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	47°00.0'	-00.6'	90.0°	46°59.4'	-02.1'	91.1°	46°57.8'	-03.6'	92.1°	46°55.0'	-05.2'	93.2°	46°51.0'	-06.7'	94.3°	46°46.0'	-08.2'	95.3°	46°39.9'	-09.7'	96.4°	0
1	46°59.4'	-01.7'	91.5°	46°57.3'	-03.2'	92.5°	46°54.1'	-04.7'	93.6°	46°49.8'	-06.3'	94.7°	46°44.4'	-07.8'	95.7°	46°37.8'	-09.3'	96.8°	46°30.2'	-10.8'	97.8°	1
2	46°57.7'	-02.8'	92.9°	46°54.1'	-04.3'	94.0°	46°49.4'	-05.8'	95.1°	46°43.5'	-07.4'	96.1°	46°36.6'	-08.9'	97.2°	46°28.6'	-10.3'	98.2°	46°19.4'	-11.8'	99.3°	2
3	46°55.0'	-03.9'	94.4°	46°49.8'	-05.4'	95.5°	46°43.5'	-06.9'	96.5°	46°36.2'	-08.4'	97.6°	46°27.7'	-09.9'	98.6°	46°18.2'	-11.4'	99.6°	46°07.6'	-12.9'	100.7°	3
4	46°51.0'	-05.0'	95.9°	46°44.4'	-06.5'	96.9°	46°36.6'	-08.0'	98.0°	46°27.7'	-09.5'	99.0°	46°17.8'	-11.0'	100.0°	46°06.8'	-12.4'	101.1°	45°54.8'	-13.9'	102.1°	4
5	46°46.0'	-06.1'	97.3°	46°37.8'	-07.6'	98.4°	46°28.6'	-09.1'	99.4°	46°18.2'	-10.6'	100.4°	46°06.8'	-12.0'	101.5°	45°54.4'	-13.5'	102.5°	45°40.9'	-14.9'	103.5°	5
6	46°39.9'	-07.2'	98.8°	46°30.2'	-08.7'	99.8°	46°19.4'	-10.2'	100.8°	46°07.6'	-11.6'	101.9°	45°54.8'	-13.1'	102.9°	45°40.9'	-14.5'	103.9°	45°26.0'	-15.9'	104.9°	6
7	46°32.6'	-08.3'	100.2°	46°21.5'	-09.8'	101.2°	46°09.3'	-11.2'	102.3°	45°56.0'	-12.7'	103.3°	45°41.7'	-14.1'	104.3°	45°26.4'	-15.5'	105.3°	45°10.1'	-16.9'	106.2°	7
8	46°24.3'	-09.4'	101.6°	46°11.7'	-10.8'	102.7°	45°58.0'	-12.3'	103.7°	45°43.3'	-13.7'	104.7°	45°27.6'	-15.1'	105.7°	45°10.9'	-16.5'	106.6°	44°53.3'	-17.8'	107.6°	8
9	46°14.9'	-10.5'	103.1°	46°00.8'	-11.9'	104.1°	45°45.7'	-13.3'	105.1°	45°29.6'	-14.7'	106.1°	45°12.5'	-16.1'	107.0°	44°54.5'	-17.4'	108.0°	44°35.5'	-18.7'	108.9°	9
10	46°04.5'	-11.5'	104.5°	45°48.9'	-12.9'	105.5°	45°32.4'	-14.3'	106.5°	45°14.9'	-15.7'	107.4°	44°56.4'	-17.0'	108.4°	44°37.0'	-18.4'	109.3°	44°16.7'	-19.7'	110.3°	10
11	45°53.0'	-12.5'	105.9°	45°36.0'	-13.9'	106.9°	45°18.1'	-15.3'	107.9°	44°59.2'	-16.7'	108.8°	44°39.4'	-18.0'	109.8°	44°18.7'	-19.3'	110.7°	43°57.0'	-20.6'	111.6°	11
12	45°40.4'	-13.6'	107.3°	45°22.1'	-14.9'	108.3°	45°02.8'	-16.3'	109.2°	44°42.6'	-17.6'	110.2°	44°21.4'	-18.9'	111.1°	43°59.4'	-20.2'	112.0°	43°36.5'	-21.4'	112.9°	12
13	45°26.9'	-14.6'	108.7°	45°07.1'	-15.9'	109.7°	44°46.5'	-17.2'	110.6°	44°24.9'	-18.5'	111.5°	44°02.5'	-19.8'	112.4°	43°39.2'	-21.1'	113.3°	43°15.0'	-22.3'	114.2°	13
14	45°12.3'	-15.6'	110.1°	44°51.2'	-16.9'	111.0°	44°29.3'	-18.2'	111.9°	44°06.4'	-19.5'	112.8°	43°42.7'	-20.7'	113.7°	43°18.1'	-21.9'	114.6°	42°52.7'	-23.1'	115.4°	14
15	44°56.7'	-16.5'	111.4°	44°34.3'	-17.8'	112.4°	44°11.1'	-19.1'	113.3°	43°46.9'	-20.4'	114.2°	43°22.0'	-21.6'	115.0°	42°56.2'	-22.8'	115.9°	42°29.6'	-23.9'	116.7°	15
16	44°40.2'	-17.5'	112.8°	44°16.5'	-18.8'	113.7°	43°52.0'	-20.0'	114.6°	43°26.6'	-21.2'	115.5°	43°00.4'	-22.4'	116.3°	42°33.4'	-23.6'	117.1°	42°05.7'	-24.7'	117.9°	16
17	44°22.7'	-18.4'	114.1°	43°57.8'	-19.7'	115.0°	43°32.0'	-20.9'	115.9°	43°05.4'	-22.1'	116.7°	42°38.0'	-23.2'	117.6°	42°09.8'	-24.4'	118.4°	41°41.0'	-25.5'	119.2°	17
18	44°04.3'	-19.3'	115.5°	43°38.1'	-20.5'	116.3°	43°11.1'	-21.7'	117.2°	42°43.3'	-22.9'	118.0°	42°14.7'	-24.0'	118.8°	41°45.4'	-25.2'	119.6°	41°15.5'	-26.2'	120.4°	18
19	43°45.0'	-20.2'	116.8°	43°17.5'	-21.4'	117.6°	42°49.3'	-22.6'	118.5°	42°20.4'	-23.7'	119.3°	41°50.7'	-24.8'	120.0°	41°20.3'	-25.9'	120.8°	40°49.4'	-27.0'	121.6°	19
20	43°24.8'	-21.1'	118.1°	42°56.1'	-22.3'	118.9°	42°26.7'	-23.4'	119.7°	41°56.6'	-24.5'	120.5°	41°25.9'	-25.6'	121.3°	40°54.4'	-26.6'	122.0°	40°22.2'	-27.7'	122.7°	20
21	43°03.7'																					

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

42° 318° LHA

Latitude CONTRARY to Declination

42° 318° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	48°00.0'	-00.6'	90.0°	47°59.4'	-02.1'	91.1°	47°57.7'	-03.7'	92.2°	47°54.8'	-05.3'	93.3°	47°50.7'	-06.8'	94.4°	47°45.5'	-08.3'	95.5°	47°39.2'	-09.9'	96.6°	0
1	47°59.4'	-01.7'	91.5°	47°57.3'	-03.3'	92.6°	47°54.0'	-04.9'	93.7°	47°49.5'	-06.4'	94.8°	47°43.9'	-07.9'	95.9°	47°37.2'	-09.5'	97.0°	47°29.3'	-11.0'	98.1°	1
2	47°57.6'	-02.9'	93.0°	47°54.0'	-04.5'	94.1°	47°49.1'	-06.0'	95.2°	47°43.1'	-07.5'	96.3°	47°36.0'	-09.1'	97.4°	47°27.7'	-10.6'	98.5°	47°18.3'	-12.1'	99.5°	2
3	47°54.8'	-04.1'	94.5°	47°49.5'	-05.6'	95.6°	47°43.1'	-07.1'	96.7°	47°35.6'	-08.7'	97.8°	47°26.9'	-10.2'	98.8°	47°17.1'	-11.7'	99.9°	47°06.2'	-13.1'	101.0°	3
4	47°50.7'	-05.2'	96.0°	47°43.9'	-06.7'	97.1°	47°36.0'	-08.3'	98.1°	47°26.9'	-09.8'	99.2°	47°16.7'	-11.3'	100.3°	47°05.4'	-12.8'	101.4°	46°53.1'	-14.2'	102.4°	4
5	47°45.5'	-06.4'	97.4°	47°37.2'	-07.9'	98.5°	47°27.7'	-09.4'	99.6°	47°17.1'	-10.9'	100.7°	47°05.4'	-12.4'	101.7°	46°52.7'	-13.8'	102.8°	46°38.9'	-15.2'	103.8°	5
6	47°39.2'	-07.5'	98.9°	47°29.3'	-09.0'	100.0°	47°18.3'	-10.5'	101.1°	47°06.2'	-12.0'	102.1°	46°53.1'	-13.4'	103.2°	46°38.9'	-14.9'	104.2°	46°23.6'	-16.3'	105.2°	6
7	47°31.7'	-08.6'	100.4°	47°20.3'	-10.1'	101.5°	47°07.8'	-11.6'	102.5°	46°54.3'	-13.0'	103.6°	46°39.7'	-14.5'	104.6°	46°24.0'	-15.9'	105.6°	46°07.4'	-17.3'	106.6°	7
8	47°23.1'	-09.7'	101.9°	47°10.2'	-11.2'	102.9°	46°56.2'	-12.7'	104.0°	46°41.2'	-14.1'	105.0°	46°25.2'	-15.5'	106.0°	46°08.1'	-16.9'	107.0°	45°50.1'	-18.3'	108.0°	8
9	47°13.3'	-10.8'	103.3°	46°59.0'	-12.3'	104.4°	46°43.6'	-13.7'	105.4°	46°27.1'	-15.1'	106.4°	46°09.7'	-16.5'	107.4°	45°51.2'	-17.9'	108.4°	45°31.8'	-19.2'	109.4°	9
10	47°02.5'	-11.9'	104.8°	46°46.7'	-13.3'	105.8°	46°29.9'	-14.8'	106.8°	46°12.0'	-16.1'	107.8°	45°53.2'	-17.5'	108.8°	45°33.4'	-18.9'	109.8°	45°12.6'	-20.2'	110.7°	10
11	46°50.6'	-13.0'	106.2°	46°33.4'	-14.4'	107.2°	46°15.1'	-15.8'	108.2°	45°55.9'	-17.1'	109.2°	45°35.7'	-18.5'	110.2°	45°14.5'	-19.8'	111.1°	44°52.4'	-21.1'	112.0°	11
12	46°37.7'	-14.0'	107.6°	46°19.0'	-15.4'	108.6°	45°59.3'	-16.8'	109.6°	45°38.7'	-18.1'	110.6°	45°17.2'	-19.4'	111.5°	44°54.7'	-20.7'	112.5°	44°31.4'	-22.0'	113.4°	12
13	46°23.6'	-15.1'	109.0°	46°03.6'	-16.4'	110.0°	45°42.6'	-17.8'	111.0°	45°20.6'	-19.1'	111.9°	44°57.7'	-20.4'	112.9°	44°34.0'	-21.6'	113.8°	44°09.4'	-22.9'	114.7°	13
14	46°08.6'	-16.1'	110.4°	45°47.2'	-17.4'	111.4°	45°24.8'	-18.7'	112.3°	45°01.5'	-20.0'	113.3°	44°37.4'	-21.3'	114.2°	44°12.4'	-22.5'	115.1°	43°46.5'	-23.7'	116.0°	14
15	45°52.5'	-17.1'	111.8°	45°29.7'	-18.4'	112.8°	45°06.1'	-19.7'	113.7°	44°41.5'	-20.9'	114.6°	44°16.1'	-22.2'	115.5°	43°49.9'	-23.4'	116.4°	43°22.8'	-24.5'	117.2°	15
16	45°35.4'	-18.0'	113.2°	45°11.3'	-19.3'	114.1°	44°46.4'	-20.6'	115.0°	44°20.6'	-21.8'	115.9°	43°53.9'	-23.0'	116.8°	43°26.5'	-24.2'	117.6°	42°58.3'	-25.3'	118.5°	16
17	45°17.4'	-19.0'	114.6°	44°52.0'	-20.3'	115.5°	44°25.8'	-21.5'	116.4°	43°58.8'	-22.7'	117.2°	43°30.9'	-23.9'	118.1°	43°02.3'	-25.0'	118.9°	42°32.9'	-26.1'	119.7°	17
18	44°58.4'	-19.9'	115.9°	44°31.7'	-21.2'	116.8°	44°04.3'	-22.4'	117.7°	43°36.1'	-23.5'	118.5°	43°07.0'	-24.7'	119.3°	42°37.3'	-25.8'	120.1°	42°06.8'	-26.9'	120.9°	18
19	44°38.4'	-20.9'	117.2°	44°10.6'	-22.1'	118.1°	43°41.9'	-23.2'	118.9°	43°12.5'	-24.4'	119.8°	42°42.4'	-25.5'	120.6°	42°11.5'	-26.6'	121.4°	41°39.9'	-27.6'	122.1°	19
20	44°17.6'	-21.7'	118.5°	43°48.5'	-22.9'	119.4°	43°18.7'	-24.1'	120.2°	42°48.1'	-25.2'	121.0°	42°16.9'	-26.3'	121.8°	41°44.9'	-27.3'	122.6°	41°12.3'	-28.3'	123.3°	20
21	43°55.8'	-22.6'	119.8°	43°25.6'	-23.8'	120.7°	42°54.6'	-24.9'	121.5°	42°23.0'	-26.0'	122.3°	41°50.6'	-27.0'	123.0°	41°17.6'	-28.0'	123.8°	40°43.9'	-29.0'	124.5°	21
22	43°33.2'	-23.5'	121.1°	43°01.8'	-24.6'	121.9°	42°29.8'	-25.7'	122.7°	41°57.0'	-26.7'	123.5°	41°23.6'	-27.7'	124.2°	40°49.5'	-28.7'	124.9°	40°14.9'	-29.7'	125.6°	22
23	43°09.7'	-24.3'	122.4°	42°37.3'	-25.4'	123.2°	42°04.1'	-26.4'	123.9°	41°30.3'	-27.5'	124.7°	40°55.8'	-28.5'	125.4°	40°20.8'	-29.4'	126.1°	39°45.2'	-30.4'	126.8°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			Dec°

42° 318° LHA

Latitude CONTRARY to DECLINATION

42° 318° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

41° 319° LHA

Latitude CONTRARY to Declination

41° 319° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	49°00.0'	-00.6'	90.0°	48°59.4'	-02.2'	91.2°	48°57.6'	-03.8'	92.3°	48°54.6'	-05.4'	93.4°	48°50.4'	-06.9'	94.6°	48°45.0'	-08.5'	95.7°	48°38.4'	-10.1'	96.9°	0
1	48°59.3'	-01.8'	91.5°	48°57.2'	-03.4'	92.7°	48°53.8'	-05.0'	93.8°	48°49.2'	-06.6'	95.0°	48°43.4'	-08.1'	96.1°	48°36.5'	-09.7'	97.2°	48°28.3'	-11.2'	98.3°	1
2	48°57.5'	-03.0'	93.0°	48°53.8'	-04.6'	94.2°	48°48.8'	-06.2'	95.3°	48°42.7'	-07.7'	96.5°	48°35.3'	-09.3'	97.6°	48°26.8'	-10.8'	98.7°	48°17.1'	-12.3'	99.8°	2
3	48°54.6'	-04.2'	94.6°	48°49.2'	-05.8'	95.7°	48°42.7'	-07.3'	96.8°	48°34.9'	-08.9'	98.0°	48°26.0'	-10.4'	99.1°	48°16.0'	-12.0'	100.2°	48°04.8'	-13.5'	101.3°	3
4	48°50.4'	-05.4'	96.1°	48°43.4'	-07.0'	97.2°	48°35.3'	-08.5'	98.3°	48°26.0'	-10.0'	99.5°	48°15.6'	-11.6'	100.6°	48°04.0'	-13.1'	101.7°	47°51.3'	-14.5'	102.7°	4
5	48°45.0'	-06.6'	97.6°	48°36.5'	-08.1'	98.7°	48°26.8'	-09.7'	99.8°	48°16.0'	-11.2'	100.9°	48°04.0'	-12.7'	102.0°	47°50.9'	-14.2'	103.1°	47°36.8'	-15.6'	104.2°	5
6	48°38.4'	-07.7'	99.1°	48°28.3'	-09.3'	100.2°	48°17.1'	-10.8'	101.3°	48°04.8'	-12.3'	102.4°	47°51.3'	-13.8'	103.5°	47°36.8'	-15.2'	104.6°	47°21.2'	-16.7'	105.6°	6
7	48°30.7'	-08.9'	100.6°	48°19.1'	-10.4'	101.7°	48°06.3'	-11.9'	102.8°	47°52.5'	-13.4'	103.9°	47°37.5'	-14.9'	104.9°	47°21.5'	-16.3'	106.0°	47°04.5'	-17.7'	107.0°	7
8	48°21.8'	-10.1'	102.1°	48°08.6'	-11.6'	103.2°	47°54.4'	-13.0'	104.3°	47°39.1'	-14.5'	105.3°	47°22.7'	-15.9'	106.4°	47°05.2'	-17.3'	107.4°	46°46.8'	-18.7'	108.4°	8
9	48°11.7'	-11.2'	103.6°	47°57.1'	-12.7'	104.7°	47°41.4'	-14.1'	105.7°	47°24.6'	-15.6'	106.8°	47°06.7'	-17.0'	107.8°	46°47.9'	-18.4'	108.8°	46°28.0'	-19.7'	109.8°	9
10	48°00.5'	-12.3'	105.0°	47°44.4'	-13.8'	106.1°	47°27.2'	-15.2'	107.2°	47°09.0'	-16.6'	108.2°	46°49.8'	-18.0'	109.2°	46°29.5'	-19.4'	110.2°	46°08.3'	-20.7'	111.2°	10
11	47°48.2'	-13.4'	106.5°	47°30.6'	-14.8'	107.6°	47°12.0'	-16.3'	108.6°	46°52.4'	-17.6'	109.6°	46°31.8'	-19.0'	110.6°	46°10.2'	-20.3'	111.6°	45°47.7'	-21.6'	112.5°	11
12	47°34.8'	-14.5'	108.0°	47°15.8'	-15.9'	109.0°	46°55.8'	-17.3'	110.0°	46°34.7'	-18.6'	111.0°	46°12.8'	-20.0'	112.0°	45°49.9'	-21.3'	112.9°	45°26.0'	-22.5'	113.9°	12
13	47°20.3'	-15.6'	109.4°	46°59.9'	-16.9'	110.4°	46°38.5'	-18.3'	111.4°	46°16.1'	-19.6'	112.4°	45°52.8'	-20.9'	113.3°	45°28.6'	-22.2'	114.3°	45°03.5'	-23.4'	115.2°	13
14	47°04.7'	-16.6'	110.8°	46°42.9'	-18.0'	111.8°	46°20.2'	-19.3'	112.8°	45°56.5'	-20.6'	113.7°	45°31.9'	-21.9'	114.7°	45°06.4'	-23.1'	115.6°	44°40.1'	-24.3'	116.5°	14
15	46°48.1'	-17.6'	112.2°	46°25.0'	-19.0'	113.2°	46°00.9'	-20.3'	114.1°	45°35.9'	-21.5'	115.1°	45°10.0'	-22.8'	116.0°	44°43.3'	-24.0'	116.9°	44°15.7'	-25.2'	117.8°	15
16	46°30.5'	-18.6'	113.6°	46°06.0'	-19.9'	114.6°	45°40.6'	-21.2'	115.5°	45°14.4'	-22.4'	116.4°	44°47.2'	-23.7'	117.3°	44°19.3'	-24.8'	118.2°	43°50.6'	-26.0'	119.0°	16
17	46°11.9'	-19.6'	115.0°	45°46.1'	-20.9'	115.9°	45°19.4'	-22.1'	116.8°	44°51.9'	-23.3'	117.7°	44°23.6'	-24.5'	118.6°	43°54.5'	-25.7'	119.4°	43°24.6'	-26.8'	120.3°	17
18	45°52.2'	-20.6'	116.3°	45°25.2'	-21.8'	117.3°	44°57.3'	-23.0'	118.2°	44°28.6'	-24.2'	119.0°	43°59.1'	-25.3'	119.9°	43°28.8'	-26.5'	120.7°	42°57.8'	-27.6'	121.5°	18
19	45°31.7'	-21.5'	117.7°	45°03.4'	-22.7'	118.6°	44°34.3'	-23.9'	119.5°	44°04.4'	-25.0'	120.3°	43°33.7'	-26.2'	121.1°	43°02.4'	-27.2'	121.9°	42°30.3'	-28.3'	122.7°	19
20	45°10.2'	-22.4'	119.0°	44°40.7'	-23.6'	119.9°	44°10.4'	-24.7'	120.7°	43°39.3'	-25.9'	121.6°	43°07.6'	-26.9'	122.4°	42°35.1'	-28.0'	123.1°	42°02.0'	-29.0'	123.9°	20
21	44°4																					

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

40° 320° LHA

Latitude CONTRARY to Declination

40° 320° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	50°00.0'	-00.6'	90.0°	49°59.4'	-02.3'	91.2°	49°57.5'	-03.9'	92.4°	49°54.4'	-05.5'	93.6°	49°50.0'	-07.1'	94.8°	49°44.5'	-08.7'	95.9°	49°37.6'	-10.3'	97.1°	0
1	49°59.3'	-01.9'	91.6°	49°57.1'	-03.5'	92.7°	49°53.6'	-05.1'	93.9°	49°48.9'	-06.7'	95.1°	49°42.9'	-08.3'	96.3°	49°35.8'	-09.9'	97.5°	49°27.4'	-11.5'	98.6°	1
2	49°57.5'	-03.1'	93.1°	49°53.6'	-04.7'	94.3°	49°48.5'	-06.3'	95.5°	49°42.2'	-07.9'	96.7°	49°34.6'	-09.5'	97.8°	49°25.9'	-11.1'	99.0°	49°15.9'	-12.6'	100.1°	2
3	49°54.4'	-04.4'	94.7°	49°48.9'	-06.0'	95.8°	49°42.2'	-07.6'	97.0°	49°34.2'	-09.1'	98.2°	49°25.1'	-10.7'	99.3°	49°14.8'	-12.3'	100.5°	49°03.3'	-13.8'	101.6°	3
4	49°50.0'	-05.6'	96.2°	49°42.9'	-07.2'	97.4°	49°34.6'	-08.8'	98.5°	49°25.1'	-10.3'	99.7°	49°14.4'	-11.9'	100.8°	49°02.5'	-13.4'	102.0°	48°49.5'	-14.9'	103.1°	4
5	49°44.5'	-06.8'	97.8°	49°35.8'	-08.4'	98.9°	49°25.9'	-10.0'	100.1°	49°14.8'	-11.5'	101.2°	49°02.5'	-13.0'	102.3°	48°49.1'	-14.5'	103.5°	48°34.6'	-16.0'	104.6°	5
6	49°37.6'	-08.0'	99.3°	49°27.4'	-09.6'	100.4°	49°15.9'	-11.1'	101.6°	49°03.3'	-12.7'	102.7°	48°49.5'	-14.2'	103.8°	48°34.6'	-15.6'	104.9°	48°18.6'	-17.1'	106.0°	6
7	49°29.6'	-09.2'	100.8°	49°17.8'	-10.8'	102.0°	49°04.8'	-12.3'	103.1°	48°50.6'	-13.8'	104.2°	48°35.3'	-15.3'	105.3°	48°18.9'	-16.7'	106.4°	48°01.5'	-18.2'	107.5°	7
8	49°20.4'	-10.4'	102.3°	49°07.0'	-11.9'	103.5°	48°52.5'	-13.4'	104.6°	48°36.8'	-14.9'	105.7°	48°20.0'	-16.4'	106.8°	48°02.2'	-17.8'	107.8°	47°43.3'	-19.2'	108.9°	8
9	49°10.0'	-11.6'	103.8°	48°55.1'	-13.1'	105.0°	48°39.0'	-14.6'	106.1°	48°21.9'	-16.0'	107.1°	48°03.7'	-17.4'	108.2°	47°44.4'	-18.8'	109.3°	47°24.1'	-20.2'	110.3°	9
10	48°58.4'	-12.7'	105.3°	48°42.0'	-14.2'	106.4°	48°24.5'	-15.7'	107.5°	48°05.9'	-17.1'	108.6°	47°46.2'	-18.5'	109.6°	47°25.5'	-19.9'	110.7°	47°03.9'	-21.2'	111.7°	10
11	48°45.7'	-13.9'	106.8°	48°27.8'	-15.3'	107.9°	48°08.8'	-16.8'	109.0°	47°48.8'	-18.2'	110.0°	47°27.7'	-19.5'	111.0°	47°05.7'	-20.9'	112.1°	46°42.7'	-22.2'	113.0°	11
12	48°31.8'	-15.0'	108.3°	48°12.4'	-16.4'	109.4°	47°52.0'	-17.8'	110.4°	47°30.6'	-19.2'	111.4°	47°08.2'	-20.5'	112.4°	46°44.8'	-21.8'	113.4°	46°20.5'	-23.1'	114.4°	12
13	48°16.8'	-16.1'	109.8°	47°56.0'	-17.5'	110.8°	47°34.2'	-18.9'	111.8°	47°11.4'	-20.2'	112.8°	46°47.7'	-21.5'	113.8°	46°23.0'	-22.8'	114.8°	45°57.4'	-24.0'	115.7°	13
14	48°00.7'	-17.2'	111.2°	47°38.5'	-18.5'	112.2°	47°15.4'	-19.9'	113.2°	46°51.2'	-21.2'	114.2°	46°26.2'	-22.5'	115.2°	46°00.2'	-23.7'	116.1°	45°33.3'	-24.9'	117.0°	14
15	47°43.6'	-18.2'	112.6°	47°20.0'	-19.5'	113.6°	46°55.5'	-20.9'	114.6°	46°30.0'	-22.1'	115.6°	46°03.7'	-23.4'	116.5°	45°36.5'	-24.6'	117.4°	45°08.4'	-25.8'	118.3°	15
16	47°25.4'	-19.2'	114.0°	47°00.5'	-20.5'	115.0°	46°34.6'	-21.8'	116.0°	46°07.9'	-23.1'	116.9°	45°40.3'	-24.3'	117.8°	45°11.9'	-25.5'	118.7°	44°42.6'	-26.6'	119.6°	16
17	47°06.1'	-20.2'	115.4°	46°39.9'	-21.5'	116.4°	46°12.8'	-22.8'	117.3°	45°44.8'	-24.0'	118.3°	45°16.0'	-25.2'	119.1°	44°46.4'	-26.3'	120.0°	44°16.0'	-27.4'	120.9°	17
18	46°45.9'	-21.2'	116.8°	46°18.4'	-22.5'	117.8°	45°50.0'	-23.7'	118.7°	45°20.8'	-24.9'	119.6°	44°50.8'	-26.0'	120.4°	44°20.1'	-27.1'	121.3°	43°48.6'	-28.2'	122.1°	18
19	46°24.7'	-22.2'	118.2°	45°55.9'	-23.4'	119.1°	45°26.3'	-24.6'	120.0°	44°56.0'	-25.7'	120.9°	44°24.8'	-26.8'	121.7°	43°52.9'	-27.9'	122.5°	43°20.3'	-29.0'	123.3°	19
20	46°02.5'	-23.1'	119.5°	45°32.5'	-24.3'	120.4°	45°01.8'	-25.4'	121.3°	44°30.2'	-26.6'	122.1°	43°58.0'	-27.6'	122.9°	43°25.0'	-28.7'	123.7°	42°51.3'	-29.7'	124.5°	20
21	45°39.4'	-24.0'	120.8°	45°08.2'	-25.2'	121.7°	44°36.3'	-26.3'	122.8°	44°03.7'	-27.4'	123.4°	43°30.3'	-28.4'	124.2°	42°56.3'	-29.5'	124.9°	42°21.6'	-30.4'	125.7°	21
22	45°15.4'	-24.9'	122.2°	44°43.1'	-26.0'	123.0°	44°10.0'	-27.1'	123.8°	43°36.3'	-28.2'	124.6°	43°01.9'	-29.2'	125.4°	42°26.8'	-30.2'	126.1°	41°51.2'	-31.1'	126.9°	22
23	44°50.5'	-25.8'	123.4°	44°17.1'	-26.8'	124.3°	43°42.9'	-27.9'	125.1°	43°08.2'	-28.9'	125.8°	42°32.7'	-29.9'	126.6°	41°56.7'	-30.9'	127.3°	41°20.0'	-31.8'	128.0°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

40° 320° LHA

Latitude CONTRARY to DECLINATION

40° 320° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

39° 321° LHA

Latitude CONTRARY to Declination

39° 321° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	51°00.0'	-00.6'	90.0°	50°59.4'	-02.3'	91.2°	50°57.4'	-04.0'	92.5°	50°54.2'	-05.6'	93.7°	50°49.7'	-07.3'	94.9°	50°43.9'	-08.9'	96.1°	50°36.8'	-10.5'	97.4°	0
1	50°59.3'	-01.9'	91.6°	50°57.0'	-03.6'	92.8°	50°53.4'	-05.2'	94.1°	50°48.6'	-06.9'	95.3°	50°42.4'	-08.5'	96.5°	50°35.0'	-10.1'	97.7°	50°26.3'	-11.7'	98.9°	1
2	50°57.4'	-03.2'	93.2°	50°53.4'	-04.9'	94.4°	50°48.2'	-06.5'	95.6°	50°41.7'	-08.1'	96.8°	50°33.9'	-09.8'	98.1°	50°24.9'	-11.4'	99.3°	50°14.6'	-12.9'	100.4°	2
3	50°54.2'	-04.5'	94.8°	50°48.6'	-06.2'	96.0°	50°41.7'	-07.8'	97.2°	50°33.5'	-09.4'	98.4°	50°24.1'	-11.0'	99.6°	50°13.5'	-12.6'	100.8°	50°01.7'	-14.1'	102.0°	3
4	50°49.7'	-05.8'	96.3°	50°42.4'	-07.4'	97.6°	50°33.9'	-09.0'	98.8°	50°24.1'	-10.6'	100.0°	50°13.2'	-12.2'	101.1°	50°01.0'	-13.8'	102.3°	49°47.6'	-15.3'	103.5°	4
5	50°43.9'	-07.1'	97.9°	50°35.0'	-08.7'	99.1°	50°24.9'	-10.3'	100.3°	50°13.5'	-11.8'	101.5°	50°01.0'	-13.4'	102.7°	49°47.2'	-14.9'	103.8°	49°32.3'	-16.4'	105.0°	5
6	50°36.8'	-08.3'	99.5°	50°26.3'	-09.9'	100.7°	50°14.6'	-11.5'	101.9°	50°01.7'	-13.0'	103.0°	49°47.6'	-14.6'	104.2°	49°32.3'	-16.1'	105.3°	49°15.9'	-17.5'	106.4°	6
7	50°28.5'	-09.5'	101.0°	50°16.4'	-11.1'	102.2°	50°03.1'	-12.7'	103.4°	49°48.6'	-14.2'	104.5°	49°33.0'	-15.7'	105.7°	49°16.2'	-17.2'	106.8°	48°58.3'	-18.6'	107.9°	7
8	50°19.0'	-10.8'	102.6°	50°05.3'	-12.3'	103.8°	49°50.5'	-13.9'	104.9°	49°34.4'	-15.4'	106.0°	49°17.3'	-16.8'	107.2°	48°59.0'	-18.3'	108.3°	48°39.7'	-19.7'	109.4°	8
9	50°08.2'	-12.0'	104.1°	49°53.0'	-13.5'	105.3°	49°36.6'	-15.0'	106.4°	49°19.1'	-16.5'	107.5°	49°00.5'	-17.9'	108.6°	48°40.7'	-19.4'	109.7°	48°20.0'	-20.7'	110.8°	9
10	49°56.2'	-13.2'	105.7°	49°39.5'	-14.7'	106.8°	49°21.6'	-16.2'	107.9°	49°02.6'	-17.6'	109.0°	48°42.5'	-19.0'	110.1°	48°21.4'	-20.4'	111.1°	47°59.2'	-21.8'	112.2°	10
11	49°43.1'	-14.3'	107.2°	49°24.8'	-15.8'	108.3°	49°05.4'	-17.3'	109.4°	48°45.0'	-18.7'	110.5°	48°23.5'	-20.1'	111.5°	48°01.0'	-21.4'	112.6°	47°37.5'	-22.8'	113.6°	11
12	49°28.7'	-15.5'	108.7°	49°09.0'	-16.9'	109.8°	48°48.2'	-18.4'	110.8°	48°26.3'	-19.7'	111.9°	48°03.4'	-21.1'	112.9°	47°39.5'	-22.4'	113.9°	47°14.7'	-23.7'	114.9°	12
13	49°13.2'	-16.6'	110.1°	48°52.0'	-18.0'	111.2°	48°29.8'	-19.4'	112.3°	48°06.5'	-20.8'	113.3°	47°42.3'	-22.1'	114.3°	47°17.1'	-23.4'	115.3°	46°51.0'	-24.7'	116.3°	13
14	48°56.6'	-17.7'	111.6°	48°34.0'	-19.1'	112.7°	48°10.4'	-20.5'	113.7°	47°45.8'	-21.8'	114.7°	47°20.2'	-23.1'	115.7°	46°53.7'	-24.3'	116.7°	46°26.3'	-25.6'	117.6°	14
15	48°38.9'	-18.8'	113.1°	48°14.9'	-20.2'	114.1°	47°49.9'	-21.5'	115.1°	47°24.0'	-22.8'	116.1°	46°57.1'	-24.0'	117.1°	46°29.4'	-25.3'	118.0°	46°00.8'	-26.4'	118.9°	15
16	48°20.1'	-19.9'	114.5°	47°54.7'	-21.2'	115.5°	47°28.4'	-22.5'	116.5°	47°01.2'	-23.7'	117.5°	46°33.1'	-25.0'	118.4°	46°04.1'	-26.1'	119.3°	45°34.3'	-27.3'	120.2°	16
17	48°00.2'	-20.9'	115.9°	47°33.5'	-22.2'	116.9°	47°05.9'	-23.4'	117.9°	46°37.5'	-24.7'	118.8°	46°08.1'	-25.8'	119.7°	45°38.0'	-27.0'	120.6°	45°07.1'	-28.1'	121.5°	17
18	47°39.3'	-21.9'	117.3°	47°11.4'	-23.1'	118.3°	46°42.5'	-24.4'	119.2°	46°12.8'	-25.6'	120.1°	45°42.3'	-26.7'	121.0°	45°11.0'	-27.8'	121.9°	44°38.9'	-28.9'	122.7°	18
19	47°17.4'	-22.9'	118.7°	46°48.2'	-24.1'	119.6°	46°18.1'	-25.3'	120.5°	45°47.3'	-26.4'	121.4°	45°15.6'	-27.6'	122.3°	44°43.2'	-28.6'	123.1°	44°10.0'	-29.7'	123.9°	19
20	46°54.6'	-23.8'	120.0°	46°24.1'	-25.0'	121.0°	45°52.9'	-26.2'	121.8°	45°20.8'	-27.3'	122.7°	44°48.0'	-28.4'	123.5°	44°14.5'	-29.4'	124.4°	43°40.3'	-30.4'	125.2°	20

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

38° 322° LHA

Latitude CONTRARY to Declination

38° 322° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	52°00.0'	-00.7'	90.0°	51°59.3'	-02.4'	91.3°	51°57.3'	-04.1'	92.6°	51°54.0'	-05.8'	93.8°	51°49.3'	-07.4'	95.1°	51°43.3'	-09.1'	96.4°	51°36.0'	-10.7'	97.6°	0
1	51°59.3'	-02.0'	91.6°	51°57.0'	-03.7'	92.9°	51°53.3'	-05.4'	94.2°	51°48.2'	-07.1'	95.4°	51°41.9'	-08.7'	96.7°	51°34.2'	-10.4'	98.0°	51°25.3'	-12.0'	99.2°	1
2	51°57.3'	-03.3'	93.2°	51°53.3'	-05.0'	94.5°	51°47.9'	-06.7'	95.8°	51°41.2'	-08.4'	97.0°	51°33.1'	-10.0'	98.3°	51°23.8'	-11.6'	99.5°	51°13.3'	-13.2'	100.8°	2
3	51°54.0'	-04.7'	94.9°	51°48.2'	-06.3'	96.1°	51°41.2'	-08.0'	97.4°	51°32.8'	-09.7'	98.6°	51°23.1'	-11.3'	99.9°	51°12.2'	-12.9'	101.1°	51°00.0'	-14.5'	102.3°	3
4	51°49.3'	-06.0'	96.5°	51°41.9'	-07.7'	97.7°	51°33.1'	-09.3'	99.0°	51°23.1'	-10.9'	100.2°	51°11.8'	-12.5'	101.5°	50°59.3'	-14.1'	102.7°	50°45.5'	-15.7'	103.9°	4
5	51°43.3'	-07.3'	98.1°	51°34.2'	-09.0'	99.3°	51°23.8'	-10.6'	100.6°	51°12.2'	-12.2'	101.8°	50°59.3'	-13.8'	103.0°	50°45.2'	-15.3'	104.2°	50°29.9'	-16.8'	105.4°	5
6	51°36.0'	-08.6'	99.7°	51°25.3'	-10.2'	100.9°	51°13.3'	-11.8'	102.1°	51°00.0'	-13.4'	103.4°	50°45.5'	-15.0'	104.6°	50°29.9'	-16.5'	105.7°	50°13.0'	-18.0'	106.9°	6
7	51°27.4'	-09.9'	101.3°	51°15.0'	-11.5'	102.5°	51°01.4'	-13.1'	103.7°	50°46.6'	-14.6'	104.9°	50°30.6'	-16.2'	106.1°	50°13.4'	-17.7'	107.2°	49°55.0'	-19.1'	108.4°	7
8	51°17.5'	-11.2'	102.9°	51°03.5'	-12.7'	104.1°	50°48.4'	-14.3'	105.3°	50°32.0'	-15.8'	106.4°	50°14.4'	-17.3'	107.6°	49°55.7'	-18.8'	108.7°	49°35.9'	-20.2'	109.8°	8
9	51°06.4'	-12.4'	104.4°	50°50.8'	-14.0'	105.6°	50°34.1'	-15.5'	106.8°	50°16.1'	-17.0'	107.9°	49°57.1'	-18.5'	109.1°	49°36.9'	-19.9'	110.2°	49°15.7'	-21.3'	111.3°	9
10	50°54.0'	-13.6'	106.0°	50°36.8'	-15.2'	107.2°	50°18.6'	-16.7'	108.3°	49°59.2'	-18.1'	109.4°	49°38.6'	-19.6'	110.6°	49°17.0'	-21.0'	111.6°	48°54.4'	-22.3'	112.7°	10
11	50°40.3'	-14.8'	107.5°	50°21.7'	-16.3'	108.7°	50°01.9'	-17.8'	109.8°	49°41.0'	-19.2'	110.9°	49°19.1'	-20.6'	112.0°	48°56.1'	-22.0'	113.1°	48°32.0'	-23.3'	114.1°	11
12	50°25.5'	-16.0'	109.0°	50°05.4'	-17.5'	110.2°	49°44.1'	-18.9'	111.3°	49°21.8'	-20.3'	112.4°	48°58.4'	-21.7'	113.4°	48°34.1'	-23.0'	114.5°	48°08.7'	-24.3'	115.5°	12
13	50°09.5'	-17.2'	110.6°	49°47.9'	-18.6'	111.7°	49°25.2'	-20.0'	112.8°	49°01.5'	-21.4'	113.8°	48°36.7'	-22.7'	114.9°	48°11.0'	-24.0'	115.9°	47°44.4'	-25.3'	116.9°	13
14	49°52.3'	-18.3'	112.0°	49°29.3'	-19.7'	113.1°	49°05.2'	-21.1'	114.2°	48°40.1'	-22.4'	115.2°	48°14.0'	-23.7'	116.3°	47°47.0'	-25.0'	117.2°	47°19.1'	-26.2'	118.2°	14
15	49°34.0'	-19.4'	113.5°	49°09.5'	-20.8'	114.6°	48°44.1'	-22.1'	115.6°	48°17.7'	-23.4'	116.6°	47°50.3'	-24.7'	117.6°	47°22.0'	-25.9'	118.6°	46°52.9'	-27.1'	119.5°	15
16	49°14.6'	-20.5'	115.0°	48°48.8'	-21.8'	116.0°	48°22.0'	-23.1'	117.0°	47°54.2'	-24.4'	118.0°	47°25.6'	-25.6'	119.0°	46°56.1'	-26.8'	119.9°	46°25.8'	-28.0'	120.8°	16
17	48°54.1'	-21.6'	116.4°	48°26.9'	-22.9'	117.4°	47°58.8'	-24.1'	118.4°	47°29.8'	-25.3'	119.4°	46°60.0'	-26.5'	120.3°	46°29.3'	-27.7'	121.2°	45°57.8'	-28.8'	122.1°	17
18	48°32.5'	-22.6'	117.8°	48°04.1'	-23.8'	118.8°	47°34.7'	-25.1'	119.8°	47°04.5'	-26.3'	120.7°	46°33.4'	-27.4'	121.6°	46°01.6'	-28.5'	122.5°	45°28.9'	-29.6'	123.4°	18
19	48°10.0'	-23.6'	119.2°	47°40.2'	-24.8'	120.2°	47°09.6'	-26.0'	121.1°	46°38.2'	-27.2'	122.0°	46°06.0'	-28.3'	122.9°	45°33.0'	-29.4'	123.8°	44°59.3'	-30.4'	124.6°	19
20	47°46.4'	-24.5'	120.6°	47°15.4'	-25.7'	121.5°	46°43.6'	-26.9'	122.4°	46°11.1'	-28.0'	123.3°	45°37.7'	-29.1'	124.2°	45°03.7'	-30.2'	125.0°	44°28.9'	-31.2'	125.8°	20
21	47°21.8'	-25.5'	121.9°	46°49.7'	-26.6'	122.9°	46°16.8'	-27.8'	123.7°	45°43.1'	-28.8'	124.6°	45°08.6'	-29.9'	125.4°	44°33.5'	-30.9'	126.2°	43°57.7'	-31.9'	127.0°	21
22	46°56.4'	-26.4'	123.3°	46°23.1'	-27.5'	124.2°	45°49.0'	-28.6'	125.0°	45°14.2'	-29.7'	125.8°	44°38.7'	-30.7'	126.6°	44°02.6'	-31.7'	127.4°	43°25.8'	-32.6'	128.2°	22
23	46°30.0'	-27.3'	124.6°	45°55.5'	-28.4'	125.4°	45°20.4'	-29.4'	126.3°	44°44.6'	-30.4'	127.1°	44°08.1'	-31.4'	127.8°	43°30.9'	-32.4'	128.6°	42°53.2'	-33.3'	129.3°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

38° 322° LHA

Latitude CONTRARY to DECLINATION

38° 322° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

37° 323° LHA

Latitude CONTRARY to Declination

37° 323° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	53°00.0'	-00.7'	90.0°	52°59.3'	-02.4'	91.3°	52°57.2'	-04.2'	92.7°	52°53.8'	-05.9'	94.0°	52°48.9'	-07.6'	95.3°	52°42.7'	-09.3'	96.6°	52°35.1'	-11.0'	97.9°	0
1	52°59.3'	-02.1'	91.7°	52°56.9'	-03.8'	93.0°	52°53.1'	-05.5'	94.3°	52°47.9'	-07.3'	95.6°	52°41.3'	-09.0'	96.9°	52°33.4'	-10.6'	98.2°	52°24.1'	-12.3'	99.5°	1
2	52°57.2'	-03.5'	93.3°	52°53.1'	-05.2'	94.6°	52°47.5'	-06.9'	96.0°	52°40.6'	-08.6'	97.3°	52°32.4'	-10.3'	98.6°	52°22.8'	-11.9'	99.8°	52°11.9'	-13.6'	101.1°	2
3	52°53.8'	-04.8'	95.0°	52°47.9'	-06.6'	96.3°	52°40.6'	-08.3'	97.6°	52°32.0'	-09.9'	98.9°	52°22.1'	-11.6'	100.2°	52°10.8'	-13.2'	101.4°	51°58.3'	-14.8'	102.7°	3
4	52°48.9'	-06.2'	96.6°	52°41.3'	-07.9'	97.9°	52°32.4'	-09.6'	99.2°	52°22.1'	-11.3'	100.5°	52°10.5'	-12.9'	101.8°	51°57.6'	-14.5'	103.0°	51°43.4'	-16.1'	104.3°	4
5	52°42.7'	-07.6'	98.3°	52°33.4'	-09.3'	99.6°	52°22.8'	-10.9'	100.8°	52°10.8'	-12.5'	102.1°	51°57.6'	-14.2'	103.4°	51°43.1'	-15.7'	104.6°	51°27.3'	-17.3'	105.8°	5
6	52°35.1'	-08.9'	99.9°	52°24.1'	-10.6'	101.2°	52°11.9'	-12.2'	102.5°	51°58.3'	-13.8'	103.7°	51°43.4'	-15.4'	104.9°	51°27.3'	-17.0'	106.2°	51°10.1'	-18.5'	107.3°	6
7	52°26.2'	-10.2'	101.5°	52°13.6'	-11.9'	102.8°	51°59.6'	-13.5'	104.0°	51°44.5'	-15.1'	105.3°	51°28.0'	-16.6'	106.5°	51°10.4'	-18.1'	107.7°	50°51.6'	-19.6'	108.9°	7
8	52°16.0'	-11.5'	103.1°	52°01.7'	-13.2'	104.4°	51°46.2'	-14.7'	105.6°	51°29.4'	-16.3'	106.8°	51°11.4'	-17.8'	108.0°	50°52.2'	-19.3'	109.2°	50°31.9'	-20.8'	110.4°	8
9	52°04.4'	-12.8'	104.7°	51°48.5'	-14.4'	106.0°	51°31.4'	-16.0'	107.2°	51°13.1'	-17.5'	108.4°	50°53.6'	-19.0'	109.6°	50°32.9'	-20.4'	110.7°	50°11.2'	-21.9'	111.8°	9
10	51°51.6'	-14.1'	106.3°	51°34.1'	-15.7'	107.5°	51°15.4'	-17.2'	108.7°	50°55.6'	-18.7'	109.9°	50°34.6'	-20.1'	111.0°	50°12.5'	-21.5'	112.2°	49°49.3'	-22.9'	113.3°	10
11	51°37.5'	-15.3'	107.9°	51°18.5'	-16.9'	109.1°	50°58.3'	-18.4'	110.3°	50°36.9'	-19.8'	111.4°	50°14.5'	-21.2'	112.5°	49°50.9'	-22.6'	113.6°	49°26.4'	-24.0'	114.7°	11
12	51°22.1'	-16.6'	109.5°	51°01.6'	-18.1'	110.6°	50°39.9'	-19.5'	111.8°	50°17.1'	-20.9'	112.9°	49°53.2'	-22.3'	114.0°	49°28.3'	-23.7'	115.1°	49°02.4'	-25.0'	116.1°	12
13	51°05.6'	-17.8'	111.0°	50°43.5'	-19.2'	112.1°	50°20.4'	-20.6'	113.3°	49°56.2'	-22.0'	114.3°	49°30.9'	-23.4'	115.4°	49°04.7'	-24.7'	116.5°	48°37.4'	-25.9'	117.5°	13
14	50°47.8'	-18.9'	112.5°	50°24.3'	-20.3'	113.6°	49°59.7'	-21.7'	114.7°	49°34.2'	-23.1'	115.8°	49°07.6'	-24.4'	116.8°	48°40.0'	-25.7'	117.9°	48°11.5'	-26.9'	118.8°	14
15	50°28.9'	-20.1'	114.0°	50°04.0'	-21.4'	115.1°	49°38.0'	-22.8'	116.2°	49°11.1'	-24.1'	117.2°	48°43.2'	-25.4'	118.2°	48°14.3'	-26.6'	119.2°	47°44.6'	-27.8'	120.2°	15
16	50°08.9'	-21.2'	115.5°	49°42.5'	-22.5'	116.5°	49°15.2'	-23.8'	117.6°	48°47.0'	-25.1'	118.6°	48°17.8'	-26.3'	119.6°	47°47.7'	-27.5'	120.6°	47°16.8'	-28.7'	121.5°	16
17	49°47.7'	-22.2'	116.9°	49°20.0'	-23.5'	118.0°	48°51.4'	-24.8'	119.0°	48°21.9'	-26.1'	120.0°	47°51.5'	-27.3'	120.9°	47°20.2'	-28.4'	121.9°	46°48.1'	-29.5'	122.8°	17
18	49°25.5'	-23.3'	118.4°	48°56.5'	-24.6'	119.4°	48°26.6'	-25.8'	120.4°	47°55.8'	-27.0'	121.3°	47°24.2'	-28.1'	122.3°	46°51.8'	-29.3'	123.2°	46°18.6'	-30.4'	124.0°	18
19	49°02.2'	-24.3'	119.8°	48°31.9'	-25.5'	120.8°	48°00.8'	-26.7'	121.7°	47°28.8'	-27.9'	122.7°	46°56.1'	-29.0'	123.6°	46°22.5'	-30.1'	124.4°	45°48.2'	-31.2'	125.3°	19
20	48°37.9'	-25.3'	121.2°	48°06.4'	-26.5'	122.1°	47°34.1'	-27.6'	123.1°	47°01.0'	-28.8'	124.0°	46°27.1'	-29.9'	124.8°	45°52.4'	-30.9'	125.7°	45°17.1'	-31.9'	126.5°	20
21																						

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

36° 324° LHA

Latitude CONTRARY to Declination

36° 324° LHA

Dec°	0			1			2			3			4			5			6			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	54°00.0'	-00.7'	90.0°	53°59.3'	-02.5'	91.4°	53°57.1'	-04.3'	92.8°	53°53.5'	-06.0'	94.1°	53°48.5'	-07.8'	95.5°	53°42.1'	-09.5'	96.8°	53°34.2'	-11.2'	98.2°	0			
1	53°59.2'	-02.2'	91.7°	53°56.8'	-03.9'	93.1°	53°52.8'	-05.7'	94.4°	53°47.5'	-07.5'	95.8°	53°40.7'	-09.2'	97.2°	53°32.5'	-10.9'	98.5°	53°23.0'	-12.6'	99.8°	1			
2	53°57.1'	-03.6'	93.4°	53°52.8'	-05.4'	94.8°	53°47.1'	-07.1'	96.1°	53°40.0'	-08.8'	97.5°	53°31.5'	-10.6'	98.8°	53°21.6'	-12.3'	100.2°	53°10.4'	-13.9'	101.5°	2			
3	53°53.5'	-05.0'	95.1°	53°47.5'	-06.8'	96.5°	53°40.0'	-08.5'	97.8°	53°31.2'	-10.2'	99.2°	53°21.0'	-11.9'	100.5°	53°09.4'	-13.6'	101.8°	52°56.4'	-15.2'	103.1°	3			
4	53°48.5'	-06.4'	96.8°	53°40.7'	-08.2'	98.1°	53°31.5'	-09.9'	99.5°	53°21.0'	-11.6'	100.8°	53°09.0'	-13.3'	102.1°	52°55.8'	-14.9'	103.4°	52°41.2'	-16.5'	104.7°	4			
5	53°42.1'	-07.8'	98.5°	53°32.5'	-09.6'	99.8°	53°21.6'	-11.3'	101.1°	53°09.4'	-12.9'	102.4°	52°55.8'	-14.6'	103.7°	52°40.9'	-16.2'	105.0°	52°24.7'	-17.8'	106.3°	5			
6	53°34.2'	-09.2'	100.1°	53°23.0'	-10.9'	101.5°	53°10.4'	-12.6'	102.8°	52°56.4'	-14.2'	104.1°	52°41.2'	-15.9'	105.3°	52°24.7'	-17.4'	106.6°	52°06.9'	-19.0'	107.8°	6			
7	53°25.0'	-10.6'	101.8°	53°12.0'	-12.3'	103.1°	52°57.8'	-13.9'	104.4°	52°42.2'	-15.5'	105.7°	52°25.4'	-17.1'	106.9°	52°07.3'	-18.7'	108.2°	51°48.0'	-20.2'	109.4°	7			
8	53°14.4'	-12.0'	103.4°	52°59.8'	-13.6'	104.7°	52°43.8'	-15.2'	106.0°	52°26.7'	-16.8'	107.3°	52°08.2'	-18.3'	108.5°	51°48.6'	-19.9'	109.7°	51°27.8'	-21.3'	110.9°	8			
9	53°02.4'	-13.3'	105.1°	52°46.2'	-14.9'	106.4°	52°28.6'	-16.5'	107.6°	52°09.9'	-18.0'	108.8°	51°49.9'	-19.5'	110.0°	51°28.8'	-21.0'	111.2°	51°06.5'	-22.5'	112.4°	9			
10	52°49.1'	-14.6'	106.7°	52°31.2'	-16.2'	108.0°	52°12.1'	-17.7'	109.2°	51°51.8'	-19.2'	110.4°	51°30.4'	-20.7'	111.6°	51°07.7'	-22.1'	112.7°	50°44.0'	-23.5'	113.9°	10			
11	52°34.5'	-15.9'	108.3°	52°15.1'	-17.4'	109.5°	51°54.4'	-18.9'	110.7°	51°32.6'	-20.4'	111.9°	51°09.6'	-21.8'	113.1°	50°45.6'	-23.2'	114.2°	50°20.5'	-24.6'	115.3°	11			
12	52°18.6'	-17.1'	109.9°	51°57.6'	-18.6'	111.1°	51°35.5'	-20.1'	112.3°	51°12.2'	-21.6'	113.4°	50°47.8'	-23.0'	114.5°	50°22.3'	-24.3'	115.7°	49°55.9'	-25.6'	116.7°	12			
13	52°01.5'	-18.4'	111.4°	51°39.0'	-19.8'	112.6°	51°15.4'	-21.3'	113.8°	50°50.6'	-22.7'	114.9°	50°24.8'	-24.0'	116.0°	49°58.0'	-25.3'	117.1°	49°30.2'	-26.6'	118.1°	13			
14	51°43.2'	-19.5'	113.0°	51°19.2'	-21.0'	114.1°	50°54.1'	-22.4'	115.3°	50°28.0'	-23.7'	116.4°	50°00.8'	-25.1'	117.4°	49°32.7'	-26.3'	118.5°	49°03.6'	-27.6'	119.5°	14			
15	51°23.6'	-20.7'	114.5°	50°58.2'	-22.1'	115.6°	50°31.7'	-23.5'	116.7°	50°04.2'	-24.8'	117.8°	49°35.8'	-26.1'	118.8°	49°06.3'	-27.3'	119.9°	48°36.0'	-28.5'	120.8°	15			
16	51°02.9'	-21.8'	116.0°	50°36.1'	-23.2'	117.1°	50°08.2'	-24.5'	118.2°	49°39.4'	-25.8'	119.2°	49°09.7'	-27.0'	120.2°	48°39.0'	-28.2'	121.2°	48°07.5'	-29.4'	122.2°	16			
17	50°41.1'	-22.9'	117.5°	50°12.9'	-24.3'	118.5°	49°43.7'	-25.5'	119.6°	49°13.6'	-26.8'	120.6°	48°42.6'	-28.0'	121.6°	48°10.8'	-29.1'	122.5°	47°38.1'	-30.3'	123.5°	17			
18	50°18.1'	-24.0'	118.9°	49°48.6'	-25.3'	120.0°	49°18.2'	-26.5'	121.0°	48°46.8'	-27.7'	122.0°	48°14.7'	-28.9'	122.9°	47°41.6'	-30.0'	123.8°	47°07.8'	-31.1'	124.7°	18			
19	49°54.1'	-25.0'	120.4°	49°23.3'	-26.3'	121.4°	48°51.6'	-27.5'	122.4°	48°19.1'	-28.7'	123.3°	47°45.8'	-29.8'	124.2°	47°11.6'	-30.9'	125.1°	46°36.7'	-31.9'	126.0°	19			
20	49°29.1'	-26.1'	121.8°	48°57.0'	-27.3'	122.7°	48°24.2'	-28.4'	123.7°	47°50.5'	-29.5'	124.6°	47°16.0'	-30.6'	125.5°	46°40.8'	-31.7'	126.4°	46°04.8'	-32.7'	127.2°	20			
21	49°03.0'	-27.0'	123.1°	48°29.8'	-28.2'	124.1°	47°55.7'	-29.3'	125.0°	47°20.9'	-30.4'	125.9°	46°45.4'	-31.4'	126.8°	46°09.1'	-32.4'	127.6°	45°32.1'	-33.4'	128.4°	21			
22	48°36.0'	-28.0'	124.5°	48°01.6'	-29.1'	125.4°	47°26.4'	-30.2'	126.3°	46°50.5'	-31.2'	127.2°	46°13.9'	-32.2'	128.0°	45°36.6'	-33.2'	128.8°	44°58.7'	-34.1'	129.6°	22			
23	48°08.0'	-28.9'	125.8°	47°32.5'	-29.9'	126.7°	46°56.3'	-31.0'	127.6°	46°19.3'	-32.0'	128.4°	45°41.7'	-33.0'	129.2°	45°03.4'	-33.9'	130.0°	44°24.6'	-34.8'	130.8°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6					Dec°	

36° 324° LHA

Latitude CONTRARY to DECLINATION

36° 324° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

35° 325° LHA

Latitude CONTRARY to Declination

35° 325° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	55°00.0'	-00.7'	90.0°	54°59.3'	-02.6'	91.4°	54°57.0'	-04.4'	92.9°	54°53.3'	-06.2'	94.3°	54°48.1'	-08.0'	95.7°	54°41.4'	-09.8'	97.1°	54°33.3'	-11.5'	98.5°	0
1	54°59.2'	-02.2'	91.7°	54°56.7'	-04.1'	93.2°	54°52.6'	-05.9'	94.6°	54°47.1'	-07.7'	96.0°	54°40.1'	-09.4'	97.4°	54°31.6'	-11.2'	98.8°	54°21.7'	-12.9'	100.2°	1
2	54°57.0'	-03.7'	93.5°	54°52.6'	-05.5'	94.9°	54°46.8'	-07.3'	96.3°	54°39.4'	-09.1'	97.7°	54°30.6'	-10.9'	99.1°	54°20.4'	-12.6'	100.5°	54°08.8'	-14.3'	101.9°	2
3	54°53.3'	-05.2'	95.2°	54°47.1'	-07.0'	96.6°	54°39.4'	-08.8'	98.0°	54°30.3'	-10.5'	99.4°	54°19.8'	-12.3'	100.8°	54°07.8'	-14.0'	102.2°	53°54.5'	-15.6'	103.5°	3
4	54°48.1'	-06.7'	97.0°	54°40.1'	-08.5'	98.4°	54°30.6'	-10.2'	99.7°	54°19.8'	-11.9'	101.1°	54°07.5'	-13.6'	102.5°	53°53.9'	-15.3'	103.8°	53°38.9'	-17.0'	105.1°	4
5	54°41.4'	-08.1'	98.7°	54°31.6'	-09.9'	100.1°	54°20.4'	-11.6'	101.4°	54°07.8'	-13.3'	102.8°	53°53.9'	-15.0'	104.1°	53°38.9'	-16.6'	105.5°	53°21.9'	-18.2'	106.8°	5
6	54°33.3'	-09.6'	100.4°	54°21.7'	-11.3'	101.8°	54°08.8'	-13.0'	103.1°	53°54.5'	-14.7'	104.5°	53°38.9'	-16.3'	105.8°	53°21.9'	-17.9'	107.1°	53°03.7'	-19.5'	108.3°	6
7	54°23.7'	-11.0'	102.1°	54°10.4'	-12.7'	103.4°	53°55.8'	-14.4'	104.8°	53°39.8'	-16.0'	106.1°	53°22.5'	-17.6'	107.4°	53°04.0'	-19.2'	108.7°	52°44.2'	-20.7'	109.9°	7
8	54°12.7'	-12.4'	103.8°	53°57.7'	-14.1'	105.1°	53°41.4'	-15.7'	106.4°	53°23.8'	-17.3'	107.7°	53°04.9'	-18.9'	109.0°	52°44.8'	-20.4'	110.2°	52°23.4'	-21.9'	111.5°	8
9	54°00.3'	-13.8'	105.4°	53°43.7'	-15.4'	106.8°	53°25.7'	-17.0'	108.0°	53°06.5'	-18.6'	109.3°	52°46.0'	-20.1'	110.6°	52°24.4'	-21.6'	111.8°	52°01.5'	-23.1'	113.0°	9
10	53°46.5'	-15.1'	107.1°	53°28.2'	-16.7'	108.4°	53°08.7'	-18.3'	109.7°	52°47.9'	-19.8'	110.9°	52°25.9'	-21.3'	112.1°	52°02.8'	-22.8'	113.3°	51°38.5'	-24.2'	114.5°	10
11	53°31.4'	-16.4'	108.7°	53°11.5'	-18.0'	110.0°	52°50.4'	-19.5'	111.2°	52°28.1'	-21.0'	112.4°	52°04.6'	-22.5'	113.6°	51°40.0'	-23.9'	114.8°	51°14.3'	-25.3'	115.9°	11
12	53°15.0'	-17.7'	110.3°	52°53.5'	-19.3'	111.6°	52°30.9'	-20.7'	112.8°	52°07.1'	-22.2'	114.0°	51°42.1'	-23.6'	115.1°	51°16.1'	-25.0'	116.3°	50°49.0'	-26.3'	117.4°	12
13	52°57.3'	-19.0'	111.9°	52°34.3'	-20.5'	113.1°	52°10.1'	-21.9'	114.3°	51°44.9'	-23.3'	115.5°	51°18.5'	-24.7'	116.6°	50°51.1'	-26.0'	117.7°	50°22.7'	-27.3'	118.8°	13
14	52°38.3'	-20.2'	113.5°	52°13.8'	-21.7'	114.7°	51°48.2'	-23.1'	115.8°	51°21.5'	-24.4'	117.0°	50°53.8'	-25.8'	118.1°	50°25.1'	-27.1'	119.1°	49°55.4'	-28.3'	120.2°	14
15	52°18.1'	-21.4'	115.0°	51°52.1'	-22.8'	116.2°	51°25.1'	-24.2'	117.3°	50°57.1'	-25.5'	118.4°	50°28.0'	-26.8'	119.5°	49°58.0'	-28.0'	120.5°	49°27.1'	-29.2'	121.5°	15
16	51°56.7'	-22.6'	116.6°	51°29.3'	-23.9'	117.7°	51°01.0'	-25.3'	118.8°	50°31.6'	-26.5'	119.9°	50°01.2'	-27.8'	120.9°	49°30.0'	-29.0'	121.9°	48°57.8'	-30.2'	122.9°	16
17	51°34.1'	-23.7'	118.1°	51°05.4'	-25.0'	119.2°	50°35.7'	-26.3'	120.2°	50°05.0'	-27.5'	121.3°	49°33.4'	-28.7'	122.3°	49°01.0'	-29.9'	123.2°	48°27.7'	-31.0'	124.2°	17
18	51°10.5'	-24.8'	119.5°	50°40.4'	-26.1'	120.6°	50°09.4'	-27.3'	121.6°	49°37.5'	-28.5'	122.6°	49°04.7'	-29.7'	123.6°	48°31.1'	-30.8'	124.6°	47°56.6'	-31.9'	125.5°	18
19	50°45.7'	-25.8'	121.0°	50°14.4'	-27.1'	122.0°	49°42.1'	-28.3'	123.0°	49°09.0'	-29.4'	124.0°	48°35.0'	-30.6'	124.9°	48°00.3'	-31.6'	125.8°	47°24.8'	-32.7'	126.7°	19
20	50°19.9'	-26.8'	122.4°	49°47.3'	-28.0'	123.4°	49°13.8'	-29.2'	124.4°	48°39.6'	-30.3'	125.3°	48°04.5'	-31.4'	126.2°	47°28.7'	-32.4'	127.1°				

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

34° 326° LHA

Latitude CONTRARY to Declination

34° 326° LHA

Dec°	0			1			2			3			4			5			6			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	56°00.0'	-00.8'	90.0°	55°59.2'	-02.6'	91.5°	55°56.9'	-04.5'	93.0°	55°53.0'	-06.4'	94.4°	55°47.6'	-08.2'	95.9°	55°40.7'	-10.0'	97.4°	55°32.2'	-11.8'	98.8°	0			
1	55°59.2'	-02.3'	91.8°	55°56.6'	-04.2'	93.3°	55°52.4'	-06.0'	94.7°	55°46.7'	-07.9'	96.2°	55°39.4'	-09.7'	97.7°	55°30.7'	-11.5'	99.1°	55°20.4'	-13.3'	100.5°	1			
2	55°56.8'	-03.9'	93.6°	55°52.4'	-05.7'	95.0°	55°46.3'	-07.6'	96.5°	55°38.8'	-09.4'	98.0°	55°29.7'	-11.2'	99.4°	55°19.2'	-12.9'	100.8°	55°07.2'	-14.7'	102.2°	2			
3	55°53.0'	-05.4'	95.4°	55°46.7'	-07.2'	96.8°	55°38.8'	-09.1'	98.3°	55°29.4'	-10.9'	99.7°	55°18.5'	-12.6'	101.1°	55°06.2'	-14.4'	102.5°	54°52.5'	-16.1'	103.9°	3			
4	55°47.6'	-06.9'	97.1°	55°39.4'	-08.8'	98.6°	55°29.7'	-10.5'	100.0°	55°18.5'	-12.3'	101.4°	55°05.9'	-14.1'	102.9°	54°51.9'	-15.8'	104.2°	54°36.4'	-17.4'	105.6°	4			
5	55°40.7'	-08.4'	98.9°	55°30.7'	-10.2'	100.3°	55°19.2'	-12.0'	101.8°	55°06.2'	-13.7'	103.2°	54°51.9'	-15.5'	104.5°	54°36.1'	-17.1'	105.9°	54°19.0'	-18.8'	107.3°	5			
6	55°32.2'	-09.9'	100.6°	55°20.4'	-11.7'	102.1°	55°07.2'	-13.4'	103.5°	54°52.5'	-15.1'	104.9°	54°36.4'	-16.8'	106.2°	54°19.0'	-18.5'	107.6°	54°00.2'	-20.1'	108.9°	6			
7	55°22.3'	-11.4'	102.4°	55°08.7'	-13.1'	103.8°	54°53.7'	-14.8'	105.2°	54°37.3'	-16.5'	106.5°	54°19.6'	-18.2'	107.9°	54°00.5'	-19.8'	109.2°	53°40.2'	-21.3'	110.5°	7			
8	55°10.9'	-12.8'	104.1°	54°55.6'	-14.6'	105.5°	54°38.9'	-16.2'	106.9°	54°20.8'	-17.9'	108.2°	54°01.4'	-19.5'	109.5°	53°40.8'	-21.0'	110.8°	53°18.9'	-22.5'	112.0°	8			
9	54°58.1'	-14.3'	105.8°	54°41.0'	-15.9'	107.2°	54°22.7'	-17.6'	108.5°	54°03.0'	-19.2'	109.8°	53°42.0'	-20.7'	111.1°	53°19.8'	-22.2'	112.4°	52°56.3'	-23.7'	113.6°	9			
10	54°43.8'	-15.6'	107.5°	54°25.1'	-17.3'	108.8°	54°05.1'	-18.9'	110.1°	53°43.8'	-20.4'	111.4°	53°21.3'	-22.0'	112.7°	52°57.5'	-23.4'	113.9°	52°32.6'	-24.8'	115.1°	10			
11	54°28.2'	-17.0'	109.2°	54°07.8'	-18.6'	110.5°	53°46.2'	-20.2'	111.8°	53°23.3'	-21.7'	113.0°	52°59.3'	-23.1'	114.2°	52°34.1'	-24.6'	115.4°	52°07.8'	-26.0'	116.6°	11			
12	54°11.2'	-18.3'	110.8°	53°49.2'	-19.9'	112.1°	53°26.0'	-21.4'	113.3°	53°01.7'	-22.9'	114.6°	52°36.2'	-24.3'	115.8°	52°09.5'	-25.7'	116.9°	51°41.8'	-27.0'	118.1°	12			
13	53°52.8'	-19.6'	112.4°	53°29.3'	-21.1'	113.7°	53°04.6'	-22.6'	114.9°	52°38.8'	-24.0'	116.1°	52°11.9'	-25.4'	117.3°	51°43.8'	-26.8'	118.4°	51°14.8'	-28.0'	119.5°	13			
14	53°33.2'	-20.9'	114.0°	53°08.2'	-22.4'	115.3°	52°42.0'	-23.8'	116.4°	52°14.8'	-25.2'	117.6°	51°46.4'	-26.5'	118.7°	51°17.1'	-27.8'	119.8°	50°46.8'	-29.0'	120.9°	14			
15	53°12.3'	-22.1'	115.6°	52°45.8'	-23.5'	116.8°	52°18.3'	-24.9'	118.0°	51°49.6'	-26.2'	119.1°	51°19.9'	-27.5'	120.2°	50°49.3'	-28.8'	121.2°	50°17.7'	-30.0'	122.3°	15			
16	52°50.2'	-23.3'	117.1°	52°22.3'	-24.7'	118.3°	51°53.3'	-26.0'	119.4°	51°23.4'	-27.3'	120.5°	50°52.4'	-28.5'	121.6°	50°20.5'	-29.8'	122.6°	49°47.7'	-30.9'	123.6°	16			
17	52°26.9'	-24.4'	118.7°	51°57.6'	-25.8'	119.8°	51°27.3'	-27.1'	120.9°	50°56.1'	-28.3'	121.9°	50°23.9'	-29.5'	123.0°	49°50.8'	-30.7'	124.0°	49°16.8'	-31.8'	124.9°	17			
18	52°02.5'	-25.5'	120.2°	51°31.9'	-26.8'	121.3°	51°00.3'	-28.1'	122.3°	50°27.8'	-29.3'	123.3°	49°54.3'	-30.4'	124.3°	49°20.1'	-31.6'	125.3°	48°45.0'	-32.7'	126.2°	18			
19	51°37.0'	-26.6'	121.6°	51°05.0'	-27.9'	122.7°	50°32.2'	-29.1'	123.7°	49°58.5'	-30.2'	124.7°	49°23.9'	-31.3'	125.7°	48°48.5'	-32.4'	126.6°	48°12.4'	-33.5'	127.5°	19			
20	51°10.4'	-27.6'	123.1°	50°37.2'	-28.9'	124.1°	50°03.1'	-30.0'	125.1°	49°28.2'	-31.1'	126.0°	48°52.5'	-32.2'	127.0°	48°16.1'	-33.2'	127.9°	47°38.9'	-34.2'	128.7°	20			
21	50°42.7'	-28.6'	124.5°	50°08.3'	-29.8'	125.5°	49°33.1'	-30.9'	126.4°	48°57.1'	-32.0'	127.3°	48°20.3'	-33.0'	128.2°	47°42.8'	-34.0'	129.1°	47°04.6'	-35.0'	130.0°	21			
22	50°14.1'	-29.6'	125.8°	49°38.5'	-30.7'	126.8°	49°02.2'	-31.8'	127.7°	48°25.1'	-32.8'	128.6°	47°47.3'	-33.8'	129.5°	47°08.8'	-34.8'	130.3°	46°29.6'	-35.7'	131.1°	22			
23	49°44.5'	-30.5'	127.2°	49°07.8'	-31.6'	128.1°	48°30.4'	-32.6'	129.0°	47°52.3'	-33.6'	129.9°	47°13.5'	-34.6'	130.7°	46°34.0'	-35.5'	131.5°	45°53.9'	-36.4'	132.3°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6					Dec°	

34° 326° LHA

Latitude CONTRARY to DECLINATION

34° 326° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

33° 327° LHA

Latitude CONTRARY to Declination

33° 327° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	57°00.0'	-00.8'	90.0°	56°59.2'	-02.7'	91.5°	56°56.8'	-04.6'	93.1°	56°52.8'	-06.5'	94.6°	56°47.1'	-08.4'	96.1°	56°39.9'	-10.3'	97.6°	56°31.2'	-12.1'	99.1°	0
1	56°59.1'	-02.4'	91.8°	56°56.5'	-04.3'	93.4°	56°52.1'	-06.2'	94.9°	56°46.2'	-08.1'	96.4°	56°38.7'	-10.0'	97.9°	56°29.7'	-11.8'	99.4°	56°19.1'	-13.6'	100.9°	1
2	56°56.7'	-04.0'	93.7°	56°52.1'	-05.9'	95.2°	56°45.9'	-07.8'	96.7°	56°38.1'	-09.7'	98.2°	56°28.7'	-11.5'	99.7°	56°17.8'	-13.3'	101.2°	56°05.4'	-15.1'	102.7°	2
3	56°52.8'	-05.6'	95.5°	56°46.2'	-07.5'	97.0°	56°38.1'	-09.4'	98.5°	56°28.4'	-11.2'	100.0°	56°17.2'	-13.0'	101.5°	56°04.5'	-14.8'	103.0°	55°50.3'	-16.5'	104.4°	3
4	56°47.1'	-07.2'	97.3°	56°38.7'	-09.1'	98.8°	56°28.7'	-10.9'	100.3°	56°17.2'	-12.7'	101.8°	56°04.2'	-14.5'	103.3°	55°49.7'	-16.2'	104.7°	55°33.8'	-17.9'	106.1°	4
5	56°39.9'	-08.8'	99.1°	56°29.7'	-10.6'	100.6°	56°17.8'	-12.4'	102.1°	56°04.5'	-14.2'	103.6°	55°49.7'	-15.9'	105.0°	55°33.5'	-17.6'	106.4°	55°15.9'	-19.3'	107.8°	5
6	56°31.2'	-10.3'	100.9°	56°19.1'	-12.1'	102.4°	56°05.4'	-13.9'	103.9°	55°50.3'	-15.6'	105.3°	55°33.8'	-17.3'	106.7°	55°15.9'	-19.0'	108.1°	54°56.6'	-20.6'	109.4°	6
7	56°20.9'	-11.8'	102.7°	56°06.9'	-13.6'	104.2°	55°51.5'	-15.3'	105.6°	55°34.7'	-17.0'	107.0°	55°16.5'	-18.7'	108.4°	54°56.9'	-20.3'	109.7°	54°36.0'	-21.9'	111.1°	7
8	56°09.1'	-13.3'	104.5°	55°53.3'	-15.1'	105.9°	55°36.2'	-16.8'	107.3°	55°17.7'	-18.4'	108.7°	54°57.8'	-20.1'	110.0°	54°36.5'	-21.6'	111.4°	54°14.0'	-23.2'	112.7°	8
9	55°55.7'	-14.8'	106.2°	55°38.3'	-16.5'	107.6°	55°19.4'	-18.1'	109.0°	54°59.2'	-19.8'	110.4°	54°37.7'	-21.3'	111.7°	54°14.9'	-22.9'	113.0°	53°50.9'	-24.4'	114.2°	9
10	55°41.0'	-16.2'	107.9°	55°21.8'	-17.9'	109.3°	55°01.3'	-19.5'	110.7°	54°39.5'	-21.1'	112.0°	54°16.4'	-22.6'	113.3°	53°52.0'	-24.1'	114.5°	53°26.5'	-25.5'	115.8°	10
11	55°24.8'	-17.6'	109.6°	55°03.9'	-19.2'	111.0°	54°41.8'	-20.8'	112.3°	54°18.4'	-22.3'	113.6°	53°53.7'	-23.8'	114.9°	53°27.9'	-25.3'	116.1°	53°01.0'	-26.7'	117.3°	11
12	55°07.2'	-19.0'	111.3°	54°44.7'	-20.5'	112.6°	54°21.0'	-22.1'	113.9°	53°56.0'	-23.6'	115.2°	53°29.9'	-25.0'	116.4°	53°02.7'	-26.4'	117.6°	52°34.3'	-27.8'	118.8°	12
13	54°48.2'	-20.3'	113.0°	54°24.1'	-21.8'	114.3°	53°58.9'	-23.3'	115.5°	53°32.5'	-24.8'	116.7°	53°04.9'	-26.2'	117.9°	52°36.3'	-27.5'	119.1°	52°06.6'	-28.8'	120.2°	13
14	54°27.9'	-21.6'	114.6°	54°02.3'	-23.1'	115.9°	53°35.6'	-24.5'	117.1°	53°07.7'	-25.9'	118.3°	52°38.8'	-27.3'	119.4°	52°08.8'	-28.6'	120.6°	51°37.8'	-29.8'	121.6°	14
15	54°06.3'	-22.8'	116.2°	53°39.2'	-24.3'	117.4°	53°11.1'	-25.7'	118.6°	52°41.8'	-27.0'	119.8°	52°11.5'	-28.3'	120.9°	51°40.2'	-29.6'	122.0°	51°08.0'	-30.8'	123.0°	15
16	53°43.5'	-24.0'	117.8°	53°15.0'	-25.4'	119.0°	52°45.4'	-26.8'	120.1°	52°14.8'	-28.1'	121.2°	51°43.2'	-29.3'	122.3°	51°10.6'	-30.5'	123.4°	50°37.2'	-31.7'	124.4°	16
17	53°19.4'	-25.2'	119.3°	52°49.5'	-26.6'	120.5°	52°18.6'	-27.9'	121.6°	51°46.7'	-29.1'	122.7°	51°13.9'	-30.3'	123.7°	50°40.1'	-31.5'	124.7°	50°05.5'	-32.6'	125.7°	17
18	52°54.2'	-26.3'	120.8°	52°23.0'	-27.6'	121.9°	51°50.8'	-28.9'	123.0°	51°17.6'	-30.1'	124.1°	50°43.5'	-31.3'	125.1°	50°08.6'	-32.4'	126.1°	49°32.9'	-33.5'	127.0°	18
19	52°27.9'	-27.4'	122.3°	51°55.3'	-28.7'	123.4°	51°21.9'	-29.9'	124.4°	50°47.5'	-31.0'	125.4°	50°12.3'	-32.2'	126.4°	49°36.3'	-33.2'	127.4°	48°59.4'	-34.3'	128.3°	19
20	52°00.5'	-28.5'	123.8°	51°26.7'	-29.7'	124.8°	50°52.0'	-30.8'	125.8°	50°16.5'	-32.0'	126.8°	49°40.1'	-33.0'	127.7°	49°03.0'	-34.1'	128.7°	48°2			

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

32° 328° LHA

Latitude CONTRARY to Declination

32° 328° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	58°00.0'	-00.8'	90.0°	57°59.2'	-02.8'	91.6°	57°56.7'	-04.8'	93.2°	57°52.5'	-06.7'	94.8°	57°46.6'	-08.7'	96.4°	57°39.2'	-10.6'	97.9°	57°30.1'	-12.5'	99.5°	0
1	57°59.1'	-02.5'	91.9°	57°56.4'	-04.5'	93.5°	57°51.9'	-06.4'	95.1°	57°45.7'	-08.4'	96.7°	57°38.0'	-10.3'	98.2°	57°28.6'	-12.2'	99.8°	57°17.6'	-14.0'	101.3°	1
2	57°56.6'	-04.2'	93.8°	57°51.9'	-06.1'	95.4°	57°45.4'	-08.1'	96.9°	57°37.4'	-10.0'	98.5°	57°27.7'	-11.9'	100.1°	57°16.4'	-13.7'	101.6°	57°03.6'	-15.5'	103.1°	2
3	57°52.5'	-05.8'	95.6°	57°45.7'	-07.8'	97.2°	57°37.4'	-09.7'	98.8°	57°27.4'	-11.6'	100.3°	57°15.8'	-13.4'	101.9°	57°02.7'	-15.2'	103.4°	56°48.1'	-17.0'	104.9°	3
4	57°46.6'	-07.5'	97.5°	57°38.0'	-09.4'	99.1°	57°27.7'	-11.3'	100.6°	57°15.8'	-13.1'	102.2°	57°02.4'	-14.9'	103.7°	56°47.5'	-16.7'	105.2°	56°31.1'	-18.5'	106.6°	4
5	57°39.2'	-09.1'	99.4°	57°28.6'	-11.0'	100.9°	57°16.4'	-12.8'	102.5°	57°02.7'	-14.7'	104.0°	56°47.5'	-16.4'	105.4°	56°30.8'	-18.2'	106.9°	56°12.6'	-19.9'	108.3°	5
6	57°30.1'	-10.7'	101.2°	57°17.6'	-12.5'	102.7°	57°03.6'	-14.4'	104.3°	56°48.1'	-16.1'	105.7°	56°31.1'	-17.9'	107.2°	56°12.6'	-19.6'	108.6°	55°52.7'	-21.2'	110.0°	6
7	57°19.4'	-12.3'	103.0°	57°05.1'	-14.1'	104.6°	56°49.2'	-15.9'	106.0°	56°31.9'	-17.6'	107.5°	56°13.2'	-19.3'	108.9°	55°53.0'	-20.9'	110.3°	55°31.5'	-22.5'	111.7°	7
8	57°07.1'	-13.8'	104.9°	56°51.0'	-15.6'	106.3°	56°33.4'	-17.3'	107.8°	56°14.3'	-19.0'	109.2°	55°53.9'	-20.7'	110.6°	55°32.1'	-22.3'	112.0°	55°09.0'	-23.8'	113.3°	8
9	56°53.3'	-15.3'	106.6°	56°35.4'	-17.1'	108.1°	56°16.0'	-18.8'	109.5°	55°55.3'	-20.4'	110.9°	55°33.2'	-22.0'	112.3°	55°09.8'	-23.6'	113.6°	54°45.2'	-25.1'	114.9°	9
10	56°38.0'	-16.8'	108.4°	56°18.3'	-18.5'	109.8°	55°57.3'	-20.1'	111.2°	55°34.9'	-21.7'	112.6°	55°11.2'	-23.3'	113.9°	54°46.3'	-24.8'	115.2°	54°20.1'	-26.3'	116.5°	10
11	56°21.2'	-18.2'	110.1°	55°59.8'	-19.9'	111.5°	55°37.1'	-21.5'	112.9°	55°13.1'	-23.0'	114.2°	54°47.9'	-24.5'	115.5°	54°21.5'	-26.0'	116.8°	53°53.8'	-27.4'	118.0°	11
12	56°02.9'	-19.6'	111.9°	55°39.9'	-21.2'	113.2°	55°15.7'	-22.8'	114.5°	54°50.1'	-24.3'	115.8°	54°23.4'	-25.8'	117.1°	53°55.5'	-27.2'	118.3°	53°26.4'	-28.5'	119.5°	12
13	55°43.3'	-21.0'	113.5°	55°18.7'	-22.6'	114.9°	54°52.9'	-24.1'	116.2°	54°25.8'	-25.5'	117.4°	53°57.6'	-26.9'	118.6°	53°28.3'	-28.3'	119.8°	52°57.9'	-29.6'	121.0°	13
14	55°22.3'	-22.3'	115.2°	54°56.2'	-23.8'	116.5°	54°28.8'	-25.3'	117.7°	54°00.3'	-26.7'	119.0°	53°30.7'	-28.0'	120.2°	53°00.0'	-29.3'	121.3°	52°28.4'	-30.6'	122.4°	14
15	54°60.0'	-23.6'	116.8°	54°32.3'	-25.0'	118.1°	54°03.5'	-26.5'	119.3°	53°33.6'	-27.8'	120.5°	53°02.7'	-29.1'	121.6°	52°30.7'	-30.4'	122.7°	51°57.8'	-31.6'	123.8°	15
16	54°36.4'	-24.8'	118.4°	54°07.3'	-26.2'	119.6°	53°37.1'	-27.6'	120.8°	53°05.8'	-28.9'	122.0°	52°33.6'	-30.1'	123.1°	52°00.3'	-31.3'	124.2°	51°26.2'	-32.5'	125.2°	16
17	54°11.6'	-26.0'	120.0°	53°41.1'	-27.4'	121.2°	53°09.5'	-28.7'	122.3°	52°36.9'	-29.9'	123.4°	52°03.4'	-31.1'	124.5°	51°29.0'	-32.3'	125.5°	50°53.7'	-33.4'	126.5°	17
18	53°45.6'	-27.2'	121.5°	53°13.7'	-28.5'	122.7°	52°40.8'	-29.7'	123.8°	52°07.0'	-30.9'	124.8°	51°32.3'	-32.1'	125.9°	50°56.7'	-33.2'	126.9°	50°20.3'	-34.3'	127.8°	18
19	53°18.4'	-28.3'	123.0°	52°45.2'	-29.5'	124.1°	52°11.1'	-30.7'	125.2°	51°36.1'	-31.9'	126.2°	51°00.2'	-33.0'	127.2°	50°23.5'	-34.1'	128.2°	49°46.0'	-35.1'	129.1°	19
20	52°50.1'	-29.3'	124.5°	52°15.7'	-30.5'	125.6°	51°40.4'	-31.7'	126.6°	51°04.2'	-32.8'	127.6°	50°27.2'	-33.9'	128.5°	49°49.4'	-34.9'	129.5°	49°10.9'	-35.9'	130.4°	20
21	52°20.8'	-30.4'	125.9°	51°45.2'	-31.5'	127.0°	51°08.7'	-32.6'	127.9°	50°31.4'	-33.7'	128.9°	49°53.3'	-34.7'	129.8°	49°14.5'	-35.7'	130.7°	48°35.0'	-36.6'	131.6°	21
22	51°50.4'	-31.3'	127.3°	51°13.7'	-32.4'	128.3°	50°36.1'	-33.5'	129.3°	49°57.7'	-34.5'	130.2°	49°18.6'	-35.5'	131.1°	48°38.8'	-36.5'	132.0°	47°58.4'	-37.4'	132.8°	22
23	51°19.1'	-32.3'	128.7°	50°41.2'	-33.3'	129.7°	50°02.5'	-34.4'	130.6°	49°23.2'	-35.3'	131.5°	48°43.1'	-36.3'	132.3°	48°02.4'	-37.2'	133.2°	47°21.0'	-38.0'	133.9°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

32° 328° LHA

Latitude CONTRARY to DECLINATION

32° 328° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

31° 329° LHA

Latitude CONTRARY to Declination

31° 329° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	59°00.0'	-00.9'	90.0°	58°59.1'	-02.9'	91.7°	58°56.5'	-04.9'	93.3°	58°52.2'	-06.9'	95.0°	58°46.1'	-08.9'	96.6°	58°38.3'	-10.9'	98.3°	58°28.9'	-12.8'	99.9°	0
1	58°59.1'	-02.6'	91.9°	58°56.2'	-04.6'	93.6°	58°51.6'	-06.6'	95.3°	58°45.2'	-08.6'	96.9°	58°37.2'	-10.6'	98.5°	58°27.5'	-12.5'	100.1°	58°16.1'	-14.4'	101.7°	1
2	58°56.5'	-04.3'	93.9°	58°51.6'	-06.4'	95.5°	58°45.0'	-08.3'	97.2°	58°36.6'	-10.3'	98.8°	58°26.6'	-12.2'	100.4°	58°14.9'	-14.1'	102.0°	58°01.7'	-16.0'	103.6°	2
3	58°52.2'	-06.1'	95.8°	58°45.2'	-08.1'	97.5°	58°36.6'	-10.0'	99.1°	58°26.3'	-11.9'	100.7°	58°14.4'	-13.8'	102.3°	58°00.8'	-15.7'	103.8°	57°45.7'	-17.5'	105.4°	3
4	58°46.1'	-07.8'	97.7°	58°37.2'	-09.7'	99.4°	58°26.6'	-11.7'	101.0°	58°14.4'	-13.6'	102.6°	58°00.5'	-15.4'	104.1°	57°45.1'	-17.2'	105.7°	57°28.2'	-19.0'	107.2°	4
5	58°38.3'	-09.5'	99.6°	58°27.5'	-11.4'	101.2°	58°14.9'	-13.3'	102.8°	58°00.8'	-15.1'	104.4°	57°45.1'	-17.0'	105.9°	57°27.9'	-18.7'	107.4°	57°09.2'	-20.5'	108.9°	5
6	58°28.9'	-11.1'	101.5°	58°16.1'	-13.0'	103.1°	58°01.7'	-14.9'	104.7°	57°45.7'	-16.7'	106.2°	57°28.2'	-18.5'	107.7°	57°09.2'	-20.2'	109.2°	56°48.7'	-21.9'	110.7°	6
7	58°17.8'	-12.7'	103.4°	58°03.1'	-14.6'	105.0°	57°46.8'	-16.4'	106.5°	57°29.0'	-18.2'	108.0°	57°09.7'	-19.9'	109.5°	56°49.0'	-21.6'	110.9°	56°26.8'	-23.2'	112.3°	7
8	58°05.0'	-14.3'	105.3°	57°48.5'	-16.2'	106.8°	57°30.4'	-17.9'	108.3°	57°10.8'	-19.6'	109.8°	56°49.8'	-21.3'	111.2°	56°27.4'	-22.9'	112.6°	56°03.6'	-24.5'	114.0°	8
9	57°50.7'	-15.9'	107.1°	57°32.3'	-17.7'	108.6°	57°12.5'	-19.4'	110.1°	56°51.2'	-21.1'	111.5°	56°28.5'	-22.7'	112.9°	56°04.4'	-24.3'	114.3°	55°39.1'	-25.8'	115.6°	9
10	57°34.8'	-17.4'	108.9°	57°14.7'	-19.1'	110.4°	56°53.1'	-20.8'	111.8°	56°30.1'	-22.4'	113.2°	56°05.8'	-24.0'	114.6°	55°40.2'	-25.5'	115.9°	55°13.3'	-27.0'	117.2°	10
11	57°17.4'	-18.9'	110.7°	56°55.5'	-20.6'	112.1°	56°32.3'	-22.2'	113.5°	56°07.6'	-23.8'	114.9°	55°41.8'	-25.3'	116.2°	55°14.6'	-26.8'	117.5°	54°46.3'	-28.2'	118.8°	11
12	56°58.5'	-20.3'	112.4°	56°35.0'	-22.0'	113.8°	56°10.1'	-23.5'	115.2°	55°43.9'	-25.1'	116.5°	55°16.5'	-26.5'	117.8°	54°47.9'	-27.9'	119.1°	54°18.2'	-29.3'	120.3°	12
13	56°38.2'	-21.7'	114.1°	56°13.0'	-23.3'	115.5°	55°46.5'	-24.8'	116.8°	55°18.8'	-26.3'	118.1°	54°50.0'	-27.7'	119.4°	54°19.9'	-29.1'	120.6°	53°48.9'	-30.4'	121.8°	13
14	56°16.5'	-23.1'	115.8°	55°49.7'	-24.6'	117.2°	55°21.7'	-26.1'	118.5°	54°52.5'	-27.5'	119.7°	54°22.2'	-28.8'	120.9°	53°50.9'	-30.1'	122.1°	53°18.5'	-31.4'	123.2°	14
15	55°53.4'	-24.4'	117.5°	55°25.1'	-25.8'	118.8°	54°55.6'	-27.3'	120.0°	54°25.1'	-28.6'	121.2°	53°53.4'	-29.9'	122.4°	53°20.7'	-31.2'	123.6°	52°47.1'	-32.4'	124.7°	15
16	55°29.0'	-25.6'	119.1°	54°59.2'	-27.1'	120.4°	54°28.4'	-28.4'	121.6°	53°56.4'	-29.7'	122.7°	53°23.5'	-31.0'	123.9°	52°49.6'	-32.2'	125.0°	52°14.7'	-33.3'	126.0°	16
17	55°03.4'	-26.9'	120.7°	54°32.2'	-28.2'	121.9°	53°60.0'	-29.5'	123.1°	53°26.7'	-30.8'	124.2°	52°52.5'	-32.0'	125.3°	52°17.4'	-33.1'	126.4°	51°41.4'	-34.2'	127.4°	17
18	54°36.5'	-28.0'	122.2°	54°04.0'	-29.3'	123.4°	53°30.4'	-30.6'	124.5°	52°55.9'	-31.8'	125.6°	52°20.5'	-32.9'	126.7°	51°44.2'	-34.0'	127.7°	50°37.1'	-35.1'	128.7°	18
19	54°08.5'	-29.1'	123.8°	53°34.7'	-30.4'	124.9°	52°59.9'	-31.6'	126.0°	52°24.2'	-32.7'	127.0°	51°47.6'	-33.9'	128.1°	51°10.2'	-34.9'	129.0°	50°02.0'	-35.9'	130.0°	19
20	53°39.4'	-30.2'	125.2°	53°04.3'	-31.4'	126.3°	52°28.3'	-32.6'	127.4°	51°51.4'	-33.7'	128.4°	51°13.7'	-34.7'	129.4°	50°35.3'	-35.7'	130.3°	49°56.1'	-36.7'	1	

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

30° 330° LHA

Latitude CONTRARY to Declination

30° 330° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	60°00.0'	-00.9'	90.0°	59°59.1'	-03.0'	91.7°	59°56.4'	-05.1'	93.5°	59°51.9'	-07.1'	95.2°	59°45.5'	-09.2'	96.9°	59°37.5'	-11.2'	98.6°	59°27.6'	-13.2'	100.3°	0
1	59°59.0'	-02.7'	92.0°	59°56.1'	-04.8'	93.7°	59°51.3'	-06.9'	95.4°	59°44.7'	-08.9'	97.2°	59°36.4'	-10.9'	98.8°	59°26.3'	-12.9'	100.5°	59°14.5'	-14.8'	102.2°	1
2	59°56.3'	-04.5'	94.0°	59°51.3'	-06.6'	95.7°	59°44.4'	-08.6'	97.4°	59°35.8'	-10.6'	99.1°	59°25.4'	-12.6'	100.8°	59°13.4'	-14.6'	102.4°	58°59.6'	-16.5'	104.1°	2
3	59°51.9'	-06.3'	96.0°	59°44.7'	-08.4'	97.7°	59°35.8'	-10.4'	99.4°	59°25.2'	-12.3'	101.1°	59°12.8'	-14.3'	102.7°	58°58.8'	-16.2'	104.3°	58°43.1'	-18.1'	105.9°	3
4	59°45.5'	-08.1'	98.0°	59°36.4'	-10.1'	99.7°	59°25.4'	-12.1'	101.3°	59°12.8'	-14.0'	103.0°	58°58.5'	-15.9'	104.6°	58°42.6'	-17.8'	106.2°	58°25.1'	-19.6'	107.8°	4
5	59°37.5'	-09.8'	99.9°	59°26.3'	-11.8'	101.6°	59°13.4'	-13.8'	103.2°	58°58.8'	-15.7'	104.9°	58°42.6'	-17.5'	106.5°	58°24.8'	-19.3'	108.0°	58°05.5'	-21.1'	109.5°	5
6	59°27.6'	-11.5'	101.9°	59°14.5'	-13.5'	103.5°	58°59.6'	-15.4'	105.1°	58°43.1'	-17.3'	106.7°	58°25.1'	-19.1'	108.3°	58°05.5'	-20.8'	109.8°	57°44.4'	-22.5'	111.3°	6
7	59°16.1'	-13.2'	103.8°	59°01.0'	-15.1'	105.4°	58°44.2'	-17.0'	107.0°	58°25.9'	-18.8'	108.6°	58°06.0'	-20.6'	110.1°	57°44.7'	-22.3'	111.6°	57°21.9'	-25.3'	113.0°	7
8	59°02.9'	-14.9'	105.7°	58°45.8'	-16.7'	107.3°	58°27.2'	-18.5'	108.8°	58°07.1'	-20.3'	110.4°	57°45.5'	-22.0'	111.9°	57°22.4'	-23.7'	113.3°	56°58.0'	-25.2'	114.7°	8
9	58°48.0'	-16.5'	107.6°	58°29.1'	-18.3'	109.1°	58°08.7'	-20.1'	110.7°	57°46.8'	-21.8'	112.1°	57°23.5'	-23.4'	113.6°	56°58.8'	-25.0'	115.0°	56°32.7'	-26.5'	116.4°	9
10	58°31.5'	-18.1'	109.4°	58°10.8'	-19.8'	110.9°	57°48.6'	-21.5'	112.4°	57°25.0'	-23.2'	113.9°	57°00.0'	-24.8'	115.3°	56°33.8'	-26.3'	116.7°	56°06.2'	-27.8'	118.0°	10
11	58°13.4'	-19.6'	111.2°	57°51.0'	-21.3'	112.7°	57°27.1'	-22.9'	114.2°	57°01.8'	-24.5'	115.6°	56°35.3'	-26.1'	117.0°	56°07.5'	-27.5'	118.3°	55°38.4'	-29.0'	119.6°	11
12	57°53.9'	-21.1'	113.0°	57°29.7'	-22.7'	114.5°	57°04.2'	-24.3'	115.9°	56°37.3'	-25.8'	117.3°	56°09.2'	-27.3'	118.6°	55°39.9'	-28.7'	119.9°	55°09.5'	-30.1'	121.1°	12
13	57°32.8'	-22.5'	114.8°	57°07.0'	-24.1'	116.2°	56°39.9'	-25.6'	117.6°	56°11.5'	-27.1'	118.9°	55°41.9'	-28.5'	120.2°	55°11.2'	-29.9'	121.4°	54°39.4'	-31.2'	122.6°	13
14	57°10.3'	-23.9'	116.5°	56°42.9'	-25.4'	117.9°	56°14.2'	-26.9'	119.2°	55°44.4'	-28.3'	120.5°	55°13.4'	-29.7'	121.7°	54°41.3'	-31.0'	122.9°	54°08.2'	-32.2'	124.1°	14
15	56°46.4'	-25.2'	118.2°	56°17.5'	-26.7'	119.5°	55°47.3'	-28.1'	120.8°	55°16.1'	-29.5'	122.0°	54°43.7'	-30.8'	123.2°	54°10.3'	-32.0'	124.4°	53°35.9'	-33.2'	125.5°	15
16	56°21.2'	-26.5'	119.8°	55°50.8'	-27.9'	121.1°	55°19.2'	-29.3'	122.4°	54°46.6'	-30.6'	123.6°	54°12.9'	-31.8'	124.7°	53°38.3'	-33.0'	125.8°	53°02.7'	-34.2'	126.9°	16
17	55°54.8'	-27.7'	121.4°	55°22.9'	-29.1'	122.7°	54°50.0'	-30.4'	123.9°	54°16.0'	-31.6'	125.0°	53°41.1'	-32.8'	126.2°	53°05.2'	-34.0'	127.2°	52°28.5'	-35.1'	128.3°	17
18	55°27.0'	-28.9'	123.0°	54°53.8'	-30.2'	124.2°	54°19.6'	-31.5'	125.4°	53°44.4'	-32.7'	126.5°	53°08.2'	-33.8'	127.6°	52°31.2'	-34.9'	128.6°	51°53.4'	-36.0'	129.6°	18
19	54°58.1'	-30.0'	124.6°	54°23.6'	-31.3'	125.7°	53°48.1'	-32.5'	126.8°	53°11.7'	-33.6'	127.9°	52°34.4'	-34.7'	128.9°	51°56.3'	-35.8'	129.9°	51°17.4'	-36.8'	130.9°	19
20	54°28.1'	-31.1'	126.1°	53°52.3'	-32.3'	127.2°	53°15.6'	-33.5'	128.2°	52°38.1'	-34.6'	129.3°	51°59.7'	-35.6'	130.3°	51°20.5'	-36.6'	131.2°	50°40.6'	-37.6'	132.1°	20
21	53°57.0'	-32.2'	127.5°	53°20.0'	-33.3'	128.6°	52°42.2'	-34.4'	129.6°	52°03.5'	-35.4'	130.6°	51°24.1'	-36.5'	131.6°	50°43.9'	-37.4'	132.5°	50°03.1'	-38.3'	133.4°	21
22	53°24.8'	-33.1'	128.9°	52°46.7'	-34.2'	130.0°	52°07.8'	-35.3'	131.0°	51°28.1'	-36.3'	131.9°	50°47.6'	-37.3'	132.8°	50°06.5'	-38.2'	133.7°	49°24.7'	-39.0'	134.6°	22
23	52°51.7'	-34.1'	130.3°	52°12.5'	-35.1'	131.3°	51°32.5'	-36.1'	132.3°	50°51.8'	-37.1'	133.2°	50°10.4'	-38.0'	134.1°	49°28.3'	-38.9'	134.9°	48°45.7'	-39.7'	135.7°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

30° 330° LHA

Latitude CONTRARY to DECLINATION

30° 330° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

29° 331° LHA

Latitude CONTRARY to Declination

29° 331° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	61°00.0'	-00.9'	90.0°	60°59.1'	-03.1'	91.8°	60°56.2'	-05.2'	93.6°	60°51.5'	-07.4'	95.4°	60°45.0'	-09.5'	97.2°	60°36.5'	-11.6'	98.9°	60°26.3'	-13.6'	100.7°	0
1	60°59.0'	-02.8'	92.1°	60°56.0'	-05.0'	93.9°	60°51.0'	-07.1'	95.7°	60°44.1'	-09.2'	97.4°	60°35.5'	-11.3'	99.2°	60°25.0'	-13.3'	100.9°	60°12.7'	-15.3'	102.6°	1
2	60°56.2'	-04.7'	94.1°	60°51.0'	-06.8'	95.9°	60°43.9'	-08.9'	97.7°	60°34.9'	-11.0'	99.4°	60°24.2'	-13.0'	101.2°	60°11.7'	-15.0'	102.9°	59°57.4'	-17.0'	104.6°	2
3	60°51.5'	-06.6'	96.2°	60°44.1'	-08.7'	97.9°	60°34.9'	-10.7'	99.7°	60°23.9'	-12.8'	101.4°	60°11.2'	-14.8'	103.2°	59°56.6'	-16.7'	104.8°	59°40.4'	-18.6'	106.5°	3
4	60°45.0'	-08.4'	98.2°	60°35.5'	-10.5'	100.0°	60°24.2'	-12.5'	101.7°	60°11.2'	-14.5'	103.4°	59°56.4'	-16.5'	105.1°	59°39.9'	-18.4'	106.7°	59°21.8'	-20.2'	108.4°	4
5	60°36.5'	-10.2'	100.2°	60°25.0'	-12.3'	102.0°	60°11.7'	-14.3'	103.7°	59°56.6'	-16.2'	105.4°	59°39.9'	-18.1'	107.0°	59°21.6'	-19.9'	108.6°	59°01.6'	-21.7'	110.2°	5
6	60°26.3'	-12.0'	102.2°	60°12.7'	-14.0'	103.9°	59°57.4'	-16.0'	105.6°	59°40.4'	-17.8'	107.3°	59°21.8'	-19.7'	108.9°	59°01.6'	-21.5'	110.5°	58°39.9'	-23.2'	112.0°	6
7	60°14.3'	-13.8'	104.2°	59°58.7'	-15.7'	105.9°	59°41.5'	-17.6'	107.5°	59°22.6'	-19.4'	109.2°	59°02.1'	-21.2'	110.7°	58°40.1'	-23.0'	112.3°	58°16.7'	-24.6'	113.8°	7
8	60°00.6'	-15.5'	106.2°	59°43.0'	-17.4'	107.8°	59°23.9'	-19.2'	109.4°	59°03.1'	-21.0'	111.0°	58°40.9'	-22.7'	112.5°	58°17.2'	-24.4'	114.0°	57°52.0'	-26.0'	115.5°	8
9	59°45.1'	-17.1'	108.1°	59°25.7'	-19.0'	109.7°	59°04.7'	-20.8'	111.3°	58°42.1'	-22.5'	112.8°	58°18.2'	-24.2'	114.3°	57°52.8'	-25.8'	115.8°	57°26.0'	-27.3'	117.2°	9
10	59°28.0'	-18.7'	110.0°	59°06.7'	-20.5'	111.6°	58°43.9'	-22.3'	113.1°	58°19.7'	-23.9'	114.6°	57°54.0'	-25.5'	116.0°	57°27.0'	-27.1'	117.5°	56°58.7'	-28.6'	118.8°	10
11	59°09.3'	-20.3'	111.8°	58°46.2'	-22.0'	113.4°	58°21.6'	-23.7'	114.9°	57°55.7'	-25.3'	116.3°	57°28.4'	-26.9'	117.7°	56°59.9'	-28.4'	119.1°	56°30.1'	-29.8'	120.4°	11
12	58°48.9'	-21.8'	113.7°	58°24.1'	-23.5'	115.2°	57°57.9'	-25.1'	116.6°	57°30.4'	-26.7'	118.0°	57°01.6'	-28.1'	119.4°	56°31.5'	-29.6'	120.7°	56°00.3'	-30.9'	122.0°	12
13	58°27.1'	-23.3'	115.5°	58°00.6'	-24.9'	116.9°	57°32.8'	-26.5'	118.3°	57°03.7'	-27.9'	119.7°	56°33.4'	-29.4'	121.0°	56°01.9'	-30.7'	122.3°	55°29.4'	-32.1'	123.5°	13
14	58°03.8'	-24.7'	117.2°	57°35.7'	-26.2'	118.6°	57°06.4'	-27.7'	120.0°	56°35.8'	-29.2'	121.3°	56°04.1'	-30.5'	122.6°	55°31.2'	-31.8'	123.8°	54°57.3'	-33.1'	125.0°	14
15	57°39.1'	-26.1'	118.9°	57°09.5'	-27.5'	120.3°	56°38.6'	-29.0'	121.6°	56°06.6'	-30.3'	122.9°	55°33.5'	-31.7'	124.1°	54°59.4'	-32.9'	125.3°	54°24.2'	-34.1'	126.4°	15
16	57°13.1'	-27.4'	120.6°	56°42.0'	-28.8'	121.9°	56°09.7'	-30.2'	123.2°	55°36.3'	-31.5'	124.4°	55°01.9'	-32.7'	125.6°	54°26.5'	-33.9'	126.7°	53°50.1'	-35.1'	127.8°	16
17	56°45.7'	-28.6'	122.2°	56°13.2'	-30.0'	123.5°	55°39.5'	-31.3'	124.7°	55°04.8'	-32.5'	125.9°	54°29.1'	-33.7'	127.1°	53°52.5'	-34.9'	128.1°	53°15.0'	-36.0'	129.2°	17
18	56°17.1'	-29.8'	123.8°	55°43.2'	-31.1'	125.1°	55°08.2'	-32.4'	126.2°	54°32.3'	-33.6'	127.4°	53°55.4'	-34.7'	128.5°	53°17.7'	-35.8'	129.5°	52°39.1'	-36.8'	130.5°	18
19	55°47.3'	-31.0'	125.4°	55°12.1'	-32.2'	126.6°	54°35.9'	-33.4'	127.7°	53°58.7'	-34.5'	128.8°	53°20.7'	-35.6'	129.8°	52°41.9'	-36.7'	130.9°	52°02.2'	-37.7'	131.8°	19
20	55°16.4'	-32.0'	126.9°	54°39.9'	-33.2'	128.0°	54°02.5'	-34.4'	129.1°	53°24.2'	-35.5'	130.2°	52°45.1'	-36.5'	131.2°	52°05.2'	-37.5'	132.1°	51°24.6'	-38.5'	133.1°	

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

28° 332° LHA

Latitude CONTRARY to Declination

28° 332° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	62°00.0'	-01.0'	90.0°	61°59.0'	-03.2'	91.9°	61°56.1'	-05.4'	93.8°	61°51.2'	-07.6'	95.6°	61°44.3'	-09.8'	97.5°	61°35.6'	-11.9'	99.3°	61°24.9'	-14.0'	101.1°	0
1	61°59.0'	-02.9'	92.1°	61°55.8'	-05.2'	94.0°	61°50.6'	-07.4'	95.9°	61°43.5'	-09.5'	97.7°	61°34.5'	-11.7'	99.6°	61°23.6'	-13.8'	101.4°	61°10.9'	-15.8'	103.1°	1
2	61°56.0'	-04.9'	94.3°	61°50.6'	-07.1'	96.1°	61°43.3'	-09.3'	98.0°	61°34.0'	-11.4'	99.8°	61°22.9'	-13.5'	101.6°	61°09.9'	-15.5'	103.4°	60°55.1'	-17.5'	105.1°	2
3	61°51.2'	-06.8'	96.4°	61°43.5'	-09.0'	98.2°	61°34.0'	-11.1'	100.0°	61°22.6'	-13.2'	101.9°	61°09.4'	-15.3'	103.6°	60°54.3'	-17.3'	105.4°	60°37.6'	-19.2'	107.1°	3
4	61°44.3'	-08.8'	98.5°	61°34.5'	-10.9'	100.3°	61°22.9'	-13.0'	102.1°	61°09.4'	-15.0'	103.9°	60°54.1'	-17.0'	105.6°	60°37.1'	-19.0'	107.3°	60°18.3'	-20.9'	109.0°	4
5	61°35.6'	-10.6'	100.6°	61°23.6'	-12.7'	102.4°	61°09.9'	-14.8'	104.1°	60°54.3'	-16.8'	105.9°	60°37.1'	-18.7'	107.6°	60°18.1'	-20.6'	109.3°	59°57.5'	-22.4'	110.9°	5
6	61°24.9'	-12.5'	102.6°	61°10.9'	-14.5'	104.4°	60°55.1'	-16.5'	106.1°	60°37.6'	-18.5'	107.8°	60°18.3'	-20.4'	109.5°	59°57.5'	-22.2'	111.2°	59°35.1'	-23.9'	112.7°	6
7	61°12.4'	-14.3'	104.7°	60°56.4'	-16.3'	106.4°	60°38.6'	-18.2'	108.1°	60°19.1'	-20.1'	109.8°	59°58.0'	-22.0'	111.4°	59°35.3'	-23.7'	113.0°	59°11.1'	-25.4'	114.5°	7
8	60°58.1'	-16.1'	106.7°	60°40.1'	-18.0'	108.4°	60°20.3'	-19.9'	110.0°	59°59.0'	-21.7'	111.7°	59°36.0'	-23.5'	113.3°	59°11.6'	-25.2'	114.8°	58°45.7'	-26.8'	116.3°	8
9	60°42.1'	-17.8'	108.6°	60°22.0'	-19.7'	110.3°	60°00.4'	-21.5'	111.9°	59°37.2'	-23.3'	113.5°	59°12.5'	-25.0'	115.1°	58°46.4'	-26.6'	116.6°	58°18.9'	-28.1'	118.0°	9
10	60°24.3'	-19.5'	110.6°	60°02.4'	-21.3'	112.2°	59°38.9'	-23.0'	113.8°	59°14.0'	-24.7'	115.3°	58°47.6'	-26.4'	116.8°	58°19.8'	-27.9'	118.3°	57°50.7'	-29.4'	119.7°	10
11	60°04.8'	-21.1'	112.5°	59°41.1'	-22.8'	114.1°	59°15.9'	-24.5'	115.6°	58°49.2'	-26.2'	117.1°	58°21.2'	-27.7'	118.6°	57°51.9'	-29.2'	120.0°	57°21.3'	-30.7'	121.3°	11
12	59°43.8'	-22.6'	114.4°	59°18.3'	-24.3'	115.9°	58°51.4'	-25.9'	117.4°	58°23.1'	-27.5'	118.8°	57°53.5'	-29.0'	120.2°	57°22.7'	-30.4'	121.6°	56°50.7'	-31.8'	122.9°	12
13	59°21.1'	-24.1'	116.2°	58°54.0'	-25.7'	117.7°	58°25.4'	-27.3'	119.1°	57°55.6'	-28.8'	120.5°	57°24.5'	-30.3'	121.9°	56°52.2'	-31.6'	123.2°	56°18.8'	-32.9'	124.4°	13
14	58°57.0'	-25.6'	118.0°	58°28.2'	-27.1'	119.4°	57°58.1'	-28.6'	120.8°	57°26.8'	-30.1'	122.2°	56°54.2'	-31.4'	123.5°	56°20.6'	-32.7'	124.7°	55°45.9'	-34.0'	125.9°	14
15	58°31.5'	-26.9'	119.7°	58°01.1'	-28.4'	121.1°	57°29.5'	-29.9'	122.5°	56°56.7'	-31.2'	123.8°	56°22.8'	-32.6'	125.0°	55°47.9'	-33.8'	126.2°	55°11.9'	-35.0'	127.4°	15
16	58°04.5'	-28.3'	121.4°	57°32.6'	-29.7'	122.8°	56°59.6'	-31.1'	124.1°	56°25.5'	-32.4'	125.3°	55°50.3'	-33.6'	126.5°	55°14.1'	-34.8'	127.7°	54°36.9'	-36.0'	128.8°	16
17	57°36.3'	-29.5'	123.1°	57°02.9'	-30.9'	124.4°	56°28.5'	-32.2'	125.6°	55°53.1'	-33.5'	126.8°	55°16.6'	-34.7'	128.0°	54°39.2'	-35.8'	129.1°	54°01.0'	-36.9'	130.2°	17
18	57°06.7'	-30.7'	124.7°	56°32.0'	-32.1'	125.9°	55°56.3'	-33.3'	127.1°	55°19.6'	-34.5'	128.3°	54°42.0'	-35.6'	129.4°	54°03.4'	-36.7'	130.5°	53°24.1'	-37.7'	131.5°	18
19	56°36.0'	-31.9'	126.3°	55°60.0'	-33.1'	127.5°	55°23.0'	-34.3'	128.6°	54°45.1'	-35.5'	129.7°	54°06.3'	-36.6'	130.8°	53°26.7'	-37.6'	131.8°	52°46.3'	-38.6'	132.8°	19
20	56°04.1'	-33.0'	127.8°	55°26.8'	-34.2'	128.9°	54°48.7'	-35.3'	130.0°	54°09.6'	-36.4'	131.1°	53°29.8'	-37.4'	132.1°	52°49.2'	-38.4'	133.1°	52°07.8'	-39.3'	134.1°	20
21	55°31.1'	-34.0'	129.3°	54°52.6'	-35.2'	130.4°	54°13.4'	-36.3'	131.4°	53°33.2'	-37.3'	132.5°	52°52.4'	-38.3'	133.4°	52°10.7'	-39.2'	134.4°	51°28.4'	-40.1'	135.3°	21
22	54°57.0'	-35.0'	130.7°	54°17.5'	-36.1'	131.8°	53°37.1'	-37.1'	132.8°	52°56.0'	-38.1'	133.8°	52°14.1'	-39.1'	134.7°	51°31.6'	-39.9'	135.6°	50°48.4'	-40.8'	136.5°	22
23	54°22.0'	-36.0'	132.1°	53°41.3'	-37.0'	133.1°	52°59.9'	-38.0'	134.1°	52°17.8'	-38.9'	135.0°	51°35.0'	-39.8'	135.9°	50°51.6'	-40.6'	136.8°	50°07.6'	-41.4'	137.6°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

28° 332° LHA

Latitude CONTRARY to DECLINATION

28° 332° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

27° 333° LHA

Latitude CONTRARY to Declination

27° 333° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	63°00.0'	-01.0'	90.0°	62°59.0'	-03.3'	92.0°	62°55.9'	-05.6'	93.9°	62°50.8'	-07.9'	95.9°	62°43.6'	-10.1'	97.8°	62°34.5'	-12.3'	99.7°	62°23.4'	-14.5'	101.6°	0
1	62°58.9'	-03.1'	92.2°	62°55.6'	-05.4'	94.2°	62°50.3'	-07.6'	96.1°	62°42.9'	-09.9'	98.0°	62°33.5'	-12.1'	99.9°	62°22.2'	-14.2'	101.8°	62°08.9'	-16.3'	103.7°	1
2	62°55.8'	-05.1'	94.4°	62°50.3'	-07.4'	96.3°	62°42.6'	-09.6'	98.3°	62°33.0'	-11.8'	100.2°	62°21.5'	-14.0'	102.1°	62°08.0'	-16.1'	103.9°	61°52.6'	-18.1'	105.7°	2
3	62°50.8'	-07.1'	96.6°	62°42.9'	-09.4'	98.5°	62°33.0'	-11.6'	100.4°	62°21.2'	-13.7'	102.3°	62°07.5'	-15.8'	104.1°	61°51.9'	-17.9'	106.0°	61°34.5'	-19.9'	107.7°	3
4	62°43.6'	-09.1'	98.8°	62°33.5'	-11.3'	100.7°	62°21.5'	-13.5'	102.5°	62°07.5'	-15.6'	104.4°	61°51.7'	-17.6'	106.2°	61°34.0'	-19.6'	108.0°	61°14.6'	-21.5'	109.7°	4
5	62°34.5'	-11.1'	100.9°	62°22.2'	-13.2'	102.8°	62°08.0'	-15.3'	104.6°	61°51.9'	-17.4'	106.4°	61°34.0'	-19.4'	108.2°	60°53.1'	-21.3'	110.0°	60°53.1'	-23.2'	111.6°	5
6	62°23.4'	-13.0'	103.0°	62°08.9'	-15.1'	104.9°	61°52.6'	-17.2'	106.7°	61°34.5'	-19.2'	108.5°	61°14.6'	-21.1'	110.2°	60°53.1'	-22.9'	111.9°	60°29.9'	-24.7'	113.5°	6
7	62°10.4'	-14.9'	105.1°	61°53.8'	-16.9'	106.9°	61°35.5'	-18.9'	108.7°	61°15.3'	-20.8'	110.4°	60°53.6'	-22.7'	112.1°	60°30.2'	-24.5'	113.8°	60°05.2'	-26.2'	115.4°	7
8	61°55.5'	-16.7'	107.2°	61°36.9'	-18.7'	109.0°	61°16.5'	-20.6'	110.7°	60°54.5'	-22.5'	112.4°	60°30.9'	-24.3'	114.0°	60°05.7'	-26.0'	115.6°	59°39.0'	-27.6'	117.2°	8
9	61°38.8'	-18.5'	109.2°	61°18.2'	-20.4'	111.0°	60°55.9'	-22.3'	112.6°	60°32.0'	-24.1'	114.3°	60°06.6'	-25.8'	115.9°	59°39.7'	-27.4'	117.4°	59°11.4'	-29.0'	118.9°	9
10	61°20.3'	-20.2'	111.2°	60°57.8'	-22.1'	112.9°	60°33.6'	-23.9'	114.5°	60°08.0'	-25.6'	116.1°	59°40.8'	-27.2'	117.7°	59°12.2'	-28.8'	119.2°	58°42.4'	-30.3'	120.6°	10
11	61°00.1'	-21.9'	113.2°	60°35.7'	-23.7'	114.8°	60°09.8'	-25.4'	116.4°	59°42.4'	-27.0'	117.9°	59°13.6'	-28.6'	119.4°	58°43.4'	-30.1'	120.9°	58°12.0'	-31.5'	122.3°	11
12	60°38.3'	-23.5'	115.1°	60°12.1'	-25.2'	116.7°	59°44.4'	-26.8'	118.2°	59°15.4'	-28.4'	119.7°	58°45.0'	-29.9'	121.1°	58°13.3'	-31.4'	122.5°	57°40.5'	-32.7'	123.9°	12
13	60°14.8'	-25.0'	117.0°	59°46.9'	-26.6'	118.5°	59°17.6'	-28.2'	120.0°	58°47.0'	-29.7'	121.4°	58°15.1'	-31.2'	122.8°	57°42.0'	-32.5'	124.1°	57°07.8'	-33.8'	125.4°	13
14	59°49.8'	-26.5'	118.8°	59°20.2'	-28.0'	120.3°	58°49.4'	-29.5'	121.7°	58°17.2'	-31.0'	123.1°	57°43.9'	-32.4'	124.4°	57°09.5'	-33.7'	125.7°	56°33.9'	-34.9'	126.9°	14
15	59°23.4'	-27.9'	120.5°	58°52.2'	-29.4'	122.0°	58°19.8'	-30.8'	123.4°	57°46.2'	-32.2'	124.7°	57°11.5'	-33.5'	126.0°	56°35.8'	-34.7'	127.2°	55°59.0'	-35.9'	128.4°	15
16	58°55.5'	-29.2'	122.3°	58°22.8'	-30.6'	123.7°	57°49.0'	-32.0'	125.0°	57°14.1'	-33.3'	126.3°	56°38.1'	-34.6'	127.5°	56°01.0'	-35.8'	128.7°	55°23.1'	-36.9'	129.8°	16
17	58°26.3'	-30.5'	124.0°	57°52.2'	-31.9'	125.3°	57°17.0'	-33.2'	126.6°	56°40.7'	-34.4'	127.8°	56°03.5'	-35.6'	129.0°	55°25.3'	-36.7'	130.1°	54°46.2'	-37.8'	131.2°	17
18	57°55.8'	-31.7'	125.6°	57°20.3'	-33.0'	126.9°	56°43.8'	-34.3'	128.1°	56°06.3'	-35.4'	129.3°	55°27.9'	-36.6'	130.4°	54°48.6'	-37.6'	131.5°	53°08.4'	-38.7'	132.5°	18
19	57°24.1'	-32.9'	127.2°	56°47.3'	-34.1'	128.4°	56°09.6'	-35.3'	129.6°	55°30.9'	-36.4'	130.7°	54°51.3'	-37.5'	131.8°	54°10.9'	-38.5'	132.8°	52°49.8'	-39.5'	133.8°	19
20	56°51.2'	-34.0'	128.7°	56°13.2'	-35.2'	129.9°	55°34.3'	-36.3'	131.0°	54°54.4'	-37.3'	132.1°	54°13.8'	-38.4'	133.1°	53°32.4'	-39.3'	134.1°	52°50.3'	-		

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

26° 334° LHA

Latitude CONTRARY to Declination

26° 334° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	64°00.0'	-01.1'	90.0°	63°58.9'	-03.5'	92.0°	63°55.7'	-05.8'	94.1°	63°50.4'	-08.2'	96.1°	63°42.9'	-10.5'	98.1°	63°33.4'	-12.7'	100.1°	63°21.8'	-15.0'	102.1°	0
1	63°58.9'	-03.2'	92.3°	63°55.5'	-05.6'	94.3°	63°49.9'	-07.9'	96.4°	63°42.2'	-10.2'	98.4°	63°32.4'	-12.5'	100.4°	63°20.6'	-14.7'	102.3°	63°06.9'	-16.9'	104.2°	1
2	63°55.7'	-05.3'	94.6°	63°49.9'	-07.7'	96.6°	63°42.0'	-10.0'	98.6°	63°32.0'	-12.3'	100.6°	63°19.9'	-14.5'	102.5°	63°05.9'	-16.6'	104.5°	62°50.0'	-18.7'	106.4°	2
3	63°50.4'	-07.5'	96.8°	63°42.2'	-09.8'	98.8°	63°32.0'	-12.0'	100.8°	63°19.7'	-14.2'	102.8°	63°05.4'	-16.4'	104.7°	62°49.3'	-18.5'	106.6°	62°31.2'	-20.5'	108.4°	3
4	63°42.9'	-09.5'	99.1°	63°32.4'	-11.8'	101.0°	63°19.9'	-14.0'	103.0°	63°05.4'	-16.2'	104.9°	62°49.0'	-18.3'	106.8°	62°30.8'	-20.3'	108.7°	62°10.7'	-22.3'	110.5°	4
5	63°33.4'	-11.6'	101.3°	63°20.6'	-13.8'	103.2°	63°05.9'	-16.0'	105.2°	62°49.3'	-18.1'	107.0°	62°30.8'	-20.1'	108.9°	62°10.4'	-22.0'	110.7°	61°48.4'	-23.9'	112.4°	5
6	63°21.8'	-13.6'	103.5°	63°06.9'	-15.7'	105.4°	62°50.0'	-17.8'	107.3°	62°31.2'	-19.9'	109.1°	62°10.7'	-21.8'	110.9°	61°48.4'	-23.7'	112.7°	61°24.5'	-25.5'	114.4°	6
7	63°08.3'	-15.5'	105.6°	62°51.1'	-17.6'	107.5°	62°32.1'	-19.6'	109.4°	62°11.4'	-21.6'	111.2°	61°48.9'	-23.5'	112.9°	61°24.7'	-25.3'	114.6°	60°58.9'	-27.1'	116.2°	7
8	62°52.7'	-17.4'	107.8°	62°33.5'	-19.4'	109.6°	62°12.5'	-21.4'	111.4°	61°49.7'	-23.3'	113.1°	61°25.3'	-25.1'	114.8°	60°59.4'	-26.8'	116.5°	60°31.9'	-28.5'	118.1°	8
9	62°35.4'	-19.2'	109.9°	62°14.1'	-21.2'	111.7°	61°51.1'	-23.1'	113.4°	61°26.5'	-24.9'	115.1°	61°00.2'	-26.6'	116.7°	60°32.5'	-28.3'	118.3°	60°03.4'	-29.9'	119.8°	9
10	62°16.1'	-21.0'	111.9°	61°52.9'	-22.9'	113.7°	61°28.0'	-24.7'	115.3°	61°01.6'	-26.4'	117.0°	60°33.6'	-28.1'	118.6°	60°04.2'	-29.7'	120.1°	59°33.5'	-31.2'	121.6°	10
11	61°55.1'	-22.7'	113.9°	61°30.0'	-24.5'	115.6°	61°03.3'	-26.3'	117.2°	60°35.1'	-27.9'	118.8°	60°05.5'	-29.5'	120.3°	59°34.5'	-31.0'	121.8°	59°02.2'	-32.5'	123.2°	11
12	61°32.4'	-24.3'	115.9°	61°05.5'	-26.1'	117.5°	60°37.0'	-27.7'	119.1°	60°07.2'	-29.3'	120.6°	59°36.0'	-30.8'	122.1°	59°03.5'	-32.3'	123.5°	58°29.8'	-33.7'	124.9°	12
13	61°08.1'	-25.9'	117.8°	60°39.4'	-27.6'	119.4°	60°09.3'	-29.2'	120.9°	59°37.8'	-30.7'	122.3°	59°05.1'	-32.1'	123.8°	58°31.2'	-33.5'	125.1°	57°56.1'	-34.8'	126.4°	13
14	60°42.2'	-27.4'	119.6°	60°11.8'	-29.0'	121.2°	59°40.1'	-30.5'	122.6°	59°07.2'	-31.9'	124.0°	58°33.0'	-33.3'	125.4°	57°57.7'	-34.6'	126.7°	57°21.3'	-35.9'	128.0°	14
15	60°14.8'	-28.8'	121.4°	59°42.8'	-30.3'	122.9°	59°09.6'	-31.8'	124.3°	58°35.2'	-33.2'	125.7°	57°59.7'	-34.5'	127.0°	57°23.1'	-35.7'	128.2°	56°45.5'	-36.9'	129.4°	15
16	59°46.0'	-30.2'	123.2°	59°12.5'	-31.6'	124.6°	58°37.8'	-33.0'	126.0°	58°02.1'	-34.3'	127.3°	57°25.2'	-35.5'	128.5°	56°47.4'	-36.7'	129.7°	56°08.6'	-37.8'	130.9°	16
17	59°15.8'	-31.5'	124.9°	58°40.9'	-32.9'	126.2°	58°04.8'	-34.2'	127.5°	57°27.8'	-35.4'	128.8°	56°49.7'	-36.6'	130.0°	56°10.7'	-37.7'	131.1°	55°30.8'	-38.7'	132.2°	17
18	58°44.3'	-32.7'	126.5°	58°08.0'	-34.0'	127.8°	57°30.7'	-35.3'	129.1°	56°52.4'	-36.4'	130.3°	56°13.1'	-37.5'	131.4°	55°33.0'	-38.6'	132.5°	54°52.0'	-39.6'	133.6°	18
19	58°11.6'	-33.9'	128.1°	57°34.0'	-35.1'	129.4°	56°55.4'	-36.3'	130.6°	56°15.9'	-37.4'	131.7°	55°35.6'	-38.4'	132.8°	54°54.4'	-39.4'	133.9°	54°12.4'	-40.4'	134.9°	19
20	57°37.7'	-35.0'	129.7°	56°58.9'	-36.2'	130.9°	56°19.1'	-37.3'	132.0°	55°38.6'	-38.3'	133.1°	54°57.1'	-39.3'	134.2°	54°15.0'	-40.3'	135.2°	53°32.1'	-41.2'	136.1°	20
21	57°02.7'	-36.0'	131.2°	56°22.7'	-37.1'	132.3°	55°41.9'	-38.2'	133.4°	55°00.2'	-39.2'	134.5°	54°17.1'	-40.1'	135.5°	53°34.7'	-41.0'	136.4°	52°50.9'	-41.9'	137.3°	21
22	56°26.6'	-37.0'	132.7°	55°45.6'	-38.1'	133.8°	55°03.7'	-39.1'	134.8°	54°21.0'	-40.0'	135.8°	53°37.7'	-40.9'	136.7°	52°53.7'	-41.8'	137.6°	52°09.0'	-42.6'	138.5°	22
23	55°49.6'	-38.0'	134.1°	55°07.5'	-39.0'	135.1°	54°24.6'	-39.9'	136.1°	53°41.0'	-40.8'	137.1°	52°56.8'	-41.6'	138.0°	52°11.9'	-42.4'	138.8°	51°26.5'	-43.2'	139.7°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

26° 334° LHA

Latitude CONTRARY to DECLINATION

26° 334° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

25° 335° LHA

Latitude CONTRARY to Declination

25° 335° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	65°00.0'	-01.1'	90.0°	64°58.9'	-03.6'	92.1°	64°55.5'	-06.0'	94.3°	64°49.9'	-08.5'	96.4°	64°42.1'	-10.9'	98.5°	64°32.2'	-13.2'	100.6°	64°20.1'	-15.5'	102.6°	0
1	64°58.8'	-03.4'	92.4°	64°55.3'	-05.8'	94.5°	64°49.5'	-08.2'	96.6°	64°41.5'	-10.6'	98.7°	64°31.3'	-13.0'	100.8°	64°19.0'	-15.3'	102.8°	64°04.6'	-17.5'	104.9°	1
2	64°55.5'	-05.6'	94.7°	64°49.5'	-08.0'	96.8°	64°41.2'	-10.4'	98.9°	64°30.8'	-12.7'	101.0°	64°18.3'	-15.0'	103.1°	64°03.7'	-17.3'	105.1°	63°47.1'	-19.4'	107.0°	2
3	64°49.9'	-07.8'	97.1°	64°41.5'	-10.2'	99.2°	64°30.8'	-12.5'	101.2°	64°18.1'	-14.8'	103.3°	64°03.3'	-17.0'	105.3°	63°46.5'	-19.2'	107.2°	63°27.7'	-21.3'	109.2°	3
4	64°42.1'	-10.0'	99.4°	64°31.3'	-12.3'	101.5°	64°18.3'	-14.6'	103.5°	64°03.3'	-16.8'	105.5°	63°46.2'	-19.0'	107.5°	63°27.3'	-21.0'	109.4°	63°06.4'	-23.1'	111.2°	4
5	64°32.2'	-12.1'	101.7°	64°19.0'	-14.4'	103.7°	64°03.7'	-16.5'	105.7°	63°47.1'	-18.5'	107.7°	63°27.5'	-20.6'	109.6°	63°06.4'	-22.6'	111.7°	62°43.4'	-24.5'	113.5°	5
6	64°20.1'	-14.2'	104.0°	64°04.6'	-16.4'	106.0°	63°47.1'	-18.5'	107.9°	63°27.7'	-20.7'	109.8°	63°06.4'	-22.6'	111.7°	62°43.4'	-24.5'	113.5°	62°18.6'	-26.4'	115.2°	6
7	64°06.0'	-16.2'	106.2°	63°48.2'	-18.3'	108.2°	63°28.6'	-20.4'	110.1°	63°07.1'	-22.4'	111.9°	62°43.8'	-24.3'	113.7°	62°18.8'	-26.2'	115.5°	61°52.2'	-27.9'	117.2°	7
8	63°49.8'	-18.1'	108.4°	63°29.9'	-20.2'	110.3°	63°08.2'	-22.2'	112.2°	62°44.7'	-24.1'	114.0°	62°19.5'	-26.0'	115.7°	61°52.7'	-27.8'	117.4°	61°24.3'	-29.4'	119.0°	8
9	63°31.7'	-20.0'	110.5°	63°09.7'	-22.0'	112.4°	62°46.0'	-24.0'	114.2°	62°20.5'	-25.8'	115.9°	61°53.5'	-27.6'	117.6°	61°24.9'	-29.2'	119.3°	60°54.9'	-30.8'	120.8°	9
10	63°11.6'	-21.8'	112.6°	62°47.7'	-23.8'	114.4°	62°22.0'	-25.6'	116.2°	61°54.7'	-27.4'	117.9°	61°25.9'	-29.1'	119.5°	60°55.7'	-30.7'	121.1°	60°24.0'	-32.2'	122.6°	10
11	62°49.8'	-23.6'	114.7°	62°23.9'	-25.4'	116.4°	61°56.4'	-27.2'	118.1°	61°27.4'	-28.9'	119.8°	60°56.9'	-30.5'	121.3°	60°25.0'	-32.0'	122.8°	59°51.9'	-33.4'	124.3°	11
12	62°26.2'	-25.3'	116.7°	61°58.5'	-27.0'	118.4°	61°29.2'	-28.7'	120.0°	60°58.5'	-30.3'	121.6°	60°26.4'	-31.8'	123.1°	59°53.0'	-33.3'	124.5°	59°18.4'	-34.6'	125.9°	12
13	62°01.0'	-26.9'	118.6°	61°31.5'	-28.5'	120.3°	61°00.5'	-30.1'	121.8°	60°28.2'	-31.7'	123.3°	59°54.6'	-33.1'	124.8°	59°19.8'	-34.5'	126.2°	58°43.8'	-35.8'	127.5°	13
14	61°34.1'	-28.4'	120.5°	61°02.9'	-30.0'	122.1°	60°30.4'	-31.5'	123.6°	59°56.5'	-32.9'	125.0°	59°21.5'	-34.3'	126.4°	58°45.3'	-35.6'	127.8°	58°08.0'	-36.8'	129.0°	14
15	61°05.7'	-29.8'	122.4°	60°32.9'	-31.4'	123.9°	59°58.9'	-32.8'	125.3°	59°23.6'	-34.2'	126.7°	58°47.2'	-35.5'	128.0°	58°09.7'	-36.7'	129.3°	57°31.2'	-37.8'	130.5°	15
16	60°35.9'	-31.2'	124.2°	60°01.6'	-32.6'	125.6°	59°26.1'	-34.0'	127.0°	58°49.4'	-35.3'	128.3°	58°11.7'	-36.5'	129.6°	57°33.0'	-37.7'	130.8°	56°53.3'	-38.8'	132.0°	16
17	60°04.7'	-32.5'	125.9°	59°28.9'	-33.9'	127.3°	58°52.1'	-35.2'	128.6°	58°14.1'	-36.4'	129.9°	57°35.2'	-37.6'	131.1°	56°55.3'	-38.7'	132.2°	56°14.6'	-39.7'	133.3°	17
18	59°32.2'	-33.8'	127.6°	58°55.1'	-35.0'	128.9°	58°16.9'	-36.3'	130.1°	57°37.7'	-37.4'	131.3°	56°57.6'	-38.5'	132.5°	56°16.7'	-39.6'	133.6°	55°34.9'	-40.5'	134.7°	18
19	58°58.4'	-34.9'	129.2°	58°20.0'	-36.1'	130.4°	57°40.6'	-37.3'	131.6°	57°00.3'	-38.4'	132.8°	56°19.1'	-39.4'	133.9°	55°37.1'	-40.4'	135.0°	54°54.3'	-41.3'	136.0°	19
20	58°23.5'	-36.0'	130.7°	57°43.9'	-37.2'	131.9°	57°03.3'	-38.3'	133.1°	56°21.9'	-39.3'	134.2°	55°39.7'	-40.3'	135.2°	54°56.7'	-41.2'	136.3°	54°13.0'	-42.1'		

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

24° 336° LHA

Latitude CONTRARY to Declination

24° 336° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	66°00.0'	-01.2'	90.0°	65°58.8'	-03.7'	92.2°	65°55.3'	-06.3'	94.5°	65°49.5'	-08.8'	96.7°	65°41.3'	-11.3'	98.9°	65°30.9'	-13.7'	101.1°	65°18.3'	-16.1'	103.2°	0
1	65°58.8'	-03.5'	92.5°	65°55.1'	-06.1'	94.7°	65°49.0'	-08.6'	96.9°	65°40.6'	-11.1'	99.1°	65°30.0'	-13.5'	101.3°	65°17.2'	-15.8'	103.4°	65°02.2'	-18.1'	105.5°	1
2	65°55.3'	-05.8'	94.9°	65°49.0'	-08.4'	97.1°	65°40.4'	-10.8'	99.3°	65°29.6'	-13.3'	101.5°	65°16.5'	-15.6'	103.6°	65°01.3'	-17.9'	105.7°	64°44.1'	-20.1'	107.8°	2
3	65°49.5'	-08.1'	97.3°	65°40.6'	-10.6'	99.5°	65°29.6'	-13.0'	101.7°	65°16.3'	-15.4'	103.8°	65°00.9'	-17.7'	105.9°	64°43.4'	-19.9'	108.0°	64°23.9'	-22.0'	109.9°	3
4	65°41.3'	-10.4'	99.8°	65°30.0'	-12.8'	101.9°	65°16.5'	-15.2'	104.0°	65°00.9'	-17.5'	106.1°	64°43.2'	-19.7'	108.2°	64°23.5'	-21.8'	110.2°	64°01.9'	-23.9'	112.1°	4
5	65°30.9'	-12.6'	102.1°	65°17.2'	-15.0'	104.3°	65°01.3'	-17.3'	106.3°	64°43.4'	-19.5'	108.4°	64°23.5'	-21.6'	110.4°	64°01.7'	-23.7'	112.3°	63°38.0'	-25.6'	114.2°	5
6	65°18.3'	-14.8'	104.5°	65°02.2'	-17.1'	106.6°	64°44.1'	-19.3'	108.6°	64°23.9'	-21.4'	110.6°	64°01.9'	-23.5'	112.5°	63°38.0'	-25.4'	114.4°	63°12.4'	-27.3'	116.2°	6
7	65°03.5'	-16.9'	106.8°	64°45.1'	-19.1'	108.8°	64°24.8'	-21.2'	110.8°	64°02.5'	-23.3'	112.7°	63°38.4'	-25.2'	114.6°	63°12.6'	-27.1'	116.4°	62°45.1'	-28.9'	118.1°	7
8	64°46.6'	-18.9'	109.1°	64°26.0'	-21.0'	111.0°	64°03.6'	-23.1'	113.0°	63°39.2'	-25.0'	114.8°	63°13.2'	-26.9'	116.6°	62°45.5'	-28.7'	118.4°	62°16.2'	-30.4'	120.0°	8
9	64°27.7'	-20.9'	111.3°	64°05.0'	-22.9'	113.2°	63°40.5'	-24.9'	115.1°	63°14.2'	-26.7'	116.9°	62°46.3'	-28.5'	118.6°	62°16.8'	-30.2'	120.3°	61°45.8'	-31.8'	121.9°	9
10	64°06.9'	-22.7'	113.4°	63°42.1'	-24.7'	115.3°	63°15.6'	-26.6'	117.1°	62°47.5'	-28.3'	118.8°	62°17.8'	-30.0'	120.5°	61°46.6'	-31.6'	122.1°	61°14.0'	-33.2'	123.7°	10
11	63°44.1'	-24.5'	115.5°	63°17.4'	-26.4'	117.3°	62°49.0'	-28.2'	119.1°	62°19.1'	-29.9'	120.7°	61°47.7'	-31.5'	122.4°	61°14.9'	-33.0'	123.9°	60°40.8'	-34.4'	125.4°	11
12	63°19.6'	-26.2'	117.6°	62°51.0'	-28.0'	119.3°	62°20.9'	-29.7'	121.0°	61°49.3'	-31.3'	122.6°	61°16.3'	-32.8'	124.1°	60°41.9'	-34.3'	125.6°	60°06.4'	-35.6'	127.0°	12
13	62°53.4'	-27.9'	119.6°	62°23.0'	-29.6'	121.2°	61°51.2'	-31.2'	122.8°	61°17.9'	-32.7'	124.4°	60°43.4'	-34.1'	125.9°	60°07.7'	-35.5'	127.3°	59°30.8'	-36.8'	128.6°	13
14	62°25.5'	-29.4'	121.5°	61°53.5'	-31.0'	123.1°	61°20.0'	-32.5'	124.6°	60°45.3'	-34.0'	126.1°	60°09.3'	-35.3'	127.5°	59°32.2'	-36.6'	128.9°	58°54.0'	-37.8'	130.2°	14
15	61°56.1'	-30.9'	123.4°	61°22.4'	-32.4'	124.9°	60°47.5'	-33.8'	126.4°	60°11.3'	-35.2'	127.8°	59°34.0'	-36.5'	129.1°	58°55.6'	-37.7'	130.4°	58°16.2'	-38.8'	131.7°	15
16	61°25.2'	-32.3'	125.2°	60°50.0'	-33.7'	126.7°	60°13.6'	-35.1'	128.1°	59°36.1'	-36.3'	129.4°	58°57.5'	-37.6'	130.7°	58°17.9'	-38.7'	131.9°	57°37.3'	-39.8'	133.1°	16
17	60°53.0'	-33.6'	126.9°	60°16.3'	-34.9'	128.3°	59°38.6'	-36.2'	129.7°	58°59.7'	-37.4'	131.0°	58°19.9'	-38.6'	132.2°	57°39.2'	-39.6'	133.4°	56°57.5'	-40.7'	134.5°	17
18	60°19.4'	-34.8'	128.6°	59°41.4'	-36.1'	130.0°	59°02.4'	-37.3'	131.2°	58°22.3'	-38.5'	132.5°	57°41.4'	-39.5'	133.6°	56°59.5'	-40.5'	134.8°	56°16.9'	-41.5'	135.8°	18
19	59°44.6'	-36.0'	130.2°	59°05.3'	-37.2'	131.5°	58°25.0'	-38.3'	132.8°	57°43.9'	-39.4'	133.9°	57°01.8'	-40.4'	135.0°	56°19.0'	-41.4'	136.1°	55°35.4'	-42.3'	137.1°	19
20	59°08.6'	-37.1'	131.8°	58°28.1'	-38.2'	133.0°	57°46.7'	-39.3'	134.2°	57°04.5'	-40.3'	135.3°	56°21.4'	-41.3'	136.4°	55°37.6'	-42.2'	137.4°	54°53.1'	-43.0'	138.4°	20
21	58°31.5'	-38.1'	133.3°	57°49.9'	-39.2'	134.5°	57°07.4'	-40.2'	135.6°	56°24.1'	-41.2'	136.7°	55°40.1'	-42.1'	137.7°	54°55.4'	-42.9'	138.6°	54°10.1'	-43.7'	139.6°	21
22	57°53.4'	-39.1'	134.8°	57°10.7'	-40.1'	135.9°	56°27.2'	-41.1'	137.0°	55°43.0'	-42.0'	138.0°	54°58.1'	-42.8'	138.9°	54°12.5'	-43.6'	139.8°	53°26.4'	-44.4'	140.7°	22
23	57°14.3'	-40.1'	136.2°	56°30.6'	-41.0'	137.3°	55°46.1'	-41.9'	138.3°	55°01.0'	-42.7'	139.2°	54°15.3'	-43.5'	140.1°	53°28.9'	-44.3'	141.0°	52°42.0'	-45.0'	141.8°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

24° 336° LHA

Latitude CONTRARY to DECLINATION

24° 336° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

23° 337° LHA

Latitude CONTRARY to Declination

23° 337° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	67°00.0'	-01.2'	90.0°	66°58.8'	-03.9'	92.4°	66°55.1'	-06.6'	94.7°	66°48.9'	-09.2'	97.0°	66°40.4'	-11.7'	99.3°	66°29.5'	-14.2'	101.6°	66°16.3'	-16.7'	103.8°	0
1	66°58.7'	-03.7'	92.6°	66°54.9'	-06.3'	94.9°	66°48.5'	-09.0'	97.2°	66°39.8'	-11.5'	99.5°	66°28.7'	-14.0'	101.8°	66°15.3'	-16.5'	104.0°	65°59.6'	-18.8'	106.2°	1
2	66°55.0'	-06.1'	95.1°	66°48.5'	-08.7'	97.4°	66°39.6'	-11.3'	99.7°	66°28.2'	-13.8'	102.0°	66°14.6'	-16.3'	104.2°	65°58.8'	-18.6'	106.4°	65°40.8'	-20.9'	108.5°	2
3	66°48.9'	-08.5'	97.6°	66°39.8'	-11.1'	99.9°	66°28.2'	-13.6'	102.2°	66°14.4'	-16.1'	104.4°	65°58.4'	-18.4'	106.6°	65°40.2'	-20.7'	108.7°	65°19.9'	-22.9'	110.8°	3
4	66°40.4'	-10.9'	100.1°	66°28.7'	-13.4'	102.4°	66°14.6'	-15.8'	104.6°	65°58.4'	-18.2'	106.8°	65°40.0'	-20.5'	108.9°	65°19.5'	-22.7'	111.0°	64°57.0'	-24.8'	113.0°	4
5	66°29.5'	-13.2'	102.6°	66°15.3'	-15.7'	104.8°	65°58.8'	-18.0'	107.0°	65°40.8'	-20.3'	109.1°	65°19.9'	-22.3'	111.2°	64°56.8'	-24.6'	113.2°	64°32.3'	-26.6'	115.1°	5
6	66°16.3'	-15.5'	105.1°	65°59.6'	-17.8'	107.2°	65°40.8'	-20.1'	109.3°	65°19.9'	-22.3'	111.4°	64°57.0'	-24.4'	113.4°	64°32.3'	-26.4'	113.3°	64°05.7'	-28.3'	117.2°	6
7	66°00.8'	-17.6'	107.4°	65°41.8'	-19.9'	109.6°	65°20.7'	-22.1'	111.6°	64°57.6'	-24.2'	113.6°	64°32.6'	-26.2'	115.5°	64°05.9'	-28.1'	117.4°	63°37.5'	-29.9'	119.2°	7
8	65°43.2'	-19.7'	109.8°	65°21.9'	-21.9'	111.8°	64°58.6'	-24.0'	113.8°	64°33.4'	-26.0'	115.8°	64°06.5'	-27.9'	117.6°	63°37.8'	-29.7'	119.4°	63°07.6'	-31.4'	121.1°	8
9	65°23.5'	-21.7'	112.1°	64°60.0'	-23.8'	114.1°	64°34.6'	-25.8'	116.0°	64°07.4'	-27.7'	117.8°	63°38.6'	-29.5'	119.6°	63°08.1'	-31.2'	121.3°	62°36.2'	-32.8'	123.0°	9
10	65°01.7'	-23.7'	114.3°	64°36.1'	-25.7'	116.2°	64°08.8'	-27.6'	118.1°	63°39.7'	-29.4'	119.9°	63°09.1'	-31.1'	121.6°	62°36.9'	-32.7'	123.2°	62°03.3'	-34.2'	124.8°	10
11	64°38.1'	-25.5'	116.4°	64°10.5'	-27.4'	118.3°	63°41.2'	-29.2'	120.1°	63°10.3'	-30.9'	121.8°	62°38.0'	-32.5'	123.4°	62°04.2'	-34.0'	125.0°	61°29.1'	-35.5'	126.5°	11
12	64°12.6'	-27.3'	118.5°	63°43.1'	-29.1'	120.3°	63°12.0'	-30.8'	122.0°	62°39.4'	-32.4'	123.7°	62°05.5'	-33.9'	125.3°	61°30.2'	-35.3'	126.8°	60°53.7'	-36.7'	128.2°	12
13	63°45.3'	-28.9'	120.6°	63°14.0'	-30.6'	122.3°	62°41.2'	-32.2'	123.9°	62°07.1'	-33.7'	125.5°	61°31.6'	-35.2'	127.0°	60°54.9'	-36.5'	128.4°	60°17.0'	-37.8'	129.8°	13
14	63°16.4'	-30.5'	122.5°	62°43.4'	-32.1'	124.2°	62°09.0'	-33.6'	125.8°	61°33.3'	-35.0'	127.3°	60°56.4'	-36.4'	128.7°	60°18.3'	-37.7'	130.1°	59°39.2'	-38.9'	131.4°	14
15	62°45.9'	-32.0'	124.4°	62°11.3'	-33.5'	126.0°	61°35.4'	-34.9'	127.5°	60°58.3'	-36.3'	128.9°	60°20.0'	-37.5'	130.3°	59°40.7'	-38.7'	131.6°	59°00.3'	-39.9'	132.9°	15
16	62°14.0'	-33.4'	126.3°	61°37.8'	-34.8'	127.8°	61°00.5'	-36.1'	129.2°	60°22.0'	-37.4'	130.6°	59°42.5'	-38.6'	131.9°	59°01.9'	-39.7'	133.1°	58°20.5'	-40.8'	134.3°	16
17	61°40.6'	-34.7'	128.0°	61°03.0'	-36.0'	129.5°	60°24.3'	-37.3'	130.8°	59°44.6'	-38.5'	132.1°	59°03.9'	-39.6'	133.4°	58°22.2'	-40.7'	134.6°	57°39.7'	-41.7'	135.7°	17
18	61°05.9'	-35.9'	129.7°	60°27.0'	-37.2'	131.1°	59°47.0'	-38.4'	132.4°	59°06.1'	-39.5'	133.6°	58°24.2'	-40.6'	134.8°	57°41.5'	-41.5'	136.0°	56°58.0'	-42.5'	137.0°	18
19	60°30.0'	-37.1'	131.4°	59°49.8'	-38.3'	132.7°	59°08.7'	-39.4'	133.9°	58°26.6'	-40.4'	135.1°	57°43.7'	-41.4'	136.2°	57°02.2'	-42.4'	138.3°	56°60.0'	-43.2'	138.3°	19
20	59°52.9'	-38.2'	133.0°	59°11.5'	-39.3'	134.2°	58°29.3'	-40.3'	135.4°	57°46.1'	-41.3'	136.5°	57°02.2'	-42.3'	137.6°	56°17.6'	-43.1'	138.6°	55°32.			

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

22° 338° LHA

Latitude CONTRARY to Declination

22° 338° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	68°00.0'	-01.3'	90.0°	67°58.7'	-04.1'	92.5°	67°54.8'	-06.8'	94.9°	67°48.4'	-09.6'	97.4°	67°39.4'	-12.2'	99.8°	67°28.0'	-14.8'	102.2°	67°14.1'	-17.4'	104.5°	0
1	67°58.7'	-03.9'	92.7°	67°54.6'	-06.6'	95.1°	67°48.0'	-09.4'	97.6°	67°38.8'	-12.0'	100.0°	67°27.2'	-14.6'	102.4°	67°13.2'	-17.1'	104.7°	66°56.8'	-19.6'	107.0°	1
2	67°54.8'	-06.4'	95.3°	67°48.0'	-09.2'	97.8°	67°38.6'	-11.8'	100.2°	67°26.8'	-14.4'	102.6°	67°12.6'	-16.9'	104.9°	66°56.0'	-19.4'	107.1°	66°37.2'	-21.7'	109.4°	2
3	67°48.4'	-09.0'	98.0°	67°38.8'	-11.6'	100.4°	67°26.8'	-14.2'	102.7°	67°12.4'	-16.7'	105.1°	66°55.6'	-19.2'	107.3°	66°36.6'	-21.5'	109.5°	66°15.5'	-23.8'	111.7°	3
4	67°39.4'	-11.4'	100.6°	67°27.2'	-14.0'	102.9°	67°12.6'	-16.6'	105.3°	66°55.6'	-19.0'	107.5°	66°36.4'	-21.3'	109.7°	66°15.1'	-23.6'	111.9°	65°51.8'	-25.7'	114.0°	4
5	67°28.0'	-13.8'	103.1°	67°13.2'	-16.4'	105.5°	66°56.0'	-18.8'	107.7°	66°36.6'	-21.1'	109.9°	66°15.1'	-23.4'	112.1°	65°51.6'	-25.5'	114.2°	65°26.1'	-27.5'	116.2°	5
6	67°14.1'	-16.2'	105.7°	66°56.8'	-18.6'	107.9°	66°37.2'	-21.0'	110.1°	66°15.5'	-23.2'	112.3°	65°51.8'	-25.3'	114.3°	65°26.1'	-27.4'	116.3°	64°58.5'	-29.3'	118.3°	6
7	66°58.0'	-18.4'	108.1°	66°38.2'	-20.8'	110.4°	66°16.3'	-23.0'	112.5°	65°52.3'	-25.1'	114.6°	65°26.4'	-27.2'	116.5°	64°58.7'	-29.1'	118.5°	64°29.3'	-30.9'	120.3°	7
8	66°39.5'	-20.6'	110.6°	66°17.4'	-22.8'	112.7°	65°53.2'	-25.0'	114.8°	65°27.2'	-27.0'	116.8°	64°59.3'	-28.9'	118.7°	64°29.6'	-30.7'	120.5°	63°58.3'	-32.5'	122.3°	8
9	66°18.9'	-22.7'	112.9°	65°54.5'	-24.8'	115.0°	65°28.3'	-26.8'	117.0°	65°00.2'	-28.8'	118.9°	64°30.3'	-30.6'	120.7°	63°58.9'	-32.3'	122.5°	63°25.9'	-33.9'	124.2°	9
10	65°56.2'	-24.7'	115.2°	65°29.7'	-26.7'	117.2°	65°01.4'	-28.6'	119.1°	64°31.4'	-30.4'	120.9°	63°59.7'	-32.1'	122.7°	63°26.6'	-33.8'	124.4°	62°52.0'	-35.3'	126.0°	10
11	65°31.6'	-26.5'	117.4°	65°03.0'	-28.5'	119.3°	64°32.8'	-30.3'	121.2°	64°01.0'	-32.0'	122.9°	63°27.6'	-33.6'	124.6°	62°52.8'	-35.1'	126.2°	62°16.7'	-36.6'	127.8°	11
12	65°05.0'	-28.3'	119.6°	64°34.6'	-30.1'	121.4°	64°02.5'	-31.9'	123.2°	63°29.0'	-33.5'	124.8°	62°54.0'	-35.0'	126.5°	62°17.7'	-36.4'	128.0°	61°40.1'	-37.8'	129.5°	12
13	64°36.7'	-30.0'	121.6°	64°04.4'	-31.7'	123.4°	63°30.7'	-33.3'	125.1°	62°55.5'	-34.9'	126.7°	62°19.0'	-36.3'	128.2°	61°41.3'	-37.6'	129.7°	61°02.4'	-38.9'	131.1°	13
14	64°06.7'	-31.6'	123.6°	63°32.7'	-33.2'	125.3°	62°57.3'	-34.7'	126.9°	62°20.6'	-36.2'	128.5°	61°42.7'	-37.5'	129.9°	61°03.7'	-38.7'	131.3°	60°23.5'	-39.9'	132.6°	14
15	63°35.1'	-33.1'	125.6°	62°59.5'	-34.6'	127.2°	62°22.6'	-36.0'	128.7°	61°44.5'	-37.4'	130.2°	61°05.2'	-38.6'	131.5°	60°24.9'	-39.8'	132.9°	59°43.6'	-40.9'	134.1°	15
16	63°02.0'	-34.5'	127.4°	62°24.9'	-35.9'	129.0°	61°46.5'	-37.3'	130.4°	61°07.1'	-38.5'	131.8°	60°26.6'	-39.7'	133.1°	59°45.1'	-40.8'	134.4°	59°02.7'	-41.8'	135.6°	16
17	62°27.5'	-35.8'	129.2°	61°48.9'	-37.2'	130.7°	61°09.3'	-38.4'	132.1°	60°28.6'	-39.6'	133.4°	59°46.9'	-40.7'	134.6°	59°04.3'	-41.7'	135.8°	58°20.9'	-42.7'	136.9°	17
18	61°51.6'	-37.1'	130.9°	61°11.8'	-38.3'	132.3°	60°30.9'	-39.5'	133.6°	59°49.0'	-40.6'	134.9°	59°06.2'	-41.6'	136.1°	58°22.6'	-42.6'	137.2°	57°38.2'	-43.5'	138.3°	18
19	61°14.6'	-38.2'	132.6°	60°33.5'	-39.4'	133.9°	59°51.4'	-40.5'	135.1°	59°08.4'	-41.5'	136.3°	58°24.6'	-42.5'	137.5°	57°40.0'	-43.4'	138.5°	56°54.7'	-44.2'	139.5°	19
20	60°36.4'	-39.3'	134.2°	59°54.1'	-40.4'	135.4°	59°10.9'	-41.4'	136.6°	58°26.9'	-42.4'	137.7°	57°42.2'	-43.3'	138.8°	56°56.7'	-44.1'	139.8°	56°10.5'	-44.9'	140.8°	20
21	59°57.1'	-40.3'	135.7°	59°13.7'	-41.3'	136.9°	58°29.5'	-42.3'	138.0°	57°44.6'	-43.2'	139.1°	56°58.9'	-44.0'	140.1°	56°12.5'	-44.8'	141.0°	55°25.6'	-45.6'	142.0°	21
22	59°16.8'	-41.3'	137.2°	58°32.4'	-42.2'	138.3°	57°47.2'	-43.1'	139.3°	57°01.4'	-44.0'	140.3°	56°14.8'	-44.7'	141.3°	55°27.7'	-45.5'	142.2°	54°40.0'	-46.2'	143.1°	22
23	58°35.5'	-42.1'	138.6°	57°50.2'	-43.0'	139.6°	57°04.1'	-43.9'	140.6°	56°17.4'	-44.7'	141.6°	55°30.1'	-45.4'	142.5°	54°42.2'	-46.1'	143.4°	53°53.8'	-46.8'	144.2°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

22° 338° LHA

Latitude CONTRARY to DECLINATION

22° 338° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

21° 339° LHA

Latitude CONTRARY to Declination

21° 339° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	69°00.0'	-01.4'	90.0°	68°58.6'	-04.3'	92.6°	68°54.6'	-07.2'	95.2°	68°47.8'	-10.0'	97.8°	68°38.4'	-12.8'	100.3°	68°26.3'	-15.5'	102.8°	68°11.8'	-18.1'	105.2°	0
1	68°58.6'	-04.1'	92.8°	68°54.4'	-07.0'	95.4°	68°47.4'	-09.8'	97.9°	68°37.8'	-12.6'	100.5°	68°25.6'	-15.3'	103.0°	68°10.9'	-17.9'	105.4°	67°53.7'	-20.4'	107.8°	1
2	68°54.5'	-06.8'	95.6°	68°47.4'	-09.6'	98.1°	68°37.6'	-12.4'	100.7°	68°25.2'	-15.1'	103.2°	68°10.3'	-17.7'	105.6°	67°53.0'	-20.2'	108.0°	67°33.4'	-22.6'	110.3°	2
3	68°47.8'	-09.4'	98.3°	68°37.8'	-12.2'	100.9°	68°25.2'	-14.9'	103.3°	68°10.1'	-17.5'	105.8°	67°52.6'	-20.0'	108.1°	67°32.8'	-22.4'	110.4°	67°10.8'	-24.7'	112.7°	3
4	68°38.4'	-12.0'	101.0°	68°25.6'	-14.7'	103.5°	68°10.3'	-17.3'	106.0°	67°52.6'	-19.8'	108.3°	67°32.6'	-22.1'	110.6°	67°10.4'	-24.3'	113.0°	66°45.9'	-26.5'	115.2°	4
5	68°26.3'	-14.5'	103.7°	68°10.9'	-17.1'	106.1°	67°53.0'	-19.6'	108.5°	67°33.4'	-21.9'	111.0°	67°10.8'	-24.1'	113.2°	66°46.1'	-26.3'	115.4°	66°19.4'	-28.4'	117.4°	5
6	68°11.8'	-17.0'	106.3°	67°53.7'	-19.5'	108.7°	67°33.4'	-21.9'	111.0°	67°10.8'	-24.1'	113.2°	66°46.1'	-26.3'	115.4°	66°19.4'	-28.4'	117.4°	65°50.8'	-30.3'	119.4°	6
7	67°54.9'	-19.3'	108.9°	67°34.3'	-21.7'	111.2°	67°11.5'	-24.0'	113.4°	66°46.6'	-26.2'	115.6°	66°19.7'	-28.2'	117.6°	65°51.0'	-30.2'	119.6°	65°20.5'	-32.0'	121.5°	7
8	67°35.5'	-21.6'	111.4°	67°12.6'	-23.8'	113.6°	66°47.5'	-26.0'	115.8°	66°20.4'	-28.1'	117.8°	65°51.5'	-30.0'	119.8°	65°20.8'	-31.9'	121.7°	64°48.5'	-33.6'	123.5°	8
9	67°14.0'	-23.7'	113.8°	66°48.7'	-25.9'	116.0°	66°21.4'	-27.9'	118.0°	65°52.3'	-29.9'	120.0°	65°21.5'	-31.7'	121.9°	64°48.9'	-33.4'	123.7°	64°14.9'	-35.0'	125.4°	9
10	66°50.3'	-25.7'	116.2°	66°22.8'	-27.8'	118.3°	65°53.5'	-29.7'	120.2°	65°22.5'	-31.6'	122.1°	64°49.8'	-33.3'	123.9°	64°15.5'	-34.9'	125.6°	63°39.9'	-36.4'	127.3°	10
11	66°24.6'	-27.7'	118.5°	65°55.0'	-29.6'	120.4°	65°23.8'	-31.4'	122.3°	64°50.9'	-33.1'	124.1°	64°16.5'	-34.8'	125.9°	63°40.6'	-36.3'	127.5°	63°03.5'	-37.7'	129.1°	11
12	65°56.9'	-29.5'	120.7°	65°25.5'	-31.3'	122.6°	64°52.4'	-33.0'	124.4°	64°17.8'	-34.6'	126.1°	63°41.7'	-36.1'	127.7°	63°04.4'	-37.5'	129.3°	62°25.8'	-38.9'	130.8°	12
13	65°27.4'	-31.2'	122.8°	64°54.2'	-32.9'	124.6°	64°19.4'	-34.5'	126.3°	63°43.1'	-36.0'	127.9°	63°05.6'	-37.4'	129.5°	62°26.8'	-38.7'	131.0°	61°46.9'	-40.0'	132.4°	13
14	64°56.3'	-32.8'	124.8°	64°21.3'	-34.4'	126.5°	63°44.9'	-35.9'	128.2°	63°07.1'	-37.3'	129.7°	62°28.2'	-38.6'	131.2°	61°48.1'	-39.9'	132.6°	61°07.0'	-41.0'	134.0°	14
15	64°23.5'	-34.3'	126.8°	63°46.9'	-35.8'	128.4°	63°09.0'	-37.2'	130.0°	62°29.8'	-38.5'	131.4°	61°49.6'	-39.7'	132.8°	61°08.2'	-40.9'	134.2°	60°26.0'	-42.0'	135.5°	15
16	63°49.2'	-35.7'	128.7°	63°11.1'	-37.1'	130.2°	62°31.8'	-38.4'	131.7°	61°51.3'	-39.6'	133.1°	61°09.8'	-40.8'	134.4°	60°27.4'	-41.9'	135.7°	59°44.0'	-42.9'	136.9°	16
17	63°13.5'	-37.0'	130.5°	62°34.0'	-38.3'	131.9°	61°53.4'	-39.5'	133.3°	61°11.7'	-40.7'	134.7°	60°29.0'	-41.8'	135.9°	59°45.5'	-42.8'	137.1°	59°01.1'	-43.7'	138.3°	17
18	62°36.5'	-38.2'	132.2°	61°55.7'	-39.5'	133.6°	61°13.8'	-40.6'	134.9°	60°31.0'	-41.7'	136.2°	59°47.3'	-42.7'	137.4°	59°02.7'	-43.6'	138.5°	58°17.4'	-44.5'	139.6°	18
19	61°58.3'	-39.4'	133.9°	61°16.2'	-40.5'	135.2°	60°33.2'	-41.6'	136.4°	59°49.3'	-42.6'	137.6°	59°04.6'	-43.5'	138.7°	58°19.1'	-44.4'	139.8°	57°32.9'	-45.2'	140.8°	19
20	61°18.9'	-40.4'	135.4°	60°35.7'	-41.5'	136.7°	59°51.6'	-42.5'	137.9°	59°06.7'	-43.4'	139.0°	58°21.1'	-44.3'	140.1°	57°34.7'	-45.1'	141.1°	56°47.7'			

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

20° 340° LHA

Latitude CONTRARY to Declination

20° 340° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	70°00.0'	-01.4'	90.0°	69°58.6'	-04.5'	92.7°	69°54.3'	-07.5'	95.5°	69°47.1'	-10.5'	98.2°	69°37.2'	-13.4'	100.8°	69°24.6'	-16.2'	103.5°	69°09.3'	-18.9'	106.0°	0
1	69°58.5'	-04.3'	92.9°	69°54.1'	-07.3'	95.7°	69°46.8'	-10.3'	98.4°	69°36.7'	-13.2'	101.0°	69°23.8'	-16.0'	103.6°	69°08.4'	-18.7'	106.2°	68°50.4'	-21.3'	108.7°	1
2	69°54.2'	-07.1'	95.8°	69°46.8'	-10.1'	98.5°	69°36.5'	-13.0'	101.2°	69°23.5'	-15.6'	103.8°	69°07.9'	-18.5'	106.4°	68°49.7'	-21.1'	108.8°	68°29.2'	-23.6'	111.2°	2
3	69°47.1'	-09.9'	98.7°	69°36.7'	-12.8'	101.4°	69°23.5'	-15.6'	104.0°	69°07.7'	-18.3'	106.5°	68°49.4'	-20.9'	109.0°	68°28.6'	-23.4'	111.4°	68°05.6'	-25.7'	113.7°	3
4	69°37.2'	-12.6'	101.6°	69°23.8'	-15.4'	104.2°	69°07.9'	-18.1'	106.7°	68°49.4'	-20.7'	109.2°	68°28.5'	-23.2'	111.6°	68°05.3'	-25.5'	113.9°	67°39.9'	-27.8'	116.1°	4
5	69°24.6'	-15.3'	104.3°	69°08.4'	-18.0'	106.9°	68°49.7'	-20.6'	109.4°	68°28.6'	-23.0'	111.8°	68°05.3'	-25.4'	114.1°	67°39.7'	-27.6'	116.3°	67°12.1'	-29.7'	118.4°	5
6	69°09.3'	-17.8'	107.1°	68°50.4'	-20.4'	109.6°	68°29.2'	-22.9'	111.9°	68°05.6'	-25.2'	114.3°	67°39.9'	-27.4'	116.5°	67°12.1'	-29.5'	118.6°	66°42.5'	-31.5'	120.7°	6
7	68°51.5'	-20.2'	109.7°	68°30.0'	-22.7'	112.1°	68°06.3'	-25.1'	114.4°	67°40.4'	-27.3'	116.7°	67°12.5'	-29.4'	118.8°	66°42.6'	-31.3'	120.8°	66°11.0'	-33.2'	122.8°	7
8	68°31.2'	-22.6'	112.3°	68°07.3'	-24.9'	114.6°	67°41.2'	-27.1'	116.9°	67°13.1'	-29.2'	119.0°	66°43.1'	-31.2'	121.0°	66°11.3'	-33.0'	123.0°	65°37.8'	-34.7'	124.8°	8
9	68°08.6'	-24.8'	114.8°	67°42.4'	-27.0'	117.1°	67°14.1'	-29.1'	119.2°	66°43.9'	-31.0'	121.2°	66°11.9'	-32.9'	123.2°	65°38.3'	-34.6'	125.0°	65°03.1'	-36.2'	126.8°	9
10	67°43.9'	-26.9'	117.3°	67°15.4'	-28.9'	119.4°	66°45.0'	-30.9'	121.4°	66°12.9'	-32.7'	123.4°	65°39.0'	-34.5'	125.2°	65°03.7'	-36.1'	127.0°	64°26.9'	-37.6'	128.7°	10
11	67°17.0'	-28.8'	119.6°	66°46.4'	-30.8'	121.6°	66°14.1'	-32.6'	123.6°	65°40.1'	-34.3'	125.4°	65°04.6'	-35.9'	127.2°	64°27.6'	-37.4'	128.9°	63°49.3'	-38.8'	130.4°	11
12	66°48.2'	-30.7'	121.9°	66°15.7'	-32.5'	123.8°	65°41.5'	-34.2'	125.6°	65°05.8'	-35.8'	127.4°	64°28.6'	-37.3'	129.1°	63°50.2'	-38.7'	130.6°	63°10.5'	-40.0'	132.2°	12
13	66°17.5'	-32.4'	124.0°	65°43.2'	-34.1'	125.9°	65°07.3'	-35.7'	127.6°	64°30.0'	-37.2'	129.3°	63°51.3'	-38.6'	130.9°	63°11.5'	-39.9'	132.4°	62°30.5'	-41.1'	133.8°	13
14	65°45.1'	-34.0'	126.1°	65°09.1'	-35.6'	127.8°	64°31.6'	-37.1'	129.5°	63°52.8'	-38.5'	131.1°	63°12.7'	-39.8'	132.6°	62°31.6'	-41.0'	134.0°	61°49.4'	-42.1'	135.3°	14
15	65°11.1'	-35.5'	128.1°	64°33.5'	-37.0'	129.7°	63°54.5'	-38.4'	131.3°	63°14.3'	-39.7'	132.8°	62°33.0'	-40.9'	134.2°	61°50.6'	-42.0'	135.6°	61°07.3'	-43.1'	136.8°	15
16	64°35.6'	-36.9'	130.0°	63°56.5'	-38.3'	131.5°	63°16.1'	-39.6'	133.0°	62°34.6'	-40.8'	134.5°	61°52.1'	-41.9'	135.8°	61°08.6'	-43.0'	137.1°	60°24.2'	-43.9'	138.3°	16
17	63°58.7'	-38.2'	131.8°	63°18.2'	-39.5'	133.3°	62°36.5'	-40.7'	134.7°	61°53.8'	-41.8'	136.0°	61°10.2'	-42.9'	137.3°	60°25.6'	-43.8'	138.5°	59°40.3'	-44.7'	139.6°	17
18	63°20.5'	-39.4'	133.5°	62°38.7'	-40.6'	134.9°	61°55.8'	-41.7'	136.3°	61°12.0'	-42.8'	137.5°	60°27.3'	-43.8'	138.7°	59°41.8'	-44.7'	139.9°	58°55.6'	-45.5'	140.9°	18
19	62°41.1'	-40.6'	135.2°	61°58.0'	-41.7'	136.5°	61°14.0'	-42.7'	137.8°	60°29.2'	-43.7'	139.0°	59°43.5'	-44.6'	140.1°	58°57.2'	-45.4'	141.2°	58°10.1'	-46.2'	142.2°	19
20	62°00.5'	-41.6'	136.8°	61°16.4'	-42.6'	138.0°	60°31.3'	-43.6'	139.2°	59°45.5'	-44.5'	140.3°	58°59.0'	-45.3'	141.4°	58°11.7'	-46.1'	142.4°	57°23.9'	-46.9'	143.4°	20
21	61°18.9'	-42.6'	138.3°	60°33.7'	-43.5'	139.5°	59°47.7'	-44.4'	140.6°	59°01.0'	-45.3'	141.7°	58°13.6'	-46.0'	142.7°	57°25.6'	-46.8'	143.6°	56°37.0'	-47.5'	144.5°	21
22	60°36.4'	-43.5'	139.8°	59°50.2'	-44.4'	140.9°	59°03.3'	-45.2'	141.9°	58°15.8'	-46.0'	142.9°	57°27.6'	-46.7'	143.9°	56°38.8'	-47.4'	144.8°	55°49.6'	-48.0'	145.6°	22
23	59°52.9'	-44.3'	141.1°	59°05.8'	-45.1'	142.2°	58°18.1'	-45.9'	143.2°	57°29.8'	-46.6'	144.1°	56°40.9'	-47.3'	145.0°	55°51.5'	-48.0'	145.9°	55°01.6'	-48.6'	146.7°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

20° 340° LHA

Latitude CONTRARY to DECLINATION

20° 340° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

19° 341° LHA

Latitude CONTRARY to Declination

19° 341° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	71°00.0'	-01.5'	90.0°	70°58.5'	-04.7'	92.9°	70°53.9'	-07.9'	95.8°	70°46.4'	-11.0'	98.6°	70°35.9'	-14.0'	101.5°	70°22.6'	-16.9'	104.2°	70°06.5'	-19.7'	106.9°	0
1	70°58.4'	-04.5'	93.1°	70°53.8'	-07.7'	96.0°	70°46.0'	-10.8'	98.8°	70°35.4'	-13.8'	101.6°	70°21.9'	-16.7'	104.4°	70°05.7'	-19.5'	107.0°	69°46.8'	-22.2'	109.6°	1
2	70°53.9'	-07.5'	96.1°	70°46.0'	-10.6'	99.0°	70°35.2'	-13.7'	101.8°	70°21.6'	-16.6'	104.5°	70°05.2'	-19.4'	107.2°	69°46.1'	-22.0'	109.8°	69°24.6'	-24.6'	112.3°	2
3	70°46.4'	-10.5'	99.1°	70°35.4'	-13.5'	101.9°	70°21.6'	-16.4'	104.7°	70°05.0'	-19.2'	107.4°	69°45.8'	-21.9'	110.0°	69°24.1'	-24.4'	112.5°	68°60.0'	-26.8'	114.9°	3
4	70°35.9'	-13.3'	102.1°	70°21.9'	-16.2'	104.9°	70°05.2'	-19.0'	107.5°	69°45.8'	-21.7'	110.1°	69°23.9'	-24.2'	112.6°	68°59.7'	-26.6'	115.0°	68°33.2'	-28.9'	117.3°	4
5	70°22.6'	-16.1'	105.0°	70°05.7'	-18.9'	107.7°	69°46.1'	-21.6'	110.3°	69°24.1'	-24.1'	112.8°	68°59.7'	-26.5'	115.2°	68°33.0'	-28.7'	117.5°	67°04.3'	-30.9'	119.7°	5
6	70°06.5'	-18.7'	107.9°	69°46.8'	-21.4'	110.5°	69°24.6'	-23.9'	113.0°	68°60.0'	-26.1'	115.4°	68°33.2'	-28.6'	117.7°	68°04.3'	-30.7'	119.9°	67°33.4'	-32.7'	122.0°	6
7	69°47.8'	-21.3'	110.7°	69°25.4'	-23.8'	113.2°	69°00.6'	-26.2'	115.6°	68°33.7'	-28.4'	117.9°	68°04.6'	-30.6'	120.1°	67°33.6'	-32.5'	122.2°	67°00.8'	-34.4'	124.2°	7
8	69°26.5'	-23.7'	113.3°	69°01.6'	-26.1'	115.7°	68°34.4'	-28.3'	118.0°	68°05.2'	-30.4'	120.2°	67°34.0'	-32.4'	122.3°	67°01.0'	-34.2'	124.3°	66°26.4'	-36.0'	126.2°	8
9	69°02.9'	-25.9'	115.9°	68°35.5'	-28.2'	118.2°	68°06.1'	-30.3'	120.4°	67°34.8'	-32.3'	122.5°	67°01.6'	-34.1'	124.5°	66°26.8'	-35.8'	126.4°	65°50.4'	-37.4'	128.2°	9
10	68°36.9'	-28.1'	118.4°	68°07.3'	-30.2'	120.6°	67°35.8'	-32.1'	122.7°	67°02.5'	-34.0'	124.7°	66°27.5'	-35.7'	126.6°	65°51.0'	-37.3'	128.4°	65°13.0'	-38.8'	130.1°	10
11	68°08.9'	-30.1'	120.8°	67°37.2'	-32.0'	122.9°	67°03.7'	-33.9'	124.9°	66°28.5'	-35.6'	126.8°	65°51.8'	-37.2'	128.6°	65°13.7'	-38.7'	130.3°	64°34.3'	-40.0'	131.9°	11
12	67°38.8'	-31.9'	123.1°	67°05.1'	-33.8'	125.1°	66°29.8'	-35.5'	127.0°	65°52.9'	-37.1'	128.8°	65°14.7'	-38.5'	130.5°	64°35.0'	-39.9'	132.1°	63°54.2'	-41.2'	133.6°	12
13	67°06.9'	-33.7'	125.3°	66°31.4'	-35.4'	127.2°	65°54.3'	-37.0'	129.0°	65°15.9'	-38.4'	130.7°	64°36.1'	-39.8'	132.3°	63°55.1'	-41.1'	133.8°	63°13.1'	-42.2'	135.3°	13
14	66°33.2'	-35.3'	127.4°	65°56.0'	-36.9'	129.2°	65°17.4'	-38.3'	130.9°	64°37.4'	-39.7'	132.5°	63°56.3'	-41.0'	134.0°	63°14.1'	-42.2'	135.5°	62°30.8'	-43.2'	136.8°	14
15	65°57.9'	-36.8'	129.5°	65°19.1'	-38.3'	131.1°	64°39.0'	-39.6'	132.7°	63°57.7'	-40.9'	134.2°	63°15.3'	-42.1'	135.7°	62°31.9'	-43.1'	137.0°	61°47.6'	-44.2'	138.3°	15
16	65°21.2'	-38.2'	131.4°	64°40.9'	-39.5'	133.0°	63°59.4'	-40.8'	134.5°	63°16.8'	-42.0'	135.9°	62°33.3'	-43.1'	137.2°	61°48.8'	-44.1'	138.5°	61°03.4'	-45.0'	139.7°	16
17	64°43.0'	-39.5'	133.2°	64°01.3'	-40.7'	134.7°	63°18.6'	-41.9'	136.1°	62°34.9'	-43.0'	137.5°	61°50.2'	-44.0'	138.7°	61°04.7'	-44.9'	139.9°	60°18.4'	-45.8'	141.1°	17
18	64°03.5'	-40.7'	134.9°	63°20.6'	-41.8'	136.4°	62°36.7'	-42.9'	137.7°	61°51.9'	-43.9'	139.0°	61°06.2'	-44.8'	140.2°	60°19.8'	-45.7'	141.3°	59°32.6'	-46.5'	142.3°	18
19	63°22.9'	-41.8'	136.6°	62°38.8'	-42.8'	137.9°	61°53.8'	-43.8'	139.2°	61°08.0'	-44.8'	140.4°	60°21.4'	-45.6'	141.5°	59°34.1'	-46.4'	142.6°	58°46.1'	-47.2'	143.6°	19
20	62°41.1'	-42.8'	138.2°	61°55.9'	-43.8'	139.4°	61°10.0'	-44.7'	140.6°	60°23.2'	-45.6'	141.7°	59°35.7'	-46.4'	142.8°	58°47.6'	-47.1'	143.8°	57°58.9'			

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

18° 342° LHA

Latitude CONTRARY to Declination

18° 342° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	72°00.0'	-01.6'	90.0°	71°58.4'	-05.0'	93.1°	71°53.6'	-08.3'	96.1°	71°45.6'	-11.6'	99.2°	71°34.5'	-14.7'	102.1°	71°20.4'	-17.8'	105.0°	71°03.5'	-20.7'	107.8°	0
1	71°58.3'	-04.8'	93.2°	71°53.4'	-08.1'	96.3°	71°45.3'	-11.4'	99.3°	71°34.0'	-14.6'	102.3°	71°19.8'	-17.6'	105.2°	71°02.7'	-20.5'	108.0°	70°42.8'	-23.3'	110.7°	1
2	71°53.5'	-08.0'	96.4°	71°45.3'	-11.2'	99.5°	71°33.9'	-14.4'	102.4°	71°19.5'	-17.4'	105.3°	71°02.2'	-20.3'	108.1°	70°42.2'	-23.1'	110.8°	70°19.5'	-25.7'	113.5°	2
3	71°45.6'	-11.1'	99.6°	71°34.0'	-14.2'	102.6°	71°19.5'	-17.3'	105.5°	71°02.0'	-20.2'	108.3°	70°41.9'	-22.9'	111.0°	70°19.1'	-25.5'	113.6°	69°53.9'	-28.0'	116.1°	3
4	71°34.5'	-14.1'	102.8°	71°19.8'	-17.1'	105.6°	71°02.2'	-20.0'	108.4°	70°41.9'	-22.8'	111.2°	70°18.9'	-25.4'	113.8°	69°53.6'	-27.8'	116.3°	69°25.9'	-30.1'	118.7°	4
5	71°20.4'	-17.0'	105.8°	71°02.7'	-19.9'	108.6°	70°42.2'	-22.6'	111.3°	70°19.1'	-25.2'	113.9°	69°53.6'	-27.7'	116.4°	69°25.7'	-30.0'	118.8°	68°55.8'	-32.1'	121.1°	5
6	71°03.5'	-19.7'	108.8°	70°42.8'	-22.5'	111.5°	70°19.5'	-25.1'	114.1°	69°53.9'	-27.5'	116.6°	69°25.9'	-29.8'	119.0°	68°55.8'	-32.0'	121.3°	68°23.6'	-33.9'	123.4°	6
7	70°43.7'	-24.4'	111.7°	70°20.3'	-25.0'	114.3°	69°54.5'	-27.4'	116.8°	69°26.3'	-29.7'	119.2°	68°56.0'	-31.8'	121.4°	68°23.8'	-33.8'	123.6°	67°49.7'	-35.7'	125.6°	7
8	70°21.4'	-24.8'	114.5°	69°55.3'	-27.3'	117.0°	69°27.0'	-29.6'	119.3°	68°56.6'	-31.7'	121.6°	68°24.2'	-33.7'	123.8°	67°50.0'	-35.5'	125.8°	67°14.0'	-37.2'	127.7°	8
9	69°56.5'	-27.2'	117.1°	69°28.1'	-29.5'	119.5°	68°57.5'	-31.6'	121.8°	68°24.9'	-33.6'	123.9°	67°50.5'	-35.4'	126.0°	67°14.4'	-37.1'	127.9°	66°36.8'	-38.7'	129.7°	9
10	69°29.4'	-29.3'	119.7°	68°58.6'	-31.5'	122.0°	68°25.9'	-33.5'	124.1°	67°51.3'	-35.3'	126.2°	67°15.1'	-37.0'	128.1°	66°37.3'	-38.6'	129.9°	65°58.1'	-40.0'	131.6°	10
11	69°00.0'	-31.4'	122.2°	68°27.1'	-33.4'	124.3°	67°52.4'	-35.2'	126.4°	67°16.0'	-36.9'	128.3°	66°38.1'	-38.5'	130.1°	65°58.8'	-39.9'	131.8°	65°18.1'	-41.2'	133.4°	11
12	68°28.7'	-33.3'	124.5°	67°53.8'	-35.1'	126.6°	67°17.2'	-36.8'	128.5°	66°39.1'	-38.4'	130.3°	65°59.7'	-39.8'	132.0°	65°18.9'	-41.1'	133.6°	64°36.9'	-42.4'	135.2°	12
13	67°55.4'	-35.0'	126.8°	67°18.7'	-36.7'	128.7°	66°40.4'	-38.3'	130.5°	66°00.8'	-39.7'	132.2°	65°19.8'	-41.1'	133.8°	64°37.7'	-42.3'	135.4°	63°54.5'	-43.4'	136.8°	13
14	67°20.4'	-36.6'	128.9°	66°42.0'	-38.2'	130.7°	66°02.2'	-39.6'	132.4°	65°21.1'	-41.0'	134.0°	64°38.8'	-42.2'	135.6°	63°55.4'	-43.3'	137.0°	63°11.1'	-44.4'	138.3°	14
15	66°43.8'	-38.1'	130.9°	66°03.8'	-39.6'	132.6°	65°22.5'	-40.9'	134.2°	64°40.1'	-42.1'	135.8°	63°56.6'	-43.3'	137.2°	63°12.1'	-44.3'	138.5°	62°26.7'	-45.3'	139.8°	15
16	66°05.7'	-39.5'	132.9°	65°24.2'	-40.8'	134.5°	64°41.6'	-42.0'	136.0°	63°58.0'	-43.2'	137.4°	63°13.3'	-44.2'	138.8°	62°27.8'	-45.2'	140.0°	61°41.4'	-46.1'	141.2°	16
17	65°26.2'	-40.7'	134.7°	64°43.4'	-42.0'	136.2°	63°59.6'	-43.1'	137.6°	63°14.8'	-44.2'	139.0°	62°29.1'	-45.1'	140.2°	61°42.6'	-46.0'	141.4°	60°55.3'	-46.8'	142.6°	17
18	64°45.4'	-41.9'	136.4°	64°01.4'	-43.0'	137.9°	63°16.5'	-44.1'	139.2°	62°30.6'	-45.1'	140.5°	61°44.0'	-46.0'	141.6°	60°56.6'	-46.8'	142.8°	60°08.5'	-47.5'	143.8°	18
19	64°03.5'	-43.0'	138.1°	63°18.4'	-44.0'	139.4°	62°32.4'	-45.0'	140.7°	61°45.6'	-45.9'	141.9°	60°58.0'	-46.7'	143.0°	60°09.8'	-47.5'	144.0°	59°20.9'	-48.2'	145.0°	19
20	63°20.5'	-44.0'	139.7°	62°34.4'	-44.9'	140.9°	61°47.4'	-45.8'	142.1°	60°59.7'	-46.7'	143.2°	60°11.3'	-47.4'	144.3°	59°22.3'	-48.1'	145.3°	58°32.7'	-48.8'	146.2°	20
21	62°36.5'	-44.9'	141.2°	61°49.4'	-45.8'	142.3°	61°01.6'	-46.6'	143.4°	60°13.0'	-47.4'	144.5°	59°23.9'	-48.1'	145.5°	58°34.2'	-48.7'	146.4°	57°43.9'	-49.3'	147.3°	21
22	61°51.6'	-45.7'	142.6°	61°03.6'	-46.6'	143.7°	60°15.0'	-47.3'	144.7°	59°25.7'	-48.0'	145.7°	58°35.8'	-48.7'	146.6°	57°45.5'	-49.3'	147.5°	56°54.6'	-49.8'	148.3°	22
23	61°05.9'	-46.5'	143.9°	60°17.1'	-47.3'	145.0°	59°27.7'	-48.0'	146.0°	58°37.7'	-48.6'	146.9°	57°47.2'	-49.2'	147.8°	56°56.2'	-49.8'	148.6°	56°04.8'	-50.3'	149.4°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

18° 342° LHA

Latitude CONTRARY to DECLINATION

18° 342° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

17° 343° LHA

Latitude CONTRARY to Declination

17° 343° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	73°00.0'	-01.7'	90.0°	72°58.3'	-05.3'	93.3°	72°53.2'	-08.8'	96.5°	72°44.7'	-12.2'	99.7°	72°33.0'	-15.5'	102.9°	72°18.0'	-18.7'	105.9°	72°00.1'	-21.7'	108.9°	0
1	72°58.2'	-05.1'	93.4°	72°53.0'	-08.6'	96.7°	72°44.4'	-12.0'	99.9°	72°32.5'	-15.4'	103.0°	72°17.4'	-18.5'	106.1°	71°59.4'	-21.5'	109.0°	71°38.4'	-24.4'	111.9°	1
2	72°53.1'	-08.5'	96.8°	72°44.4'	-11.9'	100.0°	72°32.3'	-15.2'	103.1°	72°17.1'	-18.4'	106.2°	71°58.9'	-21.4'	109.2°	71°37.8'	-24.2'	112.0°	71°14.0'	-26.9'	114.7°	2
3	72°44.7'	-11.7'	100.2°	72°32.5'	-15.1'	103.3°	72°17.1'	-18.2'	106.3°	71°58.8'	-21.2'	109.3°	71°37.5'	-24.1'	112.1°	71°13.6'	-26.8'	114.9°	70°47.1'	-29.2'	117.5°	3
4	72°33.0'	-14.9'	103.5°	72°17.4'	-18.1'	106.5°	71°58.9'	-21.1'	109.5°	71°37.5'	-23.9'	112.3°	71°13.5'	-26.6'	115.0°	70°46.8'	-29.1'	117.6°	70°17.9'	-31.4'	120.1°	4
5	72°18.0'	-17.9'	106.7°	71°59.4'	-21.0'	109.6°	71°37.8'	-23.8'	112.5°	71°13.6'	-26.5'	115.2°	70°46.8'	-29.0'	117.8°	69°46.4'	-33.3'	120.2°	69°13.0'	-35.3'	122.6°	5
6	72°00.1'	-20.8'	109.8°	71°38.4'	-23.7'	112.6°	71°14.0'	-26.3'	115.3°	70°47.1'	-28.5'	117.9°	70°17.9'	-31.2'	120.4°	69°46.4'	-33.3'	122.7°	69°13.0'	-35.3'	125.0°	6
7	71°39.3'	-23.6'	112.8°	71°14.7'	-26.2'	115.5°	70°47.7'	-28.7'	118.1°	70°18.3'	-31.0'	120.6°	69°46.7'	-33.2'	122.9°	69°13.1'	-35.2'	125.1°	68°37.7'	-37.0'	127.2°	7
8	71°15.7'	-26.1'	115.7°	70°48.5'	-28.6'	118.3°	70°19.0'	-30.9'	120.7°	69°47.2'	-33.1'	123.1°	69°13.5'	-35.1'	125.3°	68°38.0'	-36.9'	127.4°	68°00.7'	-38.6'	129.4°	8
9	70°49.6'	-28.5'	118.4°	70°19.9'	-30.8'	120.9°	69°48.0'	-33.0'	123.2°	69°14.2'	-34.9'	125.5°	68°38.5'	-36.8'	127.5°	68°01.1'	-38.5'	129.5°	67°22.2'	-40.0'	131.4°	9
10	70°21.1'	-30.7'	121.1°	69°49.1'	-32.9'	123.4°	69°15.1'	-34.8'	125.6°	68°39.2'	-36.7'	127.7°	68°01.7'	-38.3'	129.7°	67°22.6'	-39.9'	131.5°	66°42.2'	-41.3'	133.3°	10
11	69°50.4'	-32.8'	123.6°	69°16.2'	-34.7'	125.8°	68°40.2'	-36.6'	127.9°	68°02.6'	-38.3'	129.9°	67°23.4'	-39.8'	131.7°	66°42.7'	-41.2'	133.5°	66°00.9'	-42.5'	135.1°	11
12	69°17.6'	-34.7'	126.0°	68°41.5'	-36.5'	128.1°	68°03.7'	-38.2'	130.1°	67°24.3'	-39.7'	131.9°	66°43.6'	-41.1'	133.6°	66°01.5'	-42.4'	135.3°	65°18.3'	-43.6'	136.8°	12
13	68°43.0'	-36.4'	128.3°	68°05.0'	-38.1'	130.3°	67°25.5'	-39.6'	132.1°	66°44.6'	-41.0'	133.8°	66°02.4'	-42.3'	135.5°	65°19.1'	-43.5'	137.0°	64°34.7'	-44.6'	138.4°	13
14	68°06.6'	-38.0'	130.5°	67°26.9'	-39.6'	132.3°	66°45.9'	-41.0'	134.0°	66°03.6'	-42.3'	135.6°	65°20.1'	-43.5'	137.2°	64°35.6'	-44.6'	138.6°	63°50.1'	-45.6'	140.0°	14
15	67°28.6'	-39.5'	132.5°	66°47.4'	-40.9'	134.2°	66°04.9'	-42.2'	135.8°	65°21.3'	-43.4'	137.4°	64°36.6'	-44.5'	138.8°	63°51.0'	-45.5'	140.1°	63°04.5'	-46.4'	141.4°	15
16	66°49.1'	-40.8'	134.4°	66°06.5'	-42.1'	136.1°	65°22.7'	-43.3'	137.6°	64°37.9'	-44.4'	139.0°	63°52.2'	-45.4'	140.3°	63°05.5'	-46.3'	141.6°	62°18.1'	-47.2'	142.8°	16
17	66°08.2'	-42.1'	136.3°	65°24.3'	-43.3'	137.8°	64°39.4'	-44.3'	139.2°	63°53.5'	-45.3'	140.6°	63°06.8'	-46.3'	141.8°	62°19.2'	-47.1'	143.0°	61°30.9'	-47.9'	144.1°	17
18	65°26.2'	-43.2'	138.0°	64°41.1'	-44.3'	139.4°	63°55.0'	-45.3'	140.8°	63°08.2'	-46.2'	142.0°	62°20.5'	-47.1'	143.2°	61°32.1'	-47.8'	144.3°	60°43.0'	-48.6'	145.4°	18
19	64°43.0'	-44.2'	139.7°	63°56.8'	-45.2'	141.0°	63°09.8'	-46.2'	142.2°	62°21.9'	-47.0'	143.4°	61°33.4'	-47.8'	144.5°	60°44.2'	-48.5'	145.6°	59°54.5'	-49.2'	146.5°	19
20	63°58.7'	-45.2'	141.2°	63°11.5'	-46.1'	142.5°	62°23.6'	-47.0'	143.6°	61°34.9'	-47.7'	144.7°	60°45.6'	-48.5'	145.8°	59°55.7'	-49.1'	146.7°	59°05.3			

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

16° 344° LHA

Latitude CONTRARY to Declination

16° 344° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	74°00.0'	-01.8'	90.0°	73°58.2'	-05.6'	93.5°	73°52.7'	-09.3'	96.9°	73°43.7'	-12.9'	100.3°	73°31.2'	-16.4'	103.7°	73°15.4'	-19.7'	106.9°	72°56.4'	-22.8'	110.0°	0
1	73°58.1'	-05.5'	93.6°	73°52.6'	-09.2'	97.1°	73°43.4'	-12.8'	100.5°	73°30.8'	-16.2'	103.8°	73°14.8'	-19.6'	107.0°	72°55.7'	-22.7'	110.2°	72°33.5'	-25.6'	113.1°	1
2	73°52.7'	-09.0'	97.2°	73°43.4'	-12.6'	100.6°	73°30.6'	-16.1'	103.9°	73°14.5'	-19.4'	107.2°	72°55.3'	-22.5'	110.3°	72°33.0'	-25.5'	113.3°	72°07.9'	-28.2'	116.1°	2
3	73°43.7'	-12.5'	100.8°	73°30.8'	-16.0'	104.1°	73°14.5'	-19.3'	107.3°	72°55.1'	-22.4'	110.4°	72°32.7'	-25.3'	113.4°	72°07.5'	-28.1'	116.3°	71°39.7'	-30.6'	119.0°	3
4	73°31.2'	-15.8'	104.2°	73°14.8'	-19.1'	107.5°	72°55.3'	-22.3'	110.6°	72°32.7'	-25.2'	113.6°	72°07.4'	-27.9'	116.4°	71°39.4'	-30.5'	119.1°	71°09.1'	-32.8'	121.7°	4
5	73°15.4'	-19.0'	107.6°	72°55.7'	-22.1'	110.7°	72°33.0'	-25.1'	113.7°	72°07.5'	-27.8'	116.5°	71°39.4'	-30.4'	119.2°	71°09.0'	-32.7'	121.8°	70°36.3'	-34.9'	124.2°	5
6	72°56.4'	-22.0'	110.9°	72°33.5'	-25.0'	113.9°	72°07.9'	-27.7'	116.7°	71°39.7'	-30.2'	119.4°	71°09.1'	-32.6'	121.9°	70°36.3'	-34.7'	124.4°	70°01.4'	-36.7'	126.6°	6
7	72°34.3'	-24.8'	114.0°	72°08.6'	-27.6'	116.9°	71°40.2'	-30.1'	119.5°	71°09.5'	-32.5'	122.1°	70°36.5'	-34.6'	124.5°	70°01.5'	-36.6'	126.8°	69°24.7'	-38.4'	128.9°	7
8	72°09.5'	-27.5'	117.0°	71°41.0'	-30.0'	119.7°	71°10.1'	-32.4'	122.3°	70°37.0'	-34.5'	124.7°	70°01.9'	-36.5'	126.9°	69°24.9'	-38.3'	129.1°	68°46.3'	-39.9'	131.1°	8
9	71°42.0'	-29.9'	119.9°	71°11.0'	-32.3'	122.4°	70°37.7'	-34.4'	124.8°	70°02.5'	-36.4'	127.1°	69°25.4'	-38.2'	129.2°	68°46.6'	-39.8'	131.2°	68°06.3'	-41.4'	133.1°	9
10	71°12.1'	-32.2'	122.6°	70°38.7'	-34.3'	125.0°	70°03.3'	-36.3'	127.3°	69°26.1'	-38.1'	129.4°	68°47.2'	-39.8'	131.4°	68°06.8'	-41.3'	133.3°	67°25.0'	-42.6'	135.0°	10
11	70°39.9'	-34.2'	125.2°	70°04.4'	-36.2'	127.5°	69°27.0'	-38.0'	129.6°	68°48.0'	-39.7'	131.6°	68°07.4'	-41.2'	133.4°	67°25.5'	-42.6'	135.2°	66°42.3'	-43.8'	136.8°	11
12	70°05.7'	-36.1'	127.6°	69°28.2'	-37.9'	129.8°	68°49.0'	-39.6'	131.7°	68°08.3'	-41.1'	133.6°	67°26.3'	-42.5'	135.4°	66°43.0'	-43.7'	137.0°	65°58.5'	-44.9'	138.5°	12
13	69°29.5'	-37.9'	129.9°	68°50.2'	-39.5'	131.9°	68°09.4'	-41.0'	133.8°	67°27.2'	-42.4'	135.5°	66°43.8'	-43.7'	137.2°	65°59.2'	-44.8'	138.7°	65°13.7'	-45.8'	140.1°	13
14	68°51.7'	-39.5'	132.1°	68°10.7'	-41.0'	134.0°	67°28.4'	-42.3'	135.7°	66°44.8'	-43.6'	137.4°	66°00.1'	-44.7'	138.9°	65°14.4'	-45.8'	140.3°	64°27.8'	-46.7'	141.7°	14
15	68°12.2'	-40.9'	134.2°	67°29.7'	-42.3'	135.9°	66°46.0'	-43.5'	137.6°	66°01.2'	-44.7'	139.1°	65°15.4'	-45.7'	140.5°	64°28.7'	-46.7'	141.8°	63°41.1'	-47.5'	143.1°	15
16	67°31.3'	-42.2'	136.1°	66°47.5'	-43.5'	137.8°	66°02.5'	-44.6'	139.3°	65°16.6'	-45.7'	140.7°	64°29.7'	-46.6'	142.0°	63°42.0'	-47.5'	143.3°	62°53.5'	-48.3'	144.4°	16
17	66°49.1'	-43.4'	138.0°	66°04.0'	-44.6'	139.5°	65°17.9'	-45.6'	140.9°	64°30.9'	-46.6'	142.2°	63°43.1'	-47.4'	143.5°	62°54.5'	-48.2'	144.6°	62°05.2'	-49.0'	145.7°	17
18	66°05.7'	-44.5'	139.7°	65°19.4'	-45.6'	141.1°	64°32.3'	-46.5'	142.4°	63°44.3'	-47.4'	143.7°	62°55.6'	-48.2'	144.8°	62°06.3'	-48.9'	145.9°	61°16.3'	-49.6'	146.9°	18
19	65°21.2'	-45.5'	141.3°	64°33.9'	-46.5'	142.6°	63°45.8'	-47.3'	143.9°	62°57.0'	-48.1'	145.0°	62°07.5'	-48.9'	146.1°	61°17.4'	-49.5'	147.1°	60°26.7'	-50.2'	148.1°	19
20	64°35.6'	-46.4'	142.9°	63°47.4'	-47.3'	144.1°	62°58.5'	-48.1'	145.2°	62°08.8'	-48.8'	146.3°	61°18.6'	-49.5'	147.3°	60°27.8'	-50.1'	148.3°	59°36.5'	-50.7'	149.2°	20
21	63°49.2'	-47.3'	144.3°	63°00.1'	-48.0'	145.5°	62°10.4'	-48.8'	146.5°	61°20.0'	-49.4'	147.6°	60°29.1'	-50.1'	148.5°	59°37.7'	-50.6'	149.4°	58°45.8'	-51.2'	150.2°	21
22	63°02.0'	-48.0'	145.7°	62°12.1'	-48.7'	146.8°	61°21.6'	-49.4'	147.8°	60°30.6'	-50.0'	148.7°	59°39.1'	-50.6'	149.6°	58°47.1'	-51.1'	150.5°	57°54.7'	-51.6'	151.2°	22
23	62°14.0'	-48.7'	147.0°	61°23.3'	-49.4'	148.0°	60°32.2'	-50.0'	148.9°	59°40.6'	-50.6'	149.8°	58°48.5'	-51.1'	150.7°	57°56.0'	-51.6'	151.5°	57°03.1'	-52.0'	152.2°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

16° 344° LHA

Latitude CONTRARY to DECLINATION

16° 344° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

15° 345° LHA

Latitude CONTRARY to Declination

15° 345° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	75°00.0'	-02.0'	90.0°	74°58.0'	-06.0'	93.7°	74°52.2'	-09.9'	97.4°	74°42.6'	-13.7'	101.1°	74°29.3'	-17.4'	104.6°	74°12.4'	-20.8'	108.0°	73°52.2'	-24.1'	111.3°	0
1	74°58.0'	-05.8'	93.9°	74°52.1'	-09.8'	97.6°	74°42.3'	-13.6'	101.2°	74°28.9'	-17.2'	104.7°	74°11.9'	-20.7'	108.1°	73°51.6'	-24.0'	111.4°	73°28.1'	-27.0'	114.6°	1
2	74°52.2'	-09.6'	97.7°	74°42.3'	-13.5'	101.3°	74°28.7'	-17.1'	104.8°	74°11.6'	-20.6'	108.3°	73°51.2'	-23.8'	111.6°	73°27.6'	-26.8'	114.7°	73°01.1'	-29.6'	117.7°	2
3	74°42.6'	-13.3'	101.4°	74°28.9'	-17.0'	105.0°	74°11.6'	-20.4'	108.4°	73°51.1'	-23.7'	111.7°	73°27.4'	-26.7'	114.8°	73°00.8'	-29.5'	117.8°	72°31.5'	-32.1'	120.6°	3
4	74°29.3'	-16.9'	105.1°	74°11.9'	-20.3'	108.5°	73°51.2'	-23.6'	111.8°	73°27.4'	-26.6'	114.9°	73°00.6'	-29.4'	117.9°	72°31.3'	-32.0'	120.7°	71°59.4'	-34.3'	123.4°	4
5	74°12.4'	-20.2'	108.7°	73°51.6'	-23.5'	112.0°	73°27.6'	-26.5'	115.1°	73°00.8'	-29.3'	118.1°	72°31.3'	-31.9'	120.9°	71°59.3'	-34.2'	123.5°	71°25.1'	-36.4'	126.0°	5
6	73°52.2'	-23.3'	112.1°	73°28.1'	-26.4'	115.2°	73°01.1'	-29.2'	118.2°	72°31.5'	-31.7'	121.0°	71°59.4'	-34.1'	123.6°	71°25.1'	-36.2'	126.1°	70°48.7'	-38.2'	128.4°	6
7	73°28.9'	-26.3'	115.4°	73°01.7'	-29.1'	118.3°	72°32.0'	-31.6'	121.1°	71°59.7'	-34.0'	123.8°	71°25.3'	-36.1'	126.3°	70°48.8'	-38.1'	128.6°	70°10.5'	-39.9'	130.8°	7
8	73°02.6'	-29.0'	118.5°	72°32.7'	-31.5'	121.3°	72°00.3'	-33.9'	123.9°	71°25.8'	-36.1'	126.4°	70°49.2'	-38.0'	128.7°	70°10.7'	-39.8'	130.9°	69°30.6'	-41.4'	132.9°	8
9	72°33.6'	-31.5'	121.5°	72°01.1'	-33.8'	124.1°	71°26.4'	-36.0'	126.6°	70°49.7'	-37.9'	128.9°	70°11.2'	-39.7'	131.0°	69°31.0'	-41.3'	133.1°	68°49.3'	-42.8'	135.0°	9
10	72°02.2'	-33.7'	124.3°	71°27.3'	-35.9'	126.7°	70°50.5'	-37.8'	129.0°	70°11.8'	-39.6'	131.2°	69°31.5'	-41.2'	133.2°	68°49.6'	-42.7'	135.1°	68°06.5'	-44.0'	136.9°	10
11	71°28.4'	-35.8'	126.9°	70°51.4'	-37.8'	129.2°	70°12.6'	-39.5'	131.4°	69°32.2'	-41.1'	133.4°	68°50.2'	-42.6'	135.3°	68°07.0'	-43.9'	137.0°	67°22.5'	-45.1'	138.7°	11
12	70°52.6'	-37.7'	129.4°	70°13.7'	-39.5'	131.5°	69°33.1'	-41.1'	133.6°	68°51.0'	-42.5'	135.4°	68°07.6'	-43.9'	137.2°	67°23.0'	-45.1'	138.8°	66°37.3'	-46.2'	140.4°	12
13	70°14.9'	-39.4'	131.7°	69°34.2'	-41.0'	133.7°	68°52.0'	-42.5'	135.6°	68°08.5'	-43.8'	137.4°	67°23.8'	-45.0'	139.0°	66°38.0'	-46.1'	140.5°	65°51.2'	-47.1'	141.9°	13
14	69°35.5'	-41.0'	133.9°	68°53.2'	-42.4'	135.8°	68°09.5'	-43.7'	137.5°	67°24.7'	-44.9'	139.2°	66°38.8'	-46.0'	140.7°	65°51.9'	-47.0'	142.1°	65°04.1'	-47.9'	143.4°	14
15	68°54.6'	-42.4'	136.0°	68°10.8'	-43.7'	137.7°	67°25.8'	-44.9'	139.4°	66°39.8'	-46.0'	140.9°	65°52.7'	-47.0'	142.3°	65°04.9'	-47.9'	143.6°	64°16.2'	-48.7'	144.8°	15
16	68°12.2'	-43.6'	137.9°	67°27.1'	-44.8'	139.5°	66°40.9'	-45.9'	141.1°	65°53.8'	-46.9'	142.5°	65°05.8'	-47.8'	143.8°	64°17.0'	-48.6'	145.0°	63°27.5'	-49.4'	146.2°	16
17	67°28.6'	-44.8'	139.8°	66°42.3'	-45.9'	141.3°	65°55.0'	-46.9'	142.7°	65°06.9'	-47.8'	144.0°	64°18.0'	-48.6'	145.2°	63°28.4'	-49.3'	146.3°	62°38.1'	-50.0'	147.4°	17
18	66°43.8'	-45.8'	141.5°	65°56.4'	-46.8'	142.9°	65°08.1'	-47.7'	144.2°	64°19.1'	-48.5'	145.4°	63°29.4'	-49.3'	146.5°	62°39.0'	-50.0'	147.6°	61°48.1'	-50.6'	148.6°	18
19	65°57.9'	-46.8'	143.1°	65°09.6'	-47.7'	144.4°	64°20.4'	-48.5'	145.6°	63°30.6'	-49.2'	146.7°	62°40.1'	-49.9'	147.8°	61°49.1'	-50.6'	148.8°	60°57.5'	-51.1'	149.7°	19
20	65°11.1'	-47.6'	144.6°	64°21.9'	-48.5'	145.8°	63°31.9'	-49.2'	146.9°	62°41.3'	-49.9'	148.0°	61°50.2'	-50.5'	149.0°	60°58.5'	-51.1'	149.9°	6			

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

14° 346° LHA

Latitude CONTRARY to Declination

14° 346° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	76°00.0'	-02.1'	90.0°	75°57.9'	-06.4'	94.0°	75°51.6'	-10.6'	98.0°	75°41.3'	-14.6'	101.9°	75°27.0'	-18.5'	105.6°	75°09.0'	-22.1'	109.3°	74°47.5'	-25.5'	112.7°	0
1	75°57.9'	-06.3'	94.1°	75°51.5'	-10.5'	98.1°	75°41.1'	-14.5'	102.0°	75°26.7'	-18.4'	105.7°	75°08.6'	-22.0'	109.4°	74°46.9'	-25.4'	112.9°	74°22.0'	-28.5'	116.2°	1
2	75°51.6'	-10.3'	98.2°	75°41.1'	-14.4'	102.1°	75°26.6'	-18.2'	105.9°	75°08.3'	-21.9'	109.5°	74°46.6'	-25.2'	113.0°	74°21.6'	-28.3'	116.3°	73°53.6'	-31.2'	119.4°	2
3	75°41.3'	-14.3'	102.2°	75°26.7'	-18.1'	106.0°	75°08.3'	-21.7'	109.6°	74°46.5'	-25.1'	113.1°	74°21.3'	-28.2'	116.4°	73°53.2'	-31.1'	119.5°	73°22.4'	-33.7'	122.4°	3
4	75°27.0'	-18.0'	106.1°	75°08.6'	-21.6'	109.7°	74°46.6'	-25.0'	113.2°	74°21.3'	-28.1'	116.5°	73°53.1'	-31.0'	119.6°	73°22.2'	-33.6'	122.5°	72°48.7'	-35.9'	125.2°	4
5	75°09.0'	-21.5'	109.9°	74°46.9'	-24.9'	113.3°	74°21.6'	-28.0'	116.6°	73°53.2'	-30.9'	119.7°	73°22.2'	-33.5'	122.6°	72°48.6'	-35.8'	125.4°	72°12.8'	-37.9'	127.9°	5
6	74°47.5'	-24.8'	113.5°	74°22.0'	-27.9'	116.8°	73°53.6'	-30.8'	119.9°	73°22.4'	-33.4'	122.8°	72°48.7'	-35.7'	125.5°	72°12.8'	-37.9'	128.0°	71°34.8'	-39.8'	130.4°	6
7	74°22.7'	-30.7'	116.9°	73°54.1'	-30.7'	120.0°	73°22.8'	-33.3'	122.9°	72°49.0'	-35.6'	125.6°	72°13.0'	-37.8'	128.2°	71°34.9'	-39.7'	130.5°	70°55.0'	-41.4'	132.7°	7
8	73°54.9'	-37.6'	120.2°	73°23.5'	-33.2'	123.1°	72°49.5'	-35.5'	125.8°	72°13.4'	-37.7'	128.3°	71°35.2'	-39.6'	130.7°	70°55.2'	-41.3'	132.9°	70°13.6'	-42.9'	134.9°	8
9	73°24.3'	-33.1'	123.2°	72°50.3'	-35.5'	125.9°	72°14.0'	-37.6'	128.5°	71°35.7'	-39.5'	130.8°	70°55.6'	-41.3'	133.0°	70°13.9'	-42.8'	135.1°	69°30.7'	-44.2'	136.9°	9
10	72°51.2'	-35.4'	126.1°	72°14.8'	-37.5'	128.6°	71°36.4'	-39.4'	131.0°	70°56.2'	-41.2'	133.2°	70°14.4'	-42.7'	135.2°	69°31.1'	-44.1'	137.1°	68°46.5'	-45.4'	138.8°	10
11	72°15.8'	-37.5'	128.8°	71°37.3'	-39.4'	131.1°	70°56.9'	-41.1'	133.3°	70°15.0'	-42.7'	135.3°	69°31.6'	-44.1'	137.2°	68°47.0'	-45.3'	139.0°	68°01.1'	-46.5'	140.6°	11
12	71°38.4'	-39.3'	131.3°	70°57.9'	-41.1'	133.5°	70°15.8'	-42.6'	135.5°	69°32.3'	-44.0'	137.4°	68°47.6'	-45.3'	139.1°	68°01.6'	-46.4'	140.8°	67°14.6'	-47.4'	142.3°	12
13	70°59.0'	-41.0'	133.7°	70°16.8'	-42.6'	135.7°	69°33.2'	-44.0'	137.6°	68°48.3'	-45.2'	139.3°	68°02.3'	-46.4'	140.9°	67°15.2'	-47.4'	142.4°	66°27.2'	-48.3'	143.8°	13
14	70°18.0'	-42.5'	135.9°	69°34.3'	-43.9'	137.7°	68°49.3'	-45.2'	139.5°	68°03.1'	-46.3'	141.1°	67°15.9'	-47.3'	142.6°	66°27.8'	-48.3'	144.0°	65°38.9'	-49.1'	145.3°	14
15	69°35.5'	-43.9'	137.9°	68°50.4'	-45.1'	139.7°	68°04.1'	-46.3'	141.3°	67°16.8'	-47.3'	142.8°	66°28.6'	-48.2'	144.2°	65°39.5'	-49.1'	145.5°	64°49.8'	-49.8'	146.7°	15
16	68°51.7'	-45.1'	139.8°	68°05.3'	-46.2'	141.5°	67°17.8'	-47.2'	142.9°	66°29.5'	-48.2'	144.3°	65°40.4'	-49.0'	145.6°	64°50.5'	-49.8'	146.8°	63°59.9'	-50.5'	148.0°	16
17	68°06.6'	-46.2'	141.6°	67°19.0'	-47.2'	143.1°	66°30.6'	-48.1'	144.5°	65°41.3'	-49.0'	145.8°	64°51.4'	-49.7'	147.0°	64°00.7'	-50.4'	148.1°	63°09.5'	-51.1'	149.2°	17
18	67°20.4'	-47.2'	143.3°	66°31.8'	-48.1'	144.7°	65°42.5'	-48.9'	146.0°	64°52.4'	-49.7'	147.2°	64°01.6'	-50.4'	148.3°	63°10.3'	-51.0'	149.3°	62°18.4'	-51.6'	150.3°	18
19	66°33.2'	-48.1'	144.9°	65°43.7'	-48.9'	146.2°	64°53.5'	-49.7'	147.4°	64°02.7'	-50.3'	148.5°	63°11.2'	-51.0'	149.5°	62°19.3'	-51.6'	150.5°	61°26.8'	-52.1'	151.4°	19
20	65°45.1'	-48.9'	146.4°	64°54.8'	-49.6'	147.6°	64°03.9'	-50.3'	148.7°	63°12.3'	-50.9'	149.7°	62°20.3'	-51.5'	150.7°	61°27.7'	-52.0'	151.6°	60°34.7'	-52.5'	152.4°	20
21	64°56.3'	-49.6'	147.8°	64°05.2'	-50.3'	148.9°	63°13.6'	-50.9'	149.9°	62°21.4'	-51.5'	150.9°	61°28.8'	-52.0'	151.8°	60°35.7'	-52.5'	152.6°	59°42.2'	-52.9'	153.4°	21
22	64°06.7'	-50.3'	149.1°	63°14.9'	-51.0'	150.1°	62°22.6'	-51.5'	151.1°	61°29.9'	-52.0'	152.0°	60°36.7'	-52.5'	152.8°	59°43.2'	-52.9'	153.6°	58°49.3'	-53.3'	154.3°	22
23	63°16.4'	-50.9'	150.3°	62°24.0'	-51.4'	151.3°	61°31.2'	-52.0'	152.2°	60°37.9'	-52.4'	153.0°	59°44.3'	-52.9'	153.8°	58°50.3'	-53.3'	154.5°	57°56.0'	-53.7'	155.2°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

14° 346° LHA

Latitude CONTRARY to DECLINATION

14° 346° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

13° 347° LHA

Latitude CONTRARY to Declination

13° 347° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	77°00.0'	-02.3'	90.0°	76°57.7'	-06.9'	94.3°	76°51.0'	-11.4'	98.6°	76°39.8'	-15.7'	102.8°	76°24.5'	-19.7'	106.8°	76°05.2'	-23.5'	110.7°	75°42.2'	-27.0'	114.4°	0
1	76°57.7'	-06.8'	94.4°	76°50.9'	-11.2'	98.7°	76°39.6'	-15.6'	102.9°	76°24.2'	-19.6'	106.9°	76°04.8'	-23.4'	110.8°	75°41.7'	-26.9'	114.5°	75°15.2'	-30.1'	117.9°	1
2	76°50.9'	-11.1'	98.8°	76°39.6'	-15.4'	103.0°	76°24.1'	-19.5'	107.0°	76°04.6'	-23.3'	110.9°	75°41.4'	-26.8'	114.6°	75°14.8'	-30.0'	118.0°	74°45.1'	-32.9'	121.3°	2
3	76°39.8'	-15.3'	103.1°	76°24.2'	-19.4'	107.1°	76°04.6'	-23.2'	111.0°	75°41.3'	-26.7'	114.7°	75°14.6'	-29.9'	118.1°	74°44.8'	-32.8'	121.4°	74°12.2'	-35.4'	124.4°	3
4	76°24.5'	-19.3'	107.3°	76°04.8'	-23.1'	111.1°	75°41.4'	-26.6'	114.8°	74°44.8'	-32.6'	121.6°	74°12.0'	-35.2'	124.6°	73°36.7'	-37.4'	127.5°	72°59.2'	-39.5'	130.0°	4
5	76°05.2'	-23.0'	111.3°	75°41.7'	-26.5'	114.9°	74°45.1'	-32.5'	121.7°	74°12.1'	-35.1'	124.7°	73°36.8'	-37.4'	127.5°	72°59.2'	-39.5'	130.1°	72°19.5'	-41.4'	132.5°	5
6	75°42.2'	-26.4'	115.0°	74°45.1'	-32.5'	121.7°	74°12.6'	-35.0'	124.9°	73°37.1'	-37.4'	127.7°	72°59.4'	-39.5'	130.3°	72°19.6'	-41.3'	132.7°	71°38.1'	-43.0'	134.9°	6
7	75°15.8'	-29.5'	118.6°	74°45.6'	-32.4'	121.9°	73°37.6'	-37.3'	127.8°	72°59.7'	-39.4'	130.4°	72°19.9'	-41.3'	132.8°	71°38.3'	-42.9'	135.0°	70°55.1'	-44.4'	137.0°	7
8	74°46.3'	-32.3'	122.0°	74°13.2'	-35.0'	125.0°	73°37.6'	-37.3'	127.8°	72°59.7'	-39.4'	130.4°	72°19.9'	-41.3'	132.8°	71°38.3'	-42.9'	135.0°	70°55.1'	-44.4'	137.0°	8
9	74°14.0'	-34.9'	125.1°	73°38.2'	-37.2'	127.9°	73°00.3'	-39.3'	130.5°	72°20.3'	-41.2'	132.9°	71°38.6'	-42.9'	135.1°	70°55.4'	-44.4'	137.2°	70°10.7'	-45.7'	139.1°	9
10	73°39.1'	-37.2'	128.1°	73°01.0'	-39.3'	130.7°	72°21.0'	-41.1'	133.1°	71°39.1'	-42.8'	135.3°	70°55.8'	-44.3'	137.3°	70°11.0'	-45.6'	139.2°	69°25.0'	-46.8'	140.9°	10
11	73°01.9'	-39.2'	130.8°	72°21.7'	-41.1'	133.2°	71°39.8'	-42.7'	135.4°	70°56.3'	-44.2'	137.5°	70°11.5'	-45.6'	139.3°	69°25.4'	-46.8'	141.1°	68°38.1'	-47.8'	142.7°	11
12	72°22.7'	-41.0'	133.4°	71°40.7'	-42.7'	135.6°	70°57.1'	-44.2'	137.6°	70°12.1'	-45.5'	139.5°	69°25.9'	-46.7'	141.2°	68°38.6'	-47.8'	142.8°	67°50.3'	-48.7'	144.3°	12
13	71°41.7'	-42.7'	135.7°	70°58.0'	-44.1'	137.8°	70°12.9'	-45.5'	139.6°	69°26.6'	-46.7'	141.4°	68°39.2'	-47.7'	143.0°	67°50.8'	-48.7'	144.5°	67°01.6'	-49.6'	145.8°	13
14	70°59.0'	-44.1'	137.9°	70°13.8'	-45.4'	139.8°	69°27.4'	-46.6'	141.5°	68°39.9'	-47.7'	143.1°	67°51.4'	-48.6'	144.6°	67°02.1'	-49.5'	146.0°	66°12.0'	-50.3'	147.3°	14
15	70°14.9'	-45.4'	140.0°	69°28.4'	-46.6'	141.7°	68°40.8'	-47.6'	143.3°	67°52.2'	-48.6'	144.8°	67°02.8'	-49.5'	146.1°	66°12.6'	-50.2'	147.4°	65°21.7'	-50.9'	148.6°	15
16	69°29.5'	-46.6'	141.9°	68°41.8'	-47.6'	143.5°	67°53.1'	-48.6'	144.9°	67°03.6'	-49.4'	146.3°	66°13.3'	-50.2'	147.6°	65°22.4'	-50.9'	148.7°	64°30.8'	-51.5'	149.8°	16
17	68°43.0'	-47.6'	143.7°	67°54.2'	-48.5'	145.1°	67°04.6'	-49.4'	146.5°	66°14.2'	-50.2'	147.7°	65°23.1'	-50.9'	148.9°	64°31.5'	-51.5'	150.0°	63°39.2'	-52.1'	151.0°	17
18	67°55.4'	-48.5'	145.3°	67°05.7'	-49.4'	146.7°	66°15.2'	-50.1'	147.9°	65°24.0'	-50.8'	149.1°	64°32.3'	-51.5'	150.2°	63°40.0'	-52.0'	151.2°	62°47.2'	-52.6'	152.1°	18
19	67°06.9'	-49.3'	146.8°	66°16.3'	-50.1'	148.1°	65°25.0'	-50.8'	149.3°	64°33.2'	-51.4'	150.3°	63°40.8'	-52.0'	151.3°	62°47.9'	-52.5'	152.3°	61°54.6'	-53.0'	153.1°	19
20	66°17.5'	-50.1'	148.3°	65°26.2'	-50.8'	149.4°	64°34.2'	-51.4'	150.5°	63°41.7'	-52.0'	151.5°	62°48.8'	-52.5'	152.4°	61°55.4'	-53.0'	153.3°	6			

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

12° 348° LHA

Latitude CONTRARY to Declination

12° 348° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	78°00.0'	-02.5'	90.0°	77°57.5'	-07.4'	94.7°	77°50.2'	-12.3'	99.3°	77°38.2'	-16.9'	103.8°	77°21.6'	-21.2'	108.2°	77°00.8'	-25.1'	112.3°	76°36.2'	-28.8'	116.2°	0
1	77°57.5'	-07.3'	94.8°	77°50.1'	-12.2'	99.4°	77°37.9'	-16.8'	103.9°	77°21.3'	-21.1'	108.3°	77°00.4'	-25.0'	112.4°	76°35.7'	-28.6'	116.3°	76°07.4'	-31.9'	119.9°	1
2	77°50.2'	-12.1'	99.5°	77°37.9'	-16.7'	104.0°	77°21.2'	-21.0'	108.4°	77°00.2'	-24.9'	112.5°	76°35.4'	-28.5'	116.4°	76°07.1'	-31.8'	120.0°	75°35.5'	-34.7'	123.4°	2
3	77°38.2'	-16.6'	104.1°	77°21.3'	-20.9'	108.5°	77°00.2'	-24.8'	112.6°	76°35.3'	-28.4'	116.5°	76°06.9'	-31.7'	120.1°	75°35.2'	-34.6'	123.5°	75°00.8'	-37.2'	126.6°	3
4	77°21.6'	-20.8'	108.6°	77°00.4'	-24.7'	112.7°	76°35.4'	-28.4'	116.6°	76°06.9'	-31.6'	120.2°	75°35.2'	-34.5'	123.6°	75°00.6'	-37.1'	126.7°	74°23.6'	-39.5'	129.6°	4
5	77°00.8'	-24.6'	112.8°	76°35.7'	-28.3'	116.7°	76°07.1'	-31.5'	120.3°	75°35.2'	-34.5'	123.7°	75°00.6'	-37.1'	126.8°	74°23.5'	-39.4'	129.7°	73°44.1'	-41.4'	132.3°	5
6	76°36.2'	-28.2'	116.8°	76°07.4'	-31.5'	120.4°	75°35.5'	-34.4'	123.8°	75°00.8'	-37.0'	126.9°	74°23.6'	-39.3'	129.8°	73°44.1'	-41.3'	132.4°	73°02.7'	-43.1'	134.8°	6
7	76°08.0'	-31.4'	120.6°	75°36.0'	-34.3'	123.9°	75°01.1'	-36.9'	127.0°	74°23.8'	-39.2'	129.9°	73°44.3'	-41.3'	132.5°	73°02.8'	-43.1'	135.0°	72°19.6'	-44.7'	137.2°	7
8	75°36.6'	-34.2'	124.1°	75°01.7'	-36.8'	127.2°	74°24.2'	-39.2'	130.0°	73°44.6'	-41.2'	132.7°	73°03.0'	-43.0'	135.1°	72°19.7'	-44.6'	137.3°	71°34.9'	-46.0'	139.3°	8
9	75°02.4'	-36.8'	127.3°	74°24.8'	-39.1'	130.2°	73°45.1'	-41.1'	132.8°	73°03.4'	-42.9'	135.2°	72°20.0'	-44.5'	137.4°	71°35.1'	-46.0'	139.5°	70°48.9'	-47.2'	141.3°	9
10	74°25.6'	-39.0'	130.3°	73°45.7'	-41.1'	132.9°	73°04.0'	-42.9'	135.3°	72°20.5'	-44.5'	137.5°	71°35.5'	-45.9'	139.6°	70°49.2'	-47.2'	141.4°	70°01.7'	-48.3'	143.2°	10
11	73°46.6'	-41.0'	133.1°	73°04.7'	-42.8'	135.5°	72°21.1'	-44.4'	137.7°	71°36.0'	-45.8'	139.7°	70°49.6'	-47.1'	141.6°	70°02.0'	-48.2'	143.3°	69°13.4'	-49.2'	144.9°	11
12	73°05.5'	-42.8'	135.6°	72°21.8'	-44.4'	137.8°	71°36.6'	-45.8'	139.9°	70°50.1'	-47.1'	141.7°	70°02.5'	-48.2'	143.4°	69°13.8'	-49.2'	145.0°	68°24.2'	-50.0'	146.5°	12
13	72°22.7'	-44.4'	138.0°	71°37.4'	-45.8'	140.0°	70°50.8'	-47.0'	141.9°	70°03.1'	-48.1'	143.6°	69°14.3'	-49.1'	145.1°	68°24.6'	-50.0'	146.6°	67°34.2'	-50.8'	147.9°	13
14	71°38.4'	-45.7'	140.2°	70°51.7'	-47.0'	142.0°	70°03.8'	-48.1'	143.7°	69°15.0'	-49.1'	145.3°	68°25.2'	-50.0'	146.7°	67°34.6'	-50.7'	148.1°	66°43.4'	-51.5'	149.3°	14
15	70°52.6'	-47.0'	142.2°	70°04.7'	-48.1'	143.9°	69°15.7'	-49.0'	145.4°	68°25.9'	-49.9'	146.9°	67°35.2'	-50.7'	148.2°	66°43.9'	-51.4'	149.4°	65°51.9'	-52.1'	150.6°	15
16	70°05.7'	-48.0'	144.1°	69°16.6'	-49.0'	145.6°	68°26.7'	-49.9'	147.0°	67°36.0'	-50.7'	148.4°	66°44.5'	-51.4'	149.6°	65°52.5'	-52.0'	150.7°	64°59.9'	-52.6'	151.8°	16
17	69°17.6'	-49.0'	145.8°	68°27.6'	-49.9'	147.2°	67°36.8'	-50.6'	148.5°	66°45.3'	-51.4'	149.7°	65°53.2'	-52.0'	150.9°	65°00.5'	-52.6'	151.9°	64°07.3'	-53.1'	152.9°	17
18	68°28.7'	-49.8'	147.4°	67°37.7'	-50.6'	148.7°	66°46.1'	-51.3'	149.9°	65°53.9'	-52.0'	151.0°	65°01.2'	-52.5'	152.1°	64°07.9'	-53.0'	153.1°	63°14.2'	-53.5'	154.0°	18
19	67°38.8'	-50.6'	148.9°	66°47.1'	-51.3'	150.1°	65°54.8'	-51.9'	151.2°	65°02.0'	-52.5'	152.2°	64°08.6'	-53.0'	153.2°	63°14.9'	-53.5'	154.1°	62°20.7'	-53.9'	154.9°	19
20	66°48.2'	-51.3'	150.3°	65°55.8'	-51.9'	151.4°	65°02.9'	-52.5'	152.4°	64°09.5'	-53.0'	153.4°	63°15.6'	-53.5'	154.3°	62°21.4'	-53.9'	155.1°	61°26.8'	-54.3'	155.9°	20
21	65°56.9'	-51.9'	151.6°	65°03.9'	-52.5'	152.6°	64°10.4'	-53.0'	153.5°	63°16.5'	-53.4'	154.4°	62°22.2'	-53.9'	155.3°	61°27.5'	-54.2'	156.0°	60°32.5'	-54.6'	156.8°	21
22	65°05.0'	-52.4'	152.8°	64°11.4'	-53.0'	153.7°	63°17.4'	-53.4'	154.6°	62°23.0'	-53.8'	155.4°	61°28.3'	-54.2'	156.2°	60°33.3'	-54.6'	156.9°	59°37.9'	-54.9'	157.6°	22
23	64°12.6'	-52.9'	153.9°	63°18.5'	-53.4'	154.8°	62°24.0'	-53.8'	155.6°	61°29.2'	-54.2'	156.4°	60°34.1'	-54.6'	157.1°	59°38.7'	-54.9'	157.7°	58°43.0'	-55.2'	158.4°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

12° 348° LHA

Latitude CONTRARY to DECLINATION

12° 348° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

11° 349° LHA

Latitude CONTRARY to Declination

11° 349° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	79°00.0'	-02.7'	90.0°	78°57.3'	-08.1'	95.1°	78°49.3'	-13.3'	100.2°	78°36.2'	-18.2'	105.1°	78°18.2'	-22.8'	109.7°	77°55.8'	-27.0'	114.2°	77°29.3'	-30.7'	118.3°	0
1	78°57.3'	-08.0'	95.2°	78°49.2'	-13.2'	100.3°	78°36.0'	-18.1'	105.2°	78°17.9'	-22.7'	109.8°	77°55.4'	-26.9'	114.2°	77°28.8'	-30.6'	118.3°	76°58.6'	-33.9'	122.2°	1
2	78°49.3'	-13.1'	100.4°	78°36.0'	-18.1'	105.3°	78°17.8'	-22.6'	109.9°	77°55.2'	-26.8'	114.3°	77°28.6'	-30.5'	118.4°	76°58.2'	-33.8'	122.2°	76°24.7'	-36.7'	125.7°	2
3	78°36.2'	-18.0'	105.4°	78°17.9'	-22.5'	110.0°	77°55.2'	-26.7'	114.4°	77°28.5'	-30.4'	118.5°	76°58.1'	-33.7'	122.3°	76°24.4'	-36.6'	125.8°	75°47.9'	-39.2'	129.0°	3
4	78°18.2'	-22.4'	110.1°	77°55.4'	-26.6'	114.5°	77°28.6'	-30.3'	118.6°	76°58.2'	-33.6'	122.4°	76°24.3'	-36.6'	125.9°	75°47.8'	-39.1'	129.1°	75°08.7'	-41.3'	132.1°	4
5	77°55.8'	-26.5'	114.6°	77°28.8'	-30.2'	118.7°	76°58.2'	-33.6'	122.5°	76°24.4'	-36.5'	126.0°	75°47.8'	-39.1'	129.2°	75°08.7'	-41.2'	132.3°	74°27.4'	-43.2'	134.9°	5
6	77°29.3'	-30.2'	118.8°	76°58.6'	-33.5'	122.6°	76°24.7'	-36.4'	126.1°	75°47.9'	-39.0'	129.3°	75°08.7'	-41.2'	132.3°	74°27.4'	-43.2'	134.9°	73°44.2'	-44.9'	137.3°	6
7	76°59.1'	-33.4'	122.8°	76°25.1'	-36.4'	126.2°	75°48.3'	-38.9'	129.4°	75°09.0'	-41.2'	132.4°	74°27.5'	-43.1'	135.0°	73°44.2'	-44.9'	137.5°	72°59.2'	-46.4'	139.7°	7
8	76°25.7'	-36.3'	126.4°	75°48.7'	-38.9'	129.6°	75°09.3'	-41.1'	132.5°	74°27.8'	-43.1'	135.1°	73°44.4'	-44.8'	137.6°	72°59.3'	-46.3'	139.8°	72°12.8'	-47.6'	141.8°	8
9	75°49.4'	-38.8'	129.7°	75°09.9'	-41.1'	132.6°	74°28.2'	-43.0'	135.3°	73°44.7'	-44.7'	137.7°	72°59.6'	-46.3'	139.9°	72°13.0'	-47.6'	141.9°	71°25.2'	-48.7'	143.7°	9
10	75°10.5'	-41.0'	132.7°	74°28.8'	-43.0'	135.4°	73°45.2'	-44.7'	137.8°	72°60.0'	-46.2'	140.0°	72°13.3'	-47.5'	142.0°	71°25.4'	-48.7'	143.9°	70°36.5'	-49.7'	145.5°	10
11	74°29.5'	-43.0'	135.5°	73°45.8'	-44.7'	137.9°	73°00.5'	-46.2'	140.1°	72°13.8'	-47.5'	142.1°	71°25.8'	-48.6'	144.0°	70°36.7'	-49.7'	145.7°	69°46.8'	-50.6'	147.2°	11
12	73°46.6'	-44.6'	138.1°	73°01.1'	-46.1'	140.3°	72°14.3'	-47.4'	142.3°	71°26.3'	-48.6'	144.1°	70°37.2'	-49.6'	145.8°	69°47.1'	-50.5'	147.3°	68°56.2'	-51.3'	148.7°	12
13	73°01.9'	-46.1'	140.4°	72°15.0'	-47.4'	142.4°	71°26.9'	-48.6'	144.2°	70°37.7'	-49.6'	145.9°	69°47.5'	-50.5'	147.4°	68°56.6'	-51.3'	148.8°	68°04.9'	-52.0'	150.1°	13
14	72°15.8'	-47.4'	142.6°	71°27.6'	-48.5'	144.4°	70°38.3'	-49.6'	146.1°	69°48.1'	-50.5'	147.6°	68°57.1'	-51.2'	149.0°	68°05.3'	-52.0'	150.3°	67°12.9'	-52.6'	151.4°	14
15	71°28.4'	-48.5'	144.5°	70°39.1'	-49.5'	146.2°	69°48.8'	-50.4'	147.7°	68°57.6'	-51.2'	149.1°	68°05.8'	-51.9'	150.4°	67°13.3'	-52.6'	151.6°	66°20.3'	-53.1'	152.7°	15
16	70°39.9'	-49.5'	146.4°	69°49.5'	-50.4'	147.9°	68°58.3'	-51.2'	149.3°	68°06.4'	-51.9'	150.5°	67°13.9'	-52.5'	151.7°	66°20.8'	-53.1'	152.8°	65°27.2'	-53.6'	153.8°	16
17	69°50.4'	-50.4'	148.0°	68°59.1'	-51.2'	149.4°	68°07.1'	-51.9'	150.7°	67°14.5'	-52.5'	151.9°	66°21.3'	-53.1'	152.9°	65°27.7'	-53.6'	153.9°	64°33.6'	-54.0'	154.9°	17
18	69°00.0'	-51.2'	149.6°	68°07.9'	-51.9'	150.8°	67°15.3'	-52.5'	152.0°	66°22.0'	-53.0'	153.1°	65°28.3'	-53.6'	154.1°	64°34.1'	-54.0'	155.0°	63°39.5'	-54.4'	155.9°	18
19	68°08.9'	-51.8'	151.0°	67°16.1'	-52.5'	152.2°	66°22.8'	-53.0'	153.2°	65°29.0'	-53.5'	154.2°	64°34.7'	-54.0'	155.1°	63°40.1'	-54.4'	156.0°	62°45.1'	-54.8'	156.8°	19
20	67°17.0'	-52.5'	152.3°	66°23.6'	-53.0'	153.4°	65°29.7'	-53.5'	154.4°	64°35.4'	-54.0'	155.3°	63°40.7'	-54.4'	156.1°	62°45.7'	-54.8'	156.9°				

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

10° 350° LHA

Latitude CONTRARY to Declination

10° 350° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	80°00.0'	-03.0'	90.0°	79°57.0'	-08.9'	95.7°	79°48.2'	-14.6'	101.2°	79°33.8'	-19.9'	106.5°	79°14.2'	-24.7'	111.6°	78°49.9'	-29.0'	116.3°	78°21.2'	-32.8'	120.7°	0
1	79°57.0'	-08.8'	95.7°	79°48.1'	-14.5'	101.3°	79°33.7'	-19.8'	106.6°	79°14.0'	-24.6'	111.7°	78°49.5'	-28.9'	116.4°	78°20.8'	-32.8'	120.7°	77°48.4'	-36.1'	124.7°	1
2	79°48.2'	-14.4'	101.4°	79°33.7'	-19.7'	106.7°	79°13.9'	-24.5'	111.7°	78°49.4'	-28.8'	116.5°	78°20.6'	-32.7'	120.8°	77°48.1'	-36.0'	124.8°	77°12.3'	-38.9'	128.4°	2
3	79°33.8'	-19.6'	106.8°	79°14.0'	-24.4'	111.8°	78°49.4'	-28.8'	116.5°	78°20.5'	-32.6'	120.9°	77°47.9'	-35.9'	124.9°	77°12.1'	-38.8'	128.5°	76°33.4'	-41.3'	131.8°	3
4	79°14.2'	-24.4'	111.9°	78°49.5'	-28.7'	116.6°	78°20.6'	-32.5'	121.0°	77°47.9'	-35.9'	125.0°	77°12.0'	-38.7'	128.6°	76°33.3'	-41.2'	131.8°	75°52.1'	-43.4'	134.8°	4
5	78°49.9'	-28.6'	116.7°	78°20.8'	-32.5'	121.1°	77°48.1'	-35.8'	125.0°	77°12.1'	-38.7'	128.7°	76°33.3'	-41.2'	131.9°	75°52.0'	-43.3'	134.9°	75°08.7'	-45.2'	137.6°	5
6	78°21.2'	-32.4'	121.2°	77°48.4'	-35.7'	125.2°	77°12.3'	-38.6'	128.8°	76°33.4'	-41.1'	132.0°	75°52.1'	-43.3'	135.0°	75°08.7'	-45.1'	137.7°	74°23.5'	-46.7'	140.1°	6
7	77°48.8'	-35.7'	125.3°	77°12.7'	-38.6'	128.9°	76°33.7'	-41.1'	132.1°	75°52.3'	-43.2'	135.1°	75°08.8'	-45.1'	137.8°	74°23.5'	-46.7'	140.2°	73°36.7'	-48.1'	142.3°	7
8	77°13.2'	-38.5'	129.0°	76°34.1'	-41.0'	132.2°	75°52.6'	-43.2'	135.2°	75°09.0'	-45.0'	137.9°	74°23.7'	-46.6'	140.3°	73°36.8'	-48.0'	142.4°	72°48.6'	-49.2'	144.4°	8
9	76°34.6'	-41.0'	132.4°	75°53.1'	-43.1'	135.3°	75°09.4'	-45.0'	138.0°	74°24.0'	-46.6'	140.4°	73°37.1'	-48.0'	142.5°	72°48.8'	-49.2'	144.5°	71°59.4'	-50.2'	146.3°	9
10	75°53.6'	-43.1'	135.4°	75°09.9'	-45.0'	138.1°	74°24.4'	-46.6'	140.5°	73°37.4'	-48.0'	142.7°	72°49.1'	-49.2'	144.6°	71°59.6'	-50.2'	146.4°	71°09.2'	-51.1'	148.0°	10
11	75°10.5'	-44.9'	138.2°	74°24.9'	-46.5'	140.6°	73°37.9'	-47.9'	142.8°	72°49.5'	-49.1'	144.7°	71°59.9'	-50.2'	146.5°	71°09.4'	-51.1'	148.1°	70°18.0'	-51.9'	149.6°	11
12	74°25.6'	-46.5'	140.8°	73°38.4'	-47.9'	142.9°	72°49.9'	-49.1'	144.9°	72°00.3'	-50.1'	146.6°	71°09.7'	-51.1'	148.3°	70°18.3'	-51.9'	149.7°	69°26.1'	-52.6'	151.1°	12
13	73°39.1'	-47.9'	143.1°	72°50.5'	-49.1'	145.0°	72°00.8'	-50.1'	146.8°	71°10.2'	-51.0'	148.4°	70°18.7'	-51.8'	149.9°	69°26.4'	-52.5'	151.2°	68°33.6'	-53.2'	152.4°	13
14	72°51.2'	-49.0'	145.1°	72°01.5'	-50.1'	146.9°	71°10.7'	-51.0'	148.5°	70°19.2'	-51.8'	150.0°	69°26.9'	-52.5'	151.3°	68°33.9'	-53.1'	152.5°	67°40.4'	-53.7'	153.7°	14
15	72°02.2'	-50.1'	147.1°	71°11.4'	-51.0'	148.7°	70°19.7'	-51.8'	150.1°	69°27.4'	-52.5'	151.4°	68°34.3'	-53.1'	152.7°	67°40.8'	-53.7'	153.8°	66°46.7'	-54.2'	154.8°	15
16	71°12.1'	-51.0'	148.8°	70°20.4'	-51.8'	150.3°	69°27.9'	-52.5'	151.6°	68°34.9'	-53.1'	152.8°	67°41.2'	-53.6'	153.9°	66°47.1'	-54.1'	154.9°	65°52.5'	-54.6'	155.9°	16
17	70°21.1'	-51.8'	150.4°	69°28.6'	-52.5'	151.7°	68°35.5'	-53.1'	152.9°	67°41.8'	-53.6'	154.1°	66°47.6'	-54.1'	155.1°	65°53.0'	-54.6'	156.0°	64°58.0'	-55.0'	156.9°	17
18	69°29.4'	-52.4'	151.9°	68°36.2'	-53.1'	153.1°	67°42.4'	-53.6'	154.2°	66°48.1'	-54.1'	155.2°	65°53.5'	-54.5'	156.2°	64°58.4'	-54.9'	157.0°	64°03.0'	-55.3'	157.8°	18
19	68°36.9'	-53.1'	153.2°	67°43.1'	-53.6'	154.3°	66°48.8'	-54.1'	155.4°	65°54.0'	-54.5'	156.3°	64°58.9'	-54.9'	157.2°	64°03.5'	-55.3'	158.0°	63°07.7'	-55.6'	158.7°	19
20	67°43.9'	-53.6'	154.5°	66°49.5'	-54.1'	155.5°	65°54.7'	-54.5'	156.4°	64°59.5'	-54.9'	157.3°	64°04.0'	-55.3'	158.1°	63°08.2'	-55.6'	158.8°	62°12.1'	-55.9'	159.5°	20
21	66°50.3'	-54.1'	155.7°	65°55.4'	-54.5'	156.6°	65°00.2'	-54.9'	157.4°	64°04.6'	-55.2'	158.2°	63°08.7'	-55.6'	159.0°	62°12.6'	-55.8'	159.7°	61°16.2'	-56.1'	160.3°	21
22	65°56.2'	-54.5'	156.7°	65°00.9'	-54.9'	157.6°	64°05.3'	-55.2'	158.4°	63°09.4'	-55.5'	159.1°	62°13.2'	-55.8'	159.8°	61°16.8'	-56.1'	160.4°	60°20.1'	-56.3'	161.0°	22
23	65°01.7'	-54.9'	157.8°	64°06.0'	-55.2'	158.5°	63°10.1'	-55.5'	159.3°	62°13.8'	-55.8'	159.9°	61°17.4'	-56.1'	160.6°	60°20.7'	-56.3'	161.2°	59°23.8'	-56.5'	161.7°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

10° 350° LHA

Latitude CONTRARY to DECLINATION

10° 350° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

9° 351° LHA

Latitude CONTRARY to Declination

9° 351° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	81°00.0'	-03.3'	90.0°	80°56.7'	-09.9'	96.3°	80°46.9'	-16.1'	102.4°	80°31.0'	-21.8'	108.3°	80°09.5'	-26.9'	113.8°	79°42.9'	-31.4'	118.8°	79°11.8'	-35.3'	123.4°	0
1	80°56.7'	-09.8'	96.4°	80°46.9'	-16.0'	102.5°	80°30.9'	-21.7'	108.4°	80°09.2'	-26.7'	113.9°	79°42.4'	-31.2'	113.9°	79°11.3'	-35.1'	123.5°	78°36.3'	-38.4'	127.7°	1
2	80°46.9'	-15.9'	102.6°	80°30.9'	-21.6'	108.4°	80°09.2'	-26.7'	113.9°	79°42.4'	-31.2'	113.9°	79°11.3'	-35.1'	123.5°	78°36.3'	-38.4'	127.7°	77°58.1'	-41.2'	131.4°	2
3	80°31.0'	-21.6'	108.5°	80°09.2'	-26.7'	114.0°	79°42.4'	-31.2'	113.9°	79°11.2'	-35.0'	123.6°	78°36.2'	-38.3'	127.8°	77°57.9'	-41.2'	131.5°	77°16.8'	-43.6'	134.8°	3
4	80°09.5'	-26.6'	114.1°	79°42.6'	-31.1'	119.1°	79°11.3'	-35.0'	123.7°	78°36.2'	-38.3'	127.8°	77°57.8'	-41.1'	131.6°	77°16.7'	-43.5'	134.9°	76°33.3'	-45.5'	137.8°	4
5	79°42.9'	-31.0'	119.2°	79°11.5'	-34.9'	123.8°	78°36.3'	-38.2'	127.9°	77°57.9'	-41.0'	131.6°	77°16.7'	-43.4'	135.0°	76°33.2'	-45.5'	137.9°	75°47.8'	-47.2'	140.6°	5
6	79°11.8'	-34.9'	123.9°	78°36.6'	-38.2'	128.0°	77°58.1'	-41.0'	131.7°	77°16.8'	-43.4'	135.0°	76°33.3'	-45.4'	138.0°	75°47.8'	-47.1'	140.7°	75°00.6'	-48.6'	143.0°	6
7	78°37.0'	-38.1'	128.1°	77°58.4'	-41.0'	131.8°	77°17.1'	-43.3'	135.1°	76°33.5'	-45.4'	138.1°	75°47.9'	-47.1'	140.7°	75°00.6'	-48.6'	143.1°	74°12.0'	-49.8'	145.2°	7
8	77°58.8'	-40.9'	131.9°	77°17.4'	-43.3'	135.2°	76°33.7'	-45.3'	138.2°	75°48.1'	-47.1'	140.8°	75°00.8'	-48.5'	143.2°	74°12.1'	-49.8'	145.3°	73°22.2'	-50.9'	147.2°	8
9	77°17.9'	-43.3'	135.4°	76°34.1'	-45.3'	138.3°	75°48.4'	-47.0'	140.9°	75°01.0'	-48.5'	143.3°	74°12.3'	-49.7'	145.4°	73°22.3'	-50.8'	147.3°	72°31.3'	-51.7'	149.0°	9
10	76°34.6'	-45.3'	138.4°	75°48.8'	-47.0'	141.1°	75°01.4'	-48.5'	143.4°	74°12.6'	-49.7'	145.5°	73°22.5'	-50.8'	147.4°	72°31.5'	-51.7'	149.1°	71°39.6'	-52.5'	150.7°	10
11	75°49.4'	-47.0'	141.2°	75°01.8'	-48.4'	143.5°	74°12.9'	-49.7'	145.6°	73°22.8'	-50.8'	147.5°	72°31.7'	-51.7'	149.2°	71°39.8'	-52.5'	150.8°	70°47.1'	-53.2'	152.2°	11
12	75°02.4'	-48.4'	143.6°	74°13.4'	-49.7'	145.8°	73°23.3'	-50.7'	147.6°	72°32.1'	-51.7'	149.3°	71°40.1'	-52.5'	150.9°	70°47.3'	-53.2'	152.3°	69°53.9'	-53.8'	153.6°	12
13	74°14.0'	-49.6'	145.9°	73°23.7'	-50.7'	147.8°	72°32.5'	-51.6'	149.5°	71°40.4'	-52.4'	151.0°	70°47.6'	-53.1'	152.4°	69°54.1'	-53.8'	153.7°	69°00.1'	-54.3'	154.8°	13
14	73°24.3'	-50.7'	147.9°	72°33.0'	-51.6'	149.6°	71°40.9'	-52.4'	151.1°	70°48.0'	-53.1'	152.5°	69°54.5'	-53.7'	153.8°	69°00.4'	-54.3'	154.9°	68°05.8'	-54.8'	156.0°	14
15	72°33.6'	-51.6'	149.7°	71°41.4'	-52.4'	151.3°	70°48.5'	-53.1'	152.6°	69°54.9'	-53.7'	153.9°	69°00.7'	-54.3'	155.0°	68°06.1'	-54.7'	156.1°	67°11.0'	-55.2'	157.1°	15
16	71°42.0'	-52.4'	151.4°	70°49.0'	-53.1'	152.8°	69°55.3'	-53.7'	154.0°	69°01.1'	-54.2'	155.2°	68°06.5'	-54.7'	156.2°	67°11.4'	-55.1'	157.2°	66°15.9'	-55.5'	158.1°	16
17	70°49.6'	-53.1'	152.9°	69°55.9'	-53.7'	154.2°	69°01.6'	-54.2'	155.3°	68°06.9'	-54.7'	156.3°	67°11.8'	-55.1'	157.3°	66°16.2'	-55.5'	158.2°	65°20.4'	-55.8'	159.0°	17
18	69°56.5'	-53.7'	154.3°	69°02.2'	-54.2'	155.4°	68°07.4'	-54.7'	156.5°	67°12.2'	-55.1'	157.4°	66°16.6'	-55.5'	158.3°	65°20.7'	-55.8'	159.1°	64°24.5'	-56.1'	159.9°	18
19	69°02.9'	-54.2'	155.6°	68°08.0'	-54.7'	156.6°	67°12.7'	-55.1'	157.5°	66°17.1'	-55.5'	158.4°	65°21.2'	-55.8'	159.2°	64°24.9'	-56.1'	160.0°	63°28.4'	-56.4'	160.7°	19
20	68°08.6'	-54.7'	156.7°	67°13.3'	-55.1'	157.7°	66°17.7'	-55.5'	158.6°	65°21.7'	-55.8'	159.4°	64°25.4'	-56.1'	160.1°	63°28.8'	-56.4'</					

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

8° 352° LHA			Latitude CONTRARY to Declination						8° 352° LHA														
Dec°	0			1		2		3		4		5		6		Dec°							
	Hc°	d'	Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°								
0	82°00.0'	-03.7'	90.0°	81°56.3'	-11.0'	97.1°	81°45.3'	-17.9'	103.9°	81°27.6'	-24.1'	110.4°	81°03.7'	-29.5'	116.4°	80°34.5'	-34.1'	121.8°	80°00.7'	-37.9'	126.6°	0	
1	81°56.2'	-11.0'	97.1°	81°45.3'	-17.8'	104.0°	81°27.4'	-24.0'	110.5°	81°03.5'	-29.4'	116.5°	80°34.2'	-34.0'	121.9°	80°00.4'	-37.9'	126.7°	79°22.8'	-41.1'	131.0°	1	
2	81°45.3'	-17.8'	104.1°	81°27.4'	-23.9'	110.6°	81°03.4'	-29.3'	116.5°	80°34.1'	-33.9'	121.9°	80°00.2'	-37.8'	126.7°	79°22.5'	-41.0'	131.0°	78°41.7'	-43.7'	134.8°	2	
3	81°27.6'	-23.9'	110.6°	81°03.5'	-29.3'	116.6°	80°34.1'	-33.9'	122.0°	80°00.2'	-37.7'	126.8°	79°22.4'	-41.0'	131.1°	78°41.5'	-43.7'	134.9°	77°57.9'	-45.9'	138.2°	3	
4	81°03.7'	-29.2'	116.7°	80°34.2'	-33.8'	122.1°	80°00.2'	-37.7'	126.9°	79°22.4'	-40.9'	131.2°	78°41.5'	-43.6'	134.9°	77°57.8'	-45.8'	138.3°	77°12.1'	-47.7'	141.2°	4	
5	80°34.5'	-33.8'	122.2°	80°00.4'	-37.6'	127.0°	79°22.5'	-40.9'	131.2°	78°41.5'	-43.6'	135.0°	77°57.8'	-45.8'	138.3°	77°12.0'	-47.6'	141.3°	76°24.4'	-49.2'	143.9°	5	
6	80°00.7'	-37.6'	127.1°	79°22.8'	-40.8'	131.3°	78°41.7'	-43.5'	135.1°	77°57.9'	-45.8'	138.4°	77°12.1'	-47.6'	141.3°	76°24.4'	-49.2'	143.9°	75°35.2'	-50.5'	146.2°	6	
7	79°23.1'	-40.8'	131.4°	78°41.9'	-43.5'	135.2°	77°58.1'	-45.7'	138.5°	77°12.2'	-47.6'	141.4°	76°24.4'	-49.1'	144.0°	75°35.2'	-50.4'	146.3°	74°44.7'	-51.5'	148.3°	7	
8	78°42.3'	-43.5'	135.3°	77°58.4'	-45.7'	138.6°	77°12.4'	-47.5'	141.5°	76°24.6'	-49.1'	144.1°	75°35.3'	-50.4'	146.4°	74°44.8'	-51.5'	148.4°	73°53.2'	-52.4'	150.2°	8	
9	77°58.8'	-45.7'	138.7°	77°12.7'	-47.5'	141.6°	76°24.9'	-49.1'	144.2°	75°35.5'	-50.4'	146.5°	74°44.9'	-51.5'	148.5°	73°53.3'	-52.4'	150.3°	73°00.7'	-53.2'	151.9°	9	
10	77°13.2'	-47.5'	141.7°	76°25.2'	-49.0'	144.3°	75°35.8'	-50.3'	146.6°	74°45.2'	-51.4'	148.6°	73°53.5'	-52.4'	150.4°	73°00.9'	-53.2'	152.0°	72°07.5'	-53.9'	153.5°	10	
11	76°25.7'	-49.0'	144.4°	75°36.2'	-50.3'	146.7°	74°45.5'	-51.4'	148.7°	73°53.7'	-52.4'	150.5°	73°01.1'	-53.2'	152.1°	72°07.7'	-53.8'	153.6°	71°13.7'	-54.4'	154.9°	11	
12	75°36.6'	-50.3'	146.8°	74°45.8'	-51.4'	148.8°	73°54.0'	-52.3'	150.6°	73°01.4'	-53.1'	152.2°	72°07.9'	-53.8'	153.7°	71°13.8'	-54.4'	155.0°	70°19.2'	-54.9'	156.2°	12	
13	74°46.3'	-51.4'	148.9°	73°54.4'	-52.3'	150.7°	73°01.7'	-53.1'	152.3°	72°08.2'	-53.8'	153.8°	71°14.1'	-54.4'	155.1°	70°19.4'	-54.9'	156.3°	69°24.3'	-55.4'	157.3°	13	
14	73°54.9'	-52.3'	150.8°	73°02.1'	-53.1'	152.4°	72°08.6'	-53.8'	153.9°	71°14.4'	-54.4'	155.2°	70°19.7'	-54.9'	156.3°	69°24.5'	-55.3'	157.4°	68°28.9'	-55.7'	158.4°	14	
15	73°02.6'	-53.1'	152.6°	72°09.0'	-53.8'	154.0°	71°14.8'	-54.4'	155.3°	70°20.0'	-54.9'	156.5°	69°24.8'	-55.3'	157.5°	68°29.2'	-55.7'	158.5°	67°33.2'	-56.1'	159.4°	15	
16	72°09.5'	-53.8'	154.1°	71°15.2'	-54.4'	155.4°	70°20.4'	-54.9'	156.6°	69°25.1'	-55.3'	157.6°	68°29.5'	-55.7'	158.6°	67°33.4'	-56.1'	159.5°	66°37.1'	-56.4'	160.3°	16	
17	71°15.7'	-54.4'	155.5°	70°20.9'	-54.9'	156.7°	69°25.5'	-55.3'	157.7°	68°29.8'	-55.7'	158.7°	67°33.7'	-56.1'	159.6°	66°37.4'	-56.4'	160.4°	65°40.7'	-56.6'	161.1°	17	
18	70°21.4'	-54.9'	156.8°	69°26.0'	-55.3'	157.9°	68°30.2'	-55.7'	158.8°	67°34.1'	-56.0'	159.7°	66°37.7'	-56.3'	160.5°	65°41.0'	-56.6'	161.3°	64°44.1'	-56.9'	161.9°	18	
19	69°26.5'	-55.3'	158.0°	68°30.7'	-55.7'	158.9°	67°34.5'	-56.0'	159.8°	66°38.1'	-56.3'	160.6°	65°41.4'	-56.6'	161.4°	64°44.4'	-56.9'	162.0°	63°47.2'	-57.1'	162.7°	19	
20	68°31.2'	-55.7'	159.1°	67°35.0'	-56.0'	159.9°	66°38.5'	-56.3'	160.7°	65°41.7'	-56.6'	161.5°	64°44.7'	-56.8'	162.1°	63°47.5'	-57.1'	162.8°	62°50.1'	-57.3'	163.4°	20	
21	67°35.5'	-56.0'	160.1°	66°39.0'	-56.3'	160.9°	65°42.2'	-56.6'	161.6°	64°45.1'	-56.8'	162.3°	63°47.9'	-57.1'	162.9°	62°50.5'	-57.3'	163.5°	61°52.9'	-57.4'	164.0°	21	
22	66°39.5'	-56.3'	161.0°	65°42.7'	-56.6'	161.7°	64°45.6'	-56.8'	162.4°	63°48.3'	-57.1'	163.0°	62°50.8'	-57.2'	163.6°	61°53.2'	-57.4'	164.1°	60°55.4'	-57.6'	164.6°	22	
23	65°43.2'	-56.6'	161.8°	64°46.1'	-56.8'	162.5°	63°48.8'	-57.0'	163.1°	62°51.2'	-57.2'	163.7°	61°53.6'	-57.4'	164.2°	60°55.8'	-57.6'	164.7°	59°57.8'	-57.7'	165.2°	23	
Dec°	Hc°	d'	Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Dec°	
	0			1				2				3				4			5			6	

8° 352° LHA

Latitude CONTRARY to DECLINATION

8° 352° LHA

South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

7° 353° LHA			Latitude CONTRARY to Declination						7° 353° LHA													
Dec°	0			1		2		3		4		5		6		Dec°						
	Hc°	d'	Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°							
0	83°00.0'	-04.2'	90.0°	82°55.8'	-12.5'	98.1°	82°43.3'	-20.2'	105.9°	82°23.2'	-26.8'	113.1°	81°56.6'	-32.5'	119.6°	81°24.3'	-37.1'	125.4°	80°47.4'	-40.9'	130.4°	0
1	82°55.7'	-12.5'	98.2°	82°43.2'	-20.1'	105.9°	82°23.1'	-26.8'	113.1°	81°56.4'	-32.4'	119.7°	81°24.0'	-37.0'	125.5°	80°47.0'	-40.8'	130.5°	80°06.3'	-43.9'	134.9°	1
2	82°43.2'	-20.0'	106.0°	82°23.1'	-26.7'	113.2°	81°56.3'	-32.4'	119.7°	81°24.0'	-37.0'	125.5°	80°47.0'	-40.8'	130.5°	80°06.3'	-43.9'	134.9°	79°22.6'	-46.3'	138.7°	2
3	82°23.2'	-26.7'	113.3°	81°56.4'	-32.3'	119.8°	81°24.0'	-37.0'	125.5°	80°47.0'	-40.7'	130.6°	80°06.2'	-43.8'	134.9°	79°22.5'	-46.3'	138.7°	78°36.2'	-48.3'	142.0°	3
4	81°56.6'	-32.3'	119.8°	81°24.1'	-36.9'	125.6°	80°47.0'	-40.7'	130.6°	80°06.2'	-43.8'	135.0°	79°22.4'	-46.2'	138.8°	78°36.2'	-48.3'	142.0°	77°47.9'	-49.9'	144.9°	4
5	81°24.3'	-36.9'	125.7°	80°47.2'	-40.7'	130.7°	80°06.3'	-43.7'	135.0°	79°22.5'	-46.2'	138.8°	78°36.2'	-48.2'	142.1°	77°47.9'	-49.9'	144.9°	76°58.1'	-51.2'	147.4°	5
6	80°47.4'	-40.6'	130.8°	80°06.5'	-43.7'	135.1°	79°22.6'	-46.2'	138.9°	78°36.2'	-48.2'	142.2°	77°47.9'	-49.8'	145.0°	76°58.1'	-51.2'	147.5°	76°06.8'	-52.3'	149.7°	6
7	80°06.8'	-43.7'	135.2°	79°22.8'	-46.2'	139.0°	78°36.4'	-48.2'	142.2°	77°48.1'	-49.8'	145.1°	76°58.1'	-51.1'	147.6°	76°06.9'	-52.3'	149.7°	75°14.5'	-53.2'	151.6°	7
8	79°23.1'	-46.1'	139.1°	78°36.6'	-48.1'	142.3°	77°48.2'	-49.8'	145.2°	76°58.3'	-51.1'	147.6°	76°07.0'	-52.2'	149.8°	75°14.6'	-53.2'	151.7°	74°21.3'	-54.0'	153.4°	8
9	78°37.0'	-48.1'	142.4°	77°48.5'	-49.8'	145.3°	76°58.5'	-51.1'	147.7°	76°07.1'	-52.2'	149.9°	75°14.7'	-53.2'	151.8°	74°21.4'	-53.9'	153.5°	73°27.4'	-54.6'	155.0°	9
10	77°48.8'	-49.7'	145.3°	76°58.7'	-51.1'	147.8°	76°07.4'	-52.2'	150.0°	75°14.9'	-53.1'	151.9°	74°21.6'	-53.9'	153.6°	73°27.5'	-54.6'	155.1°	72°32.8'	-55.1'	156.4°	10
11	76°59.1'	-51.1'	147.9°	76°07.7'	-52.2'	150.1°	75°15.2'	-53.1'	152.0°	74°21.8'	-53.9'	153.7°	73°27.7'	-54.6'	155.1°	72°32.9'	-55.1'	156.5°	71°37.7'	-55.6'	157.7°	11
12	76°08.0'	-52.2'	150.2°	75°15.5'	-53.1'	152.1°	74°22.0'	-53.9'	153.7°	73°27.9'	-54.5'	155.2°	72°33.1'	-55.1'	156.6°	71°37.8'	-55.6'	157.8°	70°42.0'	-56.0'	158.9°	12
13	75°15.8'	-53.1'	152.2°	74°22.4'	-53.9'	153.8°	73°28.2'	-54.5'	155.3°	72°33.3'	-55.1'	156.7°	71°38.0'	-55.6'	157.9°	70°42.2'	-56.0'	158.9°	69°46.0'	-56.4'	159.9°	13
14	74°22.7'	-53.9'	154.0°	73°28.5'	-54.5'	155.4°	72°33.6'	-55.1'	156.8°	71°38.2'	-55.6'	158.0°	70°42.4'	-56.0'	159.0°	69°46.2'	-56.3'	160.0°	68°49.7'	-56.7'	160.9°	14
15	73°28.9'	-54.5'	155.5°	72°34.0'	-55.1'	156.9°	71°38.5'	-55.6'	158.1°	70°42.7'	-56.0'	159.1°	69°46.4'	-56.3'	160.1°	68°49.9'	-56.7'	161.0°	67°53.0'	-56.9'	161.8°	15
16	72°34.3'	-55.1'	157.0°	71°38.9'	-55.5'	158.2°	70°43.0'	-56.0'	159.2°	69°46.7'	-56.3'	160.2°	68°50.1'	-56.6'	161.1°	67°53.2'	-56.9'	161.9°	66°56.1'	-57.2'	162.6°	16
17	71°39.3'	-55.5'	158.3°	70°43.3'	-56.0'	159.3°	69°47.0'	-56.3'	160.3°	68°50.4'	-56.6'	161.2°	67°53.5'	-56.9'	162.0°	66°56.3'	-57.2'	162.7°	65°58.9'	-57.4'	163.4°	17
18	70°43.7'	-56.0'	159.4°	69°47.4'	-56.3'	160.4°	68°50.7'	-56.6'	161.3°	67°53.7'	-56.9'	162.1°	66°56.5'	-57.2'	162.8°	65°59.1'	-57.4'	163.5°	65°01.5'	-57.6'	164.1°	18
19	69°47.8'	-56.3'	160.5°	68°51.1'	-56.6'	161.4°	67°54.1'	-56.9'	162.2°	66°56.8'	-57.1'	162.9°	65°59.4'	-57.4'	163.5°	65°01.8'	-57.6'	164.2°	64°04.0'	-57.7'	164.7°	19
20	68°51.5'	-56.6'	161.5°	67°54.4'	-56.9'	162.3°	66°57.2'	-57.1'	163.0°	65°59.7'	-57.4'	163.7°	65°02.0'	-57.5'	164.3°	64°04.2'	-57.7'	164.8°	63°06.2'	-57.9'	165.3°	20
21	67°54.9'	-56.9'	162.4°	66°57.5'	-57.1'	163.1°	66°00.0'	-57.3'	163.8°	65°02.3'	-57.5											

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

6° 354° LHA			Latitude CONTRARY to Declination						6° 354° LHA													
Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	84°00.0'	-04.9'	90.0°	83°55.1'	-14.5'	99.4°	83°40.6'	-23.0'	108.4°	83°17.7'	-30.2'	116.5°	82°47.6'	-36.0'	123.6°	82°11.7'	-40.6'	129.7°	81°31.3'	-44.2'	134.8°	0
1	83°55.0'	-14.5'	99.5°	83°40.5'	-23.0'	108.4°	83°17.6'	-30.2'	116.5°	82°47.4'	-36.0'	123.6°	82°11.6'	-40.5'	129.7°	81°31.2'	-44.1'	134.9°	80°47.2'	-46.9'	139.3°	1
2	83°40.5'	-22.9'	108.5°	83°17.6'	-30.1'	116.6°	82°47.4'	-35.9'	123.7°	82°11.5'	-40.5'	129.7°	81°31.0'	-44.1'	134.9°	80°47.1'	-46.8'	139.3°	80°00.3'	-49.0'	143.0°	2
3	83°17.7'	-30.1'	116.6°	82°47.4'	-35.9'	123.7°	82°11.5'	-40.4'	129.8°	81°31.0'	-44.0'	135.0°	80°47.0'	-46.8'	139.3°	80°00.2'	-49.0'	143.0°	79°11.3'	-50.7'	146.2°	3
4	82°47.6'	-35.8'	123.8°	82°11.6'	-40.4'	129.9°	81°31.0'	-44.0'	135.0°	80°47.0'	-46.8'	139.4°	80°00.2'	-49.0'	143.1°	79°11.2'	-50.7'	146.2°	78°20.5'	-52.1'	148.9°	4
5	82°11.7'	-40.4'	129.9°	81°31.2'	-44.0'	135.1°	80°47.1'	-46.7'	139.4°	80°00.2'	-48.9'	143.1°	79°11.2'	-50.7'	146.3°	78°20.5'	-52.0'	149.0°	77°28.5'	-53.2'	151.3°	5
6	81°31.3'	-43.9'	135.2°	80°47.2'	-46.7'	139.5°	80°00.3'	-48.9'	143.2°	79°11.3'	-50.6'	146.3°	78°20.5'	-52.0'	149.0°	77°28.5'	-53.1'	151.4°	76°35.3'	-54.0'	153.4°	6
7	80°47.4'	-46.7'	139.6°	80°00.5'	-48.9'	143.3°	79°11.4'	-50.6'	146.4°	78°20.6'	-52.0'	149.1°	77°28.5'	-53.1'	151.4°	76°35.3'	-54.0'	153.4°	75°41.3'	-54.8'	155.2°	7
8	80°00.7'	-48.9'	143.4°	79°11.6'	-50.6'	146.5°	78°20.8'	-52.0'	149.2°	77°28.6'	-53.1'	151.5°	76°35.4'	-54.0'	153.5°	75°41.3'	-54.8'	155.2°	74°46.5'	-55.4'	156.8°	8
9	79°11.8'	-50.6'	146.6°	78°21.0'	-52.0'	149.3°	77°28.8'	-53.1'	151.6°	76°35.5'	-54.0'	153.6°	75°41.4'	-54.7'	155.3°	74°46.5'	-55.4'	156.8°	73°51.1'	-55.9'	158.2°	9
10	78°21.2'	-52.0'	149.3°	77°29.0'	-53.1'	151.6°	76°35.7'	-54.0'	153.6°	75°41.5'	-54.7'	155.4°	74°46.7'	-55.4'	156.9°	73°51.2'	-55.9'	158.3°	72°55.2'	-56.3'	159.5°	10
11	77°29.3'	-53.1'	151.7°	76°35.9'	-54.0'	153.7°	75°41.7'	-54.7'	155.5°	74°46.8'	-55.3'	157.0°	73°51.3'	-55.9'	158.3°	72°55.3'	-56.3'	159.5°	71°58.9'	-56.7'	160.6°	11
12	76°36.2'	-54.0'	153.8°	75°42.0'	-54.7'	155.5°	74°47.0'	-55.3'	157.1°	73°51.5'	-55.9'	158.4°	72°55.4'	-56.3'	159.6°	71°59.0'	-56.7'	160.7°	71°02.2'	-57.0'	161.7°	12
13	75°42.2'	-54.7'	155.6°	74°47.2'	-55.3'	157.2°	73°51.7'	-55.8'	158.5°	72°55.6'	-56.3'	159.7°	71°59.1'	-56.7'	160.8°	71°02.3'	-57.0'	161.7°	70°05.2'	-57.3'	162.6°	13
14	74°47.5'	-55.3'	157.3°	73°51.9'	-55.8'	158.6°	72°55.8'	-56.3'	159.8°	71°59.3'	-56.7'	160.9°	71°02.5'	-57.0'	161.8°	70°05.3'	-57.3'	162.7°	69°07.9'	-57.5'	163.5°	14
15	73°52.2'	-55.8'	158.7°	72°56.1'	-56.3'	159.9°	71°59.6'	-56.6'	160.9°	71°02.7'	-57.0'	161.9°	70°05.5'	-57.2'	162.8°	69°08.1'	-57.5'	163.5°	68°10.4'	-57.7'	164.2°	15
16	72°56.4'	-56.3'	160.0°	71°59.8'	-56.6'	161.0°	71°02.9'	-57.0'	162.0°	70°05.7'	-57.2'	162.8°	69°08.3'	-57.5'	163.6°	68°10.6'	-57.7'	164.3°	67°12.7'	-57.9'	165.0°	16
17	72°00.1'	-56.6'	161.1°	71°03.2'	-57.0'	162.1°	70°05.9'	-57.2'	162.9°	69°08.5'	-57.5'	163.7°	68°10.8'	-57.7'	164.4°	67°12.9'	-57.9'	165.0°	66°14.9'	-58.0'	165.6°	17
18	71°03.5'	-57.0'	162.2°	70°06.2'	-57.2'	163.0°	69°08.7'	-57.5'	163.8°	68°11.0'	-57.7'	164.5°	67°13.1'	-57.9'	165.1°	66°15.0'	-58.0'	165.7°	65°16.8'	-58.2'	166.2°	18
19	70°06.5'	-57.2'	163.1°	69°09.0'	-57.5'	163.9°	68°11.2'	-57.7'	164.6°	67°13.3'	-57.9'	165.2°	66°15.2'	-58.0'	165.8°	65°17.0'	-58.2'	166.3°	64°18.6'	-58.3'	166.8°	19
20	69°09.3'	-57.5'	164.0°	68°11.5'	-57.7'	164.7°	67°13.6'	-57.9'	165.3°	66°15.4'	-58.0'	165.9°	65°17.2'	-58.2'	166.4°	64°18.8'	-58.3'	166.9°	63°20.3'	-58.4'	167.4°	20
21	68°11.8'	-57.7'	164.8°	67°13.8'	-57.9'	165.4°	66°15.7'	-58.0'	166.0°	65°17.4'	-58.2'	166.5°	64°19.0'	-58.3'	167.0°	63°20.5'	-58.4'	167.4°	62°21.9'	-58.5'	167.9°	21
22	67°14.1'	-57.9'	165.5°	66°16.0'	-58.0'	166.1°	65°17.7'	-58.2'	166.6°	64°19.3'	-58.3'	167.1°	63°20.7'	-58.4'	167.5°	62°22.1'	-58.5'	167.9°	61°23.4'	-58.6'	168.3°	22
23	66°16.3'	-58.0'	166.2°	65°18.0'	-58.2'	166.7°	64°19.5'	-58.3'	167.2°	63°21.0'	-58.4'	167.6°	62°22.3'	-58.5'	168.0°	61°23.6'	-58.6'	168.4°	60°24.8'	-58.7'	168.8°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

6° 354° LHA Latitude CONTRARY to DECLINATION 6° 354° LHA
 South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

5° 355° LHA			Latitude CONTRARY to Declination						5° 355° LHA													
Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	85°00.0'	-05.9'	90.0°	84°54.1'	-17.2'	101.3°	84°36.9'	-26.8'	111.7°	84°10.3'	-34.4'	120.9°	83°36.0'	-40.1'	128.6°	82°56.0'	-44.4'	134.9°	82°11.7'	-47.6'	140.1°	0
1	84°54.0'	-17.1'	101.3°	84°36.9'	-26.7'	111.8°	84°10.2'	-34.3'	120.9°	83°35.9'	-40.1'	128.6°	82°55.9'	-44.4'	134.9°	82°11.6'	-47.6'	140.1°	81°24.1'	-49.9'	144.3°	1
2	84°36.9'	-26.7'	111.8°	84°10.2'	-34.3'	121.0°	83°35.9'	-40.0'	128.6°	82°55.8'	-44.3'	135.0°	82°11.5'	-47.5'	140.1°	81°24.0'	-49.9'	144.4°	80°34.2'	-51.7'	147.9°	2
3	84°10.3'	-34.3'	121.0°	83°35.9'	-40.0'	128.7°	82°55.8'	-44.3'	135.0°	82°11.5'	-47.5'	140.2°	81°24.0'	-49.9'	144.4°	80°34.1'	-51.7'	147.9°	79°42.5'	-53.1'	150.8°	3
4	83°36.0'	-40.0'	128.7°	82°55.9'	-44.3'	135.0°	82°11.5'	-47.5'	140.2°	81°24.0'	-49.9'	144.5°	79°42.4'	-53.0'	150.9°	78°49.4'	-54.1'	153.4°	77°55.2'	-55.0'	155.5°	4
5	82°56.0'	-44.3'	135.1°	81°24.0'	-49.8'	144.5°	80°34.2'	-51.6'	148.1°	79°42.5'	-53.0'	151.0°	78°49.4'	-54.1'	153.4°	77°55.2'	-55.0'	155.5°	77°00.2'	-55.7'	157.3°	5
6	82°11.7'	-47.4'	140.3°	81°24.1'	-49.8'	144.6°	79°42.6'	-53.0'	151.0°	78°49.4'	-54.1'	153.5°	77°55.3'	-55.0'	155.6°	77°00.2'	-55.7'	157.4°	76°04.5'	-56.2'	158.9°	6
7	81°24.3'	-49.8'	144.6°	80°34.3'	-51.6'	148.1°	79°42.6'	-53.0'	151.0°	78°49.4'	-54.1'	153.5°	77°55.3'	-55.0'	155.6°	77°00.2'	-55.7'	157.4°	75°08.3'	-56.7'	160.3°	7
8	80°34.5'	-51.6'	148.2°	79°42.7'	-53.0'	151.1°	78°49.5'	-54.1'	153.6°	77°55.3'	-55.0'	155.6°	77°00.3'	-55.7'	157.4°	76°04.6'	-56.2'	159.0°	75°08.3'	-56.7'	160.3°	8
9	79°42.9'	-53.0'	151.2°	78°49.7'	-54.1'	153.6°	77°55.4'	-54.9'	155.7°	77°00.4'	-55.6'	157.5°	76°04.6'	-56.2'	159.0°	75°08.3'	-56.7'	160.4°	74°11.6'	-57.1'	161.6°	9
10	78°49.9'	-54.1'	153.7°	77°55.6'	-54.9'	155.8°	77°00.5'	-55.6'	157.6°	76°04.7'	-56.2'	159.1°	75°08.4'	-56.7'	160.4°	74°11.7'	-57.0'	161.6°	73°14.6'	-57.4'	162.7°	10
11	77°55.8'	-54.9'	155.8°	77°00.7'	-55.6'	157.6°	76°04.9'	-56.2'	159.2°	75°08.5'	-56.7'	160.5°	74°11.8'	-57.0'	161.7°	73°14.6'	-57.4'	162.7°	72°17.2'	-57.6'	163.7°	11
12	77°00.8'	-55.6'	157.7°	76°05.0'	-56.2'	159.2°	75°08.7'	-56.6'	160.6°	74°11.9'	-57.0'	161.8°	73°14.7'	-57.4'	162.8°	72°17.3'	-57.6'	163.7°	71°19.6'	-57.9'	164.6°	12
13	76°05.2'	-56.2'	159.3°	75°08.8'	-56.6'	160.7°	74°12.0'	-57.0'	161.8°	73°14.9'	-57.3'	162.9°	72°17.4'	-57.6'	163.8°	71°19.6'	-57.9'	164.6°	70°21.7'	-58.1'	165.4°	13
14	75°09.0'	-56.6'	160.7°	74°12.2'	-57.0'	161.9°	73°15.0'	-57.3'	162.9°	72°17.5'	-57.6'	163.9°	71°19.7'	-57.9'	164.7°	70°21.8'	-58.1'	165.4°	69°23.6'	-58.2'	166.1°	14
15	74°12.4'	-57.0'	162.0°	73°15.2'	-57.3'	163.0°	72°17.7'	-57.6'	163.9°	71°19.9'	-57.8'	164.8°	70°21.9'	-58.1'	165.5°	69°23.7'	-58.2'	166.2°	68°25.4'	-58.4'	166.8°	15
16	73°15.4'	-57.3'	163.1°	72°17.8'	-57.6'	164.0°	71°20.0'	-57.8'	164.8°	70°22.0'	-58.0'	165.6°	69°23.8'	-58.2'	166.2°	68°25.5'	-58.4'	166.8°	67°27.0'	-58.5'	167.4°	16
17	72°18.0'	-57.6'	164.1°	71°20.2'	-57.8'	164.9°	70°22.2'	-58.0'	165.6°	69°24.0'	-58.2'	166.3°	68°25.6'	-58.4'	166.9°	67°27.1'	-58.5'	167.4°	66°28.5'	-58.6'	167.9°	17
18	71°20.4'	-57.8'	165.0°	70°22.4'	-58.0'	165.7°	69°24.2'	-58.2'	166.4°	68°25.8'	-58.4'	167.0°	67°27.3'	-58.5'	167.5°	66°28.6'	-58.6'	168.0°	65°29.9'	-58.7'	168.5°	18
19	70°22.6'	-58.0'	165.8°	69°24.3'	-58.2'	166.5°	68°25.9'	-58.4'	167.0°	67°27.4'	-58.5'	167.6°	66°28.8'	-58.6'	168.1°	65°30.0'	-58.7'	168.5°	64°31.2'	-58.8'	169.0°	19
20	69°24.6'	-58.2'	166.5°	68°26.1'	-58.4'	167.1°	67°27.6'	-58.5'	167.7°	66°28.9'	-58.6'	168.2°	65°30.1'	-58.7'	168.6°	64°31.3'	-58.8'	169.0°	63°32.3'	-58.9'	169.4°	20
21	68°26.3'	-58.4'	167.2°	67°27.8'	-58.5'	167.7°	66°29.1'	-58.6'	168.2°	65°30.3'	-58.7'	168.7°	64°31.4'	-58.8'	169.1°	63°32.5'	-58.9'	169.5°	62°33.4			

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

4° 356° LHA			Latitude CONTRARY to Declination						4° 356° LHA														
Dec°	0			1		2		3		4		5		6		Dec°							
	Hc°	d'	Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°								
0	86°00.0'	-07.4'	90.0°	85°52.6'	-20.9'	104.0°	85°31.7'	-31.7'	116.5°	85°00.1'	-39.4'	126.8°	84°20.7'	-44.8'	134.9°	83°36.0'	-48.5'	141.3°	82°47.6'	-51.1'	146.2°	0	
1	85°52.6'	-20.9'	104.0°	85°31.7'	-31.7'	116.6°	85°00.0'	-39.4'	126.8°	84°20.6'	-44.8'	135.0°	83°35.9'	-48.5'	141.3°	82°47.5'	-51.1'	146.2°	81°56.5'	-53.0'	150.2°	1	
2	85°31.7'	-31.6'	116.6°	85°00.0'	-39.4'	126.9°	84°20.6'	-44.8'	135.0°	83°35.9'	-48.5'	141.3°	82°47.4'	-51.1'	146.3°	81°56.4'	-52.9'	150.2°	81°03.5'	-54.3'	153.4°	2	
3	85°00.1'	-39.4'	126.9°	84°20.6'	-44.7'	135.0°	83°35.9'	-48.5'	141.3°	82°47.4'	-51.1'	146.3°	81°56.3'	-52.9'	150.2°	81°03.4'	-54.3'	153.4°	80°09.2'	-55.3'	156.0°	3	
4	84°20.7'	-44.7'	135.1°	83°35.9'	-48.4'	141.4°	82°47.4'	-51.0'	146.3°	81°56.3'	-52.9'	150.2°	81°03.4'	-54.3'	153.4°	80°09.2'	-55.3'	156.0°	79°13.9'	-56.1'	158.1°	4	
5	83°36.0'	-48.4'	141.4°	82°47.5'	-51.0'	146.4°	81°56.4'	-52.9'	150.3°	81°03.4'	-54.2'	153.4°	80°09.2'	-55.3'	156.0°	79°13.9'	-56.0'	158.2°	78°17.8'	-56.7'	160.0°	5	
6	82°47.6'	-51.0'	146.4°	81°56.5'	-52.9'	150.3°	81°03.5'	-54.2'	153.5°	80°09.2'	-55.3'	156.1°	79°13.9'	-56.0'	158.2°	78°17.8'	-56.6'	160.0°	77°21.2'	-57.1'	161.5°	6	
7	81°56.6'	-52.9'	150.4°	81°03.6'	-54.2'	153.5°	80°09.3'	-55.2'	156.1°	79°13.9'	-56.0'	158.2°	78°17.9'	-56.6'	160.0°	77°21.2'	-57.1'	161.6°	76°24.1'	-57.5'	162.9°	7	
8	81°03.7'	-54.2'	153.6°	80°09.4'	-55.2'	156.2°	79°14.0'	-56.0'	158.3°	78°17.9'	-56.6'	160.1°	77°21.2'	-57.1'	161.6°	76°24.1'	-57.5'	162.9°	75°26.6'	-57.8'	164.0°	8	
9	80°09.5'	-55.2'	156.2°	79°14.1'	-56.0'	158.4°	78°18.0'	-56.6'	160.1°	77°21.3'	-57.1'	161.7°	76°24.1'	-57.5'	163.0°	75°26.6'	-57.8'	164.1°	74°28.7'	-58.1'	165.1°	9	
10	79°14.2'	-56.0'	158.4°	78°18.1'	-56.6'	160.2°	77°21.4'	-57.1'	161.7°	76°24.2'	-57.5'	163.0°	75°26.6'	-57.8'	164.1°	74°28.8'	-58.1'	165.1°	73°30.7'	-58.3'	166.0°	10	
11	78°18.2'	-56.6'	160.3°	77°21.5'	-57.1'	161.8°	76°24.3'	-57.5'	163.1°	75°26.7'	-57.8'	164.2°	74°28.8'	-58.1'	165.2°	73°30.7'	-58.3'	166.0°	72°32.4'	-58.5'	166.8°	11	
12	77°21.6'	-57.1'	161.8°	76°24.4'	-57.5'	163.1°	75°26.8'	-57.8'	164.2°	74°28.9'	-58.1'	165.2°	73°30.8'	-58.3'	166.1°	72°32.5'	-58.5'	166.9°	71°33.9'	-58.6'	167.5°	12	
13	76°24.5'	-57.5'	163.2°	75°26.9'	-57.8'	164.3°	74°29.0'	-58.0'	165.3°	73°30.9'	-58.3'	166.1°	72°32.5'	-58.4'	166.9°	71°34.0'	-58.6'	167.6°	70°35.3'	-58.7'	168.2°	13	
14	75°27.0'	-57.8'	164.4°	74°29.1'	-58.0'	165.3°	73°31.0'	-58.3'	166.2°	72°32.6'	-58.4'	167.0°	71°34.1'	-58.6'	167.6°	70°35.4'	-58.7'	168.2°	69°36.6'	-58.9'	168.8°	14	
15	74°29.3'	-58.0'	165.4°	73°31.1'	-58.3'	166.3°	72°32.7'	-58.4'	167.0°	71°34.2'	-58.6'	167.7°	70°35.5'	-58.7'	168.3°	69°36.7'	-58.8'	168.8°	68°37.7'	-58.9'	169.3°	15	
16	73°31.2'	-58.3'	166.3°	72°32.8'	-58.4'	167.1°	71°34.3'	-58.6'	167.8°	70°35.6'	-58.7'	168.4°	69°36.7'	-58.8'	168.9°	68°37.8'	-58.9'	169.4°	67°38.8'	-59.0'	169.8°	16	
17	72°33.0'	-58.4'	167.1°	71°34.4'	-58.6'	167.8°	70°35.7'	-58.7'	168.4°	69°36.8'	-58.8'	169.0°	68°37.9'	-58.9'	169.5°	67°38.9'	-59.0'	169.9°	66°39.8'	-59.1'	170.3°	17	
18	71°34.5'	-58.6'	167.9°	70°35.8'	-58.7'	168.5°	69°36.9'	-58.8'	169.0°	68°38.0'	-58.9'	169.5°	67°39.0'	-59.0'	170.0°	66°39.8'	-59.1'	170.4°	65°40.6'	-59.2'	170.7°	18	
19	70°35.9'	-58.7'	168.5°	69°37.1'	-58.8'	169.1°	68°38.1'	-58.9'	169.6°	67°39.1'	-59.0'	170.0°	66°39.9'	-59.1'	170.4°	65°40.7'	-59.2'	170.8°	64°41.5'	-59.2'	171.1°	19	
20	69°37.2'	-58.8'	169.2°	68°38.2'	-58.9'	169.6°	67°39.2'	-59.0'	170.1°	66°40.0'	-59.1'	170.5°	65°40.8'	-59.2'	170.8°	64°41.6'	-59.2'	171.2°	63°42.2'	-59.3'	171.5°	20	
21	68°38.4'	-58.9'	169.7°	67°39.3'	-59.0'	170.1°	66°40.1'	-59.1'	170.5°	65°40.9'	-59.2'	170.9°	64°41.7'	-59.2'	171.2°	63°42.3'	-59.3'	171.5°	62°43.0'	-59.3'	171.8°	21	
22	67°39.4'	-59.0'	170.2°	66°40.3'	-59.1'	170.6°	65°41.0'	-59.2'	171.0°	64°41.8'	-59.2'	171.3°	63°42.4'	-59.3'	171.6°	62°43.1'	-59.3'	171.9°	61°43.6'	-59.4'	172.2°	22	
23	66°40.4'	-59.1'	170.7°	65°41.2'	-59.2'	171.0°	64°41.9'	-59.2'	171.4°	63°42.5'	-59.3'	171.7°	62°43.1'	-59.3'	171.9°	61°43.7'	-59.4'	172.2°	60°44.3'	-59.4'	172.5°	23	
Dec°	Hc°	d'	Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Dec°	
	0			1				2				3				4			5			6	

4° 356° LHA Latitude CONTRARY to DECLINATION 4° 356° LHA
 South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

North Lat. LHA > 180° . . . Zn = Z LHA < 180° . . Zn= 360-Z

3° 357° LHA			Latitude CONTRARY to Declination						3° 357° LHA													
Dec°	0			1		2		3		4		5		6		Dec°						
	Hc°	d'	Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°	Hc°	d' Z°							
0	87°00.0'	-09.7'	90.0°	86°50.3'	-26.6'	108.4°	86°23.7'	-38.2'	123.7°	85°45.5'	-45.5'	135.0°	85°00.1'	-49.9'	143.1°	84°10.3'	-52.7'	149.0°	83°17.7'	-54.5'	153.4°	0
1	86°50.2'	-26.6'	108.4°	86°23.7'	-38.2'	123.7°	85°45.5'	-45.4'	135.0°	85°00.0'	-49.8'	143.1°	84°10.2'	-52.6'	149.0°	83°17.6'	-54.5'	153.4°	82°23.2'	-55.7'	156.7°	1
2	86°23.6'	-38.2'	123.7°	85°45.5'	-45.4'	135.0°	85°00.0'	-49.8'	143.1°	84°10.2'	-52.6'	149.0°	83°17.6'	-54.5'	153.4°	82°23.1'	-55.7'	156.8°	81°27.4'	-56.6'	159.4°	2
3	85°45.5'	-45.4'	135.0°	85°00.0'	-49.8'	143.1°	84°10.2'	-52.6'	149.0°	83°17.5'	-54.4'	153.4°	82°23.1'	-55.7'	156.8°	81°27.4'	-56.6'	159.4°	80°30.9'	-57.2'	161.5°	3
4	85°00.1'	-49.8'	143.2°	84°10.2'	-52.6'	149.1°	83°17.6'	-54.4'	153.4°	82°23.1'	-55.7'	156.8°	81°27.4'	-56.6'	159.4°	80°30.9'	-57.2'	161.5°	79°33.7'	-57.7'	163.3°	4
5	84°10.3'	-52.6'	149.1°	83°17.6'	-54.4'	153.5°	82°23.1'	-55.7'	156.8°	81°27.4'	-56.6'	159.5°	80°30.9'	-57.2'	161.6°	79°33.7'	-57.7'	163.3°	78°36.0'	-58.0'	164.7°	5
6	83°17.7'	-54.4'	153.5°	82°23.2'	-55.7'	156.9°	81°27.4'	-56.5'	159.5°	80°30.9'	-57.2'	161.6°	79°33.7'	-57.7'	163.3°	78°36.0'	-58.0'	164.7°	77°37.9'	-58.3'	165.9°	6
7	82°23.2'	-55.7'	156.9°	81°27.5'	-56.5'	159.5°	80°30.9'	-57.2'	161.6°	79°33.7'	-57.7'	163.3°	78°36.0'	-58.0'	164.8°	77°37.9'	-58.3'	166.0°	76°39.6'	-58.6'	167.0°	7
8	81°27.6'	-56.5'	159.6°	80°31.0'	-57.2'	161.7°	79°33.7'	-57.7'	163.4°	78°36.0'	-58.0'	164.8°	77°37.9'	-58.3'	166.0°	76°39.6'	-58.6'	167.0°	75°41.0'	-58.7'	167.9°	8
9	80°31.0'	-57.2'	161.7°	79°33.8'	-57.7'	163.4°	78°36.1'	-58.0'	164.8°	77°38.0'	-58.3'	166.0°	76°39.6'	-58.5'	167.1°	75°41.0'	-58.7'	167.9°	74°42.3'	-58.9'	168.7°	9
10	79°33.8'	-57.7'	163.5°	78°36.1'	-58.0'	164.9°	77°38.0'	-58.3'	166.1°	76°39.7'	-58.5'	167.1°	75°41.1'	-58.7'	168.0°	74°42.3'	-58.9'	168.7°	73°43.4'	-59.0'	169.4°	10
11	78°36.2'	-58.0'	164.9°	77°38.1'	-58.3'	166.1°	76°39.7'	-58.5'	167.1°	75°41.1'	-58.7'	168.0°	74°42.3'	-58.9'	168.8°	73°43.4'	-59.0'	169.4°	72°44.4'	-59.1'	170.0°	11
12	77°38.2'	-58.3'	166.2°	76°39.8'	-58.5'	167.2°	75°41.2'	-58.7'	168.0°	74°42.4'	-58.9'	168.8°	73°43.5'	-59.0'	169.5°	72°44.4'	-59.1'	170.1°	71°45.3'	-59.2'	170.6°	12
13	76°39.8'	-58.5'	167.2°	75°41.2'	-58.7'	168.1°	74°42.4'	-58.9'	168.9°	73°43.5'	-59.0'	169.5°	72°44.5'	-59.1'	170.1°	71°45.3'	-59.2'	170.6°	70°46.1'	-59.3'	171.1°	13
14	75°41.3'	-58.7'	168.1°	74°42.5'	-58.9'	168.9°	73°43.6'	-59.0'	169.6°	72°44.5'	-59.1'	170.1°	71°45.3'	-59.2'	170.7°	70°46.1'	-59.3'	171.1°	69°46.8'	-59.3'	171.6°	14
15	74°42.6'	-58.9'	168.9°	73°43.6'	-59.0'	169.6°	72°44.6'	-59.1'	170.2°	71°45.4'	-59.2'	170.7°	70°46.1'	-59.3'	171.2°	69°46.8'	-59.3'	171.6°	68°47.4'	-59.4'	172.0°	15
16	73°43.7'	-59.0'	169.7°	72°44.6'	-59.1'	170.2°	71°45.4'	-59.2'	170.8°	70°46.2'	-59.3'	171.2°	69°46.9'	-59.3'	171.6°	68°47.5'	-59.4'	172.0°	67°48.0'	-59.5'	172.3°	16
17	72°44.7'	-59.1'	170.3°	71°45.5'	-59.2'	170.8°	70°46.2'	-59.3'	171.3°	69°46.9'	-59.3'	171.7°	68°47.5'	-59.4'	172.0°	67°48.1'	-59.4'	172.4°	66°48.6'	-59.5'	172.7°	17
18	71°45.6'	-59.2'	170.8°	70°46.3'	-59.3'	171.3°	69°47.0'	-59.3'	171.7°	68°47.6'	-59.4'	172.1°	67°48.1'	-59.4'	172.4°	66°48.6'	-59.5'	172.7°	65°49.1'	-59.5'	173.0°	18
19	70°46.4'	-59.3'	171.4°	69°47.0'	-59.3'	171.8°	68°47.6'	-59.4'	172.1°	67°48.2'	-59.4'	172.5°	66°48.7'	-59.5'	172.8°	65°49.1'	-59.5'	173.1°	64°49.6'	-59.6'	173.3°	19
20	69°47.1'	-59.3'	171.8°	68°47.7'	-59.4'	172.2°	67°48.2'	-59.4'	172.5°	66°48.7'	-59.4'	172.8°	65°49.2'	-59.5'	173.1°	64°49.6'	-59.6'	173.4°	63°50.0'	-59.6'	173.6°	20
21	68°47.8'	-59.4'	172.2°	67°48.3'	-59.4'	172.6°	66°48.8'	-59.5'	172.9°	65°49.2'	-59.5'	173.1°	64°49.7'	-59.6'	173.4°	63°50.0'	-59.6'	173.6°	62°50.4'	-59.6'		

SEMI DIAMETER (SD)

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
1	16.29'	16.26'	16.17'	16.03'	15.90'	15.80'	15.75'	15.78'	15.87'	16.00'	16.14'	16.24'
3	16.29'	16.25'	16.16'	16.02'	15.89'	15.79'	15.75'	15.79'	15.89'	16.02'	16.15'	16.25'
6	16.29'	16.24'	16.14'	16.00'	15.88'	15.78'	15.75'	15.79'	15.90'	16.03'	16.17'	16.26'
9	16.29'	16.23'	16.13'	15.99'	15.86'	15.78'	15.75'	15.80'	15.91'	16.04'	16.18'	16.26'
12	16.28'	16.22'	16.12'	15.98'	15.85'	15.77'	15.76'	15.81'	15.92'	16.06'	16.19'	16.27'
15	16.28'	16.21'	16.10'	15.96'	15.84'	15.77'	15.76'	15.82'	15.94'	16.07'	16.20'	16.27'
18	16.28'	16.20'	16.09'	15.95'	15.83'	15.76'	15.76'	15.83'	15.95'	16.08'	16.21'	16.28'
21	16.27'	16.19'	16.08'	15.94'	15.82'	15.76'	15.76'	15.84'	15.96'	16.10'	16.22'	16.28'
24	16.27'	16.18'	16.06'	15.92'	15.81'	15.76'	15.77'	15.85'	15.98'	16.11'	16.23'	16.29'
27	16.26'	16.17'	16.05'	15.91'	15.81'	15.76'	15.77'	15.86'	15.99'	16.12'	16.24'	16.29'
30	16.26'	16.17'	16.04'	15.90'	15.80'	15.75'	15.78'	15.87'	16.00'	16.14'	16.24'	16.29'

Lower Limb, ADD.

Upper Limb, SUBTRACT

DIP Correction		
Meters	Dip °	Feet
0.4	1.11'	1.30
0.6	1.36'	1.95
0.8	1.57'	2.60
1.0	1.76'	3.25
1.2	1.93'	3.90
1.4	2.08'	4.55
1.6	2.23'	5.20
1.8	2.36'	5.85
2.0	2.49'	6.50
2.2	2.61'	7.15
2.4	2.73'	7.80
2.6	2.84'	8.45
2.8	2.95'	9.10
3.0	3.05'	9.75
3.2	3.15'	10.40
3.4	3.25'	11.05
3.6	3.34'	11.70
3.8	3.43'	12.35
4.0	3.52'	13.00

Always SUBTRACT

PARALLAX	
Alt (Ha)	Parallax
0	0.14'
5	0.14'
10	0.14'
15	0.14'
20	0.14'
25	0.13'
30	0.12'
35	0.12'
40	0.11'
45	0.10'
50	0.09'
55	0.08'
60	0.07'
65	0.06'
70	0.05'
75	0.04'
80	0.03'
85	0.01'
90	0.00'

Always ADD

Hs = Sextant Altitude
 Sextant Corrections
 Ha = Actual measure altitude
 Ha = Hs +/- Index Error (IE) - Dip
 Altitude Corrections
 Ho = True Observed Altitude
 Ho = Ha + Parallax - Refraction +/- SD
 ADD Index Error if OFF the arc
 SUBTRACT Index Error if ON the arc.

If using an artificial horizon Dip = 0.
 Add or Subtract IE as normal, then halve the angle Ha.
 Then apply the Altitude corrections as normal.

Alt (Ha)	mB & DegC			REFRACTION			mB & DegC		
	1000			1015			1030		
	10	20	30	10	20	30	10	20	30
1	24.14'	23.31'	22.54'	24.50'	23.66'	22.88'	24.86'	24.01'	23.22'
2	18.07'	17.46'	16.88'	18.34'	17.72'	17.13'	18.61'	17.98'	17.39'
3	14.23'	13.75'	13.29'	14.44'	13.95'	13.49'	14.66'	14.16'	13.69'
4	11.64'	11.25'	10.87'	11.82'	11.41'	11.04'	11.99'	11.58'	11.20'
5	9.80'	9.47'	9.16'	9.95'	9.61'	9.30'	10.10'	9.75'	9.43'
6	8.44'	8.15'	7.88'	8.57'	8.28'	8.00'	8.69'	8.40'	8.12'
7	7.39'	7.14'	6.91'	7.51'	7.25'	7.01'	7.62'	7.36'	7.11'
8	6.57'	6.34'	6.13'	6.67'	6.44'	6.23'	6.76'	6.53'	6.32'
9	5.90'	5.70'	5.51'	5.99'	5.78'	5.59'	6.08'	5.87'	5.68'
10	5.35'	5.17'	5.00'	5.43'	5.24'	5.07'	5.51'	5.32'	5.15'
12	4.50'	4.34'	4.20'	4.56'	4.41'	4.26'	4.63'	4.47'	4.32'
14	3.86'	3.73'	3.61'	3.92'	3.79'	3.66'	3.98'	3.84'	3.72'
16	3.38'	3.26'	3.16'	3.43'	3.31'	3.20'	3.48'	3.36'	3.25'
18	3.00'	2.89'	2.80'	3.04'	2.94'	2.84'	3.09'	2.98'	2.88'
20	2.68'	2.59'	2.50'	2.72'	2.63'	2.54'	2.76'	2.67'	2.58'
22	2.42'	2.34'	2.26'	2.46'	2.37'	2.30'	2.49'	2.41'	2.33'
24	2.20'	2.13'	2.06'	2.23'	2.16'	2.09'	2.27'	2.19'	2.12'
26	2.01'	1.94'	1.88'	2.04'	1.97'	1.91'	2.07'	2.00'	1.94'
28	1.85'	1.79'	1.73'	1.88'	1.81'	1.75'	1.90'	1.84'	1.78'
30	1.70'	1.65'	1.59'	1.73'	1.67'	1.62'	1.75'	1.69'	1.64'
35	1.41'	1.36'	1.31'	1.43'	1.38'	1.33'	1.45'	1.40'	1.35'
40	1.18'	1.14'	1.10'	1.19'	1.15'	1.11'	1.21'	1.17'	1.13'
45	0.99'	0.95'	0.92'	1.00'	0.97'	0.94'	1.02'	0.98'	0.95'
50	0.83'	0.80'	0.77'	0.84'	0.81'	0.79'	0.85'	0.82'	0.80'
55	0.69'	0.67'	0.65'	0.70'	0.68'	0.66'	0.71'	0.69'	0.67'
60	0.57'	0.55'	0.53'	0.58'	0.56'	0.54'	0.59'	0.57'	0.55'
65	0.46'	0.44'	0.43'	0.47'	0.45'	0.44'	0.47'	0.46'	0.44'
70	0.36'	0.35'	0.34'	0.36'	0.35'	0.34'	0.37'	0.36'	0.35'
75	0.26'	0.26'	0.25'	0.27'	0.26'	0.25'	0.27'	0.26'	0.25'
80	0.17'	0.17'	0.16'	0.18'	0.17'	0.16'	0.18'	0.17'	0.17'
85	0.09'	0.08'	0.08'	0.09'	0.08'	0.08'	0.09'	0.08'	0.08'
90	0.00'	0.00'	0.00'	0.00'	0.00'	0.00'	0.00'	0.00'	0.00'

Always SUBTRACT

