

Integer

Sight Reduction Tables

Latitude 14° to 20°

USE OF THE TABLES.

The Greenwich Hour Angle (GHA) and Declination of the SUN are taken from the current year's Sun Almanac for the precise date and time of the observation.

The GHA is combined with an Assumed Longitude, somewhere close to your actual position (obtained from your GPS or, if you are a traditionalist, your Dead Reckoning position) to give your Local Hour Angle (LHA).

The resulting LHA must be a whole degree of latitude.

If LHA and Declination = SAME

Start at the first page and work forward until you find the page with your LHA.

Enter the table with your Declination and Latitude, and read off Hc, d' and Z.

Take care to note whether d' is +ve or -ve.

If LHA and Declination = CONTRARY

Start at the last page and work backwards until you find the page with your LHA.

Enter the table with your Declination and Latitude, and read of Hc, d' and Z.

Take care to note whether d' is +ve or -ve.

NOTE: Values of Hc, d' and Z are always in **BOLD** text whenever LHA and Declination are contrary.

Hc, the computed Altitude, must now be corrected for minutes of Declination by means of the correction table at the end of the tables.

Enter the table with minutes of declination and d'. It doesn't matter which way round you use the table.

If d' is -ve, SUBTRACT the value obtained from the correction table from Hc to determine the corrected value of Hc.

If d' is +ve, ADD the value obtained from the correction table to Hc to determine the corrected value of Hc.

Accuracy and Precision

This particular set of tables returns Hc, d' and Z as INTEGERS.

In the majority of situations this will give you satisfactory results as well as simplifying the entire sight reduction process.

These tables have been compared to the US National Imagery and Mapping Agency Sight Reduction Tables for Air Navigation Pub249 with the following results.

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

No difference in D' has been identified by the author.

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

2° 358° LHA

Latitude SAME as Declination

2° 358° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	75°52'	+59'	172°	74°52'	+59'	172°	73°53'	+60'	173°	72°53'	+60'	173°	71°54'	+60'	174°	70°54'	+60'	174°	69°54'	+60'	174°	0
1	76°51'	+59'	171°	75°52'	+59'	172°	74°52'	+59'	172°	73°53'	+60'	173°	72°53'	+60'	173°	71°54'	+60'	174°	70°54'	+60'	174°	1
2	77°50'	+59'	170°	76°51'	+59'	171°	75°52'	+59'	172°	74°52'	+59'	172°	73°53'	+60'	173°	72°53'	+60'	173°	71°54'	+60'	174°	2
3	78°49'	+59'	170°	77°50'	+59'	170°	76°51'	+59'	171°	75°52'	+59'	172°	74°52'	+59'	172°	73°53'	+60'	173°	72°53'	+60'	173°	3
4	79°48'	+59'	169°	78°50'	+59'	170°	77°50'	+59'	170°	76°51'	+59'	171°	75°52'	+59'	172°	74°52'	+59'	172°	73°53'	+60'	173°	4
5	80°47'	+69'	167°	79°49'	+68'	169°	78°50'	+68'	170°	77°50'	+67'	170°	76°51'	+67'	171°	75°52'	+66'	172°	74°52'	+66'	172°	5
6	81°57'	+60'	173°	80°57'	+60'	174°	79°57'	+60'	174°	78°58'	+60'	175°	77°58'	+60'	175°	76°58'	+60'	176°	75°58'	+60'	176°	6
7	82°56'	+59'	172°	81°57'	+60'	173°	80°57'	+60'	174°	79°57'	+60'	174°	78°58'	+60'	175°	77°58'	+60'	175°	76°58'	+60'	176°	7
8	83°55'	+59'	171°	82°56'	+59'	172°	81°57'	+60'	173°	80°57'	+60'	174°	79°57'	+60'	174°	78°58'	+60'	175°	77°58'	+60'	175°	8
9	84°55'	+59'	169°	83°55'	+59'	171°	82°56'	+59'	172°	81°57'	+60'	173°	80°57'	+60'	174°	79°57'	+60'	174°	78°58'	+60'	175°	9
10	85°53'	+58'	166°	84°55'	+59'	169°	83°56'	+59'	171°	82°56'	+59'	172°	81°57'	+60'	173°	80°57'	+60'	174°	79°57'	+60'	174°	10
11	86°51'	+56'	162°	85°53'	+58'	167°	84°55'	+59'	169°	83°56'	+59'	171°	82°56'	+59'	172°	81°57'	+60'	173°	80°57'	+60'	174°	11
12	87°47'	+50'	154°	86°51'	+56'	162°	85°53'	+58'	167°	84°55'	+59'	169°	83°56'	+59'	171°	82°56'	+59'	172°	81°57'	+60'	173°	12
13	88°37'	+26'	136°	87°47'	+50'	155°	86°51'	+56'	162°	85°53'	+58'	167°	84°55'	+59'	169°	83°56'	+59'	171°	82°56'	+59'	172°	13
14	89°03'	-26'	90°	88°37'	+26'	136°	87°47'	+50'	155°	86°51'	+56'	162°	85°53'	+58'	167°	84°55'	+59'	169°	83°56'	+59'	171°	14
15	88°37'	-50'	43°	89°03'	-26'	90°	88°38'	+26'	137°	87°47'	+50'	155°	86°51'	+56'	163°	85°54'	+58'	167°	84°55'	+59'	169°	15
16	87°47'	-56'	25°	88°38'	-50'	43°	89°04'	-26'	90°	88°38'	+26'	137°	87°48'	+50'	155°	86°52'	+56'	163°	85°54'	+58'	167°	16
17	86°51'	-58'	17°	87°47'	-56'	25°	88°38'	-50'	43°	89°04'	-26'	90°	88°38'	+26'	137°	87°48'	+51'	155°	86°52'	+56'	163°	17
18	85°53'	-59'	13°	86°51'	-58'	17°	87°48'	-56'	25°	88°38'	-50'	43°	89°04'	-26'	90°	88°38'	+26'	137°	87°48'	+51'	155°	18
19	84°55'	-59'	10°	85°54'	-59'	13°	86°52'	-58'	17°	87°48'	-56'	25°	88°38'	-50'	43°	89°05'	-26'	90°	88°38'	+26'	137°	19
20	83°56'	-59'	9°	84°55'	-59'	10°	85°54'	-59'	13°	86°52'	-58'	17°	87°48'	-56'	25°	88°38'	-50'	42°	89°05'	-26'	90°	20
21	82°56'	-60'	7°	83°56'	-59'	9°	84°55'	-59'	10°	85°54'	-59'	13°	86°52'	-58'	17°	87°48'	-56'	24°	88°39'	-51'	42°	21
22	81°57'	-60'	6°	82°56'	-60'	7°	83°56'	-59'	9°	84°55'	-59'	10°	85°54'	-59'	13°	86°52'	-58'	17°	87°48'	-56'	24°	22
23	80°57'	-60'	6°	81°57'	-60'	6°	82°56'	-60'	7°	83°56'	-59'	9°	84°55'	-59'	10°	85°54'	-59'	13°	86°52'	-58'	17°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	75°41'	+59'	168°	74°43'	+59'	169°	73°44'	+59'	169°	72°45'	+59'	170°	71°46'	+59'	170°	70°46'	+59'	171°	69°47'	+59'	171°	0
1	76°40'	+58'	167°	75°41'	+59'	168°	74°43'	+59'	169°	73°44'	+59'	169°	72°45'	+59'	170°	71°46'	+59'	170°	70°46'	+59'	171°	1
2	77°38'	+58'	166°	76°40'	+58'	167°	75°41'	+59'	168°	74°43'	+59'	169°	73°44'	+59'	169°	72°45'	+59'	170°	71°46'	+59'	170°	2
3	78°36'	+58'	165°	77°38'	+58'	166°	76°40'	+58'	167°	75°42'	+59'	168°	74°43'	+59'	169°	73°44'	+59'	169°	72°45'	+59'	170°	3
4	79°34'	+57'	163°	78°37'	+58'	165°	77°39'	+58'	166°	76°40'	+58'	167°	75°42'	+59'	168°	74°43'	+59'	169°	73°44'	+59'	169°	4
5	80°32'	+57'	162°	79°34'	+57'	163°	78°37'	+58'	165°	77°39'	+58'	166°	76°40'	+58'	167°	75°42'	+59'	168°	74°43'	+59'	169°	5
6	81°28'	+56'	159°	80°32'	+57'	162°	79°35'	+57'	163°	78°37'	+58'	165°	77°39'	+58'	166°	76°41'	+58'	167°	75°42'	+59'	168°	6
7	82°24'	+55'	157°	81°29'	+56'	159°	80°32'	+57'	162°	79°35'	+57'	163°	78°37'	+58'	165°	77°39'	+58'	166°	76°41'	+59'	167°	7
8	83°19'	+53'	154°	82°25'	+55'	157°	81°29'	+56'	160°	80°32'	+57'	162°	79°35'	+57'	163°	78°37'	+58'	165°	77°39'	+58'	166°	8
9	84°12'	+50'	149°	83°19'	+53'	154°	82°25'	+55'	157°	81°29'	+56'	160°	80°32'	+57'	162°	79°35'	+57'	163°	78°37'	+58'	165°	9
10	85°02'	+46'	143°	84°12'	+50'	149°	83°20'	+53'	154°	82°25'	+55'	157°	81°29'	+56'	160°	80°33'	+57'	162°	79°35'	+58'	163°	10
11	85°48'	+39'	135°	85°03'	+46'	143°	84°13'	+50'	149°	83°20'	+53'	154°	82°25'	+55'	157°	81°30'	+56'	160°	80°33'	+57'	162°	11
12	86°27'	+27'	124°	85°49'	+39'	135°	85°03'	+46'	144°	84°13'	+51'	149°	83°20'	+53'	154°	82°26'	+55'	157°	81°30'	+56'	160°	12
13	86°55'	+10'	109°	86°28'	+28'	124°	85°49'	+39'	136°	85°04'	+46'	144°	84°14'	+51'	150°	83°21'	+53'	154°	82°26'	+55'	157°	13
14	87°05'	-10'	90°	86°56'	+10'	109°	86°29'	+28'	124°	85°50'	+39'	136°	85°04'	+46'	144°	84°14'	+51'	150°	83°21'	+53'	154°	14
15	86°56'	-27'	71°	87°06'	-10'	90°	86°56'	+11'	109°	86°29'	+28'	124°	85°51'	+40'	136°	85°05'	+47'	144°	84°14'	+51'	150°	15
16	86°29'	-39'	55°	86°56'	-27'	71°	87°07'	-10'	90°	86°57'	+11'	109°	86°30'	+28'	124°	85°51'	+40'	136°	85°05'	+47'	144°	16
17	85°50'	-46'	44°	86°29'	-39'	55°	86°57'	-27'	70°	87°08'	-10'	90°	86°58'	+11'	109°	86°31'	+28'	125°	85°52'	+40'	136°	17
18	85°04'	-50'	35°	85°51'	-46'	43°	86°30'	-39'	55°	86°58'	-27'	70°	87°09'	-10'	90°	86°59'	+11'	109°	86°32'	+28'	125°	18
19	84°14'	-53'	29°	85°05'	-50'	35°	85°51'	-46'	43°	86°31'	-39'	55°	86°59'	-27'	70°	87°10'	-10'	90°	87°00'	+11'	109°	19
20	83°21'	-55'	25°	84°14'	-53'	29°	85°05'	-50'	35°	85°52'	-46'	43°	86°32'	-39'	54°	87°00'	-27'	70°	87°11'	-10'	89°	20
21	82°26'	-56'	22°	83°21'	-55'	25°	84°15'	-53'	29°	85°06'	-50'	35°	85°53'	-46'	43°	86°33'	-39'	54°	87°01'	-28'	70°	21
22	81°30'	-57'	19°	82°27'	-56'	22°	83°22'	-55'	25°	84°15'	-53'	29°	85°06'	-51'	35°	85°53'	-46'	43°	86°34'	-39'	54°	22
23	80°34'	-57'	17°	81°31'	-57'	19°	82°27'	-56'	22°	83°22'	-55'	25°	84°16'	-53'	29°	85°07'	-51'	34°	85°54'	-46'	42°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

3° 357° LHA

Latitude SAME as Declination

3° 357° LHA

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

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

4° 356° LHA

Latitude SAME as Declination

4° 356° LHA

Table with 12 columns (Dec°, 14, 15, 16, 17, 18, 19, 20, Dec°) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is symmetric around the center.

4° 356° LHA

Latitude SAME as 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

5° 355° LHA

Latitude SAME as Declination

5° 355° LHA

Table with 12 columns (Dec°, 14, 15, 16, 17, 18, 19, 20, Dec°) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is symmetric around the center.

5° 355° LHA

Latitude SAME as Declination

5° 355° LHA

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

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

6° 354° LHA Latitude SAME as Declination 6° 354° LHA

Dec°	14			15			16			17			18			19			20			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	74°48'	+55'	157°	73°52'	+56'	158°	72°56'	+56'	159°	72°00'	+57'	160°	71°03'	+57'	161°	70°07'	+57'	162°	69°09'	+58'	163°	0			
1	75°43'	+54'	155°	74°48'	+55'	157°	73°53'	+56'	158°	72°57'	+56'	159°	72°00'	+57'	160°	71°04'	+57'	161°	70°07'	+57'	162°	1			
2	76°37'	+53'	153°	75°43'	+54'	155°	74°48'	+55'	157°	73°53'	+56'	158°	72°57'	+56'	159°	72°01'	+57'	160°	71°04'	+57'	161°	2			
3	77°30'	+52'	151°	76°37'	+54'	153°	75°43'	+54'	155°	74°49'	+55'	157°	73°53'	+56'	158°	72°57'	+56'	159°	72°01'	+57'	160°	3			
4	78°23'	+51'	149°	77°31'	+53'	151°	76°38'	+54'	153°	75°44'	+54'	155°	74°49'	+55'	157°	73°54'	+56'	158°	72°58'	+56'	159°	4			
5	79°14'	+50'	146°	78°23'	+51'	149°	77°31'	+53'	151°	76°38'	+54'	153°	75°44'	+55'	155°	74°50'	+55'	157°	73°54'	+56'	158°	5			
6	80°03'	+47'	143°	79°15'	+50'	146°	78°24'	+51'	149°	77°32'	+53'	151°	76°39'	+54'	153°	75°45'	+55'	155°	74°50'	+55'	157°	6			
7	80°51'	+45'	139°	80°04'	+48'	143°	79°15'	+50'	146°	78°25'	+51'	149°	77°33'	+53'	151°	76°39'	+54'	153°	75°45'	+55'	155°	7			
8	81°36'	+41'	135°	80°52'	+45'	139°	80°05'	+48'	143°	79°16'	+50'	146°	78°25'	+51'	149°	77°33'	+53'	151°	76°40'	+54'	153°	8			
9	82°17'	+37'	130°	81°37'	+41'	135°	80°53'	+45'	139°	80°06'	+48'	143°	79°17'	+50'	146°	78°26'	+52'	149°	77°34'	+53'	151°	9			
10	82°54'	+31'	124°	82°18'	+37'	130°	81°38'	+42'	135°	80°53'	+45'	139°	80°07'	+48'	143°	79°18'	+50'	146°	78°27'	+52'	149°	10			
11	83°25'	+24'	116°	82°55'	+31'	124°	82°19'	+37'	130°	81°39'	+42'	135°	80°54'	+45'	140°	80°07'	+48'	143°	79°18'	+50'	146°	11			
12	83°49'	+16'	108°	83°26'	+24'	116°	82°56'	+32'	124°	82°20'	+37'	130°	81°40'	+42'	135°	80°55'	+45'	140°	80°08'	+48'	143°	12			
13	84°05'	+06'	99°	83°51'	+16'	108°	83°28'	+24'	117°	82°58'	+32'	124°	82°21'	+37'	130°	81°41'	+42'	135°	80°57'	+45'	140°	13			
14	84°11'	-04'	89°	84°06'	+06'	99°	83°52'	+16'	108°	83°29'	+25'	117°	82°59'	+32'	124°	82°23'	+38'	130°	81°42'	+42'	135°	14			
15	84°06'	-14'	79°	84°12'	-04'	89°	84°08'	+06'	99°	83°54'	+16'	108°	83°31'	+25'	117°	83°00'	+32'	124°	82°24'	+38'	130°	15			
16	83°52'	-23'	70°	84°08'	-14'	79°	84°14'	-04'	89°	84°10'	+06'	99°	83°55'	+16'	108°	83°32'	+25'	117°	83°02'	+32'	124°	16			
17	83°29'	-30'	62°	83°54'	-23'	70°	84°10'	-14'	79°	84°16'	-04'	89°	84°11'	+06'	99°	83°57'	+16'	108°	83°34'	+25'	117°	17			
18	82°59'	-36'	54°	83°31'	-30'	62°	83°55'	-23'	70°	84°11'	-14'	79°	84°18'	-04'	89°	84°13'	+06'	99°	83°59'	+16'	108°	18			
19	82°23'	-41'	48°	83°00'	-36'	54°	83°32'	-30'	61°	83°57'	-23'	70°	84°13'	-14'	79°	84°20'	-04'	89°	84°15'	+06'	99°	19			
20	81°42'	-44'	43°	82°24'	-41'	48°	83°02'	-36'	54°	83°34'	-31'	61°	83°59'	-23'	70°	84°15'	-14'	79°	84°22'	-04'	89°	20			
21	80°58'	-47'	38°	81°43'	-44'	43°	82°26'	-41'	48°	83°04'	-36'	54°	83°36'	-31'	61°	84°01'	-23'	69°	84°18'	-14'	79°	21			
22	80°11'	-49'	35°	80°59'	-47'	38°	81°45'	-44'	42°	82°27'	-41'	48°	83°05'	-37'	54°	83°38'	-31'	61°	84°03'	-23'	69°	22			
23	79°21'	-51'	31°	80°12'	-49'	34°	81°00'	-47'	38°	81°46'	-45'	42°	82°29'	-41'	47°	83°07'	-37'	53°	83°40'	-31'	61°	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°
	14			15			16			17			18			19			20					Dec°	

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°	14			15			16			17			18			19			20			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	74°23'	+54'	153°	73°29'	+54'	155°	72°34'	+55'	156°	71°39'	+56'	157°	70°44'	+56'	158°	69°48'	+56'	159°	68°51'	+57'	160°	0			
1	75°16'	+53'	151°	74°23'	+54'	153°	73°29'	+54'	155°	72°35'	+55'	156°	71°40'	+56'	157°	70°44'	+56'	158°	69°48'	+56'	159°	1			
2	76°09'	+52'	149°	75°17'	+53'	151°	74°24'	+54'	153°	73°30'	+54'	155°	72°35'	+55'	156°	71°40'	+56'	157°	70°45'	+56'	158°	2			
3	77°01'	+50'	147°	76°09'	+52'	149°	75°17'	+53'	151°	74°24'	+54'	153°	73°30'	+54'	155°	72°36'	+55'	156°	71°41'	+56'	157°	3			
4	77°51'	+49'	145°	77°01'	+50'	147°	76°10'	+52'	149°	75°18'	+53'	151°	74°25'	+54'	153°	73°31'	+55'	155°	72°36'	+55'	156°	4			
5	78°40'	+47'	142°	77°52'	+49'	145°	77°02'	+51'	147°	76°11'	+52'	149°	75°19'	+53'	151°	74°25'	+54'	153°	73°32'	+55'	155°	5			
6	79°27'	+45'	139°	78°40'	+47'	142°	77°52'	+49'	145°	77°03'	+51'	147°	76°11'	+52'	149°	75°19'	+53'	151°	74°26'	+54'	153°	6			
7	80°11'	+42'	135°	79°27'	+45'	139°	78°41'	+47'	142°	77°53'	+49'	145°	77°03'	+51'	147°	76°12'	+52'	150°	75°20'	+53'	151°	7			
8	80°53'	+38'	130°	80°12'	+42'	135°	79°28'	+45'	139°	78°42'	+47'	142°	77°54'	+49'	145°	77°04'	+51'	147°	76°13'	+52'	150°	8			
9	81°31'	+33'	125°	80°54'	+38'	130°	80°13'	+42'	135°	79°29'	+45'	139°	78°43'	+47'	142°	77°55'	+49'	145°	77°05'	+51'	147°	9			
10	82°04'	+28'	120°	81°32'	+34'	125°	80°55'	+38'	131°	80°14'	+42'	135°	79°31'	+45'	139°	78°44'	+47'	142°	77°56'	+49'	145°	10			
11	82°32'	+21'	113°	82°06'	+28'	120°	81°33'	+34'	125°	80°56'	+38'	131°	80°16'	+42'	135°	79°32'	+45'	139°	78°45'	+48'	142°	11			
12	82°54'	+14'	106°	82°34'	+21'	113°	82°07'	+28'	120°	81°35'	+34'	125°	80°58'	+39'	131°	80°17'	+42'	135°	79°33'	+45'	139°	12			
13	83°07'	+05'	98°	82°55'	+14'	106°	82°35'	+22'	113°	82°09'	+28'	120°	81°36'	+34'	126°	80°59'	+39'	131°	80°18'	+42'	135°	13			
14	83°12'	-03'	89°	83°09'	+05'	98°	82°57'	+14'	106°	82°37'	+22'	113°	82°10'	+29'	120°	81°38'	+34'	126°	81°01'	+39'	131°	14			
15	83°09'	-12'	81°	83°14'	-03'	89°	83°11'	+05'	97°	82°59'	+14'	106°	82°39'	+22'	113°	82°12'	+29'	120°	81°40'	+34'	126°	15			
16	82°57'	-20'	73°	83°11'	-12'	81°	83°16'	-03'	89°	83°13'	+05'	97°	83°01'	+14'	106°	82°41'	+22'	113°	82°14'	+29'	120°	16			
17	82°37'	-27'	65°	82°59'	-20'	73°	83°13'	-12'	81°	83°18'	-03'	89°	83°15'	+06'	97°	83°03'	+14'	106°	82°43'	+22'	113°	17			
18	82°10'	-32'	58°	82°39'	-27'	65°	83°01'	-20'	72°	83°15'	-12'	80°	83°21'	-03'	89°	83°17'	+06'	97°	83°05'	+14'	106°	18			
19	81°38'	-37'	52°	82°12'	-33'	58°	82°41'	-27'	65°	83°03'	-20'	72°	83°17'	-12'	80°	83°23'	-03'	89°	83°20'	+06'	97°	19			
20	81°01'	-41'	47°	81°40'	-37'	52°	82°14'	-33'	58°	82°43'	-27'	65°	83°05'	-20'	72°	83°20'	-12'	80°	83°25'	-03'	89°	20			
21	80°20'	-44'	43°	81°02'	-41'	47°	81°42'	-37'	52°	82°16'	-33'	58°	82°45'	-27'	64°	83°08'	-20'	72°	83°22'	-12'	80°	21			
22	79°36'	-46'	39°	80°21'	-44'	42°	81°04'	-41'	47°	81°43'	-37'	52°	82°18'	-33'	58°	82°47'	-27'	64°	83°10'	-20'	72°	22			
23	78°49'	-48'	35°	79°37'	-47'	39°	80°23'	-44'	42°	81°06'	-41'	46°	81°45'	-38'	51°	82°20'	-33'	57°	82°50'	-27'	64°	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°
	14			15			16			17			18			19			20					Dec°	

7° 353° LHA Latitude SAME as Declination 7° 353° LHA

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

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

8° 352° LHA

Latitude SAME as Declination

8° 352° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	73°55'	+52'	150°	73°03'	+53'	151°	72°09'	+54'	153°	71°16'	+54'	154°	70°21'	+55'	156°	69°27'	+55'	157°	68°31'	+56'	158°	0
1	74°47'	+51'	148°	73°55'	+52'	150°	73°03'	+53'	151°	72°10'	+54'	153°	71°16'	+54'	154°	70°22'	+55'	156°	69°27'	+55'	157°	1
2	75°38'	+50'	146°	74°47'	+51'	148°	73°56'	+52'	150°	73°04'	+53'	151°	72°11'	+54'	153°	71°17'	+54'	154°	70°23'	+55'	156°	2
3	76°27'	+48'	144°	75°38'	+50'	146°	74°48'	+51'	148°	73°57'	+52'	150°	73°04'	+53'	151°	72°11'	+54'	153°	71°18'	+55'	154°	3
4	77°16'	+47'	141°	76°28'	+48'	144°	75°39'	+50'	146°	74°49'	+51'	148°	73°58'	+52'	150°	73°05'	+53'	151°	72°12'	+54'	153°	4
5	78°02'	+44'	138°	77°17'	+47'	141°	76°29'	+48'	144°	75°40'	+50'	146°	74°50'	+51'	148°	73°58'	+52'	150°	73°06'	+53'	152°	5
6	78°47'	+42'	135°	78°03'	+45'	138°	77°18'	+47'	141°	76°30'	+49'	144°	75°41'	+50'	146°	74°51'	+51'	148°	73°59'	+52'	150°	6
7	79°28'	+39'	131°	78°48'	+42'	135°	78°04'	+45'	138°	77°19'	+47'	141°	76°31'	+49'	144°	75°42'	+50'	146°	74°52'	+51'	148°	7
8	80°07'	+35'	127°	79°30'	+39'	131°	78°49'	+42'	135°	78°05'	+45'	138°	77°20'	+47'	141°	76°32'	+49'	144°	75°43'	+50'	146°	8
9	80°42'	+31'	122°	80°09'	+35'	127°	79°31'	+39'	131°	78°50'	+42'	135°	78°07'	+45'	138°	77°21'	+47'	141°	76°33'	+49'	144°	9
10	81°13'	+25'	116°	80°44'	+31'	122°	80°10'	+35'	127°	79°32'	+39'	131°	78°52'	+42'	135°	78°08'	+45'	138°	77°22'	+47'	141°	10
11	81°38'	+19'	110°	81°14'	+25'	116°	80°45'	+31'	122°	80°12'	+35'	127°	79°34'	+39'	131°	78°53'	+43'	135°	78°09'	+45'	138°	11
12	81°57'	+12'	103°	81°40'	+19'	110°	81°16'	+26'	116°	80°47'	+31'	122°	80°13'	+36'	127°	79°36'	+39'	131°	78°55'	+43'	135°	12
13	82°09'	+05'	96°	81°59'	+12'	103°	81°42'	+19'	110°	81°18'	+26'	116°	80°49'	+31'	122°	80°15'	+36'	127°	79°37'	+40'	131°	13
14	82°14'	-03'	89°	82°11'	+05'	96°	82°01'	+12'	103°	81°44'	+20'	110°	81°20'	+26'	116°	80°51'	+31'	122°	80°17'	+36'	127°	14
15	82°11'	-10'	82°	82°16'	-03'	89°	82°14'	+05'	96°	82°03'	+13'	103°	81°46'	+20'	110°	81°22'	+26'	116°	80°53'	+32'	122°	15
16	82°01'	-17'	74°	82°14'	-10'	82°	82°19'	-03'	89°	82°16'	+05'	96°	82°06'	+13'	103°	81°48'	+20'	110°	81°24'	+26'	116°	16
17	81°44'	-24'	68°	82°03'	-17'	74°	82°16'	-10'	81°	82°21'	-03'	89°	82°18'	+05'	96°	82°08'	+13'	103°	81°51'	+20'	110°	17
18	81°20'	-29'	61°	81°46'	-24'	68°	82°06'	-17'	74°	82°18'	-10'	81°	82°24'	-03'	89°	82°21'	+05'	96°	82°11'	+13'	103°	18
19	80°51'	-34'	56°	81°22'	-29'	61°	81°48'	-24'	67°	82°08'	-17'	74°	82°21'	-10'	81°	82°26'	-03'	89°	82°24'	+05'	96°	19
20	80°17'	-38'	51°	80°53'	-34'	56°	81°24'	-29'	61°	81°51'	-24'	67°	82°11'	-17'	74°	82°24'	-10'	81°	82°29'	-03'	89°	20
21	79°39'	-41'	46°	80°19'	-38'	51°	80°55'	-34'	55°	81°27'	-29'	61°	81°53'	-24'	67°	82°13'	-18'	74°	82°26'	-10'	81°	21
22	78°58'	-44'	42°	79°41'	-41'	46°	80°21'	-38'	50°	80°57'	-34'	55°	81°29'	-30'	61°	81°56'	-24'	67°	82°16'	-18'	74°	22
23	78°14'	-46'	39°	79°00'	-44'	42°	79°43'	-41'	46°	80°23'	-38'	50°	81°00'	-34'	55°	81°32'	-30'	60°	81°59'	-24'	67°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	73°24'	+50'	147°	72°34'	+51'	149°	71°42'	+52'	150°	70°50'	+53'	152°	69°57'	+54'	153°	69°03'	+54'	154°	68°09'	+55'	155°	0
1	74°15'	+49'	145°	73°25'	+50'	147°	72°34'	+51'	149°	71°43'	+52'	150°	70°50'	+53'	152°	69°57'	+54'	153°	69°04'	+54'	154°	1
2	75°04'	+48'	143°	74°15'	+49'	145°	73°26'	+50'	147°	72°35'	+52'	149°	71°43'	+52'	150°	70°51'	+53'	152°	69°58'	+54'	153°	2
3	75°52'	+46'	140°	75°05'	+48'	143°	74°16'	+49'	145°	73°27'	+51'	147°	72°36'	+52'	149°	71°44'	+53'	150°	70°52'	+53'	152°	3
4	76°38'	+44'	138°	75°52'	+46'	140°	75°06'	+48'	143°	74°17'	+49'	145°	73°28'	+51'	147°	72°37'	+52'	149°	71°45'	+53'	150°	4
5	77°22'	+42'	135°	76°39'	+44'	138°	75°54'	+46'	140°	75°07'	+48'	143°	74°18'	+50'	145°	73°29'	+51'	147°	72°38'	+52'	149°	5
6	78°04'	+39'	131°	77°23'	+42'	135°	76°40'	+44'	138°	75°55'	+46'	140°	75°08'	+48'	143°	74°19'	+50'	145°	73°30'	+51'	147°	6
7	78°43'	+36'	127°	78°05'	+39'	131°	77°24'	+42'	135°	76°41'	+45'	138°	75°56'	+47'	140°	75°09'	+48'	143°	74°20'	+50'	145°	7
8	79°19'	+32'	123°	78°45'	+36'	127°	78°07'	+40'	131°	77°26'	+42'	135°	76°43'	+45'	138°	75°57'	+47'	140°	75°10'	+48'	143°	8
9	79°52'	+28'	119°	79°21'	+33'	123°	78°46'	+36'	127°	78°08'	+40'	131°	77°27'	+43'	135°	76°44'	+45'	138°	75°59'	+47'	140°	9
10	80°20'	+23'	113°	79°54'	+28'	119°	79°23'	+33'	123°	78°48'	+37'	128°	78°10'	+40'	131°	77°29'	+43'	135°	76°46'	+45'	138°	10
11	80°43'	+17'	108°	80°22'	+23'	113°	79°55'	+28'	119°	79°25'	+33'	123°	78°50'	+37'	128°	78°12'	+40'	131°	77°31'	+43'	135°	11
12	81°00'	+11'	102°	80°45'	+18'	108°	80°24'	+23'	113°	79°57'	+29'	119°	79°26'	+33'	123°	78°52'	+37'	128°	78°13'	+40'	131°	12
13	81°12'	+05'	95°	81°03'	+11'	102°	80°47'	+18'	108°	80°26'	+24'	113°	80°00'	+29'	119°	79°29'	+33'	123°	78°54'	+37'	128°	13
14	81°16'	-02'	89°	81°14'	+05'	95°	81°05'	+11'	102°	80°49'	+18'	108°	80°28'	+24'	114°	80°02'	+29'	119°	79°31'	+33'	123°	14
15	81°14'	-09'	82°	81°18'	-02'	89°	81°16'	+05'	95°	81°07'	+12'	102°	80°52'	+18'	108°	80°31'	+24'	114°	80°04'	+29'	119°	15
16	81°05'	-15'	76°	81°16'	-09'	82°	81°21'	-02'	89°	81°19'	+05'	95°	81°10'	+12'	102°	80°55'	+18'	108°	80°33'	+24'	114°	16
17	80°49'	-21'	70°	81°07'	-15'	76°	81°19'	-09'	82°	81°24'	-02'	89°	81°22'	+05'	95°	81°13'	+12'	102°	80°57'	+18'	108°	17
18	80°28'	-26'	64°	80°52'	-21'	70°	81°10'	-15'	76°	81°22'	-09'	82°	81°26'	-02'	89°	81°24'	+05'	95°	81°16'	+12'	102°	18
19	80°02'	-31'	59°	80°31'	-27'	64°	80°55'	-21'	69°	81°13'	-15'	75°	81°24'	-09'	82°	81°29'	-02'	89°	81°28'	+05'	95°	19
20	79°31'	-35'	54°	80°04'	-31'	58°	80°33'	-27'	64°	80°57'	-21'	69°	81°16'	-15'	75°	81°28'	-09'	82°	81°33'	-02'	88°	20
21	78°56'	-38'	50°	79°33'	-35'	54°	80°07'	-31'	58°	80°36'	-27'	63°	81°00'	-21'	69°	81°19'	-15'	75°	81°31'	-09'	82°	21
22	78°17'	-41'	46°	78°58'	-38'	49°	79°36'	-35'	53°	80°09'	-31'	58°	80°39'	-27'	63°	81°03'	-21'	69°	81°22'	-15'	75°	22
23	77°36'	-44'	42°	78°20'	-41'	45°	79°00'	-38'	49°	79°38'	-35'	53°	80°12'	-31'	58°	80°42'	-27'	63°	81°06'	-21'	69°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

9° 351° LHA

Latitude SAME as Declination

9° 351° LHA

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

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

10° 350° LHA

Latitude SAME as Declination

10° 350° LHA

Dec°	14			15			16			17			18			19			20			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	72°51'	+49'	144°	72°02'	+50'	146°	71°12'	+51'	147°	70°21'	+52'	149°	69°29'	+53'	150°	68°37'	+53'	152°	67°44'	+54'	153°	0			
1	73°40'	+47'	142°	72°52'	+49'	144°	72°03'	+50'	146°	71°13'	+51'	147°	70°22'	+52'	149°	69°30'	+53'	150°	68°38'	+53'	152°	1			
2	74°27'	+46'	140°	73°41'	+47'	142°	72°53'	+49'	144°	72°04'	+50'	146°	71°14'	+51'	147°	70°23'	+52'	149°	69°31'	+53'	150°	2			
3	75°13'	+44'	137°	74°28'	+46'	140°	73°42'	+48'	142°	72°54'	+49'	144°	72°05'	+50'	146°	71°15'	+51'	147°	70°24'	+52'	149°	3			
4	75°57'	+42'	134°	75°14'	+44'	137°	74°29'	+46'	140°	73°43'	+48'	142°	72°55'	+49'	144°	72°06'	+50'	146°	71°16'	+51'	147°	4			
5	76°39'	+40'	131°	75°58'	+42'	134°	75°15'	+44'	137°	74°31'	+46'	140°	73°44'	+48'	142°	72°56'	+49'	144°	72°07'	+50'	146°	5			
6	77°19'	+37'	128°	76°41'	+40'	131°	76°00'	+42'	134°	75°17'	+45'	137°	74°32'	+46'	140°	73°45'	+48'	142°	72°58'	+49'	144°	6			
7	77°56'	+34'	124°	77°21'	+37'	128°	76°42'	+40'	131°	76°01'	+43'	134°	75°18'	+45'	137°	74°33'	+46'	140°	73°47'	+48'	142°	7			
8	78°30'	+30'	120°	77°58'	+34'	124°	77°22'	+37'	128°	76°44'	+40'	131°	76°03'	+43'	135°	75°20'	+45'	137°	74°35'	+47'	140°	8			
9	79°00'	+26'	116°	78°32'	+30'	120°	78°00'	+34'	124°	77°24'	+37'	128°	76°46'	+40'	132°	76°05'	+43'	135°	75°22'	+45'	137°	9			
10	79°26'	+21'	111°	79°02'	+26'	116°	78°34'	+30'	120°	78°02'	+34'	124°	77°26'	+38'	128°	76°47'	+41'	132°	76°06'	+43'	135°	10			
11	79°47'	+16'	106°	79°28'	+21'	111°	79°04'	+26'	116°	78°36'	+31'	120°	78°04'	+34'	125°	77°28'	+38'	128°	76°49'	+41'	132°	11			
12	80°03'	+10'	100°	79°50'	+16'	106°	79°30'	+22'	111°	79°06'	+26'	116°	78°38'	+31'	120°	78°06'	+35'	125°	77°30'	+38'	128°	12			
13	80°14'	+04'	95°	80°06'	+10'	100°	79°52'	+16'	106°	79°33'	+22'	111°	79°09'	+27'	116°	78°40'	+31'	121°	78°08'	+35'	125°	13			
14	80°18'	-02'	89°	80°16'	+04'	95°	80°08'	+11'	100°	79°55'	+16'	106°	79°35'	+22'	111°	79°11'	+27'	116°	78°43'	+31'	121°	14			
15	80°16'	-08'	83°	80°20'	-02'	89°	80°19'	+05'	95°	80°11'	+11'	100°	79°57'	+17'	106°	79°38'	+22'	111°	79°14'	+27'	116°	15			
16	80°08'	-14'	77°	80°19'	-08'	83°	80°23'	-02'	89°	80°22'	+05'	95°	80°14'	+11'	100°	80°00'	+17'	106°	79°41'	+22'	111°	16			
17	79°55'	-19'	71°	80°11'	-14'	77°	80°22'	-08'	83°	80°26'	-02'	89°	80°25'	+05'	94°	80°17'	+11'	100°	80°03'	+17'	106°	17			
18	79°35'	-24'	66°	79°57'	-19'	71°	80°14'	-14'	77°	80°25'	-08'	83°	80°29'	-02'	88°	80°28'	+05'	94°	80°20'	+11'	100°	18			
19	79°11'	-28'	61°	79°38'	-24'	66°	80°00'	-19'	71°	80°17'	-14'	77°	80°28'	-08'	82°	80°33'	-01'	88°	80°31'	+05'	94°	19			
20	78°43'	-32'	57°	79°14'	-29'	61°	79°41'	-24'	66°	80°03'	-19'	71°	80°20'	-14'	76°	80°31'	-08'	82°	80°36'	-01'	88°	20			
21	78°11'	-36'	52°	78°46'	-32'	56°	79°17'	-29'	61°	79°44'	-24'	65°	80°07'	-19'	71°	80°24'	-14'	76°	80°35'	-08'	82°	21			
22	77°35'	-39'	48°	78°13'	-36'	52°	78°48'	-32'	56°	79°20'	-29'	60°	79°47'	-24'	65°	80°10'	-19'	71°	80°27'	-14'	76°	22			
23	76°56'	-41'	45°	77°37'	-39'	48°	78°16'	-36'	52°	78°51'	-33'	56°	79°23'	-29'	60°	79°51'	-24'	65°	80°14'	-19'	70°	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°
	14			15			16			17			18			19			20						

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°	14			15			16			17			18			19			20			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	72°16'	+47'	141°	71°28'	+48'	143°	70°40'	+49'	145°	69°50'	+50'	146°	69°00'	+51'	148°	68°09'	+52'	149°	67°17'	+53'	150°	0			
1	73°03'	+46'	139°	72°17'	+47'	141°	71°29'	+48'	143°	70°41'	+49'	145°	69°51'	+51'	146°	69°01'	+51'	148°	68°10'	+52'	149°	1			
2	73°48'	+44'	137°	73°04'	+46'	139°	72°18'	+47'	141°	71°30'	+49'	143°	70°42'	+50'	145°	69°52'	+51'	146°	69°02'	+52'	148°	2			
3	74°33'	+42'	134°	73°50'	+44'	137°	73°05'	+46'	139°	72°19'	+47'	141°	71°32'	+49'	143°	70°43'	+50'	145°	69°54'	+51'	146°	3			
4	75°15'	+40'	132°	74°34'	+42'	134°	73°51'	+44'	137°	73°06'	+46'	139°	72°20'	+47'	141°	71°33'	+49'	143°	70°44'	+50'	145°	4			
5	75°55'	+38'	129°	75°16'	+40'	132°	74°35'	+42'	134°	73°52'	+44'	137°	73°08'	+46'	139°	72°22'	+48'	141°	71°34'	+49'	143°	5			
6	76°32'	+35'	125°	75°56'	+38'	129°	75°18'	+40'	132°	74°37'	+43'	134°	73°54'	+45'	137°	73°09'	+46'	139°	72°23'	+48'	141°	6			
7	77°07'	+32'	122°	76°34'	+35'	125°	75°58'	+38'	129°	75°19'	+41'	132°	74°38'	+43'	134°	73°56'	+45'	137°	73°11'	+46'	139°	7			
8	77°39'	+28'	118°	77°09'	+32'	122°	76°36'	+35'	125°	76°00'	+38'	129°	75°21'	+41'	132°	74°40'	+43'	134°	73°57'	+45'	137°	8			
9	78°07'	+24'	114°	77°41'	+28'	118°	77°11'	+32'	122°	76°38'	+35'	125°	76°02'	+38'	129°	75°23'	+41'	132°	74°42'	+43'	134°	9			
10	78°31'	+20'	109°	78°09'	+24'	114°	77°43'	+28'	118°	77°13'	+32'	122°	76°40'	+36'	125°	76°04'	+38'	129°	75°25'	+41'	132°	10			
11	78°51'	+15'	104°	78°34'	+20'	109°	78°12'	+24'	114°	77°46'	+29'	118°	77°16'	+32'	122°	76°43'	+36'	125°	76°06'	+39'	129°	11			
12	79°06'	+10'	99°	78°54'	+15'	104°	78°36'	+20'	109°	78°14'	+25'	114°	77°48'	+29'	118°	77°18'	+33'	122°	76°45'	+36'	125°	12			
13	79°16'	+04'	94°	79°09'	+10'	99°	78°56'	+15'	104°	78°39'	+20'	109°	78°17'	+25'	114°	77°51'	+29'	118°	77°21'	+33'	122°	13			
14	79°20'	-01'	89°	79°18'	+04'	94°	79°11'	+10'	99°	78°59'	+15'	104°	78°42'	+20'	109°	78°20'	+25'	114°	77°54'	+29'	118°	14			
15	79°18'	-07'	83°	79°23'	-01'	89°	79°21'	+04'	94°	79°14'	+10'	99°	79°02'	+15'	104°	78°45'	+21'	109°	78°23'	+25'	114°	15			
16	79°11'	-12'	78°	79°21'	-07'	83°	79°26'	-01'	88°	79°24'	+04'	94°	79°18'	+10'	99°	79°05'	+16'	104°	78°48'	+21'	109°	16			
17	78°59'	-17'	73°	79°14'	-12'	78°	79°24'	-07'	83°	79°29'	-01'	88°	79°28'	+05'	94°	79°21'	+10'	99°	79°09'	+16'	104°	17			
18	78°42'	-22'	68°	79°02'	-17'	73°	79°18'	-12'	78°	79°28'	-07'	83°	79°32'	-01'	88°	79°31'	+05'	94°	79°25'	+10'	99°	18			
19	78°20'	-26'	63°	78°45'	-22'	68°	79°05'	-17'	72°	79°21'	-12'	78°	79°31'	-07'	83°	79°36'	-01'	88°	79°35'	+05'	94°	19			
20	77°54'	-30'	59°	78°23'	-26'	63°	78°48'	-22'	67°	79°09'	-17'	72°	79°25'	-12'	77°	79°35'	-07'	83°	79°40'	-01'	88°	20			
21	77°24'	-33'	55°	77°57'	-30'	59°	78°26'	-26'	63°	78°52'	-22'	67°	79°13'	-17'	72°	79°28'	-12'	77°	79°39'	-07'	83°	21			
22	76°50'	-36'	51°	77°27'	-33'	54°	78°00'	-30'	58°	78°30'	-26'	62°	78°55'	-22'	67°	79°16'	-17'	72°	79°32'	-12'	77°	22			
23	76°14'	-39'	48°	76°53'	-36'	51°	77°30'	-33'	54°	78°03'	-30'	58°	78°33'	-26'	62°	78°59'	-22'	67°	79°20'	-17'	72°	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°
	14			15			16			17			18			19			20						

11° 349° LHA

Latitude SAME as Declination

11° 349° LHA

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

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

12° 348° LHA

Latitude SAME as Declination

12° 348° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	71°38'	+45'	139°	70°53'	+47'	141°	70°06'	+48'	142°	69°18'	+49'	144°	68°29'	+50'	145°	67°39'	+51'	147°	66°48'	+52'	148°	0
1	72°24'	+44'	137°	71°39'	+46'	139°	70°54'	+47'	141°	70°07'	+48'	142°	69°19'	+49'	144°	68°30'	+50'	145°	67°40'	+51'	147°	1
2	73°08'	+42'	134°	72°25'	+44'	137°	71°41'	+46'	139°	70°55'	+47'	141°	70°08'	+48'	142°	69°20'	+49'	144°	68°31'	+50'	145°	2
3	73°50'	+40'	132°	73°09'	+42'	134°	72°26'	+44'	137°	71°42'	+46'	139°	70°56'	+47'	141°	70°09'	+48'	142°	69°21'	+49'	144°	3
4	74°30'	+38'	129°	73°51'	+41'	132°	73°10'	+43'	134°	72°28'	+44'	137°	71°44'	+46'	139°	70°58'	+47'	141°	70°11'	+49'	142°	4
5	75°09'	+36'	126°	74°32'	+38'	129°	73°53'	+41'	132°	73°12'	+43'	134°	72°29'	+44'	136°	71°45'	+46'	139°	70°59'	+47'	141°	5
6	75°44'	+33'	123°	75°10'	+36'	126°	74°34'	+39'	129°	73°55'	+41'	132°	73°14'	+43'	134°	72°31'	+45'	136°	71°47'	+46'	139°	6
7	76°17'	+30'	119°	75°46'	+33'	123°	75°12'	+36'	126°	74°36'	+39'	129°	73°57'	+41'	132°	73°16'	+43'	134°	72°33'	+45'	137°	7
8	76°47'	+26'	116°	76°19'	+30'	119°	75°48'	+33'	123°	75°14'	+36'	126°	74°38'	+39'	129°	73°59'	+41'	132°	73°18'	+43'	134°	8
9	77°14'	+23'	112°	76°49'	+27'	116°	76°22'	+30'	119°	75°51'	+34'	123°	75°17'	+36'	126°	74°40'	+39'	129°	74°01'	+41'	132°	9
10	77°36'	+18'	107°	77°16'	+23'	112°	76°52'	+27'	116°	76°24'	+30'	119°	75°53'	+34'	123°	75°19'	+37'	126°	74°42'	+39'	129°	10
11	77°55'	+14'	103°	77°39'	+19'	107°	77°19'	+23'	112°	76°54'	+27'	116°	76°27'	+31'	119°	75°56'	+34'	123°	75°22'	+37'	126°	11
12	78°08'	+09'	98°	77°57'	+14'	103°	77°42'	+19'	107°	77°21'	+23'	112°	76°57'	+27'	116°	76°29'	+31'	119°	75°58'	+34'	123°	12
13	78°17'	+04'	93°	78°11'	+09'	98°	78°00'	+14'	103°	77°45'	+19'	107°	77°24'	+23'	112°	77°00'	+27'	116°	76°32'	+31'	119°	13
14	78°21'	-01'	89°	78°20'	+04'	93°	78°14'	+09'	98°	78°03'	+14'	103°	77°48'	+19'	107°	77°28'	+23'	112°	77°03'	+28'	116°	14
15	78°20'	-06'	84°	78°25'	-01'	88°	78°24'	+04'	93°	78°18'	+09'	98°	78°07'	+14'	103°	77°51'	+19'	107°	77°31'	+24'	112°	15
16	78°14'	-11'	79°	78°24'	-06'	83°	78°28'	-01'	88°	78°27'	+04'	93°	78°21'	+10'	98°	78°10'	+15'	103°	77°55'	+19'	107°	16
17	78°03'	-16'	74°	78°18'	-11'	79°	78°27'	-06'	83°	78°32'	-01'	88°	78°31'	+05'	93°	78°25'	+10'	98°	78°14'	+15'	103°	17
18	77°48'	-20'	69°	78°07'	-16'	74°	78°21'	-11'	78°	78°31'	-06'	83°	78°35'	-01'	88°	78°35'	+05'	93°	78°29'	+10'	98°	18
19	77°28'	-24'	65°	77°51'	-20'	69°	78°10'	-16'	74°	78°25'	-11'	78°	78°35'	-06'	83°	78°39'	-01'	88°	78°39'	+05'	93°	19
20	77°03'	-28'	61°	77°31'	-24'	65°	77°55'	-20'	69°	78°14'	-16'	73°	78°29'	-11'	78°	78°39'	-06'	83°	78°44'	00'	88°	20
21	76°36'	-31'	57°	77°07'	-28'	61°	77°35'	-24'	64°	77°58'	-20'	69°	78°18'	-16'	73°	78°33'	-11'	78°	78°43'	-06'	83°	21
22	76°04'	-34'	53°	76°39'	-31'	57°	77°10'	-28'	60°	77°38'	-24'	64°	78°02'	-20'	68°	78°22'	-16'	73°	78°37'	-11'	78°	22
23	75°30'	-37'	50°	76°08'	-34'	53°	76°42'	-31'	56°	77°14'	-28'	60°	77°42'	-24'	64°	78°07'	-20'	68°	78°27'	-16'	73°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	70°59'	+44'	136°	70°15'	+45'	138°	69°30'	+47'	140°	68°43'	+48'	142°	67°55'	+49'	143°	67°07'	+50'	145°	66°18'	+51'	146°	0
1	71°43'	+42'	134°	71°00'	+44'	136°	70°16'	+45'	138°	69°31'	+47'	140°	68°44'	+48'	142°	67°57'	+49'	143°	67°08'	+50'	145°	1
2	72°25'	+41'	132°	71°44'	+42'	134°	71°02'	+44'	136°	70°18'	+46'	138°	69°32'	+47'	140°	68°46'	+48'	142°	67°58'	+49'	143°	2
3	73°06'	+39'	129°	72°27'	+41'	132°	71°46'	+43'	134°	71°03'	+44'	136°	70°19'	+46'	138°	69°34'	+47'	140°	68°47'	+48'	142°	3
4	73°44'	+36'	127°	73°07'	+39'	129°	72°28'	+41'	132°	71°47'	+43'	134°	71°05'	+44'	136°	70°21'	+46'	138°	69°36'	+47'	140°	4
5	74°21'	+34'	124°	73°46'	+37'	127°	73°09'	+39'	129°	72°30'	+41'	132°	71°49'	+43'	134°	71°07'	+45'	136°	70°23'	+46'	138°	5
6	74°55'	+31'	121°	74°23'	+34'	124°	73°48'	+37'	127°	73°11'	+39'	129°	72°32'	+41'	132°	71°51'	+43'	134°	71°09'	+45'	136°	6
7	75°26'	+28'	117°	74°57'	+31'	121°	74°25'	+34'	124°	73°50'	+37'	127°	73°13'	+39'	129°	72°34'	+41'	132°	71°53'	+43'	134°	7
8	75°54'	+25'	114°	75°28'	+28'	117°	74°59'	+32'	121°	74°27'	+35'	124°	73°53'	+37'	127°	73°16'	+39'	129°	72°37'	+42'	132°	8
9	76°19'	+21'	110°	75°57'	+25'	114°	75°31'	+29'	117°	75°02'	+32'	121°	74°30'	+35'	124°	73°55'	+37'	127°	73°18'	+40'	129°	9
10	76°40'	+17'	106°	76°22'	+21'	110°	75°59'	+25'	114°	75°34'	+29'	117°	75°04'	+32'	121°	74°32'	+35'	124°	73°58'	+38'	127°	10
11	76°58'	+13'	102°	76°43'	+17'	106°	76°25'	+22'	110°	76°02'	+25'	114°	75°36'	+29'	117°	75°07'	+32'	121°	74°35'	+35'	124°	11
12	77°11'	+09'	97°	77°01'	+13'	102°	76°46'	+18'	106°	76°28'	+22'	110°	76°05'	+26'	114°	75°40'	+29'	117°	75°10'	+32'	121°	12
13	77°19'	+04'	93°	77°14'	+09'	97°	77°04'	+13'	102°	76°50'	+18'	106°	76°31'	+22'	110°	76°09'	+26'	114°	75°43'	+29'	117°	13
14	77°23'	-01'	88°	77°23'	+04'	93°	77°17'	+09'	97°	77°07'	+14'	102°	76°53'	+18'	106°	76°35'	+22'	110°	76°12'	+26'	114°	14
15	77°23'	-05'	84°	77°27'	-01'	88°	77°26'	+04'	93°	77°21'	+09'	97°	77°11'	+14'	102°	76°57'	+18'	106°	76°38'	+22'	110°	15
16	77°17'	-10'	79°	77°26'	-05'	84°	77°30'	00'	88°	77°30'	+04'	93°	77°25'	+09'	97°	77°15'	+14'	102°	77°01'	+18'	106°	16
17	77°07'	-14'	75°	77°21'	-10'	79°	77°30'	-05'	84°	77°34'	00'	88°	77°34'	+04'	93°	77°29'	+09'	97°	77°19'	+14'	102°	17
18	76°53'	-18'	71°	77°11'	-14'	75°	77°25'	-10'	79°	77°34'	-05'	83°	77°38'	00'	88°	77°38'	+05'	93°	77°33'	+09'	97°	18
19	76°35'	-22'	66°	76°57'	-18'	70°	77°15'	-14'	74°	77°29'	-10'	79°	77°38'	-05'	83°	77°43'	00'	88°	77°42'	+05'	92°	19
20	76°12'	-26'	62°	76°38'	-22'	66°	77°01'	-18'	70°	77°19'	-14'	74°	77°33'	-10'	79°	77°42'	-05'	83°	77°47'	00'	88°	20
21	75°46'	-29'	59°	76°16'	-26'	62°	76°42'	-22'	66°	77°05'	-18'	70°	77°23'	-14'	74°	77°38'	-10'	79°	77°47'	-05'	83°	21
22	75°17'	-32'	55°	75°50'	-29'	58°	76°20'	-26'	62°	76°46'	-22'	66°	77°09'	-18'	70°	77°28'	-14'	74°	77°42'	-10'	78°	22
23	74°45'	-35'	52°	75°21'	-32'	55°	75°54'	-29'	58°	76°24'	-26'	62°	76°51'	-22'	65°	77°14'	-18'	69°	77°33'	-14'	74°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

13° 347° LHA

Latitude SAME as Declination

13° 347° LHA

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

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

14° 346° LHA

Latitude SAME as Declination

14° 346° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	70°18'	+42'	134°	69°36'	+44'	136°	68°52'	+45'	138°	68°07'	+47'	140°	67°20'	+48'	141°	66°33'	+49'	143°	65°45'	+50'	144°	0
1	71°00'	+41'	132°	70°19'	+42'	134°	69°37'	+44'	136°	68°53'	+45'	138°	68°08'	+47'	139°	67°22'	+48'	141°	66°35'	+49'	143°	1
2	71°41'	+39'	130°	71°02'	+41'	132°	70°21'	+43'	134°	69°39'	+44'	136°	68°55'	+46'	138°	68°10'	+47'	139°	67°24'	+48'	141°	2
3	72°20'	+37'	127°	71°43'	+39'	130°	71°04'	+41'	132°	70°23'	+43'	134°	69°40'	+44'	136°	68°56'	+46'	138°	68°11'	+47'	139°	3
4	72°57'	+35'	125°	72°22'	+37'	127°	71°45'	+39'	130°	71°05'	+41'	132°	70°25'	+43'	134°	69°42'	+44'	136°	68°58'	+46'	138°	4
5	73°32'	+32'	122°	72°59'	+35'	125°	72°24'	+37'	127°	71°47'	+39'	130°	71°08'	+41'	132°	70°27'	+43'	134°	69°44'	+45'	136°	5
6	74°04'	+30'	119°	73°34'	+33'	122°	73°01'	+35'	125°	72°26'	+38'	127°	71°49'	+40'	130°	71°10'	+42'	132°	70°29'	+43'	134°	6
7	74°34'	+27'	116°	74°07'	+30'	119°	73°36'	+33'	122°	73°04'	+35'	124°	72°29'	+38'	127°	71°51'	+40'	130°	71°12'	+42'	132°	7
8	75°01'	+24'	112°	74°36'	+27'	115°	74°09'	+30'	119°	73°39'	+33'	122°	73°06'	+36'	124°	72°31'	+38'	127°	71°54'	+40'	130°	8
9	75°24'	+20'	109°	75°03'	+24'	112°	74°39'	+27'	115°	74°12'	+30'	119°	73°42'	+33'	122°	73°09'	+36'	124°	72°34'	+38'	127°	9
10	75°44'	+16'	105°	75°27'	+20'	108°	75°06'	+24'	112°	74°42'	+27'	115°	74°15'	+30'	119°	73°45'	+33'	122°	73°12'	+36'	124°	10
11	76°01'	+12'	101°	75°47'	+16'	105°	75°30'	+20'	108°	75°10'	+24'	112°	74°45'	+28'	115°	74°18'	+31'	119°	73°48'	+34'	122°	11
12	76°13'	+08'	97°	76°04'	+13'	101°	75°51'	+17'	105°	75°34'	+21'	108°	75°13'	+24'	112°	74°49'	+28'	115°	74°21'	+31'	119°	12
13	76°21'	+04'	93°	76°16'	+08'	97°	76°07'	+13'	101°	75°54'	+17'	105°	75°37'	+21'	108°	75°16'	+25'	112°	74°52'	+28'	115°	13
14	76°25'	00'	88°	76°25'	+04'	92°	76°20'	+09'	97°	76°11'	+13'	101°	75°58'	+17'	105°	75°41'	+21'	108°	75°20'	+25'	112°	14
15	76°25'	-05'	84°	76°29'	00'	88°	76°28'	+04'	92°	76°24'	+09'	96°	76°15'	+13'	101°	76°02'	+17'	104°	75°45'	+21'	108°	15
16	76°20'	-09'	80°	76°28'	-05'	84°	76°33'	00'	88°	76°33'	+04'	92°	76°28'	+09'	96°	76°19'	+13'	100°	76°06'	+17'	104°	16
17	76°11'	-13'	76°	76°24'	-09'	80°	76°33'	-05'	84°	76°37'	00'	88°	76°37'	+04'	92°	76°32'	+09'	96°	76°24'	+13'	100°	17
18	75°58'	-17'	72°	76°15'	-13'	75°	76°28'	-09'	79°	76°37'	-04'	84°	76°41'	+00'	88°	76°41'	+05'	92°	76°37'	+09'	96°	18
19	75°41'	-21'	68°	76°02'	-17'	71°	76°19'	-13'	75°	76°32'	-09'	79°	76°41'	-04'	83°	76°46'	+00'	88°	76°46'	+05'	92°	19
20	75°20'	-24'	64°	75°45'	-21'	67°	76°06'	-17'	71°	76°24'	-13'	75°	76°37'	-09'	79°	76°46'	-04'	83°	76°51'	+00'	88°	20
21	74°56'	-27'	60°	75°24'	-24'	64°	75°49'	-21'	67°	76°11'	-17'	71°	76°28'	-13'	75°	76°42'	-09'	79°	76°51'	-04'	83°	21
22	74°29'	-30'	57°	75°00'	-27'	60°	75°29'	-24'	63°	75°54'	-21'	67°	76°15'	-17'	71°	76°33'	-13'	75°	76°47'	-09'	79°	22
23	73°59'	-33'	54°	74°33'	-30'	57°	75°04'	-27'	60°	75°33'	-24'	63°	75°58'	-21'	67°	76°20'	-17'	71°	76°38'	-13'	75°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	69°36'	+41'	132°	68°55'	+42'	134°	68°12'	+44'	136°	67°29'	+45'	137°	66°44'	+46'	139°	65°58'	+48'	141°	65°11'	+49'	142°	0
1	70°16'	+39'	130°	69°37'	+41'	132°	68°56'	+43'	134°	68°14'	+44'	136°	67°30'	+45'	137°	66°45'	+47'	139°	66°00'	+48'	140°	1
2	70°56'	+37'	128°	70°18'	+39'	130°	69°39'	+41'	132°	68°58'	+43'	134°	68°16'	+44'	136°	67°32'	+46'	137°	66°47'	+47'	139°	2
3	71°33'	+35'	125°	70°57'	+38'	128°	70°20'	+40'	130°	69°41'	+41'	132°	69°00'	+43'	134°	68°18'	+44'	136°	67°34'	+46'	137°	3
4	72°09'	+33'	123°	71°35'	+36'	125°	71°00'	+38'	128°	70°22'	+40'	130°	69°43'	+42'	132°	69°02'	+43'	134°	68°20'	+45'	136°	4
5	72°42'	+31'	120°	72°11'	+33'	123°	71°37'	+36'	125°	71°02'	+38'	128°	70°24'	+40'	130°	69°45'	+42'	132°	69°04'	+43'	134°	5
6	73°13'	+28'	117°	72°44'	+31'	120°	72°13'	+34'	123°	71°40'	+36'	125°	71°04'	+38'	127°	70°27'	+40'	130°	69°48'	+42'	132°	6
7	73°41'	+25'	114°	73°15'	+28'	117°	72°47'	+31'	120°	72°16'	+34'	123°	71°42'	+36'	125°	71°07'	+38'	127°	70°29'	+40'	130°	7
8	74°07'	+22'	111°	73°44'	+26'	114°	73°18'	+29'	117°	72°50'	+31'	120°	72°19'	+34'	122°	71°45'	+36'	125°	71°10'	+39'	127°	8
9	74°29'	+19'	107°	74°09'	+23'	111°	73°47'	+26'	114°	73°21'	+29'	117°	72°53'	+32'	120°	72°22'	+34'	122°	71°48'	+37'	125°	9
10	74°48'	+15'	104°	74°32'	+19'	107°	74°13'	+23'	110°	73°50'	+26'	114°	73°24'	+29'	117°	72°56'	+32'	120°	72°25'	+34'	122°	10
11	75°03'	+12'	100°	74°51'	+16'	104°	74°35'	+19'	107°	74°16'	+23'	110°	73°53'	+26'	114°	73°28'	+29'	117°	72°59'	+32'	120°	11
12	75°15'	+08'	96°	75°07'	+12'	100°	74°55'	+16'	103°	74°39'	+20'	107°	74°20'	+23'	110°	73°57'	+26'	114°	73°32'	+30'	117°	12
13	75°23'	+04'	92°	75°19'	+08'	96°	75°11'	+12'	100°	74°59'	+16'	103°	74°43'	+20'	107°	74°24'	+23'	110°	74°01'	+27'	114°	13
14	75°27'	00'	88°	75°27'	+04'	92°	75°23'	+08'	96°	75°15'	+12'	100°	75°03'	+16'	103°	74°47'	+20'	107°	74°28'	+24'	110°	14
15	75°27'	-04'	84°	75°31'	+00'	88°	75°31'	+04'	92°	75°27'	+08'	96°	75°19'	+12'	100°	75°07'	+16'	103°	74°51'	+20'	107°	15
16	75°23'	-08'	80°	75°31'	-04'	84°	75°35'	+00'	88°	75°35'	+04'	92°	75°31'	+09'	96°	75°23'	+13'	100°	75°11'	+17'	103°	16
17	75°15'	-12'	76°	75°27'	-08'	80°	75°35'	-04'	84°	75°40'	+00'	88°	75°40'	+04'	92°	75°36'	+09'	96°	75°28'	+13'	99°	17
18	75°03'	-16'	73°	75°19'	-12'	76°	75°31'	-08'	80°	75°40'	-04'	84°	75°44'	+00'	88°	75°45'	+05'	92°	75°41'	+09'	96°	18
19	74°47'	-19'	69°	75°07'	-16'	72°	75°23'	-12'	76°	75°36'	-08'	80°	75°45'	-04'	84°	75°49'	+00'	88°	75°50'	+05'	92°	19
20	74°28'	-22'	65°	74°51'	-19'	69°	75°11'	-16'	72°	75°28'	-12'	76°	75°41'	-08'	80°	75°50'	-04'	83°	75°55'	+01'	87°	20
21	74°05'	-26'	62°	74°32'	-22'	65°	74°56'	-19'	68°	75°16'	-16'	72°	75°33'	-12'	76°	75°46'	-08'	79°	75°55'	-04'	83°	21
22	73°40'	-28'	59°	74°10'	-26'	62°	74°37'	-22'	65°	75°01'	-19'	68°	75°21'	-16'	72°	75°38'	-12'	75°	75°52'	-08'	79°	22
23	73°11'	-31'	55°	73°44'	-28'	58°	74°14'	-26'	61°	74°42'	-23'	64°	75°06'	-19'	68°	75°27'	-16'	71°	75°44'	-12'	75°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	68°52'	+39'	130°	68°12'	+41'	132°	67°31'	+43'	134°	66°49'	+44'	136°	66°06'	+45'	137°	65°21'	+46'	139°	64°36'	+47'	140°	0
1	69°31'	+38'	128°	68°53'	+40'	130°	68°14'	+41'	132°	67°33'	+43'	134°	66°51'	+44'	135°	66°08'	+45'	137°	65°23'	+47'	139°	1
2	70°09'	+36'	126°	69°33'	+38'	128°	68°55'	+40'	130°	68°16'	+41'	132°	67°35'	+43'	134°	66°53'	+44'	135°	66°10'	+46'	137°	2
3	70°45'	+34'	123°	70°11'	+36'	126°	69°35'	+38'	128°	68°57'	+40'	130°	68°18'	+42'	132°	67°37'	+43'	134°	66°55'	+44'	135°	3
4	71°19'	+32'	121°	70°47'	+34'	123°	70°13'	+36'	126°	69°37'	+38'	128°	69°00'	+40'	130°	68°20'	+42'	132°	67°40'	+43'	134°	4
5	71°51'	+30'	118°	71°21'	+32'	121°	70°50'	+34'	123°	70°16'	+37'	126°	69°40'	+39'	128°	69°02'	+40'	130°	68°23'	+42'	132°	5
6	72°21'	+27'	115°	71°54'	+30'	118°	71°24'	+32'	121°	70°52'	+35'	123°	70°18'	+37'	126°	69°43'	+39'	128°	69°05'	+41'	130°	6
7	72°48'	+24'	112°	72°23'	+27'	115°	71°56'	+30'	118°	71°27'	+32'	121°	70°55'	+35'	123°	70°21'	+37'	126°	69°45'	+39'	128°	7
8	73°12'	+21'	109°	72°50'	+24'	112°	72°26'	+27'	115°	71°59'	+30'	118°	71°30'	+33'	121°	70°58'	+35'	123°	70°24'	+37'	126°	8
9	73°33'	+18'	106°	73°15'	+21'	109°	72°54'	+25'	112°	72°30'	+28'	115°	72°03'	+30'	118°	71°33'	+33'	121°	71°02'	+35'	123°	9
10	73°51'	+15'	103°	73°36'	+18'	106°	73°18'	+22'	109°	72°57'	+25'	112°	72°33'	+28'	115°	72°06'	+31'	118°	71°37'	+33'	121°	10
11	74°06'	+11'	99°	73°55'	+15'	102°	73°40'	+18'	106°	73°22'	+22'	109°	73°01'	+25'	112°	72°37'	+28'	115°	72°10'	+31'	118°	11
12	74°17'	+08'	95°	74°10'	+11'	99°	73°58'	+15'	102°	73°44'	+19'	106°	73°26'	+22'	109°	73°05'	+25'	112°	72°41'	+28'	115°	12
13	74°25'	+04'	92°	74°21'	+08'	95°	74°14'	+12'	99°	74°03'	+15'	102°	73°48'	+19'	106°	73°30'	+22'	109°	73°09'	+26'	112°	13
14	74°29'	+00'	88°	74°29'	+04'	92°	74°25'	+08'	95°	74°18'	+12'	99°	74°07'	+16'	102°	73°52'	+19'	106°	73°35'	+23'	109°	14
15	74°29'	-04'	84°	74°33'	+00'	88°	74°33'	+04'	92°	74°30'	+08'	95°	74°22'	+12'	99°	74°12'	+16'	102°	73°57'	+19'	106°	15
16	74°25'	-07'	81°	74°33'	-03'	84°	74°37'	+00'	88°	74°38'	+04'	91°	74°34'	+08'	95°	74°27'	+12'	99°	74°16'	+16'	102°	16
17	74°18'	-11'	77°	74°30'	-07'	80°	74°38'	-03'	84°	74°42'	+01'	88°	74°43'	+05'	91°	74°39'	+08'	95°	74°32'	+12'	99°	17
18	74°07'	-14'	73°	74°22'	-11'	77°	74°34'	-07'	80°	74°43'	-03'	84°	74°47'	+01'	88°	74°48'	+05'	91°	74°45'	+09'	95°	18
19	73°52'	-18'	70°	74°12'	-14'	73°	74°27'	-11'	77°	74°39'	-07'	80°	74°48'	-03'	84°	74°53'	+01'	87°	74°53'	+05'	91°	19
20	73°35'	-21'	66°	73°57'	-18'	70°	74°16'	-14'	73°	74°32'	-11'	76°	74°45'	-07'	80°	74°53'	-03'	84°	74°58'	+01'	87°	20
21	73°14'	-24'	63°	73°39'	-21'	66°	74°02'	-18'	69°	74°22'	-14'	73°	74°38'	-11'	76°	74°50'	-07'	80°	74°59'	-03'	83°	21
22	72°50'	-27'	60°	73°18'	-24'	63°	73°44'	-21'	66°	74°07'	-18'	69°	74°27'	-14'	72°	74°43'	-11'	76°	74°56'	-07'	80°	22
23	72°23'	-29'	57°	72°54'	-27'	60°	73°23'	-24'	63°	73°50'	-21'	66°	74°13'	-18'	69°	74°33'	-14'	72°	74°49'	-11'	76°	23
Dec°	14			15			16			17			18			19			20			Dec°

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	68°07'	+38'	128°	67°29'	+40'	130°	66°49'	+41'	132°	66°08'	+43'	134°	65°26'	+44'	135°	64°43'	+45'	137°	63°59'	+46'	138°	0
1	68°45'	+37'	126°	68°08'	+38'	128°	67°30'	+40'	130°	66°51'	+42'	132°	66°10'	+43'	134°	65°28'	+44'	135°	64°45'	+45'	137°	1
2	69°21'	+35'	124°	68°47'	+37'	126°	68°10'	+39'	128°	67°33'	+40'	130°	66°53'	+42'	132°	66°12'	+43'	134°	65°30'	+44'	135°	2
3	69°56'	+33'	122°	69°23'	+35'	124°	68°49'	+37'	126°	68°13'	+39'	128°	67°35'	+40'	130°	66°56'	+42'	132°	66°15'	+43'	134°	3
4	70°29'	+31'	119°	69°58'	+33'	122°	69°26'	+35'	124°	68°51'	+37'	126°	68°15'	+39'	128°	67°37'	+41'	130°	66°58'	+42'	132°	4
5	70°59'	+28'	117°	70°31'	+31'	119°	70°01'	+33'	122°	69°29'	+35'	124°	68°54'	+37'	126°	68°18'	+39'	128°	67°40'	+41'	130°	5
6	71°28'	+26'	114°	71°02'	+29'	117°	70°34'	+31'	119°	70°04'	+33'	121°	69°31'	+35'	124°	68°57'	+37'	126°	68°21'	+39'	128°	6
7	71°53'	+23'	111°	71°31'	+26'	114°	71°05'	+29'	116°	70°37'	+31'	119°	70°07'	+34'	121°	69°35'	+36'	124°	69°00'	+38'	126°	7
8	72°17'	+20'	108°	71°57'	+23'	111°	71°34'	+26'	114°	71°08'	+29'	116°	70°40'	+31'	119°	70°10'	+34'	121°	69°38'	+36'	124°	8
9	72°37'	+17'	105°	72°20'	+21'	108°	72°00'	+24'	111°	71°37'	+26'	114°	71°12'	+29'	116°	70°44'	+32'	119°	70°14'	+34'	121°	9
10	72°54'	+14'	102°	72°40'	+18'	105°	72°24'	+21'	108°	72°04'	+24'	111°	71°41'	+27'	114°	71°16'	+29'	116°	70°48'	+32'	119°	10
11	73°08'	+11'	98°	72°58'	+14'	102°	72°44'	+18'	105°	72°28'	+21'	108°	72°08'	+24'	111°	71°45'	+27'	114°	71°20'	+30'	116°	11
12	73°19'	+07'	95°	73°12'	+11'	98°	73°02'	+15'	101°	72°49'	+18'	105°	72°32'	+21'	108°	72°12'	+24'	111°	71°49'	+27'	114°	12
13	73°27'	+04'	91°	73°23'	+08'	95°	73°17'	+11'	98°	73°06'	+15'	101°	72°53'	+18'	105°	72°36'	+21'	108°	72°17'	+24'	111°	13
14	73°31'	+00'	88°	73°31'	+04'	91°	73°28'	+08'	95°	73°21'	+11'	98°	73°11'	+15'	101°	72°58'	+18'	104°	72°41'	+22'	108°	14
15	73°31'	-03'	84°	73°35'	+01'	88°	73°36'	+04'	91°	73°33'	+08'	95°	73°26'	+12'	98°	73°16'	+15'	101°	73°03'	+19'	104°	15
16	73°28'	-07'	81°	73°36'	-03'	84°	73°40'	+01'	88°	73°40'	+04'	91°	73°38'	+08'	94°	73°31'	+12'	98°	73°21'	+15'	101°	16
17	73°21'	-10'	77°	73°33'	-07'	81°	73°40'	-03'	84°	73°45'	+01'	87°	73°46'	+05'	91°	73°43'	+08'	94°	73°37'	+12'	98°	17
18	73°11'	-13'	74°	73°26'	-10'	77°	73°38'	-06'	81°	73°46'	-03'	84°	73°50'	+01'	87°	73°51'	+05'	91°	73°49'	+08'	94°	18
19	72°58'	-17'	71°	73°16'	-13'	74°	73°31'	-10'	77°	73°43'	-06'	80°	73°51'	-03'	84°	73°56'	+01'	87°	73°57'	+05'	91°	19
20	72°41'	-20'	67°	73°03'	-17'	70°	73°21'	-13'	74°	73°37'	-10'	77°	73°49'	-06'	80°	73°57'	-03'	84°	74°02'	+01'	87°	20
21	72°21'	-23'	64°	72°46'	-20'	67°	73°08'	-17'	70°	73°27'	-13'	73°	73°42'	-10'	77°	73°55'	-06'	80°	74°03'	-02'	83°	21
22	71°59'	-25'	61°	72°27'	-23'	64°	72°51'	-20'	67°	73°14'	-16'	70°	73°33'	-13'	73°	73°48'	-10'	76°	74°01'	-06'	80°	22
23	71°34'	-28'	58°	72°04'	-25'	61°	72°32'	-23'	64°	72°57'	-20'	67°	73°19'	-16'	70°	73°39'	-13'	73°	73°55'	-10'	76°	23
Dec°	14			15			16			17			18			19			20			Dec°

17° 343° LHA

Latitude SAME as Declination

17° 343° LHA

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

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

18° 342° LHA

Latitude SAME as Declination

18° 342° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	67°20'	+37'	127°	66°44'	+39'	129°	66°06'	+40'	130°	65°26'	+42'	132°	64°45'	+43'	134°	64°04'	+44'	135°	63°21'	+45'	136°	0
1	67°57'	+35'	125°	67°22'	+37'	127°	66°46'	+39'	128°	66°08'	+40'	130°	65°28'	+42'	132°	64°48'	+43'	133°	64°06'	+44'	135°	1
2	68°33'	+33'	122°	67°59'	+35'	125°	67°25'	+37'	126°	66°48'	+39'	128°	66°10'	+41'	130°	65°31'	+42'	132°	64°50'	+43'	133°	2
3	69°06'	+32'	120°	68°35'	+34'	122°	68°02'	+36'	124°	67°27'	+37'	126°	66°51'	+39'	128°	66°13'	+41'	130°	65°33'	+42'	132°	3
4	69°37'	+29'	118°	69°09'	+32'	120°	68°37'	+34'	122°	68°05'	+36'	124°	67°30'	+38'	126°	66°53'	+39'	128°	66°16'	+41'	130°	4
5	70°07'	+27'	115°	69°40'	+30'	118°	69°11'	+32'	120°	68°40'	+34'	122°	68°08'	+36'	124°	67°33'	+38'	126°	66°57'	+40'	128°	5
6	70°34'	+25'	113°	70°10'	+27'	115°	69°43'	+30'	118°	69°14'	+32'	120°	68°44'	+34'	122°	68°11'	+36'	124°	67°36'	+38'	126°	6
7	70°59'	+22'	110°	70°37'	+25'	112°	70°13'	+28'	115°	69°47'	+30'	117°	69°18'	+32'	120°	68°47'	+35'	122°	68°14'	+36'	124°	7
8	71°21'	+19'	107°	71°02'	+22'	110°	70°41'	+25'	112°	70°17'	+28'	115°	69°50'	+30'	117°	69°21'	+33'	120°	68°51'	+35'	122°	8
9	71°41'	+17'	104°	71°25'	+20'	107°	71°06'	+23'	110°	70°44'	+25'	112°	70°20'	+28'	115°	69°54'	+31'	117°	69°25'	+33'	120°	9
10	71°57'	+14'	101°	71°44'	+17'	104°	71°29'	+20'	107°	71°10'	+23'	110°	70°49'	+26'	112°	70°25'	+28'	115°	69°58'	+31'	117°	10
11	72°11'	+10'	98°	72°01'	+14'	101°	71°48'	+17'	104°	71°33'	+20'	107°	71°14'	+23'	109°	70°53'	+26'	112°	70°29'	+29'	115°	11
12	72°21'	+07'	94°	72°15'	+11'	98°	72°05'	+14'	101°	71°53'	+17'	104°	71°37'	+20'	107°	71°19'	+23'	109°	70°57'	+26'	112°	12
13	72°28'	+04'	91°	72°26'	+07'	94°	72°19'	+11'	97°	72°10'	+14'	101°	71°58'	+17'	104°	71°42'	+21'	106°	71°24'	+24'	109°	13
14	72°32'	+01'	88°	72°33'	+04'	91°	72°30'	+08'	94°	72°24'	+11'	97°	72°15'	+14'	100°	72°03'	+18'	103°	71°47'	+21'	106°	14
15	72°33'	-03'	84°	72°37'	+01'	88°	72°38'	+04'	91°	72°35'	+08'	94°	72°29'	+11'	97°	72°20'	+15'	100°	72°08'	+18'	103°	15
16	72°30'	-06'	81°	72°38'	-03'	84°	72°42'	+01'	88°	72°43'	+04'	91°	72°41'	+08'	94°	72°35'	+11'	97°	72°26'	+15'	100°	16
17	72°24'	-09'	78°	72°35'	-06'	81°	72°43'	-02'	84°	72°48'	+01'	87°	72°49'	+05'	91°	72°46'	+08'	94°	72°41'	+12'	97°	17
18	72°15'	-12'	75°	72°29'	-09'	78°	72°41'	-06'	81°	72°49'	-02'	84°	72°53'	+01'	87°	72°54'	+05'	90°	72°52'	+08'	94°	18
19	72°03'	-15'	71°	72°20'	-12'	74°	72°35'	-09'	77°	72°46'	-06'	81°	72°54'	-02'	84°	72°59'	+01'	87°	73°01'	+05'	90°	19
20	71°47'	-18'	68°	72°08'	-15'	71°	72°26'	-12'	74°	72°41'	-09'	77°	72°52'	-06'	80°	73°01'	-02'	84°	73°06'	+02'	87°	20
21	71°29'	-21'	65°	71°53'	-18'	68°	72°14'	-15'	71°	72°32'	-12'	74°	72°47'	-09'	77°	72°59'	-05'	80°	73°07'	-02'	83°	21
22	71°08'	-24'	62°	71°34'	-21'	65°	71°58'	-18'	68°	72°20'	-15'	71°	72°38'	-12'	74°	72°53'	-09'	77°	73°05'	-05'	80°	22
23	70°44'	-26'	60°	71°13'	-24'	62°	71°40'	-21'	65°	72°04'	-18'	68°	72°26'	-15'	70°	72°44'	-12'	73°	73°00'	-09'	77°	23

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

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	66°33'	+36'	125°	65°58'	+37'	127°	65°21'	+39'	129°	64°43'	+40'	130°	64°04'	+42'	132°	63°23'	+43'	133°	62°41'	+44'	135°	0
1	67°09'	+34'	123°	66°35'	+36'	125°	66°00'	+38'	127°	65°23'	+39'	129°	64°45'	+41'	130°	64°06'	+42'	132°	63°25'	+43'	133°	1
2	67°43'	+32'	121°	67°11'	+34'	123°	66°38'	+36'	125°	66°03'	+38'	127°	65°26'	+39'	129°	64°48'	+41'	130°	64°09'	+42'	132°	2
3	68°15'	+30'	119°	67°45'	+32'	121°	67°14'	+34'	123°	66°40'	+36'	125°	66°05'	+38'	127°	65°29'	+40'	128°	64°51'	+41'	130°	3
4	68°46'	+28'	116°	68°18'	+31'	119°	67°48'	+33'	121°	67°17'	+35'	123°	66°43'	+37'	125°	66°08'	+38'	127°	65°32'	+40'	128°	4
5	69°14'	+26'	114°	68°49'	+29'	116°	68°21'	+31'	118°	67°51'	+33'	121°	67°20'	+35'	123°	66°47'	+37'	125°	66°12'	+38'	127°	5
6	69°40'	+24'	111°	69°17'	+26'	114°	68°52'	+29'	116°	68°24'	+31'	118°	67°55'	+33'	121°	67°23'	+35'	123°	66°50'	+37'	125°	6
7	70°04'	+21'	109°	69°43'	+24'	111°	69°21'	+27'	114°	68°55'	+29'	116°	68°28'	+31'	118°	67°58'	+33'	120°	67°27'	+35'	123°	7
8	70°25'	+19'	106°	70°07'	+22'	109°	69°47'	+24'	111°	69°24'	+27'	114°	68°59'	+29'	116°	68°32'	+31'	118°	68°02'	+34'	120°	8
9	70°44'	+16'	103°	70°29'	+19'	106°	70°11'	+22'	108°	69°51'	+24'	111°	69°28'	+27'	113°	69°03'	+29'	116°	68°36'	+32'	118°	9
10	71°00'	+13'	100°	70°48'	+16'	103°	70°33'	+19'	106°	70°16'	+22'	108°	69°55'	+25'	111°	69°33'	+27'	113°	69°08'	+30'	116°	10
11	71°13'	+10'	97°	71°04'	+13'	100°	70°52'	+16'	103°	70°38'	+19'	106°	70°20'	+22'	108°	70°00'	+25'	111°	69°37'	+28'	113°	11
12	71°23'	+07'	94°	71°17'	+10'	97°	71°09'	+14'	100°	70°57'	+17'	103°	70°42'	+20'	105°	70°25'	+22'	108°	70°05'	+25'	111°	12
13	71°30'	+04'	91°	71°28'	+07'	94°	71°22'	+11'	97°	71°14'	+14'	100°	71°02'	+17'	103°	70°48'	+20'	105°	70°30'	+23'	108°	13
14	71°34'	+01'	88°	71°35'	+04'	91°	71°33'	+07'	94°	71°27'	+11'	97°	71°19'	+14'	100°	71°07'	+17'	102°	70°53'	+20'	105°	14
15	71°35'	-02'	85°	71°39'	+01'	88°	71°40'	+04'	91°	71°38'	+08'	94°	71°33'	+11'	97°	71°24'	+14'	99°	71°13'	+17'	102°	15
16	71°33'	-05'	81°	71°40'	-02'	84°	71°45'	+01'	87°	71°46'	+05'	90°	71°44'	+08'	93°	71°39'	+11'	96°	71°30'	+14'	99°	16
17	71°27'	-08'	78°	71°38'	-05'	81°	71°46'	-02'	84°	71°50'	+01'	87°	71°52'	+05'	90°	71°50'	+08'	93°	71°45'	+11'	96°	17
18	71°19'	-11'	75°	71°33'	-08'	78°	71°44'	-05'	81°	71°52'	-02'	84°	71°56'	+01'	87°	71°58'	+05'	90°	71°56'	+08'	93°	18
19	71°07'	-14'	72°	71°24'	-11'	75°	71°39'	-08'	78°	71°50'	-05'	81°	71°58'	-02'	84°	72°03'	+02'	87°	72°04'	+05'	90°	19
20	70°53'	-17'	69°	71°13'	-14'	72°	71°30'	-11'	75°	71°45'	-08'	78°	71°56'	-05'	81°	72°04'	-02'	84°	72°09'	+02'	87°	20
21	70°36'	-20'	66°	70°59'	-17'	69°	71°19'	-14'	72°	71°37'	-11'	74°	71°51'	-08'	77°	72°03'	-05'	80°	72°11'	-01'	83°	21
22	70°16'	-22'	63°	70°42'	-20'	66°	71°05'	-17'	69°	71°25'	-14'	71°	71°43'	-11'	74°	71°58'	-08'	77°	72°10'	-05'	80°	22
23	69°53'	-25'	61°	70°22'	-22'	63°	70°48'	-20'	66°	71°11'	-17'	68°	71°32'	-14'	71°	71°50'	-11'	74°	72°05'	-08'	77°	23

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°	14			15			16			17			18			19			20			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°
0	65°45'	+35'	124°	65°11'	+36'	125°	64°36'	+38'	127°	63°59'	+39'	129°	63°21'	+41'	130°	62°41'	+42'	132°	62°01'	+43'	133°	0			
1	66°20'	+33'	122°	65°47'	+35'	123°	65°14'	+36'	125°	64°38'	+38'	127°	64°01'	+40'	129°	63°23'	+41'	130°	62°44'	+42'	132°	1			
2	66°53'	+31'	119°	66°22'	+33'	121°	65°50'	+35'	123°	65°16'	+37'	125°	64°41'	+38'	127°	64°04'	+40'	129°	63°26'	+41'	130°	2			
3	67°24'	+29'	117°	66°55'	+31'	119°	66°25'	+33'	121°	65°53'	+35'	123°	65°19'	+37'	125°	64°44'	+39'	127°	64°07'	+40'	129°	3			
4	67°53'	+27'	115°	67°27'	+30'	117°	66°58'	+32'	119°	66°28'	+34'	121°	65°56'	+35'	123°	65°22'	+37'	125°	64°47'	+39'	127°	4			
5	68°20'	+25'	113°	67°56'	+28'	115°	67°30'	+30'	117°	67°02'	+32'	119°	66°31'	+34'	121°	66°00'	+36'	123°	65°26'	+37'	125°	5			
6	68°46'	+23'	110°	68°24'	+25'	113°	68°00'	+28'	115°	67°34'	+30'	117°	67°05'	+32'	119°	66°35'	+34'	121°	66°03'	+36'	123°	6			
7	69°09'	+21'	108°	68°49'	+23'	110°	68°27'	+26'	112°	68°04'	+28'	115°	67°37'	+30'	117°	67°09'	+32'	119°	66°39'	+34'	121°	7			
8	69°29'	+18'	105°	69°12'	+21'	107°	68°53'	+23'	110°	68°31'	+26'	112°	68°08'	+28'	115°	67°42'	+30'	117°	67°13'	+33'	119°	8			
9	69°47'	+15'	102°	69°33'	+18'	105°	69°16'	+21'	107°	68°57'	+24'	110°	68°36'	+26'	112°	68°12'	+28'	115°	67°46'	+31'	117°	9			
10	70°02'	+13'	99°	69°51'	+16'	102°	69°37'	+18'	105°	69°21'	+21'	107°	69°02'	+24'	110°	68°41'	+26'	112°	68°17'	+29'	114°	10			
11	70°15'	+10'	96°	70°07'	+13'	99°	69°56'	+16'	102°	69°42'	+19'	105°	69°26'	+21'	107°	69°07'	+24'	110°	68°45'	+27'	112°	11			
12	70°25'	+07'	94°	70°20'	+10'	96°	70°12'	+13'	99°	70°01'	+16'	102°	69°47'	+19'	104°	69°31'	+22'	107°	69°12'	+24'	110°	12			
13	70°32'	+04'	91°	70°30'	+07'	93°	70°25'	+10'	96°	70°17'	+13'	99°	70°06'	+16'	102°	69°53'	+19'	104°	69°36'	+22'	107°	13			
14	70°36'	+01'	88°	70°37'	+04'	90°	70°35'	+07'	93°	70°30'	+10'	96°	70°23'	+14'	99°	70°12'	+17'	102°	69°58'	+19'	104°	14			
15	70°37'	-02'	85°	70°41'	+01'	87°	70°43'	+04'	90°	70°41'	+08'	93°	70°36'	+11'	96°	70°28'	+14'	99°	70°18'	+17'	102°	15			
16	70°35'	-05'	82°	70°43'	-02'	84°	70°47'	+01'	87°	70°48'	+05'	90°	70°47'	+08'	93°	70°42'	+11'	96°	70°35'	+14'	99°	16			
17	70°30'	-08'	79°	70°41'	-05'	81°	70°48'	-02'	84°	70°53'	+02'	87°	70°55'	+05'	90°	70°53'	+08'	93°	70°49'	+11'	96°	17			
18	70°23'	-11'	76°	70°36'	-08'	78°	70°47'	-05'	81°	70°55'	-01'	84°	70°59'	+02'	87°	71°01'	+05'	90°	71°00'	+08'	93°	18			
19	70°12'	-13'	73°	70°28'	-11'	75°	70°42'	-08'	78°	70°53'	-04'	81°	71°01'	-01'	84°	71°06'	+02'	87°	71°08'	+05'	90°	19			
20	69°58'	-16'	70°	70°18'	-13'	72°	70°35'	-10'	75°	70°49'	-07'	78°	71°00'	-04'	81°	71°08'	-01'	84°	71°13'	+02'	87°	20			
21	69°42'	-19'	67°	70°04'	-16'	70°	70°24'	-13'	72°	70°41'	-10'	75°	70°55'	-07'	78°	71°07'	-04'	81°	71°15'	-01'	83°	21			
22	69°24'	-21'	64°	69°48'	-19'	67°	70°11'	-16'	69°	70°31'	-13'	72°	70°48'	-10'	75°	71°03'	-07'	77°	71°14'	-04'	80°	22			
23	69°02'	-24'	62°	69°30'	-21'	64°	69°55'	-19'	66°	70°18'	-16'	69°	70°38'	-13'	72°	70°55'	-10'	74°	71°10'	-07'	77°	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°
	14			15			16			17			18			19			20						

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°	14			15			16			17			18			19			20			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°
0	64°56'	+33'	122°	64°23'	+35'	124°	63°49'	+37'	126°	63°14'	+38'	127°	62°37'	+40'	129°	61°58'	+41'	130°	61°19'	+42'	132°	0			
1	65°30'	+32'	120°	64°59'	+34'	122°	64°26'	+35'	124°	63°52'	+37'	126°	63°16'	+39'	127°	62°39'	+40'	129°	62°01'	+41'	130°	1			
2	66°02'	+30'	118°	65°32'	+32'	120°	65°01'	+34'	122°	64°29'	+36'	124°	63°55'	+37'	125°	63°19'	+39'	127°	62°42'	+40'	129°	2			
3	66°32'	+28'	116°	66°05'	+30'	118°	65°35'	+32'	120°	65°05'	+34'	122°	64°32'	+36'	124°	63°58'	+37'	125°	63°23'	+39'	127°	3			
4	67°00'	+26'	114°	66°35'	+29'	116°	66°08'	+31'	118°	65°39'	+33'	120°	65°08'	+34'	122°	64°36'	+36'	124°	64°02'	+38'	125°	4			
5	67°26'	+24'	111°	67°03'	+27'	114°	66°38'	+29'	116°	66°11'	+31'	118°	65°42'	+33'	120°	65°12'	+35'	122°	64°39'	+36'	123°	5			
6	67°51'	+22'	109°	67°30'	+25'	111°	67°07'	+27'	114°	66°42'	+29'	116°	66°15'	+31'	118°	65°46'	+33'	120°	65°16'	+35'	122°	6			
7	68°13'	+20'	107°	67°55'	+22'	109°	67°34'	+25'	111°	67°11'	+27'	113°	66°46'	+29'	116°	66°19'	+31'	118°	65°51'	+33'	120°	7			
8	68°33'	+17'	104°	68°17'	+20'	106°	67°59'	+23'	109°	67°38'	+25'	111°	67°15'	+27'	113°	66°51'	+30'	116°	66°24'	+32'	118°	8			
9	68°50'	+15'	101°	68°37'	+18'	104°	68°21'	+20'	106°	68°03'	+23'	109°	67°43'	+25'	111°	67°20'	+28'	113°	66°55'	+30'	115°	9			
10	69°05'	+12'	99°	68°55'	+15'	101°	68°42'	+18'	104°	68°26'	+21'	106°	68°08'	+23'	109°	67°48'	+26'	111°	67°25'	+28'	113°	10			
11	69°17'	+10'	96°	69°10'	+13'	99°	68°59'	+15'	101°	68°47'	+18'	104°	68°31'	+21'	106°	68°13'	+23'	109°	67°53'	+26'	111°	11			
12	69°27'	+07'	93°	69°22'	+10'	96°	69°15'	+13'	98°	69°05'	+16'	101°	68°52'	+18'	104°	68°37'	+21'	106°	68°19'	+24'	108°	12			
13	69°34'	+04'	90°	69°32'	+07'	93°	69°28'	+10'	96°	69°20'	+13'	98°	69°10'	+16'	101°	68°58'	+19'	103°	68°42'	+21'	106°	13			
14	69°38'	+01'	87°	69°39'	+04'	90°	69°38'	+07'	93°	69°33'	+10'	96°	69°26'	+13'	98°	69°16'	+16'	101°	69°04'	+19'	103°	14			
15	69°39'	-02'	85°	69°43'	+01'	87°	69°45'	+04'	90°	69°43'	+07'	93°	69°39'	+10'	95°	69°32'	+13'	98°	69°23'	+16'	101°	15			
16	69°38'	-04'	82°	69°45'	-01'	84°	69°49'	+02'	87°	69°51'	+05'	90°	69°50'	+08'	93°	69°46'	+11'	95°	69°39'	+14'	98°	16			
17	69°33'	-07'	79°	69°43'	-04'	81°	69°51'	-01'	84°	69°56'	+02'	87°	69°57'	+05'	90°	69°56'	+08'	92°	69°52'	+11'	95°	17			
18	69°26'	-10'	76°	69°39'	-07'	79°	69°50'	-04'	81°	69°57'	-01'	84°	70°02'	+02'	87°	70°04'	+05'	89°	70°03'	+08'	92°	18			
19	69°16'	-13'	73°	69°32'	-10'	76°	69°46'	-07'	78°	69°56'	-04'	81°	70°04'	-01'	84°	70°09'	+02'	87°	70°12'	+05'	89°	19			
20	69°04'	-15'	70°	69°23'	-12'	73°	69°39'	-10'	76°	69°52'	-07'	78°	70°03'	-04'	81°	70°12'	-01'	84°	70°17'	+02'	86°	20			
21	68°49'	-18'	68°	69°10'	-15'	70°	69°29'	-12'	73°	69°46'	-10'	75°	70°00'	-07'	78°	70°11'	-04'	81°	70°19'	-01'	83°	21			
22	68°31'	-20'	65°	68°55'	-18'	67°	69°17'	-15'	70°	69°36'	-12'	72°	69°53'	-09'	75°	70°07'	-07'	78°	70°19'	-04'	80°	22			
23	68°11'	-22'	63°	68°37'	-20'	65°	69°02'	-17'	67°	69°24'	-15'	70°	69°44'	-12'	72°	70°01'	-09'	75°	70°15'	-06'	77°	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°
	14			15			16			17			18			19			20						

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 12 columns (Dec°, 14, 15, 16, 17, 18, 19, 20, Dec°) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is bordered and has a header row for each column.

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 12 columns (Dec°, 14, 15, 16, 17, 18, 19, 20, Dec°) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is bordered and has a header row for each column.

23° 337° LHA

Latitude SAME as Declination

23° 337° LHA

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

24° 336° LHA

Latitude SAME as Declination

24° 336° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	62°26'	+31'	119°	61°56'	+32'	120°	61°25'	+34'	122°	60°53'	+35'	123°	60°19'	+37'	125°	59°45'	+38'	126°	59°09'	+40'	128°	0
1	62°56'	+29'	117°	62°28'	+31'	118°	61°59'	+33'	120°	61°28'	+34'	122°	60°56'	+36'	123°	60°23'	+37'	125°	59°48'	+38'	126°	1
2	63°25'	+27'	115°	62°59'	+29'	116°	62°32'	+31'	118°	62°03'	+33'	120°	61°32'	+34'	121°	61°00'	+36'	123°	60°27'	+37'	125°	2
3	63°53'	+26'	113°	63°29'	+28'	115°	63°03'	+30'	116°	62°35'	+31'	118°	62°06'	+33'	120°	61°36'	+35'	121°	61°04'	+36'	123°	3
4	64°18'	+24'	111°	63°56'	+26'	113°	63°32'	+28'	114°	63°07'	+30'	116°	62°39'	+32'	118°	62°11'	+33'	120°	61°40'	+35'	121°	4
5	64°42'	+22'	109°	64°22'	+24'	110°	64°00'	+26'	112°	63°37'	+28'	114°	63°11'	+30'	116°	62°44'	+32'	118°	62°15'	+34'	120°	5
6	65°04'	+20'	106°	64°46'	+22'	108°	64°27'	+24'	110°	64°05'	+27'	112°	63°41'	+28'	114°	63°16'	+30'	116°	62°49'	+32'	118°	6
7	65°24'	+18'	104°	65°09'	+20'	106°	64°51'	+23'	108°	64°31'	+25'	110°	64°10'	+27'	112°	63°46'	+29'	114°	63°21'	+31'	116°	7
8	65°42'	+16'	102°	65°29'	+18'	104°	65°14'	+21'	106°	64°56'	+23'	108°	64°36'	+25'	110°	64°15'	+27'	112°	63°51'	+29'	114°	8
9	65°58'	+14'	99°	65°47'	+16'	102°	65°34'	+19'	104°	65°19'	+21'	106°	65°01'	+23'	108°	64°42'	+25'	110°	64°20'	+27'	112°	9
10	66°12'	+11'	97°	66°03'	+14'	99°	65°53'	+16'	101°	65°40'	+19'	104°	65°24'	+21'	106°	65°07'	+23'	108°	64°48'	+26'	110°	10
11	66°23'	+09'	95°	66°17'	+12'	97°	66°09'	+14'	99°	65°58'	+17'	101°	65°46'	+19'	103°	65°31'	+21'	106°	65°13'	+24'	108°	11
12	66°32'	+07'	92°	66°29'	+09'	94°	66°23'	+12'	97°	66°15'	+14'	99°	66°05'	+17'	101°	65°52'	+19'	103°	65°37'	+22'	105°	12
13	66°39'	+04'	90°	66°38'	+07'	92°	66°35'	+10'	94°	66°30'	+12'	96°	66°22'	+15'	99°	66°11'	+17'	101°	65°59'	+20'	103°	13
14	66°43'	+02'	87°	66°45'	+05'	89°	66°45'	+07'	92°	66°42'	+10'	94°	66°36'	+12'	96°	66°28'	+15'	99°	66°18'	+17'	101°	14
15	66°45'	-01'	85°	66°50'	+02'	87°	66°52'	+05'	89°	66°51'	+07'	92°	66°49'	+10'	94°	66°43'	+13'	96°	66°36'	+15'	98°	15
16	66°45'	-03'	82°	66°52'	00'	84°	66°57'	+02'	87°	66°59'	+05'	89°	66°59'	+08'	91°	66°56'	+10'	94°	66°51'	+13'	96°	16
17	66°42'	-05'	79°	66°51'	-03'	82°	66°59'	00'	84°	67°04'	+02'	86°	67°06'	+05'	89°	67°06'	+08'	91°	67°04'	+11'	94°	17
18	66°36'	-08'	77°	66°49'	-05'	79°	66°59'	-03'	82°	67°06'	+00'	84°	67°11'	+03'	86°	67°14'	+05'	89°	67°14'	+08'	91°	18
19	66°28'	-10'	74°	66°43'	-08'	77°	66°56'	-05'	79°	67°06'	-02'	81°	67°14'	+00'	84°	67°20'	+03'	86°	67°22'	+06'	88°	19
20	66°18'	-12'	72°	66°36'	-10'	74°	66°51'	-08'	76°	67°04'	-05'	79°	67°14'	-02'	81°	67°22'	+00'	83°	67°28'	+03'	86°	20
21	66°06'	-15'	70°	66°26'	-12'	72°	66°43'	-10'	74°	66°59'	-07'	76°	67°12'	-05'	78°	67°23'	-02'	81°	67°31'	+01'	83°	21
22	65°51'	-17'	67°	66°13'	-15'	69°	66°34'	-12'	71°	66°52'	-10'	74°	67°07'	-07'	76°	67°21'	-05'	78°	67°32'	-02'	81°	22
23	65°34'	-19'	65°	65°59'	-17'	67°	66°21'	-14'	69°	66°42'	-12'	71°	67°00'	-10'	73°	67°16'	-07'	76°	67°30'	-04'	78°	23
Dec°	14			15			16			17			18			19			20			Dec°

24° 336° LHA

Latitude SAME as Declination

24° 336° LHA

25° 335° LHA

Latitude SAME as Declination

25° 335° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	61°34'	+30'	117°	61°06'	+31'	119°	60°36'	+33'	121°	60°05'	+35'	122°	59°32'	+36'	124°	58°58'	+37'	125°	58°24'	+39'	126°	0
1	62°04'	+28'	116°	61°37'	+30'	117°	61°09'	+32'	119°	60°39'	+33'	120°	60°08'	+35'	122°	59°36'	+36'	123°	59°02'	+38'	125°	1
2	62°32'	+27'	114°	62°07'	+29'	115°	61°41'	+30'	117°	61°13'	+32'	119°	60°43'	+34'	120°	60°12'	+35'	122°	59°40'	+37'	123°	2
3	62°59'	+25'	112°	62°36'	+27'	114°	62°11'	+29'	115°	61°44'	+31'	117°	61°17'	+32'	119°	60°47'	+34'	120°	60°16'	+35'	122°	3
4	63°24'	+23'	110°	63°03'	+25'	112°	62°40'	+27'	113°	62°15'	+29'	115°	61°49'	+31'	117°	61°21'	+32'	118°	60°52'	+34'	120°	4
5	63°47'	+21'	108°	63°28'	+23'	110°	63°07'	+26'	111°	62°44'	+27'	113°	62°20'	+29'	115°	61°53'	+31'	117°	61°26'	+33'	118°	5
6	64°08'	+19'	106°	63°51'	+22'	107°	63°32'	+24'	109°	63°11'	+26'	111°	62°49'	+28'	113°	62°24'	+30'	115°	61°58'	+31'	117°	6
7	64°28'	+18'	103°	64°13'	+20'	105°	63°56'	+22'	107°	63°37'	+24'	109°	63°17'	+26'	111°	62°54'	+28'	113°	62°30'	+30'	115°	7
8	64°45'	+15'	101°	64°33'	+18'	103°	64°18'	+20'	105°	64°01'	+22'	107°	63°43'	+24'	109°	63°22'	+26'	111°	63°00'	+28'	113°	8
9	65°01'	+13'	99°	64°50'	+16'	101°	64°38'	+18'	103°	64°24'	+20'	105°	64°07'	+22'	107°	63°48'	+25'	109°	63°28'	+27'	111°	9
10	65°14'	+11'	97°	65°06'	+14'	99°	64°56'	+16'	101°	64°44'	+18'	103°	64°29'	+21'	105°	64°13'	+23'	107°	63°55'	+25'	109°	10
11	65°25'	+09'	94°	65°20'	+11'	96°	65°12'	+14'	98°	65°02'	+16'	101°	64°50'	+19'	103°	64°36'	+21'	105°	64°19'	+23'	107°	11
12	65°34'	+07'	92°	65°31'	+09'	94°	65°26'	+12'	96°	65°18'	+14'	98°	65°09'	+17'	100°	64°57'	+19'	103°	64°43'	+21'	105°	12
13	65°41'	+04'	89°	65°40'	+07'	92°	65°38'	+09'	94°	65°32'	+12'	96°	65°25'	+14'	98°	65°16'	+17'	100°	65°04'	+19'	102°	13
14	65°45'	+02'	87°	65°47'	+05'	89°	65°47'	+07'	91°	65°44'	+10'	94°	65°40'	+12'	96°	65°32'	+15'	98°	65°23'	+17'	100°	14
15	65°47'	00'	84°	65°52'	+02'	87°	65°54'	+05'	89°	65°54'	+07'	91°	65°52'	+10'	93°	65°47'	+12'	96°	65°40'	+15'	98°	15
16	65°47'	-03'	82°	65°54'	00'	84°	65°59'	+02'	87°	66°01'	+05'	89°	66°02'	+08'	91°	65°59'	+10'	93°	65°55'	+13'	95°	16
17	65°44'	-05'	80°	65°54'	-02'	82°	66°01'	+00'	84°	66°07'	+03'	86°	66°09'	+05'	89°	66°10'	+08'	91°	66°08'	+10'	93°	17
18	65°40'	-07'	77°	65°52'	-05'	79°	66°02'	-02'	82°	66°09'	+00'	84°	66°15'	+03'	86°	66°17'	+06'	88°	66°18'	+08'	91°	18
19	65°32'	-09'	75°	65°47'	-07'	77°	65°59'	-05'	79°	66°10'	-02'	81°	66°17'	+01'	84°	66°23'	+03'	86°	66°26'	+06'	88°	19
20	65°23'	-12'	72°	65°40'	-09'	75°	65°55'	-07'	77°	66°08'	-04'	79°	66°18'	-02'	81°	66°26'	+01'	83°	66°32'	+03'	86°	20
21	65°11'	-14'	70°	65°31'	-12'	72°	65°48'	-09'	74°	66°03'	-07'	76°	66°16'	-04'	79°	66°27'	-02'	81°	66°35'	+01'	83°	21
22	64°57'	-16'	68°	65°19'	-14'	70°	65°39'	-11'	72°	65°56'	-09'	74°	66°12'	-07'	76°	66°25'	-04'	78°	66°36'	-01'	81°	22
23	64°41'	-18'	65°	65°05'	-16'	67°	65°27'	-14'	69°	65°47'	-11'	72°	66°05'	-09'	74°	66°21'	-06'	76°	66°35'	-04'	78°	23
Dec°	14			15			16			17			18			19			20			Dec°

25° 335° LHA

Latitude SAME as Declination

25° 335° LHA

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

26° 334° LHA

Latitude SAME as Declination

26° 334° LHA

Dec°	14			15			16			17			18			19			20			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	60°42'	+29'	116°	60°15'	+31'	118°	59°46'	+32'	119°	59°16'	+34'	121°	58°44'	+35'	122°	58°12'	+37'	124°	57°38'	+38'	125°	0			
1	61°11'	+27'	115°	60°45'	+29'	116°	60°18'	+31'	118°	59°49'	+32'	119°	59°19'	+34'	121°	58°48'	+35'	122°	58°16'	+37'	124°	1			
2	61°39'	+26'	113°	61°15'	+28'	114°	60°49'	+29'	116°	60°22'	+31'	118°	59°53'	+33'	119°	59°24'	+34'	121°	58°52'	+36'	122°	2			
3	62°05'	+24'	111°	61°42'	+26'	113°	61°19'	+28'	114°	60°53'	+30'	116°	60°26'	+31'	117°	59°58'	+33'	119°	59°28'	+35'	120°	3			
4	62°29'	+23'	109°	62°09'	+25'	111°	61°47'	+26'	112°	61°23'	+28'	114°	60°58'	+30'	116°	60°31'	+32'	117°	60°03'	+33'	119°	4			
5	62°51'	+21'	107°	62°33'	+23'	109°	62°13'	+25'	110°	61°51'	+27'	112°	61°28'	+29'	114°	61°02'	+30'	116°	60°36'	+32'	117°	5			
6	63°12'	+19'	105°	62°56'	+21'	107°	62°38'	+23'	109°	62°18'	+25'	110°	61°56'	+27'	112°	61°33'	+29'	114°	61°08'	+31'	115°	6			
7	63°31'	+17'	103°	63°17'	+19'	105°	63°01'	+21'	106°	62°43'	+23'	108°	62°23'	+25'	110°	62°02'	+27'	112°	61°38'	+29'	114°	7			
8	63°48'	+15'	100°	63°36'	+17'	102°	63°22'	+20'	104°	63°06'	+22'	106°	62°49'	+24'	108°	62°29'	+26'	110°	62°08'	+28'	112°	8			
9	64°03'	+13'	98°	63°54'	+15'	100°	63°42'	+18'	102°	63°28'	+20'	104°	63°12'	+22'	106°	62°55'	+24'	108°	62°35'	+26'	110°	9			
10	64°16'	+11'	96°	64°09'	+13'	98°	63°59'	+16'	100°	63°48'	+18'	102°	63°34'	+20'	104°	63°19'	+22'	106°	63°01'	+24'	108°	10			
11	64°27'	+09'	94°	64°22'	+11'	96°	64°15'	+14'	98°	64°06'	+16'	100°	63°54'	+18'	102°	63°41'	+20'	104°	63°25'	+23'	106°	11			
12	64°36'	+07'	91°	64°33'	+09'	94°	64°29'	+11'	96°	64°22'	+14'	98°	64°12'	+16'	100°	64°01'	+18'	102°	63°48'	+21'	104°	12			
13	64°43'	+04'	89°	64°42'	+07'	91°	64°40'	+09'	93°	64°35'	+12'	95°	64°29'	+14'	98°	64°20'	+16'	100°	64°09'	+19'	102°	13			
14	64°47'	+02'	87°	64°49'	+05'	89°	64°49'	+07'	91°	64°47'	+10'	93°	64°43'	+12'	95°	64°36'	+14'	97°	64°27'	+17'	99°	14			
15	64°49'	+00'	84°	64°54'	+02'	87°	64°57'	+05'	89°	64°57'	+07'	91°	64°55'	+10'	93°	64°50'	+12'	95°	64°44'	+15'	97°	15			
16	64°49'	-02'	82°	64°57'	+00'	84°	65°01'	+03'	86°	65°04'	+05'	89°	65°05'	+08'	91°	65°03'	+10'	93°	64°59'	+13'	95°	16			
17	64°47'	-04'	80°	64°57'	-02'	82°	65°04'	+00'	84°	65°09'	+03'	86°	65°12'	+05'	88°	65°13'	+08'	90°	65°11'	+10'	93°	17			
18	64°43'	-07'	77°	64°55'	-04'	80°	65°05'	-02'	82°	65°12'	+01'	84°	65°18'	+03'	86°	65°21'	+06'	88°	65°22'	+08'	90°	18			
19	64°36'	-09'	75°	64°50'	-06'	77°	65°03'	-04'	79°	65°13'	-02'	81°	65°21'	+01'	84°	65°26'	+03'	86°	65°30'	+06'	88°	19			
20	64°27'	-11'	73°	64°44'	-09'	75°	64°59'	-06'	77°	65°11'	-04'	79°	65°22'	-01'	81°	65°30'	+01'	83°	65°36'	+04'	85°	20			
21	64°16'	-13'	71°	64°35'	-11'	73°	64°52'	-08'	75°	65°07'	-06'	77°	65°20'	-04'	79°	65°31'	-01'	81°	65°39'	+01'	83°	21			
22	64°03'	-15'	68°	64°25'	-13'	70°	64°44'	-11'	72°	65°01'	-08'	74°	65°16'	-06'	76°	65°30'	-04'	78°	65°40'	-01'	81°	22			
23	63°48'	-17'	66°	64°12'	-15'	68°	64°33'	-13'	70°	64°53'	-11'	72°	65°10'	-08'	74°	65°26'	-06'	76°	65°39'	-03'	78°	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°
	14			15			16			17			18			19			20						

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°	14			15			16			17			18			19			20			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	59°50'	+28'	115°	59°23'	+30'	117°	58°55'	+31'	118°	58°26'	+33'	120°	57°56'	+34'	121°	57°24'	+36'	123°	56°51'	+37'	124°	0			
1	60°18'	+27'	114°	59°53'	+28'	115°	59°27'	+30'	117°	58°59'	+32'	118°	58°30'	+33'	120°	58°00'	+35'	121°	57°28'	+36'	122°	1			
2	60°45'	+25'	112°	60°22'	+27'	113°	59°57'	+29'	115°	59°31'	+30'	117°	59°03'	+32'	118°	58°34'	+33'	120°	58°04'	+35'	121°	2			
3	61°10'	+24'	110°	60°49'	+25'	112°	60°26'	+27'	113°	60°01'	+29'	115°	59°35'	+31'	116°	59°08'	+32'	118°	58°39'	+34'	119°	3			
4	61°34'	+22'	108°	61°14'	+24'	110°	60°53'	+26'	111°	60°30'	+28'	113°	60°06'	+29'	115°	59°40'	+31'	116°	59°13'	+33'	118°	4			
5	61°56'	+20'	106°	61°38'	+22'	108°	61°19'	+24'	110°	60°58'	+26'	111°	60°35'	+28'	113°	60°11'	+30'	115°	59°45'	+31'	116°	5			
6	62°16'	+18'	104°	62°00'	+21'	106°	61°43'	+23'	108°	61°24'	+24'	109°	61°03'	+26'	111°	60°41'	+28'	113°	60°17'	+30'	114°	6			
7	62°34'	+17'	102°	62°21'	+19'	104°	62°06'	+21'	106°	61°48'	+23'	107°	61°29'	+25'	109°	61°09'	+27'	111°	60°47'	+28'	113°	7			
8	62°51'	+15'	100°	62°40'	+17'	102°	62°26'	+19'	104°	62°11'	+21'	106°	61°54'	+23'	107°	61°35'	+25'	109°	61°15'	+27'	111°	8			
9	63°06'	+13'	98°	62°56'	+15'	100°	62°45'	+17'	102°	62°32'	+19'	104°	62°17'	+21'	105°	62°01'	+23'	107°	61°42'	+25'	109°	9			
10	63°18'	+11'	96°	63°11'	+13'	98°	63°03'	+15'	100°	62°52'	+17'	101°	62°39'	+20'	103°	62°24'	+22'	105°	62°07'	+24'	107°	10			
11	63°29'	+09'	93°	63°24'	+11'	95°	63°18'	+13'	97°	63°09'	+16'	99°	62°58'	+18'	101°	62°46'	+20'	103°	62°31'	+22'	105°	11			
12	63°38'	+07'	91°	63°36'	+09'	93°	63°31'	+11'	95°	63°25'	+14'	97°	63°16'	+16'	99°	63°06'	+18'	101°	62°53'	+20'	103°	12			
13	63°44'	+05'	89°	63°45'	+07'	91°	63°42'	+09'	93°	63°38'	+12'	95°	63°32'	+14'	97°	63°24'	+16'	99°	63°13'	+18'	101°	13			
14	63°49'	+02'	87°	63°51'	+05'	89°	63°52'	+07'	91°	63°50'	+10'	93°	63°46'	+12'	95°	63°40'	+14'	97°	63°32'	+16'	99°	14			
15	63°51'	+00'	84°	63°56'	+03'	86°	63°59'	+05'	88°	63°59'	+07'	91°	63°58'	+10'	93°	63°54'	+12'	95°	63°48'	+14'	97°	15			
16	63°52'	-02'	82°	63°59'	+01'	84°	64°04'	+03'	86°	64°07'	+05'	88°	64°07'	+08'	90°	64°06'	+10'	92°	64°02'	+12'	94°	16			
17	63°50'	-04'	80°	63°59'	-02'	82°	64°07'	+01'	84°	64°12'	+03'	86°	64°15'	+06'	88°	64°16'	+08'	90°	64°15'	+10'	92°	17			
18	63°46'	-06'	78°	63°58'	-04'	80°	64°07'	-01'	82°	64°15'	+01'	84°	64°21'	+03'	86°	64°24'	+06'	88°	64°25'	+08'	90°	18			
19	63°40'	-08'	75°	63°54'	-06'	77°	64°06'	-04'	79°	64°16'	-01'	81°	64°24'	+01'	83°	64°30'	+04'	86°	64°33'	+06'	88°	19			
20	63°32'	-10'	73°	63°48'	-08'	75°	64°02'	-06'	77°	64°15'	-03'	79°	64°25'	-01'	81°	64°33'	+01'	83°	64°39'	+04'	85°	20			
21	63°21'	-12'	71°	63°40'	-10'	73°	63°57'	-08'	75°	64°12'	-06'	77°	64°24'	-03'	79°	64°35'	-01'	81°	64°43'	+02'	83°	21			
22	63°09'	-14'	69°	63°30'	-12'	71°	63°49'	-10'	73°	64°06'	-08'	75°	64°21'	-05'	77°	64°34'	-03'	79°	64°45'	-01'	81°	22			
23	62°55'	-16'	67°	63°18'	-14'	68°	63°39'	-12'	70°	63°58'	-10'	72°	64°16'	-08'	74°	64°31'	-05'	76°	64°44'	-03'	78°	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°
	14			15			16			17			18			19			20						

27° 333° LHA

Latitude SAME as Declination

27° 333° LHA

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

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

28° 332° LHA

Latitude SAME as Declination

28° 332° LHA

Table with 24 rows (Dec 0-23) and columns for hours, minutes, and seconds for LHA values 14-20. Includes a 'Dec°' column on the right.

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 24 rows (Dec 0-23) and columns for hours, minutes, and seconds for LHA values 14-20. Includes a 'Dec°' column on the right.

29° 331° LHA

Latitude SAME as Declination

29° 331° LHA

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

30° 330° LHA

Latitude SAME as Declination

30° 330° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	57°10'	+26'	113°	56°46'	+28'	114°	56°21'	+29'	116°	55°55'	+31'	117°	55°27'	+32'	118°	54°58'	+34'	119°	54°28'	+35'	121°	0
1	57°36'	+25'	111°	57°14'	+26'	113°	56°50'	+28'	114°	56°25'	+30'	115°	55°59'	+31'	117°	55°32'	+32'	118°	55°03'	+34'	119°	1
2	58°01'	+23'	109°	57°41'	+25'	111°	57°19'	+27'	112°	56°55'	+28'	114°	56°30'	+30'	115°	56°04'	+31'	116°	55°37'	+33'	118°	2
3	58°25'	+22'	108°	58°06'	+24'	109°	57°45'	+25'	111°	57°23'	+27'	112°	57°00'	+29'	114°	56°35'	+30'	115°	56°10'	+32'	116°	3
4	58°46'	+20'	106°	58°29'	+22'	107°	58°11'	+24'	109°	57°50'	+26'	110°	57°29'	+27'	112°	57°06'	+29'	113°	56°41'	+30'	115°	4
5	59°07'	+19'	104°	58°51'	+21'	106°	58°35'	+23'	107°	58°16'	+24'	109°	57°56'	+26'	110°	57°35'	+28'	112°	57°12'	+29'	113°	5
6	59°26'	+17'	102°	59°12'	+19'	104°	58°57'	+21'	105°	58°40'	+23'	107°	58°22'	+25'	109°	58°02'	+26'	110°	57°41'	+28'	112°	6
7	59°43'	+16'	100°	59°31'	+18'	102°	59°18'	+19'	104°	59°03'	+21'	105°	58°47'	+23'	107°	58°29'	+25'	108°	58°09'	+27'	110°	7
8	59°58'	+14'	98°	59°49'	+16'	100°	59°38'	+18'	102°	59°24'	+20'	103°	59°10'	+22'	105°	58°53'	+23'	107°	58°36'	+25'	108°	8
9	60°12'	+12'	96°	60°05'	+14'	98°	59°55'	+16'	100°	59°44'	+18'	102°	59°31'	+20'	103°	59°17'	+22'	105°	59°01'	+24'	106°	9
10	60°24'	+10'	94°	60°19'	+12'	96°	60°12'	+14'	98°	60°02'	+16'	100°	59°51'	+18'	101°	59°39'	+20'	103°	59°25'	+22'	105°	10
11	60°35'	+09'	92°	60°31'	+11'	94°	60°26'	+13'	96°	60°19'	+15'	98°	60°10'	+17'	99°	59°59'	+19'	101°	59°47'	+21'	103°	11
12	60°43'	+07'	90°	60°42'	+09'	92°	60°39'	+11'	94°	60°34'	+13'	96°	60°27'	+15'	97°	60°18'	+17'	99°	60°08'	+19'	101°	12
13	60°50'	+05'	88°	60°51'	+07'	90°	60°50'	+09'	92°	60°47'	+11'	94°	60°42'	+13'	95°	60°35'	+15'	97°	60°27'	+17'	99°	13
14	60°55'	+03'	86°	60°58'	+05'	88°	60°59'	+07'	90°	60°58'	+09'	92°	60°55'	+12'	93°	60°51'	+14'	95°	60°44'	+16'	97°	14
15	60°58'	+01'	84°	61°03'	+03'	86°	61°06'	+05'	88°	61°07'	+08'	90°	61°07'	+10'	91°	61°04'	+12'	93°	61°00'	+14'	95°	15
16	60°59'	-01'	82°	61°06'	+01'	84°	61°11'	+03'	86°	61°15'	+06'	88°	61°16'	+08'	89°	61°16'	+10'	91°	61°14'	+12'	93°	16
17	60°58'	-03'	80°	61°07'	-01'	82°	61°15'	+02'	84°	61°20'	+04'	86°	61°24'	+06'	87°	61°26'	+08'	89°	61°26'	+10'	91°	17
18	60°55'	-05'	78°	61°07'	-02'	80°	61°16'	00'	82°	61°24'	+02'	83°	61°30'	+04'	85°	61°34'	+06'	87°	61°36'	+08'	89°	18
19	60°51'	-06'	76°	61°04'	-04'	78°	61°16'	-02'	80°	61°26'	00'	81°	61°34'	+02'	83°	61°40'	+04'	85°	61°44'	+06'	87°	19
20	60°44'	-08'	74°	61°00'	-06'	76°	61°14'	-04'	77°	61°26'	-02'	79°	61°36'	+00'	81°	61°44'	+02'	83°	61°51'	+05'	85°	20
21	60°36'	-10'	72°	60°54'	-08'	74°	61°10'	-06'	75°	61°24'	-04'	77°	61°36'	-02'	79°	61°47'	+00'	81°	61°55'	+03'	83°	21
22	60°26'	-12'	70°	60°45'	-10'	72°	61°04'	-08'	73°	61°20'	-06'	75°	61°34'	-04'	77°	61°47'	-02'	79°	61°58'	+01'	81°	22
23	60°14'	-14'	68°	60°36'	-12'	70°	60°56'	-10'	71°	61°14'	-08'	73°	61°31'	-06'	75°	61°45'	-04'	77°	61°58'	-01'	78°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

30° 330° LHA

Latitude SAME as Declination

30° 330° LHA

31° 329° LHA

Latitude SAME as Declination

31° 329° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	56°16'	+25'	112°	55°53'	+27'	113°	55°29'	+29'	115°	55°03'	+30'	116°	54°37'	+31'	117°	54°08'	+33'	118°	53°39'	+34'	120°	0
1	56°42'	+24'	110°	56°20'	+26'	112°	55°58'	+27'	113°	55°33'	+29'	114°	55°08'	+30'	116°	54°41'	+32'	117°	54°14'	+33'	118°	1
2	57°06'	+23'	109°	56°46'	+24'	110°	56°25'	+26'	111°	56°02'	+28'	113°	55°38'	+29'	114°	55°13'	+31'	116°	54°47'	+32'	117°	2
3	57°29'	+21'	107°	57°11'	+23'	108°	56°51'	+25'	110°	56°30'	+26'	111°	56°08'	+28'	113°	55°44'	+30'	114°	55°19'	+31'	115°	3
4	57°50'	+20'	105°	57°34'	+22'	107°	57°16'	+23'	108°	56°56'	+25'	110°	56°36'	+27'	111°	56°13'	+28'	112°	55°50'	+30'	114°	4
5	58°10'	+18'	103°	57°56'	+20'	105°	57°39'	+22'	106°	57°22'	+24'	108°	57°02'	+25'	109°	56°42'	+27'	111°	56°20'	+29'	112°	5
6	58°29'	+17'	102°	58°16'	+19'	103°	58°01'	+21'	105°	57°45'	+22'	106°	57°28'	+24'	108°	57°09'	+26'	109°	56°48'	+27'	111°	6
7	58°46'	+15'	100°	58°35'	+17'	101°	58°22'	+19'	103°	58°08'	+21'	104°	57°52'	+23'	106°	57°35'	+24'	108°	57°16'	+26'	109°	7
8	59°01'	+14'	98°	58°52'	+16'	99°	58°41'	+17'	101°	58°29'	+19'	103°	58°15'	+21'	104°	57°59'	+23'	106°	57°42'	+25'	107°	8
9	59°14'	+12'	96°	59°07'	+14'	98°	58°58'	+16'	99°	58°48'	+18'	101°	58°36'	+20'	103°	58°22'	+22'	104°	58°07'	+23'	106°	9
10	59°26'	+10'	94°	59°21'	+12'	96°	59°14'	+14'	97°	59°06'	+16'	99°	58°55'	+18'	101°	58°44'	+20'	102°	58°30'	+22'	104°	10
11	59°36'	+08'	92°	59°33'	+11'	94°	59°29'	+13'	95°	59°22'	+15'	97°	59°14'	+17'	99°	59°04'	+18'	100°	58°52'	+20'	102°	11
12	59°45'	+07'	90°	59°44'	+09'	92°	59°41'	+11'	94°	59°37'	+13'	95°	59°30'	+15'	97°	59°22'	+17'	99°	59°12'	+19'	100°	12
13	59°52'	+05'	88°	59°53'	+07'	90°	59°52'	+09'	92°	59°49'	+11'	93°	59°45'	+13'	95°	59°39'	+15'	97°	59°31'	+17'	98°	13
14	59°57'	+03'	86°	60°00'	+05'	88°	60°01'	+07'	90°	60°00'	+09'	91°	59°58'	+11'	93°	59°54'	+13'	95°	59°48'	+16'	97°	14
15	60°00'	+01'	84°	60°05'	+03'	86°	60°08'	+05'	88°	60°10'	+08'	89°	60°10'	+10'	91°	60°08'	+12'	93°	60°04'	+14'	95°	15
16	60°01'	-01'	82°	60°08'	+02'	84°	60°14'	+04'	86°	60°17'	+06'	87°	60°19'	+08'	89°	60°19'	+10'	91°	60°17'	+12'	93°	16
17	60°00'	-02'	80°	60°10'	00'	82°	60°17'	+02'	84°	60°23'	+04'	85°	60°27'	+06'	87°	60°29'	+08'	89°	60°29'	+10'	91°	17
18	59°58'	-04'	78°	60°10'	-02'	80°	60°19'	00'	82°	60°27'	+02'	83°	60°33'	+04'	85°	60°37'	+06'	87°	60°40'	+08'	89°	18
19	59°54'	-06'	76°	60°08'	-04'	78°	60°19'	-02'	80°	60°29'	+00'	81°	60°37'	+02'	83°	60°44'	+04'	85°	60°48'	+07'	87°	19
20	59°48'	-08'	74°	60°04'	-06'	76°	60°17'	-04'	78°	60°29'	-02'	79°	60°40'	+00'	81°	60°48'	+03'	83°	60°55'	+05'	85°	20
21	59°40'	-09'	72°	59°58'	-07'	74°	60°14'	-05'	76°	60°28'	-03'	77°	60°40'	-01'	79°	60°51'	+01'	81°	60°59'	+03'	83°	21
22	59°31'	-11'	70°	59°50'	-09'	72°	60°08'	-07'	74°	60°24'	-05'	75°	60°39'	-03'	77°	60°51'	-01'	79°	61°02'	+01'	80°	22
23	59°20'	-13'	68°	59°41'	-11'	70°	60°01'	-09'	72°	60°19'	-07'	73°	60°36'	-05'	75°	60°50'	-03'	77°	61°03'	-01'	78°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

31° 329° LHA

Latitude SAME as Declination

31° 329° LHA

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

32° 328° LHA

Latitude SAME as Declination

32° 328° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	55°22'	+25'	111°	55°00'	+26'	112°	54°36'	+28'	114°	54°12'	+29'	115°	53°46'	+31'	116°	53°18'	+32'	118°	52°50'	+33'	119°	0
1	55°47'	+24'	110°	55°26'	+25'	111°	55°04'	+27'	112°	54°41'	+28'	114°	54°16'	+30'	115°	53°51'	+31'	116°	53°24'	+33'	117°	1
2	56°11'	+22'	108°	55°52'	+24'	109°	55°31'	+26'	111°	55°09'	+27'	112°	54°46'	+29'	113°	54°22'	+30'	115°	53°56'	+31'	116°	2
3	56°33'	+21'	106°	56°16'	+23'	108°	55°57'	+24'	109°	55°36'	+26'	110°	55°15'	+27'	112°	54°52'	+29'	113°	54°28'	+30'	114°	3
4	56°54'	+19'	105°	56°38'	+21'	106°	56°21'	+23'	107°	56°02'	+25'	109°	55°42'	+26'	110°	55°21'	+28'	112°	54°58'	+29'	113°	4
5	57°14'	+18'	103°	57°00'	+20'	104°	56°44'	+22'	106°	56°27'	+23'	107°	56°08'	+25'	109°	55°49'	+27'	110°	55°27'	+28'	111°	5
6	57°32'	+17'	101°	57°19'	+18'	103°	57°06'	+20'	104°	56°50'	+22'	106°	56°33'	+24'	107°	56°15'	+25'	108°	55°55'	+27'	110°	6
7	57°48'	+15'	99°	57°38'	+17'	101°	57°26'	+19'	102°	57°12'	+20'	104°	56°57'	+22'	105°	56°40'	+24'	107°	56°22'	+26'	108°	7
8	58°03'	+13'	97°	57°55'	+15'	99°	57°44'	+17'	101°	57°33'	+19'	102°	57°19'	+21'	104°	57°04'	+23'	105°	56°48'	+24'	107°	8
9	58°16'	+12'	96°	58°10'	+14'	97°	58°01'	+16'	99°	57°52'	+17'	100°	57°40'	+19'	102°	57°27'	+21'	103°	57°12'	+23'	105°	9
10	58°28'	+10'	94°	58°23'	+12'	95°	58°17'	+14'	97°	58°09'	+16'	99°	57°59'	+18'	100°	57°48'	+20'	102°	57°35'	+21'	103°	10
11	58°38'	+08'	92°	58°36'	+10'	93°	58°31'	+12'	95°	58°25'	+14'	97°	58°17'	+16'	98°	58°08'	+18'	100°	57°57'	+20'	101°	11
12	58°47'	+07'	90°	58°46'	+09'	92°	58°44'	+11'	93°	58°39'	+13'	95°	58°33'	+15'	96°	58°26'	+17'	98°	58°17'	+19'	100°	12
13	58°53'	+05'	88°	58°55'	+07'	90°	58°54'	+09'	91°	58°52'	+11'	93°	58°48'	+13'	95°	58°42'	+15'	96°	58°35'	+17'	98°	13
14	58°58'	+03'	86°	59°02'	+05'	88°	59°03'	+07'	89°	59°03'	+09'	91°	59°01'	+11'	93°	58°57'	+13'	94°	58°52'	+15'	96°	14
15	59°02'	+02'	84°	59°07'	+04'	86°	59°11'	+06'	87°	59°12'	+08'	89°	59°13'	+10'	91°	59°11'	+12'	92°	59°07'	+14'	94°	15
16	59°03'	00'	82°	59°11'	+02'	84°	59°16'	+04'	85°	59°20'	+06'	87°	59°22'	+08'	89°	59°23'	+10'	91°	59°21'	+12'	92°	16
17	59°03'	-02'	80°	59°12'	+00'	82°	59°20'	+02'	84°	59°26'	+04'	85°	59°30'	+06'	87°	59°32'	+08'	89°	59°33'	+10'	90°	17
18	59°01'	-04'	78°	59°13'	-02'	80°	59°22'	+00'	82°	59°30'	+02'	83°	59°36'	+04'	85°	59°41'	+06'	87°	59°43'	+09'	88°	18
19	58°57'	-05'	76°	59°11'	-03'	78°	59°23'	-01'	80°	59°32'	+01'	81°	59°41'	+03'	83°	59°47'	+05'	85°	59°52'	+07'	86°	19
20	58°52'	-07'	74°	59°07'	-05'	76°	59°21'	-03'	78°	59°33'	-01'	79°	59°43'	+01'	81°	59°52'	+03'	83°	59°59'	+05'	84°	20
21	58°45'	-09'	72°	59°02'	-07'	74°	59°18'	-05'	76°	59°32'	-03'	77°	59°44'	-01'	79°	59°55'	+01'	81°	60°04'	+03'	82°	21
22	58°36'	-10'	71°	58°55'	-09'	72°	59°13'	-07'	74°	59°29'	-05'	75°	59°43'	-03'	77°	59°56'	-01'	79°	60°07'	+01'	80°	22
23	58°26'	-12'	69°	58°47'	-10'	70°	59°06'	-08'	72°	59°24'	-07'	73°	59°40'	-05'	75°	59°55'	-03'	77°	60°08'	00'	78°	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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	54°28'	+24'	110°	54°06'	+26'	112°	53°43'	+27'	113°	53°19'	+29'	114°	52°54'	+30'	115°	52°28'	+32'	117°	52°00'	+33'	118°	0
1	54°52'	+23'	109°	54°32'	+25'	110°	54°11'	+26'	111°	53°48'	+28'	113°	53°24'	+29'	114°	52°59'	+31'	115°	52°33'	+32'	116°	1
2	55°15'	+22'	107°	54°57'	+23'	109°	54°37'	+25'	110°	54°16'	+27'	111°	53°54'	+28'	113°	53°30'	+29'	114°	53°05'	+31'	115°	2
3	55°37'	+20'	106°	55°20'	+22'	107°	55°02'	+24'	108°	54°43'	+25'	110°	54°22'	+27'	111°	53°59'	+28'	112°	53°36'	+30'	114°	3
4	55°58'	+19'	104°	55°42'	+21'	105°	55°26'	+22'	107°	55°08'	+24'	108°	54°49'	+26'	109°	54°28'	+27'	111°	54°06'	+29'	112°	4
5	56°17'	+18'	102°	56°03'	+19'	104°	55°48'	+21'	105°	55°32'	+23'	107°	55°14'	+24'	108°	54°55'	+26'	109°	54°35'	+28'	111°	5
6	56°34'	+16'	100°	56°23'	+18'	102°	56°09'	+20'	103°	55°55'	+21'	105°	55°39'	+23'	106°	55°21'	+25'	108°	55°02'	+26'	109°	6
7	56°51'	+15'	99°	56°41'	+17'	100°	56°29'	+18'	102°	56°16'	+20'	103°	56°02'	+22'	105°	55°46'	+24'	106°	55°29'	+25'	107°	7
8	57°05'	+13'	97°	56°57'	+15'	98°	56°48'	+17'	100°	56°36'	+19'	101°	56°24'	+20'	103°	56°09'	+22'	104°	55°54'	+24'	106°	8
9	57°18'	+12'	95°	57°12'	+14'	97°	57°04'	+15'	98°	56°55'	+17'	100°	56°44'	+19'	101°	56°32'	+21'	103°	56°18'	+23'	104°	9
10	57°30'	+10'	93°	57°26'	+12'	95°	57°20'	+14'	96°	57°12'	+16'	98°	57°03'	+18'	100°	56°52'	+19'	101°	56°40'	+21'	103°	10
11	57°40'	+08'	92°	57°38'	+10'	93°	57°34'	+12'	95°	57°28'	+14'	96°	57°21'	+16'	98°	57°12'	+18'	99°	57°01'	+20'	101°	11
12	57°49'	+07'	90°	57°48'	+09'	91°	57°46'	+11'	93°	57°42'	+13'	94°	57°37'	+15'	96°	57°30'	+16'	98°	57°21'	+18'	99°	12
13	57°55'	+05'	88°	57°57'	+07'	89°	57°57'	+09'	91°	57°55'	+11'	93°	57°51'	+13'	94°	57°46'	+15'	96°	57°39'	+17'	97°	13
14	58°00'	+03'	86°	58°04'	+05'	88°	58°06'	+07'	89°	58°06'	+09'	91°	58°04'	+11'	92°	58°01'	+13'	94°	57°56'	+15'	96°	14
15	58°04'	+02'	84°	58°09'	+04'	86°	58°13'	+06'	87°	58°15'	+08'	89°	58°15'	+10'	90°	58°14'	+12'	92°	58°11'	+14'	94°	15
16	58°06'	+00'	82°	58°13'	+02'	84°	58°19'	+04'	85°	58°23'	+06'	87°	58°25'	+08'	89°	58°26'	+10'	90°	58°25'	+12'	92°	16
17	58°06'	-02'	80°	58°15'	+00'	82°	58°23'	+02'	83°	58°29'	+04'	85°	58°33'	+06'	87°	58°36'	+08'	88°	58°37'	+10'	90°	17
18	58°04'	-03'	78°	58°15'	-01'	80°	58°25'	+01'	82°	58°33'	+03'	83°	58°39'	+05'	85°	58°44'	+07'	86°	58°47'	+09'	88°	18
19	58°01'	-05'	76°	58°14'	-03'	78°	58°26'	-01'	80°	58°36'	+01'	81°	58°44'	+03'	83°	58°51'	+05'	84°	58°56'	+07'	86°	19
20	57°56'	-07'	75°	58°11'	-05'	76°	58°25'	-03'	78°	58°37'	-01'	79°	58°47'	+01'	81°	58°56'	+03'	83°	59°03'	+05'	84°	20
21	57°49'	-08'	73°	58°06'	-06'	74°	58°22'	-04'	76°	58°36'	-03'	77°	58°48'	-01'	79°	58°59'	+01'	81°	59°08'	+03'	82°	21
22	57°41'	-10'	71°	58°00'	-08'	72°	58°17'	-06'	74°	58°33'	-04'	75°	58°48'	-02'	77°	59°00'	00'	79°	59°11'	+02'	80°	22
23	57°31'	-11'	69°	57°52'	-10'	70°	58°11'	-08'	72°	58°29'	-06'	74°	58°45'	-04'	75°	59°00'	-02'	77°	59°13'	00'	78°	23

33° 327° LHA

Latitude SAME as Declination

33° 327° LHA

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

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

34° 326° LHA

Latitude SAME as Declination

34° 326° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	53°33'	+24'	110°	53°12'	+25'	111°	52°50'	+27'	112°	52°27'	+28'	113°	52°03'	+30'	115°	51°37'	+31'	116°	51°10'	+32'	117°	0
1	53°57'	+23'	108°	53°38'	+24'	109°	53°17'	+26'	111°	52°55'	+27'	112°	52°32'	+29'	113°	52°08'	+30'	114°	51°43'	+31'	116°	1
2	54°20'	+21'	107°	54°02'	+23'	108°	53°43'	+25'	109°	53°22'	+26'	110°	53°01'	+28'	112°	52°38'	+29'	113°	52°14'	+30'	114°	2
3	54°41'	+20'	105°	54°25'	+22'	106°	54°07'	+23'	108°	53°48'	+25'	109°	53°28'	+26'	110°	53°07'	+28'	112°	52°44'	+29'	113°	3
4	55°01'	+19'	103°	54°46'	+20'	105°	54°31'	+22'	106°	54°13'	+24'	107°	53°55'	+25'	109°	53°35'	+27'	110°	53°14'	+28'	111°	4
5	55°20'	+17'	102°	55°07'	+19'	103°	54°53'	+21'	104°	54°37'	+22'	106°	54°20'	+24'	107°	54°01'	+26'	109°	53°42'	+27'	110°	5
6	55°37'	+16'	100°	55°26'	+18'	101°	55°13'	+19'	103°	54°59'	+21'	104°	54°44'	+23'	106°	54°27'	+24'	107°	54°09'	+26'	108°	6
7	55°53'	+14'	98°	55°44'	+16'	100°	55°33'	+18'	101°	55°20'	+20'	103°	55°07'	+21'	104°	54°51'	+23'	105°	54°35'	+25'	107°	7
8	56°07'	+13'	97°	56°00'	+15'	98°	55°51'	+17'	99°	55°40'	+18'	101°	55°28'	+20'	102°	55°14'	+22'	104°	54°59'	+23'	105°	8
9	56°20'	+11'	95°	56°15'	+13'	96°	56°07'	+15'	98°	55°58'	+17'	99°	55°48'	+19'	101°	55°36'	+20'	102°	55°23'	+22'	104°	9
10	56°32'	+10'	93°	56°28'	+12'	95°	56°22'	+14'	96°	56°15'	+15'	98°	56°07'	+17'	99°	55°57'	+19'	100°	55°45'	+21'	102°	10
11	56°42'	+08'	91°	56°40'	+10'	93°	56°36'	+12'	94°	56°31'	+14'	96°	56°24'	+16'	97°	56°16'	+18'	99°	56°06'	+19'	100°	11
12	56°50'	+07'	89°	56°50'	+09'	91°	56°48'	+11'	92°	56°45'	+12'	94°	56°40'	+14'	96°	56°33'	+16'	97°	56°25'	+18'	99°	12
13	56°57'	+05'	88°	56°59'	+07'	89°	56°59'	+09'	91°	56°57'	+11'	92°	56°54'	+13'	94°	56°50'	+15'	95°	56°43'	+17'	97°	13
14	57°02'	+04'	86°	57°06'	+06'	87°	57°08'	+07'	89°	57°08'	+09'	90°	57°07'	+11'	92°	57°04'	+13'	93°	57°00'	+15'	95°	14
15	57°06'	+02'	84°	57°12'	+04'	85°	57°15'	+06'	87°	57°18'	+08'	89°	57°18'	+10'	90°	57°17'	+12'	92°	57°15'	+14'	93°	15
16	57°08'	+00'	82°	57°15'	+02'	84°	57°21'	+04'	85°	57°26'	+06'	87°	57°28'	+08'	88°	57°29'	+10'	90°	57°28'	+12'	91°	16
17	57°08'	-01'	80°	57°18'	+01'	82°	57°26'	+03'	83°	57°32'	+05'	85°	57°36'	+06'	86°	57°39'	+08'	88°	57°40'	+10'	90°	17
18	57°07'	-03'	78°	57°18'	-01'	80°	57°28'	+01'	81°	57°36'	+03'	83°	57°43'	+05'	85°	57°47'	+07'	86°	57°51'	+09'	88°	18
19	57°04'	-04'	77°	57°17'	-03'	78°	57°29'	-01'	80°	57°39'	+01'	81°	57°47'	+03'	83°	57°54'	+05'	84°	57°59'	+07'	86°	19
20	57°00'	-06'	75°	57°15'	-04'	76°	57°28'	-02'	78°	57°40'	00'	79°	57°51'	+02'	81°	57°59'	+03'	82°	58°06'	+05'	84°	20
21	56°54'	-08'	73°	57°11'	-06'	74°	57°26'	-04'	76°	57°40'	-02'	77°	57°52'	00'	79°	58°03'	+02'	81°	58°12'	+04'	82°	21
22	56°46'	-09'	71°	57°05'	-07'	73°	57°22'	-06'	74°	57°38'	-04'	76°	57°52'	-02'	77°	58°05'	+00'	79°	58°16'	+02'	80°	22
23	56°37'	-11'	69°	56°57'	-09'	71°	57°16'	-07'	72°	57°34'	-05'	74°	57°50'	-03'	75°	58°05'	-02'	77°	58°18'	+00'	78°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	52°38'	+23'	109°	52°18'	+25'	110°	51°57'	+26'	111°	51°34'	+28'	113°	51°10'	+29'	114°	50°46'	+30'	115°	50°20'	+32'	116°	0
1	53°02'	+22'	108°	52°43'	+24'	109°	52°23'	+25'	110°	52°02'	+27'	111°	51°40'	+28'	112°	51°16'	+29'	114°	50°52'	+31'	115°	1
2	53°24'	+21'	106°	53°07'	+22'	107°	52°48'	+24'	109°	52°28'	+26'	110°	52°08'	+27'	111°	51°46'	+28'	112°	51°22'	+30'	113°	2
3	53°45'	+20'	104°	53°29'	+21'	106°	53°12'	+23'	107°	52°54'	+24'	108°	52°35'	+26'	110°	52°14'	+27'	111°	51°52'	+29'	112°	3
4	54°04'	+18'	103°	53°50'	+20'	104°	53°35'	+22'	105°	53°18'	+23'	107°	53°00'	+25'	108°	52°41'	+26'	109°	52°21'	+28'	111°	4
5	54°23'	+17'	101°	54°10'	+19'	103°	53°57'	+20'	104°	53°42'	+22'	105°	53°25'	+24'	107°	53°08'	+25'	108°	52°49'	+27'	109°	5
6	54°40'	+16'	100°	54°29'	+17'	101°	54°17'	+19'	102°	54°04'	+21'	104°	53°49'	+22'	105°	53°33'	+24'	106°	53°15'	+25'	108°	6
7	54°55'	+14'	98°	54°46'	+16'	99°	54°36'	+18'	101°	54°24'	+19'	102°	54°11'	+21'	103°	53°57'	+23'	105°	53°41'	+24'	106°	7
8	55°10'	+13'	96°	55°02'	+15'	98°	54°54'	+16'	99°	54°44'	+18'	100°	54°32'	+20'	102°	54°19'	+21'	103°	54°05'	+23'	104°	8
9	55°22'	+11'	94°	55°17'	+13'	96°	55°10'	+15'	97°	55°02'	+17'	99°	54°52'	+18'	100°	54°41'	+20'	102°	54°28'	+22'	103°	9
10	55°34'	+10'	93°	55°30'	+12'	94°	55°25'	+14'	96°	55°19'	+15'	97°	55°10'	+17'	98°	55°01'	+19'	100°	54°50'	+21'	101°	10
11	55°44'	+08'	91°	55°42'	+10'	92°	55°39'	+12'	94°	55°34'	+14'	95°	55°27'	+16'	97°	55°20'	+17'	98°	55°10'	+19'	100°	11
12	55°52'	+07'	89°	55°52'	+09'	91°	55°51'	+11'	92°	55°48'	+12'	94°	55°43'	+14'	95°	55°37'	+16'	97°	55°29'	+18'	98°	12
13	55°59'	+05'	87°	56°01'	+07'	89°	56°01'	+09'	90°	56°00'	+11'	92°	55°57'	+13'	93°	55°53'	+15'	95°	55°47'	+16'	96°	13
14	56°04'	+04'	86°	56°08'	+06'	87°	56°10'	+08'	89°	56°11'	+09'	90°	56°10'	+11'	92°	56°08'	+13'	93°	56°04'	+15'	95°	14
15	56°08'	+02'	84°	56°14'	+04'	85°	56°18'	+06'	87°	56°20'	+08'	88°	56°21'	+10'	90°	56°21'	+12'	91°	56°19'	+13'	93°	15
16	56°10'	+01'	82°	56°18'	+03'	84°	56°24'	+04'	85°	56°28'	+06'	87°	56°31'	+08'	88°	56°32'	+10'	90°	56°32'	+12'	91°	16
17	56°11'	-01'	80°	56°20'	+01'	82°	56°28'	+03'	83°	56°35'	+05'	85°	56°39'	+07'	86°	56°42'	+08'	88°	56°44'	+10'	89°	17
18	56°10'	-02'	78°	56°21'	-01'	80°	56°31'	+01'	81°	56°39'	+03'	83°	56°46'	+05'	84°	56°51'	+07'	86°	56°54'	+09'	87°	18
19	56°08'	-04'	77°	56°21'	-02'	78°	56°32'	00'	80°	56°42'	+02'	81°	56°51'	+03'	83°	56°58'	+05'	84°	57°03'	+07'	86°	19
20	56°04'	-06'	75°	56°19'	-04'	76°	56°32'	-02'	78°	56°44'	00'	79°	56°54'	+02'	81°	57°03'	+04'	82°	57°10'	+06'	84°	20
21	55°58'	-07'	73°	56°15'	-05'	75°	56°30'	-03'	76°	56°44'	-02'	77°	56°56'	+00'	79°	57°07'	+02'	80°	57°16'	+04'	82°	21
22	55°51'	-09'	71°	56°10'	-07'	73°	56°27'	-05'	74°	56°42'	-03'	76°	56°56'	-01'	77°	57°09'	+00'	79°	57°20'	+02'	80°	22
23	55°42'	-10'	70°	56°03'	-08'	71°	56°22'	-07'	72°	56°39'	-05'	74°	56°55'	-03'	75°	57°09'	-01'	77°	57°22'	+01'	78°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	51°43'	+23'	108°	51°24'	+24'	110°	51°03'	+26'	111°	50°41'	+27'	112°	50°18'	+29'	113°	49°54'	+30'	114°	49°29'	+31'	115°	0
1	52°06'	+22'	107°	51°48'	+23'	108°	51°29'	+25'	109°	51°08'	+26'	111°	50°47'	+28'	112°	50°24'	+29'	113°	50°00'	+30'	114°	1
2	52°28'	+21'	105°	52°11'	+22'	107°	51°53'	+24'	108°	51°34'	+25'	109°	51°14'	+26'	110°	50°53'	+28'	111°	50°30'	+29'	113°	2
3	52°48'	+19'	104°	52°33'	+21'	105°	52°17'	+22'	106°	51°59'	+24'	108°	51°41'	+25'	109°	51°21'	+27'	110°	51°00'	+28'	111°	3
4	53°08'	+18'	102°	52°54'	+20'	104°	52°39'	+21'	105°	52°23'	+23'	106°	52°06'	+24'	107°	51°48'	+26'	109°	51°28'	+27'	110°	4
5	53°26'	+17'	101°	53°14'	+18'	102°	53°01'	+20'	103°	52°46'	+22'	105°	52°30'	+23'	106°	52°13'	+25'	107°	51°55'	+26'	108°	5
6	53°42'	+15'	99°	53°32'	+17'	100°	53°21'	+19'	102°	53°08'	+20'	103°	52°54'	+22'	104°	52°38'	+24'	106°	52°21'	+25'	107°	6
7	53°58'	+14'	97°	53°49'	+16'	99°	53°39'	+17'	100°	53°28'	+19'	101°	53°16'	+21'	103°	53°02'	+22'	104°	52°46'	+24'	105°	7
8	54°12'	+13'	96°	54°05'	+14'	97°	53°57'	+16'	99°	53°47'	+18'	100°	53°36'	+19'	101°	53°24'	+21'	103°	53°10'	+23'	104°	8
9	54°24'	+11'	94°	54°19'	+13'	95°	54°13'	+15'	97°	54°05'	+16'	98°	53°56'	+18'	100°	53°45'	+20'	101°	53°33'	+21'	102°	9
10	54°36'	+10'	92°	54°32'	+12'	94°	54°28'	+13'	95°	54°22'	+15'	97°	54°14'	+17'	98°	54°05'	+19'	99°	53°54'	+20'	101°	10
11	54°45'	+08'	91°	54°44'	+10'	92°	54°41'	+12'	94°	54°37'	+14'	95°	54°31'	+15'	96°	54°23'	+17'	98°	54°15'	+19'	99°	11
12	54°54'	+07'	89°	54°54'	+09'	90°	54°53'	+11'	92°	54°50'	+12'	93°	54°46'	+14'	95°	54°41'	+16'	96°	54°34'	+18'	97°	12
13	55°01'	+05'	87°	55°03'	+07'	89°	55°04'	+09'	90°	55°03'	+11'	92°	55°00'	+13'	93°	54°57'	+14'	94°	54°51'	+16'	96°	13
14	55°06'	+04'	86°	55°10'	+06'	87°	55°13'	+08'	88°	55°14'	+09'	90°	55°13'	+11'	91°	55°11'	+13'	93°	55°07'	+15'	94°	14
15	55°10'	+02'	84°	55°16'	+04'	85°	55°20'	+06'	87°	55°23'	+08'	88°	55°24'	+10'	90°	55°24'	+12'	91°	55°22'	+13'	92°	15
16	55°13'	+01'	82°	55°20'	+03'	83°	55°26'	+05'	85°	55°31'	+06'	86°	55°34'	+08'	88°	55°36'	+10'	89°	55°36'	+12'	91°	16
17	55°14'	-01'	80°	55°23'	+01'	82°	55°31'	+03'	83°	55°37'	+05'	85°	55°42'	+07'	86°	55°46'	+09'	87°	55°48'	+10'	89°	17
18	55°13'	-02'	79°	55°24'	00'	80°	55°34'	+02'	81°	55°42'	+03'	83°	55°49'	+05'	84°	55°54'	+07'	86°	55°58'	+09'	87°	18
19	55°11'	-04'	77°	55°24'	-02'	78°	55°36'	+00'	80°	55°46'	+02'	81°	55°54'	+04'	82°	56°01'	+06'	84°	56°07'	+07'	85°	19
20	55°07'	-05'	75°	55°22'	-03'	76°	55°36'	-02'	78°	55°48'	+00'	79°	55°58'	+02'	81°	56°07'	+04'	82°	56°14'	+06'	84°	20
21	55°02'	-07'	73°	55°19'	-05'	75°	55°34'	-03'	76°	55°48'	-01'	77°	56°00'	+01'	79°	56°11'	+02'	80°	56°20'	+04'	82°	21
22	54°56'	-08'	72°	55°14'	-06'	73°	55°31'	-05'	74°	55°47'	-03'	76°	56°01'	-01'	77°	56°13'	+01'	79°	56°24'	+03'	80°	22
23	54°48'	-09'	70°	55°08'	-08'	71°	55°27'	-06'	73°	55°44'	-04'	74°	56°00'	-03'	75°	56°14'	-01'	77°	56°27'	+01'	78°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	50°48'	+22'	108°	50°29'	+24'	109°	50°09'	+25'	110°	49°48'	+27'	111°	49°25'	+28'	112°	49°02'	+29'	113°	48°38'	+31'	114°	0
1	51°10'	+21'	106°	50°53'	+23'	108°	50°34'	+24'	109°	50°14'	+26'	110°	49°53'	+27'	111°	49°32'	+28'	112°	49°08'	+30'	113°	1
2	51°32'	+20'	105°	51°16'	+22'	106°	50°58'	+23'	107°	50°40'	+25'	108°	50°21'	+26'	110°	50°00'	+27'	111°	49°38'	+29'	112°	2
3	51°52'	+19'	103°	51°37'	+20'	105°	51°22'	+22'	106°	51°05'	+24'	107°	50°47'	+25'	108°	50°27'	+26'	109°	50°07'	+28'	110°	3
4	52°11'	+18'	102°	51°58'	+19'	103°	51°44'	+21'	104°	51°28'	+22'	105°	51°12'	+24'	107°	50°54'	+25'	108°	50°35'	+27'	109°	4
5	52°28'	+16'	100°	52°17'	+18'	101°	52°04'	+20'	103°	51°51'	+21'	104°	51°35'	+23'	105°	51°19'	+24'	106°	51°02'	+26'	108°	5
6	52°45'	+15'	99°	52°35'	+17'	100°	52°24'	+18'	101°	52°12'	+20'	102°	51°58'	+22'	104°	51°43'	+23'	105°	51°27'	+25'	106°	6
7	53°00'	+14'	97°	52°52'	+16'	98°	52°43'	+17'	100°	52°32'	+19'	101°	52°20'	+20'	102°	52°06'	+22'	103°	51°52'	+24'	105°	7
8	53°14'	+13'	95°	53°07'	+14'	97°	53°00'	+16'	98°	52°51'	+18'	99°	52°40'	+19'	101°	52°28'	+21'	102°	52°15'	+22'	103°	8
9	53°26'	+11'	94°	53°22'	+13'	95°	53°16'	+15'	96°	53°08'	+16'	98°	52°59'	+18'	99°	52°49'	+20'	100°	52°38'	+21'	102°	9
10	53°37'	+10'	92°	53°35'	+12'	93°	53°30'	+13'	95°	53°25'	+15'	96°	53°17'	+17'	97°	53°09'	+18'	99°	52°59'	+20'	100°	10
11	53°47'	+08'	90°	53°46'	+10'	92°	53°44'	+12'	93°	53°39'	+14'	95°	53°34'	+15'	96°	53°27'	+17'	97°	53°19'	+19'	99°	11
12	53°56'	+07'	89°	53°56'	+09'	90°	53°55'	+11'	92°	53°53'	+12'	93°	53°49'	+14'	94°	53°44'	+16'	96°	53°38'	+17'	97°	12
13	54°03'	+06'	87°	54°05'	+07'	88°	54°06'	+09'	90°	54°05'	+11'	91°	54°03'	+13'	93°	54°00'	+14'	94°	53°55'	+16'	95°	13
14	54°08'	+04'	85°	54°12'	+06'	87°	54°15'	+08'	88°	54°16'	+09'	90°	54°16'	+11'	91°	54°14'	+13'	92°	54°11'	+15'	94°	14
15	54°12'	+03'	84°	54°18'	+04'	85°	54°23'	+06'	86°	54°26'	+08'	88°	54°27'	+10'	89°	54°27'	+12'	91°	54°26'	+13'	92°	15
16	54°15'	+01'	82°	54°23'	+03'	83°	54°29'	+05'	85°	54°34'	+07'	86°	54°37'	+08'	88°	54°39'	+10'	89°	54°39'	+12'	90°	16
17	54°16'	00'	80°	54°26'	+02'	82°	54°34'	+03'	83°	54°40'	+05'	84°	54°45'	+07'	86°	54°49'	+09'	87°	54°51'	+10'	89°	17
18	54°16'	-02'	79°	54°27'	+00'	80°	54°37'	+02'	81°	54°45'	+04'	83°	54°52'	+05'	84°	54°58'	+07'	86°	55°02'	+09'	87°	18
19	54°14'	-03'	77°	54°27'	-01'	78°	54°39'	+00'	80°	54°49'	+02'	81°	54°58'	+04'	82°	55°05'	+06'	84°	55°11'	+08'	85°	19
20	54°11'	-05'	75°	54°26'	-03'	76°	54°39'	-01'	78°	54°51'	+01'	79°	55°02'	+02'	81°	55°11'	+04'	82°	55°18'	+06'	83°	20
21	54°07'	-06'	73°	54°23'	-04'	75°	54°38'	-03'	76°	54°52'	-01'	77°	55°04'	+01'	79°	55°15'	+03'	80°	55°24'	+05'	82°	21
22	54°01'	-07'	72°	54°19'	-06'	73°	54°36'	-04'	74°	54°51'	-02'	76°	55°05'	-01'	77°	55°18'	+01'	79°	55°29'	+03'	80°	22
23	53°53'	-09'	70°	54°13'	-07'	71°	54°32'	-06'	73°	54°49'	-04'	74°	55°05'	-02'	75°	55°19'	00'	77°	55°32'	+02'	78°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

37° 323° LHA

Latitude SAME as Declination

37° 323° LHA

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

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

38° 322° LHA

Latitude SAME as Declination

38° 322° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	49°52'	+22'	107°	49°34'	+23'	108°	49°15'	+25'	109°	48°54'	+26'	111°	48°33'	+28'	112°	48°10'	+29'	113°	47°46'	+30'	114°	0
1	50°14'	+21'	106°	49°57'	+22'	107°	49°39'	+24'	108°	49°20'	+25'	109°	49°00'	+27'	110°	48°39'	+28'	111°	48°16'	+29'	112°	1
2	50°35'	+20'	104°	50°20'	+21'	105°	50°03'	+23'	107°	49°45'	+24'	108°	49°27'	+26'	109°	49°07'	+27'	110°	48°46'	+28'	111°	2
3	50°55'	+19'	103°	50°41'	+20'	104°	50°26'	+22'	105°	50°10'	+23'	106°	49°52'	+25'	107°	49°34'	+26'	109°	49°14'	+27'	110°	3
4	51°14'	+17'	101°	51°01'	+19'	102°	50°48'	+21'	104°	50°33'	+22'	105°	50°17'	+24'	106°	50°00'	+25'	107°	49°41'	+26'	108°	4
5	51°31'	+16'	100°	51°20'	+18'	101°	51°08'	+19'	102°	50°55'	+21'	103°	50°40'	+22'	105°	50°25'	+24'	106°	50°08'	+25'	107°	5
6	51°47'	+15'	98°	51°38'	+17'	99°	51°27'	+18'	101°	51°16'	+20'	102°	51°03'	+21'	103°	50°48'	+23'	104°	50°33'	+24'	106°	6
7	52°02'	+14'	97°	51°55'	+15'	98°	51°46'	+17'	99°	51°35'	+19'	100°	51°24'	+20'	102°	51°11'	+22'	103°	50°57'	+23'	104°	7
8	52°16'	+12'	95°	52°10'	+14'	96°	52°03'	+16'	98°	51°54'	+17'	99°	51°44'	+19'	100°	51°33'	+21'	101°	51°20'	+22'	103°	8
9	52°28'	+11'	93°	52°24'	+13'	95°	52°18'	+14'	96°	52°11'	+16'	97°	52°03'	+18'	99°	51°53'	+19'	100°	51°43'	+21'	101°	9
10	52°39'	+10'	92°	52°37'	+11'	93°	52°33'	+13'	94°	52°27'	+15'	96°	52°21'	+16'	97°	52°13'	+18'	98°	52°03'	+20'	100°	10
11	52°49'	+08'	90°	52°48'	+10'	92°	52°46'	+12'	93°	52°42'	+14'	94°	52°37'	+15'	95°	52°31'	+17'	97°	52°23'	+18'	98°	11
12	52°57'	+07'	89°	52°58'	+09'	90°	52°58'	+10'	91°	52°56'	+12'	93°	52°52'	+14'	94°	52°48'	+16'	95°	52°42'	+17'	96°	12
13	53°05'	+06'	87°	53°07'	+07'	88°	53°08'	+09'	90°	53°08'	+11'	91°	53°06'	+13'	92°	53°03'	+14'	94°	52°59'	+16'	95°	13
14	53°10'	+04'	85°	53°14'	+06'	87°	53°17'	+08'	88°	53°19'	+09'	89°	53°19'	+11'	91°	53°18'	+13'	92°	53°15'	+15'	93°	14
15	53°14'	+03'	84°	53°21'	+05'	85°	53°25'	+06'	86°	53°28'	+08'	88°	53°30'	+10'	89°	53°31'	+12'	90°	53°30'	+13'	92°	15
16	53°17'	+01'	82°	53°25'	+03'	83°	53°32'	+05'	85°	53°36'	+07'	86°	53°40'	+08'	87°	53°42'	+10'	89°	53°43'	+12'	90°	16
17	53°19'	+00'	80°	53°28'	+02'	82°	53°36'	+04'	83°	53°43'	+05'	84°	53°48'	+07'	86°	53°52'	+09'	87°	53°55'	+11'	88°	17
18	53°19'	-01'	79°	53°30'	+00'	80°	53°40'	+02'	81°	53°48'	+04'	83°	53°56'	+06'	84°	54°01'	+07'	85°	54°05'	+09'	87°	18
19	53°18'	-03'	77°	53°31'	-01'	78°	53°42'	+01'	80°	53°52'	+02'	81°	54°01'	+04'	82°	54°09'	+06'	84°	54°15'	+08'	85°	19
20	53°15'	-04'	75°	53°30'	-02'	77°	53°43'	-01'	78°	53°55'	+01'	79°	54°05'	+03'	81°	54°15'	+05'	82°	54°22'	+06'	83°	20
21	53°11'	-06'	74°	53°27'	-04'	75°	53°42'	-02'	76°	53°56'	00'	77°	54°08'	+01'	79°	54°19'	+03'	80°	54°29'	+05'	82°	21
22	53°05'	-07'	72°	53°23'	-05'	73°	53°40'	-04'	74°	53°55'	-02'	76°	54°09'	00'	77°	54°22'	+02'	78°	54°33'	+03'	80°	22
23	52°58'	-08'	70°	53°18'	-07'	71°	53°36'	-05'	73°	53°54'	-03'	74°	54°09'	-02'	75°	54°24'	+00'	77°	54°37'	+02'	78°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	48°57'	+22'	107°	48°39'	+23'	108°	48°20'	+24'	109°	48°00'	+26'	110°	47°39'	+27'	111°	47°17'	+28'	112°	46°55'	+30'	113°	0
1	49°18'	+21'	105°	49°02'	+22'	106°	48°44'	+23'	107°	48°26'	+25'	108°	48°06'	+26'	110°	47°46'	+27'	111°	47°24'	+29'	112°	1
2	49°39'	+19'	104°	49°24'	+21'	105°	49°08'	+22'	106°	48°51'	+24'	107°	48°33'	+25'	108°	48°13'	+27'	109°	47°53'	+28'	110°	2
3	49°58'	+18'	102°	49°45'	+20'	103°	49°30'	+21'	105°	49°15'	+23'	106°	48°58'	+24'	107°	48°40'	+26'	108°	48°21'	+27'	109°	3
4	50°16'	+17'	101°	50°05'	+19'	102°	49°51'	+20'	103°	49°37'	+22'	104°	49°22'	+23'	105°	49°05'	+25'	107°	48°48'	+26'	108°	4
5	50°34'	+16'	99°	50°23'	+18'	100°	50°12'	+19'	102°	49°59'	+21'	103°	49°45'	+22'	104°	49°30'	+24'	105°	49°14'	+25'	106°	5
6	50°49'	+15'	98°	50°41'	+16'	99°	50°31'	+18'	100°	50°20'	+19'	101°	50°07'	+21'	103°	49°53'	+22'	104°	49°39'	+24'	105°	6
7	51°04'	+14'	96°	50°57'	+15'	97°	50°49'	+17'	99°	50°39'	+18'	100°	50°28'	+20'	101°	50°16'	+21'	102°	50°03'	+23'	103°	7
8	51°18'	+12'	95°	51°12'	+14'	96°	51°05'	+16'	97°	50°57'	+17'	98°	50°48'	+19'	100°	50°37'	+20'	101°	50°25'	+22'	102°	8
9	51°30'	+11'	93°	51°26'	+13'	94°	51°21'	+14'	96°	51°14'	+16'	97°	51°07'	+18'	98°	50°58'	+19'	99°	50°47'	+21'	101°	9
10	51°41'	+10'	92°	51°39'	+11'	93°	51°35'	+13'	94°	51°30'	+15'	95°	51°24'	+16'	97°	51°17'	+18'	98°	51°08'	+19'	99°	10
11	51°51'	+08'	90°	51°50'	+10'	91°	51°48'	+12'	92°	51°45'	+13'	94°	51°40'	+15'	95°	51°35'	+17'	96°	51°27'	+18'	98°	11
12	51°59'	+07'	88°	52°00'	+09'	90°	52°00'	+10'	91°	51°58'	+12'	92°	51°56'	+14'	93°	51°51'	+15'	95°	51°46'	+17'	96°	12
13	52°06'	+06'	87°	52°09'	+07'	88°	52°11'	+09'	89°	52°11'	+11'	91°	52°09'	+13'	92°	52°07'	+14'	93°	52°03'	+16'	94°	13
14	52°12'	+04'	85°	52°17'	+06'	86°	52°20'	+08'	88°	52°21'	+10'	89°	52°22'	+11'	90°	52°21'	+13'	92°	52°19'	+15'	93°	14
15	52°17'	+03'	83°	52°23'	+05'	85°	52°28'	+07'	86°	52°31'	+08'	87°	52°33'	+10'	89°	52°34'	+12'	90°	52°33'	+13'	91°	15
16	52°20'	+02'	82°	52°28'	+03'	83°	52°34'	+05'	84°	52°39'	+07'	86°	52°43'	+09'	87°	52°45'	+10'	88°	52°46'	+12'	90°	16
17	52°21'	+00'	80°	52°31'	+02'	81°	52°39'	+04'	83°	52°46'	+05'	84°	52°52'	+07'	85°	52°56'	+09'	87°	52°58'	+11'	88°	17
18	52°22'	-01'	79°	52°33'	+01'	80°	52°43'	+02'	81°	52°52'	+04'	82°	52°59'	+06'	84°	53°05'	+08'	85°	53°09'	+09'	86°	18
19	52°21'	-02'	77°	52°34'	-01'	78°	52°45'	+01'	79°	52°56'	+03'	81°	53°05'	+04'	82°	53°12'	+06'	83°	53°18'	+08'	85°	19
20	52°19'	-04'	75°	52°33'	-02'	77°	52°46'	00'	78°	52°58'	+01'	79°	53°09'	+03'	80°	53°18'	+05'	82°	53°26'	+07'	83°	20
21	52°15'	-05'	74°	52°31'	-03'	75°	52°46'	-02'	76°	53°00'	00'	77°	53°12'	+02'	79°	53°23'	+03'	80°	53°33'	+05'	81°	21
22	52°10'	-06'	72°	52°28'	-05'	73°	52°44'	-03'	75°	53°00'	-01'	76°	53°14'	+00'	77°	53°27'	+02'	78°	53°38'	+04'	80°	22
23	52°04'	-08'	70°	52°23'	-06'	72°	52°41'	-04'	73°	52°58'	-03'	74°	53°14'	-01'	75°	53°29'	+01'	77°	53°42'	+02'	78°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

39° 321° LHA

Latitude SAME as Declination

39° 321° LHA

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

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

40° 320° LHA

Latitude SAME as Declination

40° 320° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	48°01'	+21'	106°	47°44'	+23'	107°	47°25'	+24'	108°	47°06'	+25'	109°	46°46'	+27'	110°	46°25'	+28'	111°	46°03'	+29'	112°	0
1	48°22'	+20'	105°	48°06'	+22'	106°	47°49'	+23'	107°	47°31'	+24'	108°	47°13'	+26'	109°	46°53'	+27'	110°	46°32'	+28'	111°	1
2	48°42'	+19'	103°	48°28'	+21'	104°	48°12'	+22'	105°	47°56'	+23'	107°	47°38'	+25'	108°	47°20'	+26'	109°	47°00'	+27'	110°	2
3	49°01'	+18'	102°	48°48'	+19'	103°	48°34'	+21'	104°	48°19'	+22'	105°	48°03'	+24'	106°	47°46'	+25'	107°	47°27'	+27'	108°	3
4	49°19'	+17'	100°	49°08'	+18'	101°	48°55'	+20'	103°	48°42'	+21'	104°	48°27'	+23'	105°	48°11'	+24'	106°	47°54'	+26'	107°	4
5	49°36'	+16'	99°	49°26'	+17'	100°	49°15'	+19'	101°	49°03'	+20'	102°	48°50'	+22'	103°	48°35'	+23'	105°	48°19'	+25'	106°	5
6	49°52'	+15'	97°	49°43'	+16'	99°	49°34'	+18'	100°	49°23'	+19'	101°	49°11'	+21'	102°	48°58'	+22'	103°	48°44'	+24'	104°	6
7	50°06'	+13'	96°	50°00'	+15'	97°	49°52'	+17'	98°	49°42'	+18'	99°	49°32'	+20'	101°	49°20'	+21'	102°	49°08'	+23'	103°	7
8	50°20'	+12'	94°	50°15'	+14'	96°	50°08'	+15'	97°	50°00'	+17'	98°	49°52'	+18'	99°	49°41'	+20'	100°	49°30'	+22'	101°	8
9	50°32'	+11'	93°	50°28'	+13'	94°	50°24'	+14'	95°	50°17'	+16'	96°	50°10'	+17'	98°	50°01'	+19'	99°	49°52'	+20'	100°	9
10	50°43'	+10'	91°	50°41'	+11'	92°	50°38'	+13'	94°	50°33'	+15'	95°	50°27'	+16'	96°	50°20'	+18'	97°	50°12'	+19'	99°	10
11	50°53'	+08'	90°	50°52'	+10'	91°	50°51'	+12'	92°	50°48'	+13'	93°	50°44'	+15'	95°	50°38'	+17'	96°	50°31'	+18'	97°	11
12	51°01'	+07'	88°	51°02'	+09'	89°	51°02'	+10'	91°	51°01'	+12'	92°	50°59'	+14'	93°	50°55'	+15'	94°	50°50'	+17'	96°	12
13	51°08'	+06'	87°	51°11'	+08'	88°	51°13'	+09'	89°	51°13'	+11'	90°	51°12'	+13'	92°	51°10'	+14'	93°	51°07'	+16'	94°	13
14	51°14'	+05'	85°	51°19'	+06'	86°	51°22'	+08'	87°	51°24'	+10'	89°	51°25'	+11'	90°	51°24'	+13'	91°	51°22'	+15'	92°	14
15	51°19'	+03'	83°	51°25'	+05'	85°	51°30'	+07'	86°	51°34'	+08'	87°	51°36'	+10'	88°	51°37'	+12'	90°	51°37'	+13'	91°	15
16	51°22'	+02'	82°	51°30'	+04'	83°	51°37'	+05'	84°	51°42'	+07'	86°	51°46'	+09'	87°	51°49'	+10'	88°	51°50'	+12'	89°	16
17	51°24'	+01'	80°	51°34'	+02'	81°	51°42'	+04'	83°	51°49'	+06'	84°	51°55'	+07'	85°	51°59'	+09'	86°	52°02'	+11'	88°	17
18	51°25'	-01'	79°	51°36'	+01'	80°	51°46'	+03'	81°	51°55'	+04'	82°	52°02'	+06'	84°	52°08'	+08'	85°	52°13'	+09'	86°	18
19	51°24'	-02'	77°	51°37'	00'	78°	51°49'	+01'	79°	51°59'	+03'	81°	52°08'	+05'	82°	52°16'	+06'	83°	52°22'	+08'	85°	19
20	51°22'	-03'	75°	51°37'	-02'	77°	51°50'	+00'	78°	52°02'	+02'	79°	52°13'	+03'	80°	52°22'	+05'	82°	52°30'	+07'	83°	20
21	51°19'	-05'	74°	51°35'	-03'	75°	51°50'	-01'	76°	52°04'	+00'	77°	52°16'	+02'	79°	52°27'	+04'	80°	52°37'	+05'	81°	21
22	51°14'	-06'	72°	51°32'	-04'	73°	51°49'	-03'	75°	52°04'	-01'	76°	52°18'	+01'	77°	52°31'	+02'	78°	52°42'	+04'	80°	22
23	51°09'	-07'	71°	51°28'	-06'	72°	51°46'	-04'	73°	52°03'	-02'	74°	52°19'	-01'	75°	52°33'	+01'	77°	52°46'	+03'	78°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	47°05'	+21'	106°	46°48'	+22'	107°	46°30'	+24'	108°	46°12'	+25'	109°	45°52'	+26'	110°	45°32'	+27'	111°	45°10'	+29'	111°	0
1	47°26'	+20'	104°	47°10'	+21'	105°	46°54'	+23'	106°	46°37'	+24'	107°	46°18'	+25'	108°	45°59'	+27'	109°	45°39'	+28'	110°	1
2	47°45'	+19'	103°	47°32'	+20'	104°	47°17'	+22'	105°	47°01'	+23'	106°	46°44'	+24'	107°	46°26'	+26'	108°	46°07'	+27'	109°	2
3	48°04'	+18'	101°	47°52'	+19'	102°	47°38'	+21'	104°	47°24'	+22'	105°	47°08'	+23'	106°	46°51'	+25'	107°	46°34'	+26'	108°	3
4	48°22'	+17'	100°	48°11'	+18'	101°	47°59'	+20'	102°	47°46'	+21'	103°	47°32'	+22'	104°	47°16'	+24'	105°	47°00'	+25'	106°	4
5	48°38'	+16'	98°	48°29'	+17'	100°	48°19'	+19'	101°	48°07'	+20'	102°	47°54'	+21'	103°	47°40'	+23'	104°	47°25'	+24'	105°	5
6	48°54'	+14'	97°	48°46'	+16'	98°	48°37'	+17'	99°	48°27'	+19'	100°	48°15'	+20'	101°	48°03'	+22'	103°	47°49'	+23'	104°	6
7	49°08'	+13'	96°	49°02'	+15'	97°	48°54'	+16'	98°	48°46'	+18'	99°	48°36'	+19'	100°	48°25'	+21'	101°	48°13'	+22'	102°	7
8	49°22'	+12'	94°	49°17'	+14'	95°	49°11'	+15'	96°	49°04'	+17'	97°	48°55'	+18'	99°	48°46'	+20'	100°	48°35'	+21'	101°	8
9	49°34'	+11'	93°	49°31'	+12'	94°	49°26'	+14'	95°	49°20'	+16'	96°	49°13'	+17'	97°	49°05'	+19'	98°	48°56'	+20'	99°	9
10	49°45'	+10'	91°	49°43'	+11'	92°	49°40'	+13'	93°	49°36'	+14'	95°	49°31'	+16'	96°	49°24'	+18'	97°	49°16'	+19'	98°	10
11	49°54'	+08'	89°	49°54'	+10'	91°	49°53'	+12'	92°	49°50'	+13'	93°	49°47'	+15'	94°	49°42'	+16'	95°	49°35'	+18'	97°	11
12	50°03'	+07'	88°	50°04'	+09'	89°	50°05'	+10'	90°	50°04'	+12'	92°	50°02'	+14'	93°	49°58'	+15'	94°	49°53'	+17'	95°	12
13	50°10'	+06'	86°	50°13'	+08'	88°	50°15'	+09'	89°	50°16'	+11'	90°	50°15'	+13'	91°	50°13'	+14'	92°	50°10'	+16'	94°	13
14	50°16'	+05'	85°	50°21'	+06'	86°	50°25'	+08'	87°	50°27'	+10'	88°	50°28'	+11'	90°	50°27'	+13'	91°	50°26'	+15'	92°	14
15	50°21'	+04'	83°	50°27'	+05'	84°	50°33'	+07'	86°	50°36'	+08'	87°	50°39'	+10'	88°	50°40'	+12'	89°	50°40'	+13'	91°	15
16	50°25'	+02'	82°	50°33'	+04'	83°	50°39'	+06'	84°	50°45'	+07'	85°	50°49'	+09'	87°	50°52'	+10'	88°	50°54'	+12'	89°	16
17	50°27'	+01'	80°	50°36'	+03'	81°	50°45'	+04'	83°	50°52'	+06'	84°	50°58'	+08'	85°	51°02'	+09'	86°	51°06'	+11'	87°	17
18	50°28'	00'	79°	50°39'	+01'	80°	50°49'	+03'	81°	50°58'	+05'	82°	51°05'	+06'	83°	51°12'	+08'	85°	51°17'	+10'	86°	18
19	50°27'	-02'	77°	50°40'	+00'	78°	50°52'	+02'	79°	51°02'	+03'	81°	51°12'	+05'	82°	51°20'	+07'	83°	51°26'	+08'	84°	19
20	50°26'	-03'	75°	50°40'	-01'	77°	50°54'	+00'	78°	51°06'	+02'	79°	51°17'	+04'	80°	51°26'	+05'	81°	51°34'	+07'	83°	20
21	50°23'	-04'	74°	50°39'	-02'	75°	50°54'	-01'	76°	51°08'	+01'	77°	51°20'	+02'	79°	51°31'	+04'	80°	51°41'	+06'	81°	21
22	50°19'	-05'	72°	50°37'	-04'	73°	50°53'	-02'	75°	51°09'	-01'	76°	51°23'	+01'	77°	51°35'	+03'	78°	51°47'	+04'	80°	22
23	50°14'	-07'	71°	50°33'	-05'	72°	50°51'	-03'	73°	51°08'	-02'	74°	51°24'	00'	75°	51°38'	+01'	77°	51°51'	+03'	78°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	46°09'	+20'	105°	45°53'	+22'	106°	45°35'	+23'	107°	45°17'	+24'	108°	44°58'	+26'	109°	44°38'	+27'	110°	44°18'	+28'	111°	0
1	46°29'	+19'	104°	46°14'	+21'	105°	45°59'	+22'	106°	45°42'	+24'	107°	45°24'	+25'	108°	45°05'	+26'	109°	44°46'	+27'	110°	1
2	46°49'	+18'	102°	46°35'	+20'	103°	46°21'	+21'	104°	46°05'	+23'	105°	45°49'	+24'	106°	45°32'	+25'	107°	45°13'	+27'	108°	2
3	47°07'	+17'	101°	46°55'	+19'	102°	46°42'	+20'	103°	46°28'	+22'	104°	46°13'	+23'	105°	45°57'	+24'	106°	45°40'	+26'	107°	3
4	47°24'	+16'	99°	47°14'	+18'	101°	47°02'	+19'	102°	46°50'	+21'	103°	46°36'	+22'	104°	46°21'	+24'	105°	46°06'	+25'	106°	4
5	47°41'	+15'	98°	47°32'	+17'	99°	47°22'	+18'	100°	47°11'	+20'	101°	46°58'	+21'	102°	46°45'	+23'	103°	46°31'	+24'	104°	5
6	47°56'	+14'	97°	47°49'	+16'	98°	47°40'	+17'	99°	47°30'	+19'	100°	47°19'	+20'	101°	47°07'	+22'	102°	46°54'	+23'	103°	6
7	48°10'	+13'	95°	48°04'	+15'	96°	47°57'	+16'	97°	47°49'	+18'	98°	47°40'	+19'	100°	47°29'	+21'	101°	47°17'	+22'	102°	7
8	48°24'	+12'	94°	48°19'	+14'	95°	48°13'	+15'	96°	48°07'	+17'	97°	47°59'	+18'	98°	47°50'	+20'	99°	47°39'	+21'	100°	8
9	48°36'	+11'	92°	48°33'	+12'	93°	48°29'	+14'	94°	48°23'	+15'	96°	48°17'	+17'	97°	48°09'	+19'	98°	48°00'	+20'	99°	9
10	48°46'	+10'	91°	48°45'	+11'	92°	48°43'	+13'	93°	48°39'	+14'	94°	48°34'	+16'	95°	48°28'	+17'	96°	48°20'	+19'	98°	10
11	48°56'	+09'	89°	48°56'	+10'	90°	48°55'	+12'	92°	48°53'	+13'	93°	48°50'	+15'	94°	48°45'	+16'	95°	48°39'	+18'	96°	11
12	49°05'	+07'	88°	49°06'	+09'	89°	49°07'	+11'	90°	49°06'	+12'	91°	49°05'	+14'	92°	49°01'	+15'	94°	48°57'	+17'	95°	12
13	49°12'	+06'	86°	49°15'	+08'	87°	49°18'	+09'	89°	49°18'	+11'	90°	49°18'	+12'	91°	49°17'	+14'	92°	49°14'	+16'	93°	13
14	49°18'	+05'	85°	49°23'	+07'	86°	49°27'	+08'	87°	49°29'	+10'	88°	49°31'	+11'	89°	49°31'	+13'	91°	49°30'	+14'	92°	14
15	49°23'	+04'	83°	49°30'	+05'	84°	49°35'	+07'	85°	49°39'	+09'	87°	49°42'	+10'	88°	49°44'	+12'	89°	49°44'	+13'	90°	15
16	49°27'	+03'	82°	49°35'	+04'	83°	49°42'	+06'	84°	49°48'	+07'	85°	49°52'	+09'	86°	49°55'	+11'	88°	49°57'	+12'	89°	16
17	49°29'	+01'	80°	49°39'	+03'	81°	49°48'	+04'	82°	49°55'	+06'	84°	50°01'	+08'	85°	50°06'	+09'	86°	50°09'	+11'	87°	17
18	49°31'	+00'	79°	49°42'	+02'	80°	49°52'	+03'	81°	50°01'	+05'	82°	50°09'	+06'	83°	50°15'	+08'	84°	50°20'	+10'	86°	18
19	49°31'	-01'	77°	49°44'	+00'	78°	49°55'	+02'	79°	50°06'	+04'	80°	50°15'	+05'	82°	50°23'	+07'	83°	50°30'	+08'	84°	19
20	49°30'	-02'	75°	49°44'	-01'	77°	49°57'	+01'	78°	50°09'	+02'	79°	50°20'	+04'	80°	50°30'	+06'	81°	50°38'	+07'	83°	20
21	49°27'	-04'	74°	49°43'	-02'	75°	49°58'	00'	76°	50°12'	+01'	77°	50°24'	+03'	79°	50°36'	+04'	80°	50°46'	+06'	81°	21
22	49°24'	-05'	72°	49°41'	-03'	74°	49°58'	-02'	75°	50°13'	00'	76°	50°27'	+01'	77°	50°40'	+03'	78°	50°52'	+05'	79°	22
23	49°19'	-06'	71°	49°38'	-05'	72°	49°56'	-03'	73°	50°13'	-01'	74°	50°28'	+00'	75°	50°43'	+02'	77°	50°56'	+03'	78°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	45°12'	+20'	105°	44°57'	+21'	106°	44°40'	+23'	106°	44°23'	+24'	107°	44°04'	+25'	108°	43°45'	+27'	109°	43°25'	+28'	110°	0
1	45°32'	+19'	103°	45°18'	+21'	104°	45°03'	+22'	105°	44°47'	+23'	106°	44°30'	+25'	107°	44°12'	+26'	108°	43°53'	+27'	109°	1
2	45°52'	+18'	102°	45°39'	+20'	103°	45°25'	+21'	104°	45°10'	+22'	105°	44°54'	+24'	106°	44°37'	+25'	107°	44°20'	+26'	108°	2
3	46°10'	+17'	100°	45°58'	+19'	101°	45°46'	+20'	103°	45°32'	+21'	103°	45°18'	+23'	104°	45°02'	+24'	105°	44°46'	+25'	106°	3
4	46°27'	+16'	99°	46°17'	+18'	100°	46°06'	+19'	101°	45°54'	+20'	102°	45°41'	+22'	103°	45°26'	+23'	104°	45°11'	+25'	105°	4
5	46°43'	+15'	98°	46°35'	+17'	99°	46°25'	+18'	100°	46°14'	+19'	101°	46°02'	+21'	102°	45°50'	+22'	103°	45°36'	+24'	104°	5
6	46°58'	+14'	96°	46°51'	+16'	97°	46°43'	+17'	98°	46°34'	+18'	99°	46°23'	+20'	100°	46°12'	+21'	101°	45°59'	+23'	103°	6
7	47°12'	+13'	95°	47°07'	+15'	96°	47°00'	+16'	97°	46°52'	+17'	98°	46°43'	+19'	99°	46°33'	+20'	100°	46°22'	+22'	101°	7
8	47°25'	+12'	93°	47°21'	+13'	94°	47°16'	+15'	96°	47°10'	+16'	97°	47°02'	+18'	98°	46°54'	+19'	99°	46°44'	+21'	100°	8
9	47°37'	+11'	92°	47°35'	+12'	93°	47°31'	+14'	94°	47°26'	+15'	95°	47°20'	+17'	96°	47°13'	+18'	97°	47°05'	+20'	98°	9
10	47°48'	+10'	90°	47°47'	+11'	92°	47°45'	+13'	93°	47°42'	+14'	94°	47°37'	+16'	95°	47°31'	+17'	96°	47°25'	+19'	97°	10
11	47°58'	+09'	89°	47°58'	+10'	90°	47°58'	+12'	91°	47°56'	+13'	92°	47°53'	+15'	93°	47°49'	+16'	95°	47°43'	+18'	96°	11
12	48°07'	+07'	88°	48°09'	+09'	89°	48°09'	+11'	90°	48°09'	+12'	91°	48°08'	+14'	92°	48°05'	+15'	93°	48°01'	+17'	94°	12
13	48°14'	+06'	86°	48°18'	+08'	87°	48°20'	+09'	88°	48°21'	+11'	89°	48°21'	+12'	91°	48°20'	+14'	92°	48°18'	+16'	93°	13
14	48°20'	+05'	85°	48°25'	+07'	86°	48°29'	+08'	87°	48°32'	+10'	88°	48°34'	+11'	89°	48°34'	+13'	90°	48°33'	+14'	91°	14
15	48°25'	+04'	83°	48°32'	+05'	84°	48°38'	+07'	85°	48°42'	+09'	86°	48°45'	+10'	88°	48°47'	+12'	89°	48°48'	+13'	90°	15
16	48°29'	+03'	82°	48°38'	+04'	83°	48°45'	+06'	84°	48°50'	+07'	85°	48°55'	+09'	86°	48°59'	+11'	87°	49°01'	+12'	88°	16
17	48°32'	+02'	80°	48°42'	+03'	81°	48°50'	+05'	82°	48°58'	+06'	83°	49°04'	+08'	85°	49°09'	+09'	86°	49°13'	+11'	87°	17
18	48°34'	+00'	79°	48°45'	+02'	80°	48°55'	+04'	81°	49°04'	+05'	82°	49°12'	+07'	83°	49°19'	+08'	84°	49°24'	+10'	85°	18
19	48°34'	-01'	77°	48°47'	+01'	78°	48°59'	+02'	79°	49°09'	+04'	80°	49°19'	+05'	82°	49°27'	+07'	83°	49°34'	+09'	84°	19
20	48°33'	-02'	76°	48°48'	00'	77°	49°01'	+01'	78°	49°13'	+03'	79°	49°24'	+04'	80°	49°34'	+06'	81°	49°43'	+07'	82°	20
21	48°31'	-03'	74°	48°47'	-02'	75°	49°02'	00'	76°	49°16'	+01'	77°	49°28'	+03'	78°	49°40'	+05'	80°	49°50'	+06'	81°	21
22	48°28'	-04'	72°	48°46'	-03'	74°	49°02'	-01'	75°	49°17'	+00'	76°	49°31'	+02'	77°	49°44'	+03'	78°	49°56'	+05'	79°	22
23	48°24'	-06'	71°	48°43'	-04'	72°	49°01'	-03'	73°	49°17'	-01'	74°	49°33'	+01'	75°	49°48'	+02'	77°	50°01'	+04'	78°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

43° 317° LHA

Latitude SAME as Declination

43° 317° LHA

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

44° 316° LHA

Latitude SAME as Declination

44° 316° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	44°16'	+20'	104°	44°01'	+21'	105°	43°45'	+22'	106°	43°28'	+24'	107°	43°10'	+25'	108°	42°51'	+26'	109°	42°32'	+27'	110°	0
1	44°36'	+19'	103°	44°22'	+20'	104°	44°07'	+22'	105°	43°52'	+23'	106°	43°35'	+24'	106°	43°18'	+25'	107°	42°59'	+27'	108°	1
2	44°55'	+18'	101°	44°42'	+19'	102°	44°29'	+21'	103°	44°15'	+22'	104°	43°59'	+23'	105°	43°43'	+25'	106°	43°26'	+26'	107°	2
3	45°13'	+17'	100°	45°02'	+18'	101°	44°50'	+20'	102°	44°37'	+21'	103°	44°23'	+22'	104°	44°08'	+24'	105°	43°52'	+25'	106°	3
4	45°29'	+16'	99°	45°20'	+17'	100°	45°09'	+19'	101°	44°58'	+20'	102°	44°45'	+22'	103°	44°31'	+23'	104°	44°17'	+24'	105°	4
5	45°45'	+15'	97°	45°37'	+16'	98°	45°28'	+18'	99°	45°18'	+19'	100°	45°07'	+21'	101°	44°54'	+22'	102°	44°41'	+23'	103°	5
6	46°00'	+14'	96°	45°54'	+15'	97°	45°46'	+17'	98°	45°37'	+18'	99°	45°27'	+20'	100°	45°16'	+21'	101°	45°04'	+22'	102°	6
7	46°14'	+13'	95°	46°09'	+14'	96°	46°03'	+16'	97°	45°55'	+17'	98°	45°47'	+19'	99°	45°37'	+20'	100°	45°27'	+22'	101°	7
8	46°27'	+12'	93°	46°24'	+13'	94°	46°19'	+15'	95°	46°13'	+16'	96°	46°06'	+18'	97°	45°58'	+19'	98°	45°48'	+21'	99°	8
9	46°39'	+11'	92°	46°37'	+12'	93°	46°34'	+14'	94°	46°29'	+15'	95°	46°23'	+17'	96°	46°17'	+18'	97°	46°09'	+20'	98°	9
10	46°50'	+10'	90°	46°49'	+11'	91°	46°47'	+13'	92°	46°44'	+14'	93°	46°40'	+16'	94°	46°35'	+17'	96°	46°29'	+19'	97°	10
11	47°00'	+09'	89°	47°00'	+10'	90°	47°00'	+12'	91°	46°59'	+13'	92°	46°56'	+15'	93°	46°52'	+16'	94°	46°47'	+18'	95°	11
12	47°08'	+08'	87°	47°11'	+09'	88°	47°12'	+11'	90°	47°12'	+12'	91°	47°10'	+14'	92°	47°08'	+15'	93°	47°05'	+17'	94°	12
13	47°16'	+06'	86°	47°20'	+08'	87°	47°22'	+09'	88°	47°24'	+11'	89°	47°24'	+13'	90°	47°23'	+14'	91°	47°21'	+16'	92°	13
14	47°22'	+05'	84°	47°28'	+07'	86°	47°32'	+08'	87°	47°35'	+10'	88°	47°37'	+11'	89°	47°37'	+13'	90°	47°37'	+14'	91°	14
15	47°28'	+04'	83°	47°34'	+06'	84°	47°40'	+07'	85°	47°45'	+09'	86°	47°48'	+10'	87°	47°50'	+12'	88°	47°51'	+13'	90°	15
16	47°32'	+03'	81°	47°40'	+05'	83°	47°47'	+06'	84°	47°53'	+08'	85°	47°58'	+09'	86°	48°02'	+11'	87°	48°05'	+12'	88°	16
17	47°35'	+02'	80°	47°45'	+03'	81°	47°53'	+05'	82°	48°01'	+06'	83°	48°07'	+08'	84°	48°13'	+10'	85°	48°17'	+11'	87°	17
18	47°37'	+01'	79°	47°48'	+02'	80°	47°58'	+04'	81°	48°07'	+05'	82°	48°15'	+07'	83°	48°22'	+08'	84°	48°28'	+10'	85°	18
19	47°37'	00'	77°	47°50'	+01'	78°	48°02'	+03'	79°	48°13'	+04'	80°	48°22'	+06'	81°	48°31'	+07'	83°	48°38'	+09'	84°	19
20	47°37'	-02'	76°	47°51'	00'	77°	48°05'	+01'	78°	48°17'	+03'	79°	48°28'	+05'	80°	48°38'	+06'	81°	48°47'	+08'	82°	20
21	47°35'	-03'	74°	47°51'	-01'	75°	48°06'	+00'	76°	48°20'	+02'	77°	48°32'	+03'	78°	48°44'	+05'	79°	48°54'	+06'	81°	21
22	47°33'	-04'	73°	47°50'	-02'	74°	48°06'	-01'	75°	48°22'	+01'	76°	48°36'	+02'	77°	48°49'	+04'	78°	49°01'	+05'	79°	22
23	47°29'	-05'	71°	47°48'	-04'	72°	48°05'	-02'	73°	48°22'	-01'	74°	48°38'	+01'	75°	48°53'	+02'	76°	49°06'	+04'	78°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

44° 316° LHA

Latitude SAME as Declination

44° 316° LHA

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

45° 315° LHA

Latitude SAME as Declination

45° 315° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	43°19'	+20'	104°	43°05'	+21'	105°	42°49'	+22'	105°	42°33'	+23'	106°	42°16'	+25'	107°	41°57'	+26'	108°	41°38'	+27'	109°	0
1	43°39'	+19'	102°	43°26'	+20'	103°	43°11'	+21'	104°	42°56'	+23'	105°	42°40'	+24'	106°	42°23'	+25'	107°	42°06'	+26'	108°	1
2	43°57'	+18'	101°	43°46'	+19'	102°	43°33'	+20'	103°	43°19'	+22'	104°	43°04'	+23'	105°	42°48'	+24'	106°	42°32'	+26'	106°	2
3	44°15'	+17'	100°	44°05'	+18'	101°	43°53'	+20'	102°	43°41'	+21'	102°	43°27'	+22'	103°	43°13'	+23'	104°	42°57'	+25'	105°	3
4	44°32'	+16'	98°	44°23'	+17'	99°	44°13'	+19'	100°	44°01'	+20'	101°	43°49'	+21'	102°	43°36'	+23'	103°	43°22'	+24'	104°	4
5	44°48'	+15'	97°	44°40'	+16'	98°	44°31'	+18'	99°	44°21'	+19'	100°	44°11'	+20'	101°	43°59'	+22'	102°	43°46'	+23'	103°	5
6	45°03'	+14'	96°	44°56'	+15'	97°	44°49'	+17'	98°	44°40'	+18'	99°	44°31'	+19'	100°	44°21'	+21'	100°	44°09'	+22'	101°	6
7	45°16'	+13'	94°	45°11'	+14'	95°	45°06'	+16'	96°	44°59'	+17'	97°	44°50'	+19'	98°	44°41'	+20'	99°	44°31'	+21'	100°	7
8	45°29'	+12'	93°	45°26'	+13'	94°	45°21'	+15'	95°	45°16'	+16'	96°	45°09'	+18'	97°	45°01'	+19'	98°	44°53'	+20'	99°	8
9	45°41'	+11'	91°	45°39'	+12'	92°	45°36'	+14'	93°	45°32'	+15'	94°	45°27'	+17'	95°	45°20'	+18'	96°	45°13'	+19'	97°	9
10	45°52'	+10'	90°	45°51'	+11'	91°	45°50'	+13'	92°	45°47'	+14'	93°	45°43'	+16'	94°	45°38'	+17'	95°	45°32'	+18'	96°	10
11	46°02'	+09'	89°	46°03'	+10'	90°	46°02'	+12'	91°	46°01'	+13'	92°	45°59'	+15'	93°	45°55'	+16'	94°	45°51'	+18'	95°	11
12	46°10'	+08'	87°	46°13'	+09'	88°	46°14'	+11'	89°	46°14'	+12'	90°	46°13'	+14'	91°	46°12'	+15'	92°	46°08'	+17'	93°	12
13	46°18'	+07'	86°	46°22'	+08'	87°	46°25'	+10'	88°	46°26'	+11'	89°	46°27'	+13'	90°	46°27'	+14'	91°	46°25'	+15'	92°	13
14	46°24'	+05'	84°	46°30'	+07'	85°	46°34'	+08'	86°	46°37'	+10'	87°	46°40'	+11'	88°	46°41'	+13'	90°	46°40'	+14'	91°	14
15	46°30'	+04'	83°	46°37'	+06'	84°	46°43'	+07'	85°	46°47'	+09'	86°	46°51'	+10'	87°	46°54'	+12'	88°	46°55'	+13'	89°	15
16	46°34'	+03'	81°	46°43'	+05'	82°	46°50'	+06'	83°	46°56'	+08'	85°	47°01'	+09'	86°	47°05'	+11'	87°	47°08'	+12'	88°	16
17	46°37'	+02'	80°	46°47'	+04'	81°	46°56'	+05'	82°	47°04'	+07'	83°	47°11'	+08'	84°	47°16'	+10'	85°	47°21'	+11'	86°	17
18	46°40'	+01'	78°	46°51'	+03'	80°	47°01'	+04'	81°	47°11'	+06'	82°	47°19'	+07'	83°	47°26'	+09'	84°	47°32'	+10'	85°	18
19	46°41'	00'	77°	46°54'	+01'	78°	47°05'	+03'	79°	47°16'	+04'	80°	47°26'	+06'	81°	47°34'	+07'	82°	47°42'	+09'	83°	19
20	46°40'	-01'	76°	46°55'	+00'	77°	47°08'	+02'	78°	47°21'	+03'	79°	47°32'	+05'	80°	47°42'	+06'	81°	47°51'	+08'	82°	20
21	46°39'	-02'	74°	46°55'	-01'	75°	47°10'	+01'	76°	47°24'	+02'	77°	47°37'	+04'	78°	47°48'	+05'	79°	47°59'	+07'	80°	21
22	46°37'	-03'	73°	46°54'	-02'	74°	47°11'	00'	75°	47°26'	+01'	76°	47°40'	+03'	77°	47°53'	+04'	78°	48°05'	+06'	79°	22
23	46°34'	-05'	71°	46°52'	-03'	72°	47°10'	-02'	73°	47°27'	00'	74°	47°43'	+01'	75°	47°57'	+03'	76°	48°11'	+04'	77°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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									
Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	42°23'	+19'	103°	42°09'	+21'	104°	41°54'	+22'	105°	41°38'	+23'	106°	41°21'	+24'	107°	41°03'	+26'	107°	40°45'	+27'	108°	0
1	42°42'	+18'	102°	42°29'	+20'	103°	42°15'	+21'	104°	42°01'	+22'	105°	41°45'	+24'	105°	41°29'	+25'	106°	41°12'	+26'	107°	1
2	43°00'	+17'	101°	42°49'	+19'	101°	42°36'	+20'	102°	42°23'	+21'	103°	42°09'	+23'	104°	41°54'	+24'	105°	41°38'	+25'	106°	2
3	43°18'	+17'	99°	43°08'	+18'	100°	42°57'	+19'	101°	42°45'	+21'	102°	42°32'	+22'	103°	42°18'	+23'	104°	42°03'	+24'	105°	3
4	43°34'	+16'	98°	43°26'	+17'	99°	43°16'	+18'	100°	43°05'	+20'	101°	42°53'	+21'	102°	42°41'	+22'	103°	42°27'	+24'	103°	4
5	43°50'	+15'	97°	43°43'	+16'	98°	43°34'	+17'	98°	43°25'	+19'	99°	43°15'	+20'	100°	43°03'	+22'	101°	42°51'	+23'	102°	5
6	44°05'	+14'	95°	43°59'	+15'	96°	43°52'	+17'	97°	43°44'	+18'	98°	43°35'	+19'	99°	43°25'	+21'	100°	43°14'	+22'	101°	6
7	44°18'	+13'	94°	44°14'	+14'	95°	44°08'	+16'	96°	44°02'	+17'	97°	43°54'	+18'	98°	43°45'	+20'	99°	43°36'	+21'	100°	7
8	44°31'	+12'	93°	44°28'	+13'	94°	44°24'	+15'	94°	44°19'	+16'	95°	44°12'	+17'	96°	44°05'	+19'	97°	43°57'	+20'	98°	8
9	44°43'	+11'	91°	44°41'	+12'	92°	44°38'	+14'	93°	44°35'	+15'	94°	44°30'	+17'	95°	44°24'	+18'	96°	44°17'	+19'	97°	9
10	44°54'	+10'	90°	44°53'	+11'	91°	44°52'	+13'	92°	44°50'	+14'	93°	44°46'	+16'	94°	44°42'	+17'	95°	44°36'	+18'	96°	10
11	45°03'	+09'	88°	45°05'	+10'	89°	45°05'	+12'	90°	45°04'	+13'	91°	45°02'	+15'	92°	44°59'	+16'	93°	44°55'	+17'	94°	11
12	45°12'	+08'	87°	45°15'	+09'	88°	45°16'	+11'	89°	45°17'	+12'	90°	45°16'	+14'	91°	45°15'	+15'	92°	45°12'	+16'	93°	12
13	45°20'	+07'	86°	45°24'	+08'	87°	45°27'	+10'	88°	45°29'	+11'	89°	45°30'	+13'	90°	45°30'	+14'	91°	45°29'	+15'	92°	13
14	45°26'	+06'	84°	45°32'	+07'	85°	45°37'	+09'	86°	45°40'	+10'	87°	45°42'	+12'	88°	45°44'	+13'	89°	45°44'	+14'	90°	14
15	45°32'	+05'	83°	45°39'	+06'	84°	45°45'	+08'	85°	45°50'	+09'	86°	45°54'	+10'	87°	45°57'	+12'	88°	45°59'	+13'	89°	15
16	45°37'	+03'	81°	45°45'	+05'	82°	45°53'	+06'	83°	45°59'	+08'	84°	46°04'	+09'	85°	46°09'	+11'	86°	46°12'	+12'	87°	16
17	45°40'	+02'	80°	45°50'	+04'	81°	45°59'	+05'	82°	46°07'	+07'	83°	46°14'	+08'	84°	46°20'	+10'	85°	46°24'	+11'	86°	17
18	45°42'	+01'	78°	45°54'	+03'	79°	46°04'	+04'	80°	46°14'	+06'	81°	46°22'	+07'	83°	46°29'	+09'	84°	46°36'	+10'	85°	18
19	45°44'	+00'	77°	45°57'	+02'	78°	46°09'	+03'	79°	46°20'	+05'	80°	46°29'	+06'	81°	46°38'	+08'	82°	46°46'	+09'	83°	19
20	45°44'	-01'	76°	45°59'	+01'	77°	46°12'	+02'	78°	46°24'	+04'	79°	46°36'	+05'	80°	46°46'	+07'	81°	46°55'	+08'	82°	20
21	45°43'	-02'	74°	45°59'	00'	75°	46°14'	+01'	76°	46°28'	+02'	77°	46°41'	+04'	78°	46°52'	+05'	79°	47°03'	+07'	80°	21
22	45°41'	-03'	73°	45°59'	-02'	74°	46°15'	00'	75°	46°30'	+01'	76°	46°45'	+03'	77°	46°58'	+04'	78°	47°10'	+06'	79°	22
23	45°38'	-04'	71°	45°57'	-03'	72°	46°15'	-01'	73°	46°32'	+00'	74°	46°48'	+02'	75°	47°02'	+03'	76°	47°16'	+05'	77°	23
Dec°	14			15			16			17			18			19			20			Dec°

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									
Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	41°26'	+19'	103°	41°12'	+20'	104°	40°58'	+22'	104°	40°42'	+23'	105°	40°26'	+24'	106°	40°09'	+25'	107°	39°51'	+26'	108°	0
1	41°45'	+18'	101°	41°33'	+19'	102°	41°19'	+21'	103°	41°05'	+22'	104°	40°50'	+23'	105°	40°34'	+24'	106°	40°18'	+26'	107°	1
2	42°03'	+17'	100°	41°52'	+19'	101°	41°40'	+20'	102°	41°27'	+21'	103°	41°13'	+22'	104°	40°59'	+24'	104°	40°43'	+25'	105°	2
3	42°20'	+16'	99°	42°11'	+18'	100°	42°00'	+19'	101°	41°48'	+20'	102°	41°36'	+22'	102°	41°23'	+23'	103°	41°08'	+24'	104°	3
4	42°37'	+15'	98°	42°28'	+17'	98°	42°19'	+18'	99°	42°09'	+19'	100°	41°58'	+21'	101°	41°45'	+22'	102°	41°33'	+23'	103°	4
5	42°52'	+15'	96°	42°45'	+16'	97°	42°37'	+17'	98°	42°28'	+19'	99°	42°18'	+20'	100°	42°08'	+21'	101°	41°56'	+23'	102°	5
6	43°07'	+14'	95°	43°01'	+15'	96°	42°54'	+16'	97°	42°47'	+18'	98°	42°38'	+19'	99°	42°29'	+20'	100°	42°18'	+22'	100°	6
7	43°20'	+13'	94°	43°16'	+14'	95°	43°11'	+15'	95°	43°05'	+17'	96°	42°57'	+18'	97°	42°49'	+20'	98°	42°40'	+21'	99°	7
8	43°33'	+12'	92°	43°30'	+13'	93°	43°26'	+15'	94°	43°21'	+16'	95°	43°16'	+17'	96°	43°09'	+19'	97°	43°01'	+20'	98°	8
9	43°45'	+11'	91°	43°43'	+12'	92°	43°41'	+14'	93°	43°37'	+15'	94°	43°33'	+16'	95°	43°28'	+18'	96°	43°21'	+19'	97°	9
10	43°55'	+10'	90°	43°55'	+11'	90°	43°54'	+13'	91°	43°52'	+14'	92°	43°49'	+15'	93°	43°45'	+17'	94°	43°40'	+18'	95°	10
11	44°05'	+09'	88°	44°07'	+10'	89°	44°07'	+12'	90°	44°06'	+13'	91°	44°05'	+15'	92°	44°02'	+16'	93°	43°59'	+17'	94°	11
12	44°14'	+08'	87°	44°17'	+09'	88°	44°19'	+11'	89°	44°20'	+12'	90°	44°19'	+14'	91°	44°18'	+15'	92°	44°16'	+16'	93°	12
13	44°22'	+07'	85°	44°26'	+08'	86°	44°29'	+10'	87°	44°32'	+11'	88°	44°33'	+13'	89°	44°33'	+14'	90°	44°32'	+15'	91°	13
14	44°29'	+06'	84°	44°34'	+07'	85°	44°39'	+09'	86°	44°43'	+10'	87°	44°45'	+12'	88°	44°47'	+13'	89°	44°48'	+14'	90°	14
15	44°34'	+05'	83°	44°42'	+06'	84°	44°48'	+08'	85°	44°53'	+09'	86°	44°57'	+11'	87°	45°00'	+12'	88°	45°02'	+13'	89°	15
16	44°39'	+04'	81°	44°48'	+05'	82°	44°55'	+07'	83°	45°02'	+08'	84°	45°08'	+10'	85°	45°12'	+11'	86°	45°16'	+12'	87°	16
17	44°43'	+03'	80°	44°53'	+04'	81°	45°02'	+06'	82°	45°10'	+07'	83°	45°17'	+09'	84°	45°23'	+10'	85°	45°28'	+11'	86°	17
18	44°45'	+02'	78°	44°57'	+03'	79°	45°08'	+05'	80°	45°17'	+06'	81°	45°26'	+07'	82°	45°33'	+09'	83°	45°40'	+10'	84°	18
19	44°47'	+01'	77°	45°00'	+02'	78°	45°12'	+03'	79°	45°23'	+05'	80°	45°33'	+06'	81°	45°42'	+08'	82°	45°50'	+09'	83°	19
20	44°48'	00'	76°	45°02'	+01'	77°	45°16'	+02'	78°	45°28'	+04'	79°	45°40'	+05'	80°	45°50'	+07'	81°	45°59'	+08'	82°	20
21	44°47'	-01'	74°	45°03'	00'	75°	45°18'	+01'	76°	45°32'	+03'	77°	45°45'	+04'	78°	45°57'	+06'	79°	46°08'	+07'	80°	21
22	44°46'	-03'	73°	45°03'	-01'	74°	45°19'	+00'	75°	45°35'	+02'	76°	45°49'	+03'	77°	46°03'	+05'	78°	46°15'	+06'	79°	22
23	44°43'	-04'	71°	45°02'	-02'	72°	45°20'	-01'	73°	45°37'	+01'	74°	45°52'	+02'	75°	46°07'	+04'	76°	46°21'	+05'	77°	23
Dec°	14			15			16			17			18			19			20			Dec°

47° 313° LHA Latitude SAME as Declination 47° 313° LHA

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

48° 312° LHA

Latitude SAME as Declination

48° 312° LHA

Dec°	14			15			16			17			18			19			20			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	40°29'	+19'	102°	40°16'	+20'	103°	40°02'	+21'	104°	39°47'	+22'	105°	39°31'	+24'	106°	39°15'	+25'	106°	38°58'	+26'	107°	0			
1	40°48'	+18'	101°	40°36'	+19'	102°	40°23'	+20'	103°	40°09'	+22'	104°	39°55'	+23'	104°	39°40'	+24'	105°	39°24'	+25'	106°	1			
2	41°06'	+17'	100°	40°55'	+18'	101°	40°44'	+20'	101°	40°31'	+21'	102°	40°18'	+22'	103°	40°04'	+23'	104°	39°49'	+25'	105°	2			
3	41°23'	+16'	98°	41°13'	+17'	99°	41°03'	+19'	100°	40°52'	+20'	101°	40°40'	+21'	102°	40°27'	+23'	103°	40°14'	+24'	104°	3			
4	41°39'	+15'	97°	41°31'	+17'	98°	41°22'	+18'	99°	41°12'	+19'	100°	41°01'	+21'	101°	40°50'	+22'	102°	40°37'	+23'	102°	4			
5	41°54'	+14'	96°	41°48'	+16'	97°	41°40'	+17'	98°	41°31'	+18'	99°	41°22'	+20'	99°	41°12'	+21'	100°	41°01'	+22'	101°	5			
6	42°09'	+14'	95°	42°03'	+15'	96°	41°57'	+16'	96°	41°50'	+18'	97°	41°42'	+19'	98°	41°33'	+20'	99°	41°23'	+22'	100°	6			
7	42°22'	+13'	93°	42°18'	+14'	94°	42°13'	+15'	95°	42°08'	+17'	96°	42°01'	+18'	97°	41°53'	+19'	98°	41°44'	+21'	99°	7			
8	42°35'	+12'	92°	42°32'	+13'	93°	42°29'	+14'	94°	42°24'	+16'	95°	42°19'	+17'	96°	42°13'	+19'	97°	42°05'	+20'	97°	8			
9	42°46'	+11'	91°	42°45'	+12'	92°	42°43'	+14'	92°	42°40'	+15'	93°	42°36'	+16'	94°	42°31'	+18'	95°	42°25'	+19'	96°	9			
10	42°57'	+10'	89°	42°57'	+11'	90°	42°57'	+13'	91°	42°55'	+14'	92°	42°52'	+15'	93°	42°49'	+17'	94°	42°44'	+18'	95°	10			
11	43°07'	+09'	88°	43°09'	+10'	89°	43°09'	+12'	90°	43°09'	+13'	91°	43°08'	+14'	92°	43°06'	+16'	93°	43°02'	+17'	94°	11			
12	43°16'	+08'	87°	43°19'	+09'	88°	43°21'	+11'	88°	43°22'	+12'	89°	43°22'	+14'	90°	43°21'	+15'	91°	43°20'	+16'	92°	12			
13	43°24'	+07'	85°	43°28'	+08'	86°	43°32'	+10'	87°	43°34'	+11'	88°	43°36'	+13'	89°	43°36'	+14'	90°	43°36'	+15'	91°	13			
14	43°31'	+06'	84°	43°37'	+07'	85°	43°42'	+09'	86°	43°45'	+10'	87°	43°48'	+12'	88°	43°50'	+13'	89°	43°51'	+14'	90°	14			
15	43°37'	+05'	82°	43°44'	+06'	83°	43°50'	+08'	84°	43°56'	+09'	85°	44°00'	+11'	86°	44°03'	+12'	87°	44°06'	+14'	88°	15			
16	43°42'	+04'	81°	43°50'	+05'	82°	43°58'	+07'	83°	44°05'	+08'	84°	44°11'	+10'	85°	44°16'	+11'	86°	44°19'	+13'	87°	16			
17	43°45'	+03'	80°	43°56'	+04'	81°	44°05'	+06'	82°	44°13'	+07'	83°	44°20'	+09'	84°	44°27'	+10'	85°	44°32'	+12'	86°	17			
18	43°48'	+02'	78°	44°00'	+03'	79°	44°11'	+05'	80°	44°20'	+06'	81°	44°29'	+08'	82°	44°37'	+09'	83°	44°43'	+11'	84°	18			
19	43°50'	+01'	77°	44°03'	+02'	78°	44°16'	+04'	79°	44°27'	+05'	80°	44°37'	+07'	81°	44°46'	+08'	82°	44°54'	+10'	83°	19			
20	43°51'	00'	76°	44°06'	+01'	77°	44°19'	+03'	77°	44°32'	+04'	78°	44°43'	+06'	79°	44°54'	+07'	80°	45°04'	+09'	81°	20			
21	43°51'	-01'	74°	44°07'	+00'	75°	44°22'	+02'	76°	44°36'	+03'	77°	44°49'	+05'	78°	45°01'	+06'	79°	45°12'	+07'	80°	21			
22	43°50'	-02'	73°	44°07'	-01'	74°	44°24'	+01'	75°	44°39'	+02'	76°	44°54'	+04'	77°	45°07'	+05'	78°	45°20'	+06'	79°	22			
23	43°48'	-03'	71°	44°07'	-02'	72°	44°25'	00'	73°	44°41'	+01'	74°	44°57'	+03'	75°	45°12'	+04'	76°	45°26'	+05'	77°	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°
	14			15			16			17			18			19			20						

48° 312° LHA

Latitude SAME as Declination

48° 312° LHA

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

49° 311° LHA

Latitude SAME as Declination

49° 311° LHA

Dec°	14			15			16			17			18			19			20			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	39°32'	+18'	102°	39°19'	+20'	103°	39°06'	+21'	103°	38°51'	+22'	104°	38°36'	+23'	105°	38°20'	+25'	106°	38°04'	+26'	107°	0			
1	39°51'	+18'	101°	39°39'	+19'	101°	39°27'	+20'	102°	39°14'	+21'	103°	39°00'	+23'	104°	38°45'	+24'	105°	38°29'	+25'	105°	1			
2	40°08'	+17'	99°	39°58'	+18'	100°	39°47'	+19'	101°	39°35'	+21'	102°	39°22'	+22'	103°	39°09'	+23'	103°	38°54'	+24'	104°	2			
3	40°25'	+16'	98°	40°16'	+17'	99°	40°06'	+19'	100°	39°56'	+20'	101°	39°44'	+21'	101°	39°32'	+22'	102°	39°19'	+24'	103°	3			
4	40°41'	+15'	97°	40°33'	+16'	98°	40°25'	+18'	99°	40°16'	+19'	99°	40°05'	+20'	100°	39°54'	+22'	101°	39°42'	+23'	102°	4			
5	40°56'	+14'	96°	40°50'	+16'	96°	40°43'	+17'	97°	40°35'	+18'	98°	40°26'	+20'	99°	40°16'	+21'	100°	40°05'	+22'	101°	5			
6	41°11'	+13'	94°	41°06'	+15'	95°	41°00'	+16'	96°	40°53'	+17'	97°	40°45'	+19'	98°	40°37'	+20'	99°	40°27'	+21'	99°	6			
7	41°24'	+13'	93°	41°20'	+14'	94°	41°16'	+15'	95°	41°10'	+17'	96°	41°04'	+18'	96°	40°57'	+19'	97°	40°49'	+21'	98°	7			
8	41°37'	+12'	92°	41°34'	+13'	93°	41°31'	+14'	93°	41°27'	+16'	94°	41°22'	+17'	95°	41°16'	+18'	96°	41°09'	+20'	97°	8			
9	41°48'	+11'	90°	41°47'	+12'	91°	41°46'	+14'	92°	41°43'	+15'	93°	41°39'	+16'	94°	41°35'	+18'	95°	41°29'	+19'	96°	9			
10	41°59'	+10'	89°	41°59'	+11'	90°	41°59'	+13'	91°	41°58'	+14'	92°	41°55'	+15'	93°	41°52'	+17'	94°	41°48'	+18'	94°	10			
11	42°09'	+09'	88°	42°11'	+10'	89°	42°12'	+12'	90°	42°12'	+13'	90°	42°11'	+14'	91°	42°09'	+16'	92°	42°06'	+17'	93°	11			
12	42°18'	+08'	86°	42°21'	+09'	87°	42°23'	+11'	88°	42°25'	+12'	89°	42°25'	+14'	90°	42°25'	+15'	91°	42°23'	+16'	92°	12			
13	42°26'	+07'	85°	42°30'	+08'	86°	42°34'	+10'	87°	42°37'	+11'	88°	42°39'	+13'	89°	42°40'	+14'	90°	42°40'	+15'	91°	13			
14	42°33'	+06'	84°	42°39'	+08'	85°	42°44'	+09'	86°	42°48'	+10'	86°	42°51'	+12'	87°	42°54'	+13'	88°	42°55'	+15'	89°	14			
15	42°39'	+05'	82°	42°46'	+07'	83°	42°53'	+08'	84°	42°59'	+09'	85°	43°03'	+11'	86°	43°07'	+12'	87°	43°09'	+14'	88°	15			
16	42°44'	+04'	81°	42°53'	+06'	82°	43°01'	+07'	83°	43°08'	+08'	84°	43°14'	+10'	85°	43°19'	+11'	86°	43°23'	+13'	87°	16			
17	42°48'	+03'	80°	42°59'	+05'	81°	43°08'	+06'	81°	43°16'	+07'	82°	43°24'	+09'	83°	43°30'	+10'	84°	43°36'	+12'	85°	17			
18	42°51'	+02'	78°	43°03'	+04'	79°	43°14'	+05'	80°	43°24'	+06'	81°	43°33'	+08'	82°	43°40'	+09'	83°	43°47'	+11'	84°	18			
19	42°54'	+01'	77°	43°07'	+03'	78°	43°19'	+04'	79°	43°30'	+05'	80°	43°40'	+07'	81°	43°50'	+08'	82°	43°58'	+10'	83°	19			
20	42°55'	+00'	76°	43°09'	+02'	76°	43°23'	+03'	77°	43°36'	+04'	78°	43°47'	+06'	79°	43°58'	+07'	80°	44°08'	+09'	81°	20			
21	42°55'	-01'	74°	43°11'	+01'	75°	43°26'	+02'	76°	43°40'	+03'	77°	43°53'	+05'	78°	44°05'	+06'	79°	44°17'	+08'	80°	21			
22	42°55'	-02'	73°	43°12'	00'	74°	43°28'	+01'	75°	43°44'	+02'	76°	43°58'	+04'	76°	44°12'	+05'	77°	44°24'	+07'	78°	22			
23	42°53'	-03'	71°	43°12'	-01'	72°	43°29'	+00'	73°	43°46'	+01'	74°	44°02'	+03'	75°	44°17'	+04'	76°	44°31'	+06'	77°	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°
	14			15			16			17			18			19			20						

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°	14			15			16			17			18			19			20			Dec°									
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°										
0	38°35'	+18'	101°	38°23'	+19'	102°	38°10'	+21'	103°	37°56'	+22'	104°	37°41'	+23'	105°	37°26'	+24'	105°	37°10'	+25'	106°	0									
1	38°53'	+17'	100°	38°42'	+19'	101°	38°30'	+20'	102°	38°18'	+21'	103°	38°04'	+22'	103°	37°50'	+24'	104°	37°35'	+25'	105°	1									
2	39°11'	+17'	99°	39°01'	+18'	100°	38°50'	+19'	101°	38°39'	+20'	101°	38°27'	+22'	102°	38°14'	+23'	103°	38°00'	+24'	104°	2									
3	39°27'	+16'	98°	39°19'	+17'	99°	39°10'	+18'	99°	38°59'	+20'	100°	38°48'	+21'	101°	38°36'	+22'	102°	38°24'	+23'	103°	3									
4	39°43'	+15'	97°	39°36'	+16'	97°	39°28'	+18'	98°	39°19'	+19'	99°	39°09'	+20'	100°	38°59'	+21'	101°	38°47'	+23'	101°	4									
5	39°58'	+14'	95°	39°52'	+16'	96°	39°46'	+17'	97°	39°38'	+18'	98°	39°29'	+19'	99°	39°20'	+21'	99°	39°10'	+22'	100°	5									
6	40°12'	+13'	94°	40°08'	+15'	95°	40°02'	+16'	96°	39°56'	+17'	97°	39°49'	+19'	97°	39°41'	+20'	98°	39°32'	+21'	99°	6									
7	40°26'	+13'	93°	40°23'	+14'	94°	40°18'	+15'	94°	40°13'	+17'	95°	40°07'	+18'	96°	40°01'	+19'	97°	39°53'	+20'	98°	7									
8	40°38'	+12'	91°	40°36'	+13'	92°	40°34'	+14'	93°	40°30'	+16'	94°	40°25'	+17'	95°	40°20'	+18'	96°	40°13'	+20'	97°	8									
9	40°50'	+11'	90°	40°49'	+12'	91°	40°48'	+13'	92°	40°45'	+15'	93°	40°42'	+16'	94°	40°38'	+17'	94°	40°33'	+19'	95°	9									
10	41°01'	+10'	89°	41°02'	+11'	90°	41°01'	+13'	91°	41°00'	+14'	91°	40°58'	+15'	92°	40°55'	+17'	93°	40°52'	+18'	94°	10									
11	41°11'	+09'	88°	41°13'	+10'	88°	41°14'	+12'	89°	41°14'	+13'	90°	41°14'	+14'	91°	41°12'	+16'	92°	41°10'	+17'	93°	11									
12	41°20'	+08'	86°	41°23'	+09'	87°	41°26'	+11'	88°	41°27'	+12'	89°	41°28'	+14'	90°	41°28'	+15'	91°	41°27'	+16'	92°	12									
13	41°28'	+07'	85°	41°33'	+09'	86°	41°37'	+10'	87°	41°40'	+11'	88°	41°42'	+13'	88°	41°43'	+14'	89°	41°43'	+15'	90°	13									
14	41°35'	+06'	84°	41°41'	+08'	84°	41°47'	+09'	85°	41°51'	+10'	86°	41°54'	+12'	87°	41°57'	+13'	88°	41°59'	+15'	89°	14									
15	41°41'	+05'	82°	41°49'	+07'	83°	41°56'	+08'	84°	42°01'	+09'	85°	42°06'	+11'	86°	42°10'	+12'	87°	42°13'	+14'	88°	15									
16	41°47'	+04'	81°	41°56'	+06'	82°	42°04'	+07'	83°	42°11'	+09'	84°	42°17'	+10'	84°	42°22'	+11'	85°	42°27'	+13'	86°	16									
17	41°51'	+03'	80°	42°01'	+05'	80°	42°11'	+06'	81°	42°19'	+08'	82°	42°27'	+09'	83°	42°34'	+10'	84°	42°40'	+12'	85°	17									
18	41°54'	+03'	78°	42°06'	+04'	79°	42°17'	+05'	80°	42°27'	+07'	81°	42°36'	+08'	82°	42°44'	+09'	83°	42°51'	+11'	84°	18									
19	41°57'	+02'	77°	42°10'	+03'	78°	42°22'	+04'	79°	42°34'	+06'	80°	42°44'	+07'	80°	42°54'	+09'	81°	43°02'	+10'	82°	19									
20	41°59'	+01'	76°	42°13'	+02'	76°	42°27'	+03'	77°	42°40'	+05'	78°	42°51'	+06'	79°	43°02'	+08'	80°	43°12'	+09'	81°	20									
21	41°59'	00'	74°	42°15'	+01'	75°	42°30'	+02'	76°	42°44'	+04'	77°	42°57'	+05'	78°	43°10'	+07'	79°	43°21'	+08'	80°	21									
22	41°59'	-01'	73°	42°16'	+00'	74°	42°33'	+01'	75°	42°48'	+03'	75°	43°03'	+04'	76°	43°16'	+06'	77°	43°29'	+07'	78°	22									
23	41°58'	-02'	71°	42°16'	-01'	72°	42°34'	+01'	73°	42°51'	+02'	74°	43°07'	+03'	75°	43°22'	+05'	76°	43°36'	+06'	77°	23									
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°									
			14				15				16				17				18				19				20				Dec°

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°	14			15			16			17			18			19			20			Dec°									
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°										
0	37°38'	+18'	101°	37°26'	+19'	102°	37°13'	+20'	103°	37°00'	+22'	103°	36°46'	+23'	104°	36°31'	+24'	105°	36°15'	+25'	105°	0									
1	37°56'	+17'	100°	37°45'	+18'	101°	37°34'	+20'	101°	37°22'	+21'	102°	37°09'	+22'	103°	36°55'	+23'	104°	36°40'	+24'	104°	1									
2	38°13'	+16'	99°	38°04'	+18'	99°	37°54'	+19'	100°	37°43'	+20'	101°	37°31'	+21'	102°	37°18'	+23'	102°	37°05'	+24'	103°	2									
3	38°30'	+16'	97°	38°22'	+17'	98°	38°13'	+18'	99°	38°03'	+19'	100°	37°52'	+21'	101°	37°41'	+22'	101°	37°29'	+23'	102°	3									
4	38°45'	+15'	96°	38°39'	+16'	97°	38°31'	+17'	98°	38°22'	+19'	99°	38°13'	+20'	99°	38°03'	+21'	100°	37°52'	+22'	101°	4									
5	39°00'	+14'	95°	38°55'	+15'	96°	38°48'	+17'	97°	38°41'	+18'	97°	38°33'	+19'	98°	38°24'	+20'	99°	38°14'	+22'	100°	5									
6	39°14'	+13'	94°	39°10'	+15'	95°	39°05'	+16'	95°	38°59'	+17'	96°	38°52'	+18'	97°	38°44'	+20'	98°	38°36'	+21'	99°	6									
7	39°28'	+12'	92°	39°25'	+14'	93°	39°21'	+15'	94°	39°16'	+16'	95°	39°11'	+18'	96°	39°04'	+19'	97°	38°57'	+20'	97°	7									
8	39°40'	+12'	91°	39°38'	+13'	92°	39°36'	+14'	93°	39°33'	+16'	94°	39°28'	+17'	94°	39°23'	+18'	95°	39°17'	+19'	96°	8									
9	39°52'	+11'	90°	39°51'	+12'	91°	39°50'	+13'	92°	39°48'	+15'	92°	39°45'	+16'	93°	39°41'	+17'	94°	39°37'	+19'	95°	9									
10	40°03'	+10'	89°	40°04'	+11'	89°	40°04'	+13'	90°	40°03'	+14'	91°	40°01'	+15'	92°	39°59'	+17'	93°	39°55'	+18'	94°	10									
11	40°13'	+09'	87°	40°15'	+10'	88°	40°16'	+12'	89°	40°17'	+13'	90°	40°17'	+14'	91°	40°15'	+16'	92°	40°13'	+17'	92°	11									
12	40°22'	+08'	86°	40°25'	+10'	87°	40°28'	+11'	88°	40°30'	+12'	89°	40°31'	+14'	89°	40°31'	+15'	90°	40°30'	+16'	91°	12									
13	40°30'	+07'	85°	40°35'	+09'	86°	40°39'	+10'	86°	40°42'	+11'	87°	40°45'	+13'	88°	40°46'	+14'	89°	40°47'	+15'	90°	13									
14	40°37'	+06'	83°	40°44'	+08'	84°	40°49'	+09'	85°	40°54'	+11'	86°	40°57'	+12'	87°	41°00'	+13'	88°	41°02'	+15'	89°	14									
15	40°44'	+06'	82°	40°51'	+07'	83°	40°58'	+08'	84°	41°04'	+10'	85°	41°09'	+11'	86°	41°14'	+12'	86°	41°17'	+14'	87°	15									
16	40°49'	+05'	81°	40°58'	+06'	82°	41°06'	+07'	83°	41°14'	+09'	83°	41°20'	+10'	84°	41°26'	+11'	85°	41°31'	+13'	86°	16									
17	40°54'	+04'	79°	41°04'	+05'	80°	41°14'	+06'	81°	41°23'	+08'	82°	41°30'	+09'	83°	41°37'	+11'	84°	41°43'	+12'	85°	17									
18	40°57'	+03'	78°	41°09'	+04'	79°	41°20'	+06'	80°	41°30'	+07'	81°	41°40'	+08'	82°	41°48'	+10'	82°	41°55'	+11'	83°	18									
19	41°00'	+02'	77°	41°14'	+03'	78°	41°26'	+05'	79°	41°37'	+06'	79°	41°48'	+07'	80°	41°58'	+09'	81°	42°06'	+10'	82°	19									
20	41°02'	+01'	76°	41°17'	+02'	76°	41°31'	+04'	77°	41°43'	+05'	78°	41°55'	+06'	79°	42°06'	+08'	80°	42°16'	+09'	81°	20									
21	41°03'	+00'	74°	41°19'	+01'	75°	41°34'	+03'	76°	41°48'	+04'	77°	42°02'	+06'	78°	42°14'	+07'	79°	42°26'	+08'	79°	21									
22	41°03'	-01'	73°	41°21'	+01'	74°	41°37'	+02'	75°	41°53'	+03'	75°	42°07'	+05'	76°	42°21'	+06'	77°	42°34'	+07'	78°	22									
23	41°03'	-02'	72°	41°21'	00'	72°	41°39'	+01'	73°	41°56'	+02'	74°	42°12'	+04'	75°	42°27'	+05'	76°	42°41'	+06'	77°	23									
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°									
			14				15				16				17				18				19				20				Dec°

51° 309° LHA

Latitude SAME as Declination

51° 309° LHA

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

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

52° 308° LHA

Latitude SAME as Declination

52° 308° LHA

Dec°	14			15			16			17			18			19			20			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	36°41'	+18'	101°	36°29'	+19'	101°	36°17'	+20'	102°	36°04'	+21'	103°	35°50'	+23'	104°	35°36'	+24'	104°	35°21'	+25'	105°	0			
1	36°59'	+17'	100°	36°48'	+18'	100°	36°37'	+19'	101°	36°26'	+21'	102°	36°13'	+22'	102°	36°00'	+23'	103°	35°46'	+24'	104°	1			
2	37°16'	+16'	98°	37°07'	+18'	99°	36°57'	+19'	100°	36°46'	+20'	101°	36°35'	+21'	101°	36°23'	+22'	102°	36°10'	+24'	103°	2			
3	37°32'	+16'	97°	37°24'	+17'	98°	37°16'	+18'	99°	37°06'	+19'	99°	36°56'	+21'	100°	36°45'	+22'	101°	36°33'	+23'	102°	3			
4	37°48'	+15'	96°	37°41'	+16'	97°	37°34'	+17'	97°	37°25'	+19'	98°	37°17'	+20'	99°	37°07'	+21'	100°	36°56'	+22'	100°	4			
5	38°02'	+14'	95°	37°57'	+15'	95°	37°51'	+17'	96°	37°44'	+18'	97°	37°36'	+19'	98°	37°28'	+20'	98°	37°19'	+22'	99°	5			
6	38°16'	+13'	93°	38°12'	+15'	94°	38°08'	+16'	95°	38°02'	+17'	96°	37°55'	+18'	97°	37°48'	+20'	97°	37°40'	+21'	98°	6			
7	38°30'	+12'	92°	38°27'	+14'	93°	38°23'	+15'	94°	38°19'	+16'	95°	38°14'	+18'	95°	38°08'	+19'	96°	38°01'	+20'	97°	7			
8	38°42'	+12'	91°	38°41'	+13'	92°	38°38'	+14'	93°	38°35'	+16'	93°	38°31'	+17'	94°	38°27'	+18'	95°	38°21'	+19'	96°	8			
9	38°54'	+11'	90°	38°54'	+12'	90°	38°53'	+13'	91°	38°51'	+15'	92°	38°48'	+16'	93°	38°45'	+17'	94°	38°41'	+19'	94°	9			
10	39°04'	+10'	88°	39°06'	+11'	89°	39°06'	+13'	90°	39°06'	+14'	91°	39°04'	+15'	92°	39°02'	+17'	92°	38°59'	+18'	93°	10			
11	39°14'	+09'	87°	39°17'	+10'	88°	39°19'	+12'	89°	39°20'	+13'	90°	39°20'	+14'	90°	39°19'	+16'	91°	39°17'	+17'	92°	11			
12	39°23'	+08'	86°	39°27'	+10'	87°	39°30'	+11'	87°	39°33'	+12'	88°	39°34'	+14'	89°	39°35'	+15'	90°	39°34'	+16'	91°	12			
13	39°32'	+07'	85°	39°37'	+09'	85°	39°41'	+10'	86°	39°45'	+11'	87°	39°48'	+13'	88°	39°49'	+14'	89°	39°50'	+15'	90°	13			
14	39°39'	+07'	83°	39°46'	+08'	84°	39°52'	+09'	85°	39°56'	+11'	86°	40°00'	+12'	87°	40°04'	+13'	87°	40°06'	+15'	88°	14			
15	39°46'	+06'	82°	39°54'	+07'	83°	40°01'	+08'	84°	40°07'	+10'	84°	40°12'	+11'	85°	40°17'	+12'	86°	40°20'	+14'	87°	15			
16	39°52'	+05'	81°	40°01'	+06'	82°	40°09'	+08'	82°	40°17'	+09'	83°	40°24'	+10'	84°	40°29'	+12'	85°	40°34'	+13'	86°	16			
17	39°56'	+04'	79°	40°07'	+05'	80°	40°17'	+07'	81°	40°26'	+08'	82°	40°34'	+09'	83°	40°41'	+11'	84°	40°47'	+12'	84°	17			
18	40°00'	+03'	78°	40°12'	+04'	79°	40°24'	+06'	80°	40°34'	+07'	81°	40°43'	+08'	81°	40°52'	+10'	82°	40°59'	+11'	83°	18			
19	40°04'	+02'	77°	40°17'	+04'	78°	40°29'	+05'	78°	40°41'	+06'	79°	40°52'	+08'	80°	41°02'	+09'	81°	41°11'	+10'	82°	19			
20	40°06'	+01'	75°	40°20'	+03'	76°	40°34'	+04'	77°	40°47'	+05'	78°	40°59'	+07'	79°	41°11'	+08'	80°	41°21'	+09'	81°	20			
21	40°07'	+00'	74°	40°23'	+02'	75°	40°38'	+03'	76°	40°53'	+04'	77°	41°06'	+06'	77°	41°19'	+07'	78°	41°30'	+09'	79°	21			
22	40°08'	00'	73°	40°25'	+01'	74°	40°41'	+02'	74°	40°57'	+04'	75°	41°12'	+05'	76°	41°26'	+06'	77°	41°39'	+08'	78°	22			
23	40°07'	-01'	72°	40°26'	+00'	72°	40°44'	+01'	73°	41°01'	+03'	74°	41°17'	+04'	75°	41°32'	+05'	76°	41°46'	+07'	77°	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°
	14			15			16			17			18			19			20						

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°	14			15			16			17			18			19			20			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	35°44'	+18'	100°	35°33'	+19'	101°	35°21'	+20'	102°	35°08'	+21'	102°	34°55'	+22'	103°	34°41'	+23'	104°	34°26'	+25'	104°	0			
1	36°01'	+17'	99°	35°51'	+18'	100°	35°41'	+19'	101°	35°29'	+20'	101°	35°17'	+22'	102°	35°04'	+23'	103°	34°51'	+24'	103°	1			
2	36°18'	+16'	98°	36°09'	+17'	99°	36°00'	+19'	99°	35°50'	+20'	100°	35°39'	+21'	101°	35°27'	+22'	102°	35°15'	+23'	102°	2			
3	36°34'	+15'	97°	36°27'	+17'	97°	36°19'	+18'	98°	36°10'	+19'	99°	36°00'	+20'	100°	35°49'	+22'	100°	35°38'	+23'	101°	3			
4	36°50'	+15'	96°	36°43'	+16'	96°	36°36'	+17'	97°	36°29'	+18'	98°	36°20'	+20'	99°	36°11'	+21'	99°	36°01'	+22'	100°	4			
5	37°04'	+14'	94°	36°59'	+15'	95°	36°54'	+16'	96°	36°47'	+18'	97°	36°40'	+19'	97°	36°32'	+20'	98°	36°23'	+21'	99°	5			
6	37°18'	+13'	93°	37°14'	+14'	94°	37°10'	+16'	95°	37°05'	+17'	95°	36°59'	+18'	96°	36°52'	+19'	97°	36°44'	+21'	98°	6			
7	37°31'	+12'	92°	37°29'	+14'	93°	37°26'	+15'	93°	37°22'	+16'	94°	37°17'	+18'	95°	37°11'	+19'	96°	37°05'	+20'	96°	7			
8	37°44'	+12'	91°	37°43'	+13'	91°	37°41'	+14'	92°	37°38'	+15'	93°	37°34'	+17'	94°	37°30'	+18'	95°	37°25'	+19'	95°	8			
9	37°55'	+11'	89°	37°56'	+12'	90°	37°55'	+13'	91°	37°53'	+15'	92°	37°51'	+16'	93°	37°48'	+17'	93°	37°44'	+19'	94°	9			
10	38°06'	+10'	88°	38°08'	+11'	89°	38°08'	+13'	90°	38°08'	+14'	91°	38°07'	+15'	91°	38°05'	+17'	92°	38°03'	+18'	93°	10			
11	38°16'	+09'	87°	38°19'	+11'	88°	38°21'	+12'	88°	38°22'	+13'	89°	38°23'	+14'	90°	38°22'	+16'	91°	38°21'	+17'	92°	11			
12	38°25'	+08'	86°	38°30'	+10'	86°	38°33'	+11'	87°	38°35'	+12'	88°	38°37'	+14'	89°	38°38'	+15'	90°	38°38'	+16'	90°	12			
13	38°34'	+08'	84°	38°39'	+09'	85°	38°44'	+10'	86°	38°48'	+12'	87°	38°51'	+13'	88°	38°53'	+14'	88°	38°54'	+15'	89°	13			
14	38°41'	+07'	83°	38°48'	+08'	84°	38°54'	+09'	85°	38°59'	+11'	86°	39°04'	+12'	86°	39°07'	+13'	87°	39°09'	+15'	88°	14			
15	38°48'	+06'	82°	38°56'	+07'	83°	39°04'	+09'	83°	39°10'	+10'	84°	39°16'	+11'	85°	39°20'	+13'	86°	39°24'	+14'	87°	15			
16	38°54'	+05'	81°	39°04'	+06'	81°	39°12'	+08'	82°	39°20'	+09'	83°	39°27'	+10'	84°	39°33'	+12'	85°	39°38'	+13'	85°	16			
17	38°59'	+04'	79°	39°10'	+06'	80°	39°20'	+07'	81°	39°29'	+08'	82°	39°37'	+10'	83°	39°45'	+11'	83°	39°51'	+12'	84°	17			
18	39°04'	+03'	78°	39°16'	+05'	79°	39°27'	+06'	80°	39°37'	+07'	80°	39°47'	+09'	81°	39°55'	+10'	82°	40°03'	+11'	83°	18			
19	39°07'	+03'	77°	39°20'	+04'	78°	39°33'	+05'	78°	39°45'	+07'	79°	39°55'	+08'	80°	40°06'	+09'	81°	40°15'	+11'	82°	19			
20	39°09'	+02'	75°	39°24'	+03'	76°	39°38'	+04'	77°	39°51'	+06'	78°	40°03'	+07'	79°	40°15'	+08'	79°	40°25'	+10'	80°	20			
21	39°11'	+01'	74°	39°27'	+02'	75°	39°42'	+03'	76°	39°57'	+05'	77°	40°10'	+06'	77°	40°23'	+07'	78°	40°35'	+09'	79°	21			
22	39°12'	+00'	73°	39°29'	+01'	74°	39°46'	+03'	74°	40°02'	+04'	75°	40°16'	+05'	76°	40°30'	+07'	77°	40°44'	+08'	78°	22			
23	39°12'	-01'	72°	39°31'	+00'	72°	39°48'	+02'	73°	40°05'	+03'	74°	40°22'	+04'	75°	40°37'	+06'	76°	40°52'	+07'	76°	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°
	14			15			16			17			18			19			20						

53° 307° LHA

Latitude SAME as Declination

53° 307° LHA

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

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

54° 306° LHA

Latitude SAME as Declination

54° 306° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	34°46'	+17'	100°	34°36'	+19'	101°	34°24'	+20'	101°	34°12'	+21'	102°	33°59'	+22'	103°	33°46'	+23'	103°	33°32'	+24'	104°	0
1	35°04'	+17'	99°	34°54'	+18'	99°	34°44'	+19'	100°	34°33'	+20'	101°	34°21'	+21'	102°	34°09'	+23'	102°	33°56'	+24'	103°	1
2	35°20'	+16'	98°	35°12'	+17'	98°	35°03'	+18'	99°	34°53'	+20'	100°	34°43'	+21'	100°	34°32'	+22'	101°	34°20'	+23'	102°	2
3	35°36'	+15'	96°	35°29'	+17'	97°	35°21'	+18'	98°	35°13'	+19'	99°	35°04'	+20'	99°	34°54'	+21'	100°	34°43'	+23'	101°	3
4	35°52'	+15'	95°	35°46'	+16'	96°	35°39'	+17'	97°	35°32'	+18'	97°	35°24'	+19'	98°	35°15'	+21'	99°	35°05'	+22'	99°	4
5	36°06'	+14'	94°	36°02'	+15'	95°	35°56'	+16'	96°	35°50'	+18'	96°	35°43'	+19'	97°	35°36'	+20'	98°	35°27'	+21'	98°	5
6	36°20'	+13'	93°	36°17'	+14'	94°	36°13'	+16'	94°	36°08'	+17'	95°	36°02'	+18'	96°	35°56'	+19'	96°	35°48'	+21'	97°	6
7	36°33'	+12'	92°	36°31'	+14'	92°	36°28'	+15'	93°	36°25'	+16'	94°	36°20'	+17'	95°	36°15'	+19'	95°	36°09'	+20'	96°	7
8	36°46'	+12'	90°	36°45'	+13'	91°	36°43'	+14'	92°	36°41'	+15'	93°	36°38'	+17'	93°	36°34'	+18'	94°	36°29'	+19'	95°	8
9	36°57'	+11'	89°	36°58'	+12'	90°	36°57'	+13'	91°	36°56'	+15'	91°	36°54'	+16'	92°	36°52'	+17'	93°	36°48'	+18'	94°	9
10	37°08'	+10'	88°	37°10'	+11'	89°	37°11'	+13'	89°	37°11'	+14'	90°	37°10'	+15'	91°	37°09'	+17'	92°	37°07'	+18'	93°	10
11	37°18'	+09'	87°	37°21'	+11'	87°	37°23'	+12'	88°	37°25'	+13'	89°	37°25'	+14'	90°	37°25'	+16'	91°	37°24'	+17'	91°	11
12	37°27'	+09'	85°	37°32'	+10'	86°	37°35'	+11'	87°	37°38'	+12'	88°	37°40'	+14'	89°	37°41'	+15'	89°	37°41'	+16'	90°	12
13	37°36'	+08'	84°	37°42'	+09'	85°	37°46'	+10'	86°	37°50'	+12'	87°	37°54'	+13'	87°	37°56'	+14'	88°	37°58'	+16'	89°	13
14	37°44'	+07'	83°	37°51'	+08'	84°	37°57'	+10'	85°	38°02'	+11'	85°	38°07'	+12'	86°	38°10'	+13'	87°	38°13'	+15'	88°	14
15	37°51'	+06'	82°	37°59'	+07'	82°	38°06'	+09'	83°	38°13'	+10'	84°	38°19'	+11'	85°	38°24'	+13'	86°	38°28'	+14'	86°	15
16	37°57'	+05'	80°	38°06'	+07'	81°	38°15'	+08'	82°	38°23'	+09'	83°	38°30'	+11'	84°	38°36'	+12'	84°	38°42'	+13'	85°	16
17	38°02'	+05'	79°	38°13'	+06'	80°	38°23'	+07'	81°	38°32'	+08'	82°	38°41'	+10'	82°	38°48'	+11'	83°	38°55'	+12'	84°	17
18	38°07'	+04'	78°	38°19'	+05'	79°	38°30'	+06'	79°	38°41'	+08'	80°	38°50'	+09'	81°	38°59'	+10'	82°	39°07'	+12'	83°	18
19	38°10'	+03'	77°	38°24'	+04'	77°	38°36'	+05'	78°	38°48'	+07'	79°	38°59'	+08'	80°	39°10'	+09'	81°	39°19'	+11'	81°	19
20	38°13'	+02'	75°	38°28'	+03'	76°	38°42'	+05'	77°	38°55'	+06'	78°	39°07'	+07'	79°	39°19'	+09'	79°	39°30'	+10'	80°	20
21	38°15'	+01'	74°	38°31'	+03'	75°	38°47'	+04'	76°	39°01'	+05'	76°	39°15'	+06'	77°	39°28'	+08'	78°	39°40'	+09'	79°	21
22	38°16'	+00'	73°	38°34'	+02'	74°	38°50'	+03'	74°	39°06'	+04'	75°	39°21'	+06'	76°	39°35'	+07'	77°	39°49'	+08'	78°	22
23	38°17'	00'	72°	38°35'	+01'	72°	38°53'	+02'	73°	39°10'	+03'	74°	39°27'	+05'	75°	39°42'	+06'	75°	39°57'	+07'	76°	23

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	33°49'	+17'	100°	33°39'	+18'	100°	33°28'	+20'	101°	33°16'	+21'	102°	33°04'	+22'	102°	32°51'	+23'	103°	32°37'	+24'	103°	0
1	34°06'	+16'	98°	33°57'	+18'	99°	33°47'	+19'	100°	33°37'	+20'	100°	33°25'	+21'	101°	33°13'	+22'	102°	33°01'	+24'	102°	1
2	34°23'	+16'	97°	34°15'	+17'	98°	34°06'	+18'	99°	33°57'	+19'	99°	33°47'	+21'	100°	33°36'	+22'	101°	33°24'	+23'	101°	2
3	34°38'	+15'	96°	34°32'	+16'	97°	34°24'	+18'	97°	34°16'	+19'	98°	34°07'	+20'	99°	33°58'	+21'	100°	33°47'	+22'	100°	3
4	34°54'	+14'	95°	34°48'	+16'	96°	34°42'	+17'	96°	34°35'	+18'	97°	34°27'	+19'	98°	34°19'	+21'	98°	34°10'	+22'	99°	4
5	35°08'	+14'	94°	35°04'	+15'	94°	34°59'	+16'	95°	34°53'	+17'	96°	34°47'	+19'	97°	34°39'	+20'	97°	34°31'	+21'	98°	5
6	35°22'	+13'	93°	35°19'	+14'	93°	35°15'	+16'	94°	35°10'	+17'	95°	35°05'	+18'	95°	34°59'	+19'	96°	34°52'	+20'	97°	6
7	35°35'	+12'	91°	35°33'	+14'	92°	35°31'	+15'	93°	35°27'	+16'	94°	35°23'	+17'	94°	35°18'	+19'	95°	35°13'	+20'	96°	7
8	35°47'	+12'	90°	35°47'	+13'	91°	35°45'	+14'	92°	35°43'	+15'	92°	35°41'	+17'	93°	35°37'	+18'	94°	35°33'	+19'	94°	8
9	35°59'	+11'	89°	36°00'	+12'	90°	36°00'	+13'	90°	35°59'	+15'	91°	35°57'	+16'	92°	35°55'	+17'	93°	35°52'	+18'	93°	9
10	36°10'	+10'	88°	36°12'	+11'	88°	36°13'	+13'	89°	36°13'	+14'	90°	36°13'	+15'	91°	36°12'	+16'	91°	36°10'	+18'	92°	10
11	36°20'	+09'	87°	36°23'	+11'	87°	36°26'	+12'	88°	36°27'	+13'	89°	36°28'	+15'	89°	36°29'	+16'	90°	36°28'	+17'	91°	11
12	36°29'	+09'	85°	36°34'	+10'	86°	36°38'	+11'	87°	36°41'	+12'	88°	36°43'	+14'	88°	36°44'	+15'	89°	36°45'	+16'	90°	12
13	36°38'	+08'	84°	36°44'	+09'	85°	36°49'	+10'	86°	36°53'	+12'	86°	36°57'	+13'	87°	36°59'	+14'	88°	37°01'	+16'	89°	13
14	36°46'	+07'	83°	36°53'	+08'	84°	36°59'	+10'	84°	37°05'	+11'	85°	37°10'	+12'	86°	37°14'	+14'	87°	37°17'	+15'	87°	14
15	36°53'	+06'	82°	37°01'	+08'	82°	37°09'	+09'	83°	37°16'	+10'	84°	37°22'	+11'	85°	37°27'	+13'	85°	37°32'	+14'	86°	15
16	36°59'	+06'	80°	37°09'	+07'	81°	37°18'	+08'	82°	37°26'	+09'	83°	37°33'	+11'	83°	37°40'	+12'	84°	37°46'	+13'	85°	16
17	37°05'	+05'	79°	37°16'	+06'	80°	37°26'	+07'	81°	37°35'	+09'	81°	37°44'	+10'	82°	37°52'	+11'	83°	37°59'	+13'	84°	17
18	37°10'	+04'	78°	37°22'	+05'	79°	37°33'	+07'	79°	37°44'	+08'	80°	37°54'	+09'	81°	38°03'	+10'	82°	38°12'	+12'	82°	18
19	37°14'	+03'	77°	37°27'	+04'	77°	37°40'	+06'	78°	37°52'	+07'	79°	38°03'	+08'	80°	38°14'	+10'	80°	38°23'	+11'	81°	19
20	37°17'	+02'	75°	37°32'	+04'	76°	37°46'	+05'	77°	37°59'	+06'	78°	38°12'	+08'	78°	38°23'	+09'	79°	38°34'	+10'	80°	20
21	37°19'	+02'	74°	37°35'	+03'	75°	37°51'	+04'	76°	38°05'	+05'	76°	38°19'	+07'	77°	38°32'	+08'	78°	38°44'	+09'	79°	21
22	37°21'	+01'	73°	37°38'	+02'	74°	37°55'	+03'	74°	38°11'	+05'	75°	38°26'	+06'	76°	38°40'	+07'	77°	38°54'	+08'	77°	22
23	37°22'	00'	72°	37°40'	+01'	72°	37°58'	+03'	73°	38°15'	+04'	74°	38°32'	+05'	75°	38°47'	+06'	75°	39°02'	+08'	76°	23

55° 305° LHA

Latitude SAME as Declination

55° 305° LHA

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

56° 304° LHA

Latitude SAME as Declination

56° 304° LHA

Dec°	14			15			16			17			18			19			20			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	32°52'	+17'	99°	32°42'	+18'	100°	32°31'	+19'	101°	32°20'	+20'	101°	32°08'	+22'	102°	31°55'	+23'	102°	31°42'	+24'	103°	0			
1	33°09'	+16'	98°	33°00'	+18'	99°	32°50'	+19'	99°	32°40'	+20'	100°	32°29'	+21'	101°	32°18'	+22'	101°	32°06'	+23'	102°	1			
2	33°25'	+16'	97°	33°17'	+17'	98°	33°09'	+18'	98°	33°00'	+19'	99°	32°50'	+20'	100°	32°40'	+22'	100°	32°29'	+23'	101°	2			
3	33°41'	+15'	96°	33°34'	+16'	96°	33°27'	+17'	97°	33°19'	+19'	98°	33°11'	+20'	98°	33°02'	+21'	99°	32°52'	+22'	100°	3			
4	33°56'	+14'	95°	33°50'	+16'	95°	33°44'	+17'	96°	33°38'	+18'	97°	33°31'	+19'	97°	33°23'	+20'	98°	33°14'	+22'	99°	4			
5	34°10'	+14'	93°	34°06'	+15'	94°	34°01'	+16'	95°	33°56'	+17'	95°	33°50'	+19'	96°	33°43'	+20'	97°	33°36'	+21'	97°	5			
6	34°24'	+13'	92°	34°21'	+14'	93°	34°17'	+15'	94°	34°13'	+17'	94°	34°08'	+18'	95°	34°03'	+19'	96°	33°56'	+20'	96°	6			
7	34°37'	+12'	91°	34°35'	+14'	92°	34°33'	+15'	92°	34°30'	+16'	93°	34°26'	+17'	94°	34°22'	+18'	95°	34°17'	+20'	95°	7			
8	34°49'	+12'	90°	34°49'	+13'	91°	34°48'	+14'	91°	34°46'	+15'	92°	34°44'	+17'	93°	34°40'	+18'	93°	34°36'	+19'	94°	8			
9	35°01'	+11'	89°	35°02'	+12'	89°	35°02'	+13'	90°	35°01'	+15'	91°	35°00'	+16'	92°	34°58'	+17'	92°	34°56'	+18'	93°	9			
10	35°12'	+10'	88°	35°14'	+11'	88°	35°15'	+13'	89°	35°16'	+14'	90°	35°16'	+15'	90°	35°15'	+16'	91°	35°14'	+18'	92°	10			
11	35°22'	+09'	86°	35°25'	+11'	87°	35°28'	+12'	88°	35°30'	+13'	88°	35°31'	+15'	89°	35°32'	+16'	90°	35°32'	+17'	91°	11			
12	35°31'	+09'	85°	35°36'	+10'	86°	35°40'	+11'	87°	35°43'	+13'	87°	35°46'	+14'	88°	35°48'	+15'	89°	35°49'	+16'	89°	12			
13	35°40'	+08'	84°	35°46'	+09'	85°	35°51'	+11'	85°	35°56'	+12'	86°	36°00'	+13'	87°	36°03'	+14'	87°	36°05'	+16'	88°	13			
14	35°48'	+07'	83°	35°55'	+09'	83°	36°02'	+10'	84°	36°08'	+11'	85°	36°13'	+12'	86°	36°17'	+14'	86°	36°21'	+15'	87°	14			
15	35°55'	+07'	81°	36°04'	+08'	82°	36°12'	+09'	83°	36°19'	+10'	84°	36°25'	+12'	84°	36°31'	+13'	85°	36°35'	+14'	86°	15			
16	36°02'	+06'	80°	36°12'	+07'	81°	36°21'	+08'	82°	36°29'	+10'	82°	36°37'	+11'	83°	36°44'	+12'	84°	36°50'	+13'	85°	16			
17	36°08'	+05'	79°	36°19'	+06'	80°	36°29'	+08'	80°	36°39'	+09'	81°	36°48'	+10'	82°	36°56'	+11'	83°	37°03'	+13'	83°	17			
18	36°13'	+04'	78°	36°25'	+06'	78°	36°37'	+07'	79°	36°48'	+08'	80°	36°58'	+09'	81°	37°07'	+11'	81°	37°16'	+12'	82°	18			
19	36°17'	+03'	77°	36°31'	+05'	77°	36°44'	+06'	78°	36°56'	+07'	79°	37°07'	+09'	79°	37°18'	+10'	80°	37°28'	+11'	81°	19			
20	36°21'	+03'	75°	36°35'	+04'	76°	36°50'	+05'	77°	37°03'	+07'	77°	37°16'	+08'	78°	37°28'	+09'	79°	37°39'	+10'	80°	20			
21	36°23'	+02'	74°	36°39'	+03'	75°	36°55'	+04'	75°	37°09'	+06'	76°	37°23'	+07'	77°	37°37'	+08'	78°	37°49'	+10'	78°	21			
22	36°25'	+01'	73°	36°43'	+02'	74°	36°59'	+04'	74°	37°15'	+05'	75°	37°30'	+06'	76°	37°45'	+07'	76°	37°59'	+09'	77°	22			
23	36°26'	+00'	72°	36°45'	+02'	72°	37°03'	+03'	73°	37°20'	+04'	74°	37°37'	+05'	74°	37°52'	+07'	75°	38°07'	+08'	76°	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°
			14			15			16			17			18			19			20			Dec°	

56° 304° LHA

Latitude SAME as Declination

56° 304° LHA

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

57° 303° LHA

Latitude SAME as Declination

57° 303° LHA

Dec°	14			15			16			17			18			19			20			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	31°54'	+17'	99°	31°44'	+18'	100°	31°34'	+19'	100°	31°23'	+20'	101°	31°12'	+21'	101°	31°00'	+23'	102°	30°47'	+24'	103°	0			
1	32°11'	+16'	98°	32°02'	+17'	98°	31°53'	+19'	99°	31°44'	+20'	100°	31°33'	+21'	100°	31°22'	+22'	101°	31°11'	+23'	101°	1			
2	32°27'	+16'	97°	32°20'	+17'	97°	32°12'	+18'	98°	32°03'	+19'	99°	31°54'	+20'	99°	31°44'	+21'	100°	31°34'	+23'	100°	2			
3	32°43'	+15'	96°	32°37'	+16'	96°	32°30'	+17'	97°	32°22'	+19'	97°	32°14'	+20'	98°	32°06'	+21'	99°	31°56'	+22'	99°	3			
4	32°58'	+14'	94°	32°53'	+16'	95°	32°47'	+17'	96°	32°41'	+18'	96°	32°34'	+19'	97°	32°26'	+20'	98°	32°18'	+21'	98°	4			
5	33°12'	+14'	93°	33°08'	+15'	94°	33°04'	+16'	95°	32°59'	+17'	95°	32°53'	+18'	96°	32°47'	+20'	96°	32°40'	+21'	97°	5			
6	33°26'	+13'	92°	33°23'	+14'	93°	33°20'	+15'	93°	33°16'	+17'	94°	33°12'	+18'	95°	33°06'	+19'	95°	33°00'	+20'	96°	6			
7	33°39'	+12'	91°	33°37'	+14'	92°	33°35'	+15'	92°	33°33'	+16'	93°	33°29'	+17'	94°	33°25'	+18'	94°	33°21'	+20'	95°	7			
8	33°51'	+12'	90°	33°51'	+13'	90°	33°50'	+14'	91°	33°49'	+15'	92°	33°47'	+17'	92°	33°44'	+18'	93°	33°40'	+19'	94°	8			
9	34°03'	+11'	89°	34°04'	+12'	89°	34°04'	+13'	90°	34°04'	+15'	91°	34°03'	+16'	91°	34°02'	+17'	92°	33°59'	+18'	93°	9			
10	34°13'	+10'	87°	34°16'	+12'	88°	34°18'	+13'	89°	34°19'	+14'	89°	34°19'	+15'	90°	34°19'	+16'	91°	34°18'	+18'	91°	10			
11	34°24'	+10'	86°	34°27'	+11'	87°	34°30'	+12'	87°	34°33'	+13'	88°	34°34'	+15'	89°	34°35'	+16'	90°	34°35'	+17'	90°	11			
12	34°33'	+09'	85°	34°38'	+10'	86°	34°43'	+11'	86°	34°46'	+13'	87°	34°49'	+14'	88°	34°51'	+15'	88°	34°52'	+16'	89°	12			
13	34°42'	+08'	84°	34°48'	+09'	84°	34°54'	+11'	85°	34°59'	+12'	86°	35°03'	+13'	87°	35°06'	+14'	87°	35°09'	+16'	88°	13			
14	34°50'	+07'	83°	34°58'	+09'	83°	35°05'	+10'	84°	35°11'	+11'	85°	35°16'	+12'	85°	35°20'	+14'	86°	35°24'	+15'	87°	14			
15	34°58'	+07'	81°	35°07'	+08'	82°	35°15'	+09'	83°	35°22'	+10'	83°	35°28'	+12'	84°	35°34'	+13'	85°	35°39'	+14'	86°	15			
16	35°05'	+06'	80°	35°15'	+07'	81°	35°24'	+09'	81°	35°32'	+10'	82°	35°40'	+11'	83°	35°47'	+12'	84°	35°53'	+14'	84°	16			
17	35°11'	+05'	79°	35°22'	+07'	80°	35°32'	+08'	80°	35°42'	+09'	81°	35°51'	+10'	82°	35°59'	+12'	82°	36°07'	+13'	83°	17			
18	35°16'	+05'	78°	35°28'	+06'	78°	35°40'	+07'	79°	35°51'	+08'	80°	36°01'	+10'	80°	36°11'	+11'	81°	36°20'	+12'	82°	18			
19	35°20'	+04'	76°	35°34'	+05'	77°	35°47'	+06'	78°	35°59'	+08'	79°	36°11'	+09'	79°	36°22'	+10'	80°	36°32'	+11'	81°	19			
20	35°24'	+03'	75°	35°39'	+04'	76°	35°53'	+06'	77°	36°07'	+07'	77°	36°20'	+08'	78°	36°32'	+09'	79°	36°43'	+11'	79°	20			
21	35°27'	+02'	74°	35°43'	+04'	75°	35°59'	+05'	75°	36°14'	+06'	76°	36°28'	+07'	77°	36°41'	+09'	78°	36°54'	+10'	78°	21			
22	35°30'	+02'	73°	35°47'	+03'	73°	36°04'	+04'	74°	36°20'	+05'	75°	36°35'	+07'	76°	36°50'	+08'	76°	37°04'	+09'	77°	22			
23	35°31'	+01'	72°	35°50'	+02'	72°	36°08'	+03'	73°	36°25'	+05'	74°	36°42'	+06'	74°	36°58'	+07'	75°	37°13'	+08'	76°	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°
			14			15			16			17			18			19			20			Dec°	

57° 303° LHA

Latitude SAME as Declination

57° 303° LHA

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

58° 302° LHA

Latitude SAME as Declination

58° 302° LHA

Dec°	14			15			16			17			18			19			20			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	30°57'	+17'	99°	30°47'	+18'	99°	30°37'	+19'	100°	30°27'	+20'	100°	30°16'	+21'	101°	30°04'	+22'	101°	29°52'	+23'	102°	0			
1	31°13'	+16'	97°	31°05'	+17'	98°	30°56'	+18'	99°	30°47'	+20'	99°	30°37'	+21'	100°	30°26'	+22'	100°	30°15'	+23'	101°	1			
2	31°29'	+15'	96°	31°22'	+17'	97°	31°15'	+18'	98°	31°07'	+19'	98°	30°58'	+20'	99°	30°48'	+21'	99°	30°38'	+22'	100°	2			
3	31°45'	+15'	95°	31°39'	+16'	96°	31°33'	+17'	96°	31°25'	+18'	97°	31°18'	+20'	98°	31°09'	+21'	98°	31°01'	+22'	99°	3			
4	32°00'	+14'	94°	31°55'	+15'	95°	31°50'	+17'	95°	31°44'	+18'	96°	31°37'	+19'	97°	31°30'	+20'	97°	31°22'	+21'	98°	4			
5	32°14'	+14'	93°	32°10'	+15'	94°	32°06'	+16'	94°	32°02'	+17'	95°	31°56'	+18'	95°	31°50'	+20'	96°	31°44'	+21'	97°	5			
6	32°27'	+13'	92°	32°25'	+14'	92°	32°22'	+15'	93°	32°19'	+17'	94°	32°15'	+18'	94°	32°10'	+19'	95°	32°04'	+20'	96°	6			
7	32°40'	+12'	91°	32°39'	+14'	91°	32°38'	+15'	92°	32°35'	+16'	93°	32°32'	+17'	93°	32°29'	+18'	94°	32°24'	+20'	94°	7			
8	32°53'	+12'	89°	32°53'	+13'	90°	32°52'	+14'	91°	32°51'	+15'	91°	32°50'	+17'	92°	32°47'	+18'	93°	32°44'	+19'	93°	8			
9	33°04'	+11'	88°	33°06'	+12'	89°	33°07'	+13'	90°	33°07'	+15'	90°	33°06'	+16'	91°	33°05'	+17'	92°	33°03'	+18'	92°	9			
10	33°15'	+10'	87°	33°18'	+12'	88°	33°20'	+13'	88°	33°21'	+14'	89°	33°22'	+15'	90°	33°22'	+16'	90°	33°21'	+18'	91°	10			
11	33°26'	+10'	86°	33°30'	+11'	87°	33°33'	+12'	87°	33°35'	+13'	88°	33°37'	+15'	89°	33°38'	+16'	89°	33°39'	+17'	90°	11			
12	33°35'	+09'	85°	33°41'	+10'	85°	33°45'	+11'	86°	33°49'	+13'	87°	33°52'	+14'	87°	33°54'	+15'	88°	33°56'	+16'	89°	12			
13	33°44'	+08'	84°	33°51'	+10'	84°	33°56'	+11'	85°	34°01'	+12'	86°	34°06'	+13'	86°	34°09'	+14'	87°	34°12'	+16'	88°	13			
14	33°53'	+08'	82°	34°00'	+09'	83°	34°07'	+10'	84°	34°13'	+11'	84°	34°19'	+13'	85°	34°24'	+14'	86°	34°28'	+15'	86°	14			
15	34°00'	+07'	81°	34°09'	+08'	82°	34°17'	+09'	83°	34°25'	+11'	83°	34°32'	+12'	84°	34°38'	+13'	85°	34°43'	+14'	85°	15			
16	34°07'	+06'	80°	34°17'	+07'	81°	34°27'	+09'	81°	34°35'	+10'	82°	34°43'	+11'	83°	34°51'	+12'	83°	34°57'	+14'	84°	16			
17	34°13'	+06'	79°	34°25'	+07'	79°	34°35'	+08'	80°	34°45'	+09'	81°	34°55'	+10'	81°	35°03'	+12'	82°	35°11'	+13'	83°	17			
18	34°19'	+05'	78°	34°32'	+06'	78°	34°43'	+07'	79°	34°55'	+09'	80°	35°05'	+10'	80°	35°15'	+11'	81°	35°24'	+12'	82°	18			
19	34°24'	+04'	76°	34°38'	+05'	77°	34°51'	+07'	78°	35°03'	+08'	78°	35°15'	+09'	79°	35°26'	+10'	80°	35°36'	+12'	80°	19			
20	34°28'	+03'	75°	34°43'	+05'	76°	34°57'	+06'	76°	35°11'	+07'	77°	35°24'	+08'	78°	35°36'	+10'	79°	35°48'	+11'	79°	20			
21	34°31'	+03'	74°	34°48'	+04'	75°	35°03'	+05'	75°	35°18'	+06'	76°	35°32'	+08'	77°	35°46'	+09'	77°	35°59'	+10'	78°	21			
22	34°34'	+02'	73°	34°51'	+03'	73°	35°08'	+04'	74°	35°24'	+06'	75°	35°40'	+07'	75°	35°55'	+08'	76°	36°09'	+09'	77°	22			
23	34°36'	+01'	72°	34°55'	+02'	72°	35°13'	+04'	73°	35°30'	+05'	74°	35°47'	+06'	74°	36°03'	+07'	75°	36°18'	+09'	76°	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°
	14			15			16			17			18			19			20						

58° 302° LHA

Latitude SAME as Declination

58° 302° LHA

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

59° 301° LHA

Latitude SAME as Declination

59° 301° LHA

Dec°	14			15			16			17			18			19			20			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	29°59'	+16'	98°	29°50'	+18'	99°	29°41'	+19'	99°	29°30'	+20'	100°	29°20'	+21'	101°	29°09'	+22'	101°	28°57'	+23'	102°	0			
1	30°15'	+16'	97°	30°08'	+17'	98°	29°59'	+18'	98°	29°50'	+19'	99°	29°41'	+20'	99°	29°31'	+22'	100°	29°20'	+23'	101°	1			
2	30°31'	+15'	96°	30°25'	+17'	97°	30°18'	+18'	97°	30°10'	+19'	98°	30°01'	+20'	98°	29°52'	+21'	99°	29°43'	+22'	99°	2			
3	30°47'	+15'	95°	30°41'	+16'	96°	30°35'	+17'	96°	30°28'	+18'	97°	30°21'	+19'	97°	30°13'	+21'	98°	30°05'	+22'	98°	3			
4	31°01'	+14'	94°	30°57'	+15'	94°	30°52'	+17'	95°	30°47'	+18'	96°	30°41'	+19'	96°	30°34'	+20'	97°	30°26'	+21'	97°	4			
5	31°16'	+14'	93°	31°13'	+15'	93°	31°09'	+16'	94°	31°04'	+17'	94°	30°59'	+18'	95°	30°54'	+19'	96°	30°48'	+21'	96°	5			
6	31°29'	+13'	92°	31°27'	+14'	92°	31°25'	+15'	93°	31°22'	+17'	93°	31°18'	+18'	94°	31°13'	+19'	95°	31°08'	+20'	95°	6			
7	31°42'	+12'	90°	31°41'	+14'	91°	31°40'	+15'	92°	31°38'	+16'	92°	31°35'	+17'	93°	31°32'	+18'	93°	31°28'	+19'	94°	7			
8	31°54'	+12'	89°	31°55'	+13'	90°	31°55'	+14'	90°	31°54'	+15'	91°	31°53'	+17'	92°	31°50'	+18'	92°	31°48'	+19'	93°	8			
9	32°06'	+11'	88°	32°08'	+12'	89°	32°09'	+13'	89°	32°09'	+15'	90°	32°09'	+16'	91°	32°08'	+17'	91°	32°07'	+18'	92°	9			
10	32°17'	+10'	87°	32°20'	+12'	88°	32°22'	+13'	88°	32°24'	+14'	89°	32°25'	+15'	89°	32°25'	+16'	90°	32°25'	+18'	91°	10			
11	32°28'	+10'	86°	32°32'	+11'	86°	32°35'	+12'	87°	32°38'	+13'	88°	32°40'	+15'	88°	32°42'	+16'	89°	32°42'	+17'	90°	11			
12	32°37'	+09'	85°	32°43'	+10'	85°	32°47'	+12'	86°	32°51'	+13'	86°	32°55'	+14'	87°	32°57'	+15'	88°	32°59'	+16'	88°	12			
13	32°47'	+08'	83°	32°53'	+10'	84°	32°59'	+11'	85°	33°04'	+12'	85°	33°09'	+13'	86°	33°13'	+15'	87°	33°16'	+16'	87°	13			
14	32°55'	+08'	82°	33°03'	+09'	83°	33°10'	+10'	83°	33°16'	+11'	84°	33°22'	+13'	85°	33°27'	+14'	85°	33°32'	+15'	86°	14			
15	33°03'	+07'	81°	33°12'	+08'	82°	33°20'	+10'	82°	33°28'	+11'	83°	33°35'	+12'	84°	33°41'	+13'	84°	33°47'	+14'	85°	15			
16	33°10'	+06'	80°	33°20'	+08'	80°	33°30'	+09'	81°	33°39'	+10'	82°	33°47'	+11'	82°	33°54'	+13'	83°	34°01'	+14'	84°	16			
17	33°16'	+06'	79°	33°28'	+07'	79°	33°39'	+08'	80°	33°49'	+09'	81°	33°58'	+11'	81°	34°07'	+12'	82°	34°15'	+13'	83°	17			
18	33°22'	+05'	77°	33°35'	+06'	78°	33°47'	+08'	79°	33°58'	+09'	79°	34°09'	+10'	80°	34°19'	+11'	81°	34°28'	+12'	81°	18			
19	33°27'	+04'	76°	33°41'	+06'	77°	33°54'	+07'	78°	34°07'	+08'	78°	34°19'	+09'	79°	34°30'	+11'	80°	34°41'	+12'	80°	19			
20	33°32'	+04'	75°	33°47'	+05'	76°	34°01'	+06'	76°	34°15'	+07'	77°	34°28'	+09'	78°	34°41'	+10'	78°	34°52'	+11'	79°	20			
21	33°35'	+03'	74°	33°52'	+04'	75°	34°07'	+05'	75°	34°22'	+07'	76°	34°37'	+08'	76°	34°50'	+09'	77°	35°03'	+10'	78°	21			
22	33°38'	+02'	73°	33°56'	+04'	73°	34°13'	+05'	74°	34°29'	+06'	75°	34°45'	+07'	75°	35°00'	+08'	76°	35°14'	+10'	77°	22			
23	33°41'	+02'	71°	33°59'	+03'	72°	34°18'	+04'	73°	34°35'	+05'	73°	34°52'	+06'	74°	35°08'	+08'	75°	35°23'	+09'	75°	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°
	14			15			16			17			18			19			20						

59° 301° LHA

Latitude SAME as Declination

59° 301° LHA

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

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

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	29°01'	+16'	98°	28°53'	+17'	98°	28°44'	+19'	99°	28°34'	+20'	100°	28°24'	+21'	100°	28°13'	+22'	101°	28°01'	+23'	101°	0
1	29°18'	+16'	97°	29°10'	+17'	97°	29°02'	+18'	98°	28°54'	+19'	99°	28°44'	+20'	99°	28°35'	+21'	100°	28°24'	+23'	100°	1
2	29°33'	+15'	96°	29°27'	+16'	96°	29°20'	+18'	97°	29°13'	+19'	97°	29°05'	+20'	98°	28°56'	+21'	99°	28°47'	+22'	99°	2
3	29°49'	+15'	95°	29°44'	+16'	95°	29°38'	+17'	96°	29°31'	+18'	96°	29°25'	+19'	97°	29°17'	+20'	97°	29°09'	+22'	98°	3
4	30°03'	+14'	94°	29°59'	+15'	94°	29°55'	+16'	95°	29°50'	+18'	95°	29°44'	+19'	96°	29°37'	+20'	96°	29°31'	+21'	97°	4
5	30°17'	+14'	92°	30°15'	+15'	93°	30°11'	+16'	94°	30°07'	+17'	94°	30°03'	+18'	95°	29°57'	+19'	95°	29°52'	+20'	96°	5
6	30°31'	+13'	91°	30°29'	+14'	92°	30°27'	+15'	92°	30°24'	+16'	93°	30°21'	+18'	94°	30°17'	+19'	94°	30°12'	+20'	95°	6
7	30°44'	+12'	90°	30°43'	+14'	91°	30°42'	+15'	91°	30°41'	+16'	92°	30°38'	+17'	92°	30°35'	+18'	93°	30°32'	+19'	94°	7
8	30°56'	+12'	89°	30°57'	+13'	90°	30°57'	+14'	90°	30°57'	+15'	91°	30°55'	+16'	91°	30°54'	+18'	92°	30°51'	+19'	93°	8
9	31°08'	+11'	88°	31°10'	+12'	88°	31°11'	+14'	89°	31°12'	+15'	90°	31°12'	+16'	90°	31°11'	+17'	91°	31°10'	+18'	91°	9
10	31°19'	+11'	87°	31°22'	+12'	87°	31°25'	+13'	88°	31°27'	+14'	89°	31°28'	+15'	89°	31°28'	+16'	90°	31°28'	+18'	90°	10
11	31°30'	+10'	86°	31°34'	+11'	86°	31°38'	+12'	87°	31°41'	+13'	87°	31°43'	+15'	88°	31°45'	+16'	89°	31°46'	+17'	89°	11
12	31°39'	+09'	84°	31°45'	+10'	85°	31°50'	+12'	86°	31°54'	+13'	86°	31°58'	+14'	87°	32°01'	+15'	87°	32°03'	+16'	88°	12
13	31°49'	+09'	83°	31°55'	+10'	84°	32°02'	+11'	84°	32°07'	+12'	85°	32°12'	+13'	86°	32°16'	+15'	86°	32°20'	+16'	87°	13
14	31°57'	+08'	82°	32°05'	+09'	83°	32°13'	+10'	83°	32°19'	+12'	84°	32°25'	+13'	85°	32°31'	+14'	85°	32°35'	+15'	86°	14
15	32°05'	+07'	81°	32°15'	+09'	82°	32°23'	+10'	82°	32°31'	+11'	83°	32°38'	+12'	83°	32°45'	+13'	84°	32°51'	+15'	85°	15
16	32°13'	+07'	80°	32°23'	+08'	80°	32°33'	+09'	81°	32°42'	+10'	82°	32°50'	+12'	82°	32°58'	+13'	83°	33°05'	+14'	84°	16
17	32°19'	+06'	79°	32°31'	+07'	79°	32°42'	+08'	80°	32°52'	+10'	80°	33°02'	+11'	81°	33°11'	+12'	82°	33°19'	+13'	82°	17
18	32°25'	+05'	77°	32°38'	+07'	78°	32°50'	+08'	79°	33°02'	+09'	79°	33°13'	+10'	80°	33°23'	+11'	81°	33°32'	+13'	81°	18
19	32°31'	+05'	76°	32°45'	+06'	77°	32°58'	+07'	77°	33°11'	+08'	78°	33°23'	+10'	79°	33°34'	+11'	79°	33°45'	+12'	80°	19
20	32°35'	+04'	75°	32°51'	+05'	76°	33°05'	+06'	76°	33°19'	+08'	77°	33°32'	+09'	78°	33°45'	+10'	78°	33°57'	+11'	79°	20
21	32°39'	+03'	74°	32°56'	+05'	74°	33°12'	+06'	75°	33°27'	+07'	76°	33°41'	+08'	76°	33°55'	+09'	77°	34°08'	+11'	78°	21
22	32°43'	+03'	73°	33°00'	+04'	73°	33°17'	+05'	74°	33°34'	+06'	74°	33°50'	+07'	75°	34°05'	+09'	76°	34°19'	+10'	76°	22
23	32°46'	+02'	71°	33°04'	+03'	72°	33°23'	+04'	73°	33°40'	+06'	73°	33°57'	+07'	74°	34°13'	+08'	75°	34°29'	+09'	75°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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

61° 299° LHA Latitude SAME as Declination 61° 299° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	28°04'	+16'	98°	27°55'	+17'	98°	27°47'	+18'	99°	27°37'	+20'	99°	27°27'	+21'	100°	27°17'	+22'	100°	27°06'	+23'	101°	0
1	28°20'	+16'	97°	28°13'	+17'	97°	28°05'	+18'	98°	27°57'	+19'	98°	27°48'	+20'	99°	27°39'	+21'	99°	27°29'	+22'	100°	1
2	28°36'	+15'	95°	28°30'	+16'	96°	28°23'	+17'	97°	28°16'	+19'	97°	28°08'	+20'	98°	28°00'	+21'	98°	27°51'	+22'	99°	2
3	28°51'	+15'	94°	28°46'	+16'	95°	28°40'	+17'	95°	28°34'	+18'	96°	28°28'	+19'	97°	28°21'	+20'	97°	28°13'	+21'	98°	3
4	29°05'	+14'	93°	29°02'	+15'	94°	28°57'	+16'	94°	28°52'	+18'	95°	28°47'	+19'	95°	28°41'	+20'	96°	28°35'	+21'	97°	4
5	29°19'	+13'	92°	29°17'	+15'	93°	29°14'	+16'	93°	29°10'	+17'	94°	29°06'	+18'	94°	29°01'	+19'	95°	28°55'	+20'	95°	5
6	29°33'	+13'	91°	29°31'	+14'	92°	29°29'	+15'	92°	29°27'	+16'	93°	29°24'	+18'	93°	29°20'	+19'	94°	29°16'	+20'	94°	6
7	29°46'	+12'	90°	29°45'	+14'	90°	29°45'	+15'	91°	29°43'	+16'	92°	29°41'	+17'	92°	29°39'	+18'	93°	29°36'	+19'	93°	7
8	29°58'	+12'	89°	29°59'	+13'	89°	29°59'	+14'	90°	29°59'	+15'	90°	29°58'	+16'	91°	29°57'	+18'	92°	29°55'	+19'	92°	8
9	30°10'	+11'	88°	30°12'	+12'	88°	30°14'	+14'	89°	30°15'	+15'	89°	30°15'	+16'	90°	30°15'	+17'	91°	30°14'	+18'	91°	9
10	30°21'	+11'	86°	30°24'	+12'	87°	30°27'	+13'	88°	30°29'	+14'	88°	30°31'	+15'	89°	30°32'	+17'	89°	30°32'	+18'	90°	10
11	30°32'	+10'	85°	30°36'	+11'	86°	30°40'	+12'	87°	30°43'	+14'	87°	30°46'	+15'	88°	30°48'	+16'	88°	30°50'	+17'	89°	11
12	30°42'	+09'	84°	30°47'	+11'	85°	30°52'	+12'	85°	30°57'	+13'	86°	31°01'	+14'	87°	31°04'	+15'	87°	31°07'	+17'	88°	12
13	30°51'	+09'	83°	30°58'	+10'	84°	31°04'	+11'	84°	31°10'	+12'	85°	31°15'	+14'	85°	31°19'	+15'	86°	31°23'	+16'	87°	13
14	31°00'	+08'	82°	31°08'	+09'	82°	31°15'	+11'	83°	31°22'	+12'	84°	31°29'	+13'	84°	31°34'	+14'	85°	31°39'	+15'	86°	14
15	31°08'	+08'	81°	31°17'	+09'	81°	31°26'	+10'	82°	31°34'	+11'	83°	31°42'	+12'	83°	31°48'	+14'	84°	31°55'	+15'	84°	15
16	31°15'	+07'	80°	31°26'	+08'	80°	31°36'	+09'	81°	31°45'	+10'	81°	31°54'	+12'	82°	32°02'	+13'	83°	32°09'	+14'	83°	16
17	31°22'	+06'	78°	31°34'	+07'	79°	31°45'	+09'	80°	31°56'	+10'	80°	32°06'	+11'	81°	32°15'	+12'	81°	32°23'	+13'	82°	17
18	31°29'	+06'	77°	31°42'	+07'	78°	31°54'	+08'	78°	32°06'	+09'	79°	32°17'	+10'	80°	32°27'	+12'	80°	32°37'	+13'	81°	18
19	31°34'	+05'	76°	31°48'	+06'	77°	32°02'	+07'	77°	32°15'	+09'	78°	32°27'	+10'	79°	32°39'	+11'	79°	32°50'	+12'	80°	19
20	31°39'	+04'	75°	31°55'	+06'	76°	32°09'	+07'	76°	32°23'	+08'	77°	32°37'	+09'	77°	32°50'	+10'	78°	33°02'	+12'	79°	20
21	31°44'	+04'	74°	32°00'	+05'	74°	32°16'	+06'	75°	32°31'	+07'	76°	32°46'	+08'	76°	33°00'	+10'	77°	33°13'	+11'	77°	21
22	31°47'	+03'	73°	32°05'	+04'	73°	32°22'	+05'	74°	32°39'	+07'	74°	32°54'	+08'	75°	33°10'	+09'	76°	33°24'	+10'	76°	22
23	31°50'	+02'	71°	32°09'	+04'	72°	32°27'	+05'	73°	32°45'	+06'	73°	33°02'	+07'	74°	33°19'	+08'	74°	33°34'	+10'	75°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

61° 299° LHA Latitude SAME as Declination 61° 299° LHA

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

62° 298° LHA

Latitude SAME as Declination

62° 298° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	27°06'	+16'	97°	26°58'	+17'	98°	26°50'	+18'	98°	26°41'	+19'	99°	26°31'	+20'	99°	26°21'	+22'	100°	26°11'	+23'	100°	0
1	27°22'	+16'	96°	27°15'	+17'	97°	27°08'	+18'	97°	27°00'	+19'	98°	26°52'	+20'	98°	26°43'	+21'	99°	26°33'	+22'	99°	1
2	27°38'	+15'	95°	27°32'	+16'	96°	27°26'	+17'	96°	27°19'	+18'	97°	27°12'	+20'	97°	27°04'	+21'	98°	26°56'	+22'	98°	2
3	27°53'	+15'	94°	27°48'	+16'	95°	27°43'	+17'	95°	27°37'	+18'	96°	27°31'	+19'	96°	27°24'	+20'	97°	27°17'	+21'	97°	3
4	28°07'	+14'	93°	28°04'	+15'	93°	28°00'	+16'	94°	27°55'	+17'	95°	27°50'	+19'	95°	27°45'	+20'	96°	27°39'	+21'	96°	4
5	28°21'	+13'	92°	28°19'	+15'	92°	28°16'	+16'	93°	28°13'	+17'	93°	28°09'	+18'	94°	28°04'	+19'	95°	27°59'	+20'	95°	5
6	28°35'	+13'	91°	28°33'	+14'	91°	28°32'	+15'	92°	28°30'	+16'	92°	28°27'	+18'	93°	28°23'	+19'	93°	28°20'	+20'	94°	6
7	28°47'	+12'	90°	28°48'	+14'	90°	28°47'	+15'	91°	28°46'	+16'	91°	28°44'	+17'	92°	28°42'	+18'	92°	28°39'	+19'	93°	7
8	29°00'	+12'	89°	29°01'	+13'	89°	29°02'	+14'	90°	29°02'	+15'	90°	29°01'	+16'	91°	29°00'	+18'	91°	28°59'	+19'	92°	8
9	29°12'	+11'	87°	29°14'	+12'	88°	29°16'	+14'	89°	29°17'	+15'	89°	29°18'	+16'	90°	29°18'	+17'	90°	29°17'	+18'	91°	9
10	29°23'	+11'	86°	29°26'	+12'	87°	29°29'	+13'	87°	29°32'	+14'	88°	29°34'	+15'	89°	29°35'	+17'	89°	29°36'	+18'	90°	10
11	29°34'	+10'	85°	29°38'	+11'	86°	29°43'	+12'	86°	29°46'	+14'	87°	29°49'	+15'	87°	29°52'	+16'	88°	29°53'	+17'	89°	11
12	29°44'	+10'	84°	29°50'	+11'	85°	29°55'	+12'	85°	30°00'	+13'	86°	30°04'	+14'	86°	30°07'	+15'	87°	30°10'	+17'	87°	12
13	29°53'	+09'	83°	30°00'	+10'	83°	30°07'	+11'	84°	30°13'	+12'	85°	30°18'	+14'	85°	30°23'	+15'	86°	30°27'	+16'	86°	13
14	30°02'	+08'	82°	30°10'	+10'	82°	30°18'	+11'	83°	30°25'	+12'	83°	30°32'	+13'	84°	30°38'	+14'	85°	30°43'	+15'	85°	14
15	30°10'	+08'	81°	30°20'	+09'	81°	30°29'	+10'	82°	30°37'	+11'	82°	30°45'	+12'	83°	30°52'	+14'	84°	30°58'	+15'	84°	15
16	30°18'	+07'	79°	30°29'	+08'	80°	30°39'	+10'	81°	30°48'	+11'	81°	30°57'	+12'	82°	31°06'	+13'	82°	31°13'	+14'	83°	16
17	30°25'	+07'	78°	30°37'	+08'	79°	30°48'	+09'	79°	30°59'	+10'	80°	31°09'	+11'	81°	31°19'	+12'	81°	31°28'	+14'	82°	17
18	30°32'	+06'	77°	30°45'	+07'	78°	30°57'	+08'	78°	31°09'	+09'	79°	31°20'	+11'	79°	31°31'	+12'	80°	31°41'	+13'	81°	18
19	30°38'	+05'	76°	30°52'	+06'	77°	31°06'	+08'	77°	31°19'	+09'	78°	31°31'	+10'	78°	31°43'	+11'	79°	31°54'	+12'	80°	19
20	30°43'	+05'	75°	30°58'	+06'	75°	31°13'	+07'	76°	31°28'	+08'	77°	31°41'	+09'	77°	31°54'	+11'	78°	32°07'	+12'	78°	20
21	30°48'	+04'	74°	31°04'	+05'	74°	31°20'	+06'	75°	31°36'	+08'	75°	31°51'	+09'	76°	32°05'	+10'	77°	32°18'	+11'	77°	21
22	30°52'	+03'	72°	31°10'	+05'	73°	31°27'	+06'	74°	31°43'	+07'	74°	31°59'	+08'	75°	32°15'	+09'	75°	32°29'	+10'	76°	22
23	30°55'	+03'	71°	31°14'	+04'	72°	31°32'	+05'	72°	31°50'	+06'	73°	32°07'	+07'	74°	32°24'	+09'	74°	32°40'	+10'	75°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°08'	+16'	97°	26°01'	+17'	98°	25°52'	+18'	98°	25°44'	+19'	98°	25°35'	+20'	99°	25°25'	+21'	99°	25°15'	+22'	100°	0
1	26°24'	+15'	96°	26°18'	+17'	96°	26°11'	+18'	97°	26°03'	+19'	97°	25°55'	+20'	98°	25°47'	+21'	98°	25°38'	+22'	99°	1
2	26°40'	+15'	95°	26°34'	+16'	95°	26°28'	+17'	96°	26°22'	+18'	96°	26°15'	+19'	97°	26°08'	+21'	97°	26°00'	+22'	98°	2
3	26°54'	+14'	94°	26°50'	+16'	94°	26°46'	+17'	95°	26°40'	+18'	95°	26°34'	+19'	96°	26°28'	+20'	96°	26°21'	+21'	97°	3
4	27°09'	+14'	93°	27°06'	+15'	93°	27°02'	+16'	94°	26°58'	+17'	94°	26°53'	+18'	95°	26°48'	+20'	95°	26°42'	+21'	96°	4
5	27°23'	+13'	92°	27°21'	+15'	92°	27°18'	+16'	93°	27°15'	+17'	93°	27°12'	+18'	94°	27°08'	+19'	94°	27°03'	+20'	95°	5
6	27°36'	+13'	91°	27°36'	+14'	91°	27°34'	+15'	92°	27°32'	+16'	92°	27°30'	+17'	93°	27°27'	+19'	93°	27°23'	+20'	94°	6
7	27°49'	+12'	89°	27°50'	+14'	90°	27°49'	+15'	90°	27°49'	+16'	91°	27°47'	+17'	92°	27°45'	+18'	92°	27°43'	+19'	93°	7
8	28°02'	+12'	88°	28°03'	+13'	89°	28°04'	+14'	89°	28°04'	+15'	90°	28°04'	+16'	90°	28°04'	+18'	91°	28°02'	+19'	91°	8
9	28°13'	+11'	87°	28°16'	+12'	88°	28°18'	+14'	88°	28°20'	+15'	89°	28°21'	+16'	89°	28°21'	+17'	90°	28°21'	+18'	90°	9
10	28°25'	+11'	86°	28°29'	+12'	87°	28°32'	+13'	87°	28°35'	+14'	88°	28°37'	+15'	88°	28°38'	+17'	89°	28°39'	+18'	89°	10
11	28°36'	+10'	85°	28°41'	+11'	85°	28°45'	+13'	86°	28°49'	+14'	87°	28°52'	+15'	87°	28°55'	+16'	88°	28°57'	+17'	88°	11
12	28°46'	+10'	84°	28°52'	+11'	84°	28°58'	+12'	85°	29°03'	+13'	85°	29°07'	+14'	86°	29°11'	+15'	87°	29°14'	+17'	87°	12
13	28°55'	+09'	83°	29°03'	+10'	83°	29°09'	+11'	84°	29°16'	+13'	84°	29°21'	+14'	85°	29°26'	+15'	85°	29°31'	+16'	86°	13
14	29°04'	+09'	82°	29°13'	+10'	82°	29°21'	+11'	83°	29°28'	+12'	83°	29°35'	+13'	84°	29°41'	+14'	84°	29°47'	+16'	85°	14
15	29°13'	+08'	80°	29°23'	+09'	81°	29°32'	+10'	82°	29°40'	+11'	82°	29°48'	+13'	83°	29°56'	+14'	83°	30°02'	+15'	84°	15
16	29°21'	+07'	79°	29°32'	+09'	80°	29°42'	+10'	80°	29°52'	+11'	81°	30°01'	+12'	82°	30°09'	+13'	82°	30°17'	+14'	83°	16
17	29°28'	+07'	78°	29°40'	+08'	79°	29°52'	+09'	79°	30°03'	+10'	80°	30°13'	+11'	80°	30°23'	+13'	81°	30°32'	+14'	82°	17
18	29°35'	+06'	77°	29°48'	+07'	78°	30°01'	+09'	78°	30°13'	+10'	79°	30°24'	+11'	79°	30°35'	+12'	80°	30°46'	+13'	80°	18
19	29°41'	+06'	76°	29°56'	+07'	76°	30°09'	+08'	77°	30°23'	+09'	78°	30°35'	+10'	78°	30°47'	+11'	79°	30°59'	+13'	79°	19
20	29°47'	+05'	75°	30°02'	+06'	75°	30°17'	+07'	76°	30°32'	+08'	76°	30°46'	+10'	77°	30°59'	+11'	78°	31°11'	+12'	78°	20
21	29°52'	+04'	74°	30°09'	+06'	74°	30°25'	+07'	75°	30°40'	+08'	75°	30°55'	+09'	76°	31°10'	+10'	76°	31°23'	+11'	77°	21
22	29°56'	+04'	72°	30°14'	+05'	73°	30°31'	+06'	74°	30°48'	+07'	74°	31°04'	+08'	75°	31°20'	+10'	75°	31°35'	+11'	76°	22
23	30°00'	+03'	71°	30°19'	+04'	72°	30°37'	+05'	72°	30°55'	+07'	73°	31°13'	+08'	74°	31°29'	+09'	74°	31°45'	+10'	75°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

63° 297° LHA

Latitude SAME as Declination

63° 297° LHA

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

64° 296° LHA

Latitude SAME as Declination

64° 296° LHA

Table with 13 columns (Dec°, 14, 15, 16, 17, 18, 19, 20, Dec°) and 24 rows. Each column from 14 to 20 contains three sub-columns for Hc°, d', and Z°. Values range from 25°10' to 30°51'.

64° 296° LHA

Latitude SAME as Declination

64° 296° LHA

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

65° 295° LHA

Latitude SAME as Declination

65° 295° LHA

Table with 13 columns (Dec°, 14, 15, 16, 17, 18, 19, 20, Dec°) and 24 rows. Each column from 14 to 20 contains three sub-columns for Hc°, d', and Z°. Values range from 24°13' to 29°57'.

65° 295° LHA

Latitude SAME as Declination

65° 295° LHA

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

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

66° 294° LHA

Latitude SAME as Declination

66° 294° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	23°15'	+16'	96°	23°08'	+17'	97°	23°01'	+18'	97°	22°53'	+19'	97°	22°45'	+20'	98°	22°37'	+21'	98°	22°28'	+22'	99°	0
1	23°30'	+15'	95°	23°25'	+16'	96°	23°19'	+17'	96°	23°12'	+18'	96°	23°05'	+20'	97°	22°58'	+21'	97°	22°50'	+22'	98°	1
2	23°45'	+15'	94°	23°41'	+16'	94°	23°36'	+17'	95°	23°31'	+18'	95°	23°25'	+19'	96°	23°19'	+20'	96°	23°12'	+21'	97°	2
3	24°00'	+14'	93°	23°57'	+15'	93°	23°53'	+17'	94°	23°49'	+18'	94°	23°44'	+19'	95°	23°39'	+20'	95°	23°33'	+21'	96°	3
4	24°14'	+14'	92°	24°12'	+15'	92°	24°09'	+16'	93°	24°06'	+17'	93°	24°03'	+18'	94°	23°59'	+19'	94°	23°54'	+20'	95°	4
5	24°28'	+13'	91°	24°27'	+15'	91°	24°26'	+16'	92°	24°23'	+17'	92°	24°21'	+18'	93°	24°18'	+19'	93°	24°14'	+20'	94°	5
6	24°42'	+13'	90°	24°42'	+14'	90°	24°41'	+15'	91°	24°40'	+16'	91°	24°39'	+17'	92°	24°37'	+18'	92°	24°34'	+20'	93°	6
7	24°55'	+12'	89°	24°56'	+14'	89°	24°56'	+15'	90°	24°57'	+16'	90°	24°56'	+17'	91°	24°55'	+18'	91°	24°54'	+19'	91°	7
8	25°07'	+12'	88°	25°09'	+13'	88°	25°11'	+14'	89°	25°12'	+15'	89°	25°13'	+16'	89°	25°13'	+18'	90°	25°13'	+19'	90°	8
9	25°19'	+12'	87°	25°22'	+13'	87°	25°25'	+14'	87°	25°28'	+15'	88°	25°30'	+16'	88°	25°31'	+17'	89°	25°32'	+18'	89°	9
10	25°31'	+11'	85°	25°35'	+12'	86°	25°39'	+13'	86°	25°43'	+14'	87°	25°46'	+16'	87°	25°48'	+17'	88°	25°50'	+18'	88°	10
11	25°42'	+11'	84°	25°47'	+12'	85°	25°52'	+13'	85°	25°57'	+14'	86°	26°01'	+15'	86°	26°05'	+16'	87°	26°08'	+17'	87°	11
12	25°52'	+10'	83°	25°59'	+11'	84°	26°05'	+12'	84°	26°11'	+13'	85°	26°16'	+15'	85°	26°21'	+16'	86°	26°25'	+17'	86°	12
13	26°02'	+10'	82°	26°10'	+11'	83°	26°18'	+12'	83°	26°24'	+13'	84°	26°31'	+14'	84°	26°37'	+15'	85°	26°42'	+16'	85°	13
14	26°12'	+09'	81°	26°21'	+10'	82°	26°29'	+11'	82°	26°37'	+12'	83°	26°45'	+14'	83°	26°52'	+15'	84°	26°58'	+16'	84°	14
15	26°21'	+09'	80°	26°31'	+10'	80°	26°41'	+11'	81°	26°50'	+12'	81°	26°59'	+13'	82°	27°07'	+14'	82°	27°14'	+15'	83°	15
16	26°29'	+08'	79°	26°41'	+09'	79°	26°52'	+10'	80°	27°02'	+11'	80°	27°12'	+13'	81°	27°21'	+14'	81°	27°30'	+15'	82°	16
17	26°37'	+08'	78°	26°50'	+09'	78°	27°02'	+10'	79°	27°13'	+11'	79°	27°24'	+12'	80°	27°35'	+13'	80°	27°45'	+14'	81°	17
18	26°45'	+07'	77°	26°59'	+08'	77°	27°12'	+09'	78°	27°24'	+10'	78°	27°36'	+12'	79°	27°48'	+13'	79°	27°59'	+14'	80°	18
19	26°52'	+06'	76°	27°07'	+08'	76°	27°21'	+09'	77°	27°35'	+10'	77°	27°48'	+11'	78°	28°01'	+12'	78°	28°13'	+13'	79°	19
20	26°58'	+06'	74°	27°14'	+07'	75°	27°30'	+08'	75°	27°45'	+09'	76°	27°59'	+10'	76°	28°13'	+12'	77°	28°26'	+13'	77°	20
21	27°04'	+05'	73°	27°21'	+07'	74°	27°38'	+08'	74°	27°54'	+09'	75°	28°09'	+10'	75°	28°24'	+11'	76°	28°39'	+12'	76°	21
22	27°10'	+05'	72°	27°28'	+06'	73°	27°46'	+07'	73°	28°03'	+08'	74°	28°19'	+09'	74°	28°35'	+11'	75°	28°51'	+12'	75°	22
23	27°15'	+04'	71°	27°34'	+05'	72°	27°53'	+07'	72°	28°11'	+08'	73°	28°29'	+09'	73°	28°46'	+10'	74°	29°03'	+11'	74°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	22°17'	+15'	96°	22°10'	+17'	96°	22°04'	+18'	97°	21°56'	+19'	97°	21°49'	+20'	97°	21°41'	+21'	98°	21°32'	+22'	98°	0
1	22°32'	+15'	95°	22°27'	+16'	95°	22°21'	+17'	96°	22°15'	+18'	96°	22°09'	+19'	96°	22°02'	+20'	97°	21°54'	+22'	97°	1
2	22°47'	+15'	94°	22°43'	+16'	94°	22°39'	+17'	95°	22°34'	+18'	95°	22°28'	+19'	95°	22°22'	+20'	96°	22°16'	+21'	96°	2
3	23°02'	+14'	93°	22°59'	+15'	93°	22°55'	+16'	94°	22°51'	+18'	94°	22°47'	+19'	94°	22°42'	+20'	95°	22°37'	+21'	95°	3
4	23°16'	+14'	92°	23°14'	+15'	92°	23°12'	+16'	93°	23°09'	+17'	93°	23°06'	+18'	93°	23°02'	+19'	94°	22°58'	+20'	94°	4
5	23°30'	+13'	91°	23°29'	+15'	91°	23°28'	+16'	91°	23°26'	+17'	92°	23°24'	+18'	92°	23°21'	+19'	93°	23°18'	+20'	93°	5
6	23°43'	+13'	90°	23°44'	+14'	90°	23°44'	+15'	90°	23°43'	+16'	91°	23°42'	+17'	91°	23°40'	+18'	92°	23°38'	+20'	92°	6
7	23°56'	+13'	88°	23°58'	+14'	89°	23°59'	+15'	89°	23°59'	+16'	90°	23°59'	+17'	90°	23°59'	+18'	91°	23°58'	+19'	91°	7
8	24°09'	+12'	87°	24°11'	+13'	88°	24°13'	+14'	88°	24°15'	+15'	89°	24°16'	+17'	89°	24°17'	+18'	90°	24°17'	+19'	90°	8
9	24°21'	+12'	86°	24°25'	+13'	87°	24°28'	+14'	87°	24°30'	+15'	88°	24°33'	+16'	88°	24°34'	+17'	89°	24°36'	+18'	89°	9
10	24°33'	+11'	85°	24°37'	+12'	86°	24°42'	+13'	86°	24°45'	+15'	87°	24°49'	+16'	87°	24°51'	+17'	88°	24°54'	+18'	88°	10
11	24°44'	+11'	84°	24°50'	+12'	85°	24°55'	+13'	85°	25°00'	+14'	86°	25°04'	+15'	86°	25°08'	+16'	86°	25°12'	+17'	87°	11
12	24°54'	+10'	83°	25°01'	+11'	84°	25°08'	+12'	84°	25°14'	+14'	84°	25°19'	+15'	85°	25°24'	+16'	85°	25°29'	+17'	86°	12
13	25°05'	+10'	82°	25°13'	+11'	82°	25°20'	+12'	83°	25°27'	+13'	83°	25°34'	+14'	84°	25°40'	+15'	84°	25°46'	+16'	85°	13
14	25°14'	+09'	81°	25°24'	+10'	81°	25°32'	+12'	82°	25°41'	+13'	82°	25°48'	+14'	83°	25°56'	+15'	83°	26°02'	+16'	84°	14
15	25°24'	+09'	80°	25°34'	+10'	80°	25°44'	+11'	81°	25°53'	+12'	81°	26°02'	+13'	82°	26°11'	+14'	82°	26°18'	+16'	83°	15
16	25°32'	+08'	79°	25°44'	+09'	79°	25°55'	+11'	80°	26°05'	+12'	80°	26°15'	+13'	81°	26°25'	+14'	81°	26°34'	+15'	82°	16
17	25°41'	+08'	78°	25°53'	+09'	78°	26°05'	+10'	79°	26°17'	+11'	79°	26°28'	+12'	80°	26°39'	+13'	80°	26°49'	+15'	81°	17
18	25°48'	+07'	77°	26°02'	+08'	77°	26°15'	+10'	77°	26°28'	+11'	78°	26°40'	+12'	78°	26°52'	+13'	79°	27°03'	+14'	79°	18
19	25°56'	+07'	75°	26°11'	+08'	76°	26°25'	+09'	76°	26°39'	+10'	77°	26°52'	+11'	77°	27°05'	+12'	78°	27°17'	+14'	78°	19
20	26°02'	+06'	74°	26°18'	+07'	75°	26°34'	+09'	75°	26°49'	+10'	76°	27°03'	+11'	76°	27°17'	+12'	77°	27°31'	+13'	77°	20
21	26°09'	+06'	73°	26°26'	+07'	74°	26°42'	+08'	74°	26°59'	+09'	75°	27°14'	+10'	75°	27°29'	+11'	76°	27°44'	+12'	76°	21
22	26°14'	+05'	72°	26°33'	+06'	73°	26°50'	+07'	73°	27°08'	+09'	74°	27°24'	+10'	74°	27°41'	+11'	75°	27°56'	+12'	75°	22
23	26°20'	+05'	71°	26°39'	+06'	71°	26°58'	+07'	72°	27°16'	+08'	72°	27°34'	+09'	73°	27°51'	+10'	73°	28°08'	+11'	74°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

67° 293° LHA

Latitude SAME as Declination

67° 293° LHA

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

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

68° 292° LHA

Latitude SAME as Declination

68° 292° LHA

Dec°	14			15			16			17			18			19			20			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°
0	21°19'	+15'	96°	21°13'	+16'	96°	21°06'	+18'	96°	21°00'	+19'	97°	20°52'	+20'	97°	20°45'	+21'	97°	20°37'	+22'	98°	0			
1	21°34'	+15'	95°	21°29'	+16'	95°	21°24'	+17'	95°	21°18'	+18'	96°	21°12'	+19'	96°	21°05'	+20'	96°	20°58'	+21'	97°	1			
2	21°49'	+15'	94°	21°45'	+16'	94°	21°41'	+17'	94°	21°36'	+18'	95°	21°31'	+19'	95°	21°26'	+20'	95°	21°20'	+21'	96°	2			
3	22°04'	+14'	92°	22°01'	+15'	93°	21°58'	+16'	93°	21°54'	+17'	94°	21°50'	+19'	94°	21°46'	+20'	94°	21°41'	+21'	95°	3			
4	22°18'	+14'	91°	22°16'	+15'	92°	22°14'	+16'	92°	22°12'	+17'	93°	22°09'	+18'	93°	22°05'	+19'	93°	22°02'	+20'	94°	4			
5	22°32'	+13'	90°	22°31'	+14'	91°	22°30'	+16'	91°	22°29'	+17'	92°	22°27'	+18'	92°	22°25'	+19'	92°	22°22'	+20'	93°	5			
6	22°45'	+13'	89°	22°46'	+14'	90°	22°46'	+15'	90°	22°45'	+16'	91°	22°45'	+17'	91°	22°43'	+18'	91°	22°42'	+20'	92°	6			
7	22°58'	+13'	88°	23°00'	+14'	89°	23°01'	+15'	89°	23°02'	+16'	90°	23°02'	+17'	90°	23°02'	+18'	90°	23°01'	+19'	91°	7			
8	23°11'	+12'	87°	23°13'	+13'	88°	23°16'	+14'	88°	23°18'	+15'	88°	23°19'	+17'	89°	23°20'	+18'	89°	23°20'	+19'	90°	8			
9	23°23'	+12'	86°	23°27'	+13'	87°	23°30'	+14'	87°	23°33'	+15'	87°	23°36'	+16'	88°	23°38'	+17'	88°	23°39'	+18'	89°	9			
10	23°35'	+11'	85°	23°40'	+12'	85°	23°44'	+13'	86°	23°48'	+15'	86°	23°52'	+16'	87°	23°55'	+17'	87°	23°57'	+18'	88°	10			
11	23°46'	+11'	84°	23°52'	+12'	84°	23°58'	+13'	85°	24°03'	+14'	85°	24°07'	+15'	86°	24°12'	+16'	86°	24°15'	+17'	87°	11			
12	23°57'	+10'	83°	24°04'	+11'	83°	24°11'	+13'	84°	24°17'	+14'	84°	24°23'	+15'	85°	24°28'	+16'	85°	24°33'	+17'	86°	12			
13	24°07'	+10'	82°	24°15'	+11'	82°	24°23'	+12'	83°	24°31'	+13'	83°	24°37'	+14'	84°	24°44'	+15'	84°	24°50'	+17'	85°	13			
14	24°17'	+09'	81°	24°26'	+11'	81°	24°35'	+12'	82°	24°44'	+13'	82°	24°52'	+14'	83°	24°59'	+15'	83°	25°06'	+16'	83°	14			
15	24°26'	+09'	80°	24°37'	+10'	80°	24°47'	+11'	81°	24°57'	+12'	81°	25°06'	+13'	81°	25°14'	+15'	82°	25°23'	+16'	82°	15			
16	24°35'	+08'	79°	24°47'	+10'	79°	24°58'	+11'	79°	25°09'	+12'	80°	25°19'	+13'	80°	25°29'	+14'	81°	25°38'	+15'	81°	16			
17	24°44'	+08'	77°	24°57'	+09'	78°	25°09'	+10'	78°	25°21'	+11'	79°	25°32'	+12'	79°	25°43'	+14'	80°	25°53'	+15'	80°	17			
18	24°52'	+08'	76°	25°06'	+09'	77°	25°19'	+10'	77°	25°32'	+11'	78°	25°45'	+12'	78°	25°57'	+13'	79°	26°08'	+14'	79°	18			
19	24°59'	+07'	75°	25°14'	+08'	76°	25°29'	+09'	76°	25°43'	+10'	77°	25°57'	+12'	77°	26°10'	+13'	78°	26°22'	+14'	78°	19			
20	25°06'	+07'	74°	25°23'	+08'	75°	25°38'	+09'	75°	25°53'	+10'	76°	26°08'	+11'	76°	26°22'	+12'	77°	26°36'	+13'	77°	20			
21	25°13'	+06'	73°	25°30'	+07'	74°	25°47'	+08'	74°	26°03'	+09'	74°	26°19'	+11'	75°	26°34'	+12'	75°	26°49'	+13'	76°	21			
22	25°19'	+06'	72°	25°37'	+07'	72°	25°55'	+08'	73°	26°13'	+09'	73°	26°30'	+10'	74°	26°46'	+11'	74°	27°02'	+12'	75°	22			
23	25°25'	+05'	71°	25°44'	+06'	71°	26°03'	+07'	72°	26°22'	+08'	72°	26°40'	+09'	73°	26°57'	+11'	73°	27°14'	+12'	74°	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°
14			15			16			17			18			19			20							

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°	14			15			16			17			18			19			20			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°
0	20°21'	+15'	95°	20°15'	+16'	96°	20°09'	+17'	96°	20°03'	+18'	96°	19°56'	+20'	97°	19°48'	+21'	97°	19°41'	+22'	97°	0			
1	20°36'	+15'	94°	20°32'	+16'	95°	20°26'	+17'	95°	20°21'	+18'	95°	20°15'	+19'	96°	20°09'	+20'	96°	20°02'	+21'	96°	1			
2	20°51'	+15'	93°	20°48'	+16'	94°	20°44'	+17'	94°	20°39'	+18'	94°	20°34'	+19'	95°	20°29'	+20'	95°	20°24'	+21'	95°	2			
3	21°06'	+14'	92°	21°03'	+15'	93°	21°00'	+16'	93°	20°57'	+17'	93°	20°53'	+18'	94°	20°49'	+20'	94°	20°45'	+21'	94°	3			
4	21°20'	+14'	91°	21°18'	+15'	92°	21°17'	+16'	92°	21°14'	+17'	92°	21°12'	+18'	93°	21°09'	+19'	93°	21°05'	+20'	93°	4			
5	21°34'	+13'	90°	21°33'	+14'	91°	21°33'	+16'	91°	21°31'	+17'	91°	21°30'	+18'	92°	21°28'	+19'	92°	21°26'	+20'	92°	5			
6	21°47'	+13'	89°	21°48'	+14'	89°	21°48'	+15'	90°	21°48'	+16'	90°	21°48'	+17'	91°	21°47'	+18'	91°	21°45'	+20'	91°	6			
7	22°00'	+13'	88°	22°02'	+14'	88°	22°03'	+15'	89°	22°04'	+16'	89°	22°05'	+17'	90°	22°05'	+18'	90°	22°05'	+19'	90°	7			
8	22°13'	+12'	87°	22°16'	+13'	87°	22°18'	+14'	88°	22°20'	+15'	88°	22°22'	+17'	89°	22°23'	+18'	89°	22°24'	+19'	89°	8			
9	22°25'	+12'	86°	22°29'	+13'	86°	22°33'	+14'	87°	22°36'	+15'	87°	22°39'	+16'	88°	22°41'	+17'	88°	22°43'	+18'	88°	9			
10	22°37'	+11'	85°	22°42'	+12'	85°	22°47'	+14'	86°	22°51'	+15'	86°	22°55'	+16'	87°	22°58'	+17'	87°	23°01'	+18'	87°	10			
11	22°48'	+11'	84°	22°54'	+12'	84°	23°00'	+13'	85°	23°05'	+14'	85°	23°10'	+15'	85°	23°15'	+16'	86°	23°19'	+18'	86°	11			
12	22°59'	+10'	83°	23°06'	+12'	83°	23°13'	+13'	84°	23°20'	+14'	84°	23°26'	+15'	84°	23°31'	+16'	85°	23°37'	+17'	85°	12			
13	23°09'	+10'	82°	23°18'	+11'	82°	23°26'	+12'	82°	23°34'	+13'	83°	23°41'	+14'	83°	23°47'	+16'	84°	23°54'	+17'	84°	13			
14	23°19'	+10'	81°	23°29'	+11'	81°	23°38'	+12'	81°	23°47'	+13'	82°	23°55'	+14'	82°	24°03'	+15'	83°	24°10'	+16'	83°	14			
15	23°29'	+09'	79°	23°40'	+10'	80°	23°50'	+11'	80°	24°00'	+12'	81°	24°09'	+14'	81°	24°18'	+15'	82°	24°27'	+16'	82°	15			
16	23°38'	+09'	78°	23°50'	+10'	79°	24°01'	+11'	79°	24°12'	+12'	80°	24°23'	+13'	80°	24°33'	+14'	81°	24°42'	+15'	81°	16			
17	23°47'	+08'	77°	24°00'	+09'	78°	24°12'	+10'	78°	24°24'	+12'	79°	24°36'	+13'	79°	24°47'	+14'	80°	24°58'	+15'	80°	17			
18	23°55'	+08'	76°	24°09'	+09'	77°	24°23'	+10'	77°	24°36'	+11'	78°	24°49'	+12'	78°	25°01'	+13'	78°	25°13'	+14'	79°	18			
19	24°03'	+07'	75°	24°18'	+08'	76°	24°33'	+10'	76°	24°47'	+11'	76°	25°01'	+12'	77°	25°14'	+13'	77°	25°27'	+14'	78°	19			
20	24°10'	+07'	74°	24°27'	+08'	75°	24°42'	+09'	75°	24°58'	+10'	75°	25°13'	+11'	76°	25°27'	+12'	76°	25°41'	+13'	77°	20			
21	24°17'	+06'	73°	24°35'	+08'	73°	24°52'	+09'	74°	25°08'	+10'	74°	25°24'	+11'	75°	25°40'	+12'	75°	25°55'	+13'	76°	21			
22	24°24'	+06'	72°	24°42'	+07'	72°	25°00'	+08'	73°	25°18'	+09'	73°	25°35'	+10'	74°	25°51'	+11'	74°	26°08'	+13'	75°	22			
23	24°30'	+05'	71°	24°49'	+07'	71°	25°08'	+08'	72°	25°27'	+09'	72°	25°45'	+10'	73°	26°03'	+11'	73°	26°20'	+12'	74°	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°
14			15			16			17			18			19			20							

69° 291° LHA

Latitude SAME as Declination

69° 291° LHA

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

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

70° 290° LHA

Latitude SAME as Declination

70° 290° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	19°23'	+15'	95°	19°17'	+16'	95°	19°12'	+17'	96°	19°05'	+18'	96°	18°59'	+19'	96°	18°52'	+20'	97°	18°45'	+22'	97°	0
1	19°38'	+15'	94°	19°34'	+16'	94°	19°29'	+17'	95°	19°24'	+18'	95°	19°18'	+19'	95°	19°13'	+20'	96°	19°06'	+21'	96°	1
2	19°53'	+15'	93°	19°50'	+16'	93°	19°46'	+17'	94°	19°42'	+18'	94°	19°38'	+19'	94°	19°33'	+20'	95°	19°28'	+21'	95°	2
3	20°07'	+14'	92°	20°05'	+15'	92°	20°03'	+16'	93°	20°00'	+17'	93°	19°56'	+18'	93°	19°53'	+19'	94°	19°48'	+21'	94°	3
4	20°22'	+14'	91°	20°20'	+15'	91°	20°19'	+16'	92°	20°17'	+17'	92°	20°15'	+18'	92°	20°12'	+19'	93°	20°09'	+20'	93°	4
5	20°35'	+13'	90°	20°35'	+14'	90°	20°35'	+16'	91°	20°34'	+17'	91°	20°33'	+18'	91°	20°31'	+19'	92°	20°29'	+20'	92°	5
6	20°49'	+13'	89°	20°50'	+14'	89°	20°50'	+15'	90°	20°51'	+16'	90°	20°51'	+17'	90°	20°50'	+18'	91°	20°49'	+19'	91°	6
7	21°02'	+13'	88°	21°04'	+14'	88°	21°06'	+15'	89°	21°07'	+16'	89°	21°08'	+17'	89°	21°08'	+18'	90°	21°09'	+19'	90°	7
8	21°14'	+12'	87°	21°18'	+13'	87°	21°21'	+14'	88°	21°23'	+16'	88°	21°25'	+17'	88°	21°26'	+18'	89°	21°28'	+19'	89°	8
9	21°27'	+12'	86°	21°31'	+13'	86°	21°35'	+14'	86°	21°38'	+15'	87°	21°42'	+16'	87°	21°44'	+17'	88°	21°46'	+18'	88°	9
10	21°39'	+11'	85°	21°44'	+13'	85°	21°49'	+14'	85°	21°54'	+15'	86°	21°58'	+16'	86°	22°01'	+17'	87°	22°05'	+18'	87°	10
11	21°50'	+11'	84°	21°57'	+12'	84°	22°03'	+13'	84°	22°08'	+14'	85°	22°14'	+15'	85°	22°18'	+17'	86°	22°23'	+18'	86°	11
12	22°01'	+11'	83°	22°09'	+12'	83°	22°16'	+13'	83°	22°23'	+14'	84°	22°29'	+15'	84°	22°35'	+16'	85°	22°40'	+17'	85°	12
13	22°12'	+10'	81°	22°20'	+11'	82°	22°29'	+12'	82°	22°37'	+14'	83°	22°44'	+15'	83°	22°51'	+16'	84°	22°58'	+17'	84°	13
14	22°22'	+10'	80°	22°32'	+11'	81°	22°41'	+12'	81°	22°50'	+13'	82°	22°59'	+14'	82°	23°07'	+15'	82°	23°14'	+16'	83°	14
15	22°32'	+09'	79°	22°43'	+10'	80°	22°53'	+12'	80°	23°03'	+13'	81°	23°13'	+14'	81°	23°22'	+15'	81°	23°31'	+16'	82°	15
16	22°41'	+09'	78°	22°53'	+10'	79°	23°05'	+11'	79°	23°16'	+12'	79°	23°27'	+13'	80°	23°37'	+14'	80°	23°47'	+16'	81°	16
17	22°50'	+09'	77°	23°03'	+10'	78°	23°16'	+11'	78°	23°28'	+12'	78°	23°40'	+13'	79°	23°51'	+14'	79°	24°02'	+15'	80°	17
18	22°59'	+08'	76°	23°13'	+09'	77°	23°27'	+10'	77°	23°40'	+11'	77°	23°53'	+12'	78°	24°05'	+14'	78°	24°17'	+15'	79°	18
19	23°07'	+08'	75°	23°22'	+09'	75°	23°37'	+10'	76°	23°51'	+11'	76°	24°05'	+12'	77°	24°19'	+13'	77°	24°32'	+14'	78°	19
20	23°14'	+07'	74°	23°31'	+08'	74°	23°47'	+09'	75°	24°02'	+10'	75°	24°17'	+12'	76°	24°32'	+13'	76°	24°46'	+14'	77°	20
21	23°22'	+07'	73°	23°39'	+08'	73°	23°56'	+09'	74°	24°13'	+10'	74°	24°29'	+11'	75°	24°45'	+12'	75°	25°00'	+13'	75°	21
22	23°28'	+06'	72°	23°47'	+07'	72°	24°05'	+08'	73°	24°23'	+10'	73°	24°40'	+11'	73°	24°57'	+12'	74°	25°13'	+13'	74°	22
23	23°35'	+06'	71°	23°54'	+07'	71°	24°14'	+08'	72°	24°32'	+09'	72°	24°51'	+10'	72°	25°09'	+11'	73°	25°26'	+12'	73°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	18°25'	+15'	95°	18°20'	+16'	95°	18°14'	+17'	95°	18°08'	+18'	96°	18°02'	+19'	96°	17°56'	+20'	96°	17°49'	+21'	97°	0
1	18°40'	+15'	94°	18°36'	+16'	94°	18°32'	+17'	94°	18°27'	+18'	95°	18°22'	+19'	95°	18°16'	+20'	95°	18°10'	+21'	96°	1
2	18°55'	+14'	93°	18°52'	+16'	93°	18°48'	+17'	93°	18°45'	+18'	94°	18°41'	+19'	94°	18°36'	+20'	94°	18°31'	+21'	95°	2
3	19°09'	+14'	92°	19°07'	+15'	92°	19°05'	+16'	92°	19°02'	+17'	93°	18°59'	+18'	93°	18°56'	+19'	93°	18°52'	+20'	94°	3
4	19°23'	+14'	91°	19°23'	+15'	91°	19°21'	+16'	91°	19°20'	+17'	92°	19°18'	+18'	92°	19°15'	+19'	92°	19°13'	+20'	93°	4
5	19°37'	+13'	90°	19°37'	+15'	90°	19°37'	+16'	90°	19°37'	+17'	91°	19°36'	+18'	91°	19°34'	+19'	91°	19°33'	+20'	92°	5
6	19°51'	+13'	89°	19°52'	+14'	89°	19°53'	+15'	89°	19°53'	+16'	90°	19°53'	+17'	90°	19°53'	+18'	90°	19°53'	+19'	91°	6
7	20°04'	+13'	88°	20°06'	+14'	88°	20°08'	+15'	88°	20°10'	+16'	89°	20°11'	+17'	89°	20°12'	+18'	89°	20°12'	+19'	90°	7
8	20°16'	+12'	87°	20°20'	+13'	87°	20°23'	+14'	87°	20°26'	+16'	88°	20°28'	+17'	88°	20°30'	+18'	88°	20°31'	+19'	89°	8
9	20°29'	+12'	85°	20°33'	+13'	86°	20°37'	+14'	86°	20°41'	+15'	87°	20°45'	+16'	87°	20°47'	+17'	87°	20°50'	+18'	88°	9
10	20°41'	+12'	84°	20°46'	+13'	85°	20°52'	+14'	85°	20°56'	+15'	86°	21°01'	+16'	86°	21°05'	+17'	86°	21°09'	+18'	87°	10
11	20°52'	+11'	83°	20°59'	+12'	84°	21°05'	+13'	84°	21°11'	+14'	85°	21°17'	+16'	85°	21°22'	+17'	85°	21°27'	+18'	86°	11
12	21°03'	+11'	82°	21°11'	+12'	83°	21°19'	+13'	83°	21°26'	+14'	83°	21°32'	+15'	84°	21°38'	+16'	84°	21°44'	+17'	85°	12
13	21°14'	+10'	81°	21°23'	+11'	82°	21°32'	+13'	82°	21°40'	+14'	82°	21°47'	+15'	83°	21°55'	+16'	83°	22°02'	+17'	84°	13
14	21°25'	+10'	80°	21°35'	+11'	81°	21°44'	+12'	81°	21°53'	+13'	81°	22°02'	+14'	82°	22°11'	+15'	82°	22°18'	+17'	83°	14
15	21°35'	+10'	79°	21°46'	+11'	80°	21°56'	+12'	80°	22°07'	+13'	80°	22°17'	+14'	81°	22°26'	+15'	81°	22°35'	+16'	82°	15
16	21°44'	+09'	78°	21°56'	+10'	78°	22°08'	+11'	79°	22°20'	+12'	79°	22°30'	+14'	80°	22°41'	+15'	80°	22°51'	+16'	81°	16
17	21°53'	+09'	77°	22°07'	+10'	77°	22°20'	+11'	78°	22°32'	+12'	78°	22°44'	+13'	79°	22°56'	+14'	79°	23°07'	+15'	79°	17
18	22°02'	+08'	76°	22°17'	+09'	76°	22°30'	+11'	77°	22°44'	+12'	77°	22°57'	+13'	78°	23°10'	+14'	78°	23°22'	+15'	78°	18
19	22°11'	+08'	75°	22°26'	+09'	75°	22°41'	+10'	76°	22°56'	+11'	76°	23°10'	+12'	77°	23°24'	+13'	77°	23°37'	+14'	77°	19
20	22°18'	+08'	74°	22°35'	+09'	74°	22°51'	+10'	75°	23°07'	+11'	75°	23°22'	+12'	75°	23°37'	+13'	76°	23°51'	+14'	76°	20
21	22°26'	+07'	73°	22°44'	+08'	73°	23°01'	+09'	74°	23°18'	+10'	74°	23°34'	+11'	74°	23°50'	+12'	75°	24°05'	+14'	75°	21
22	22°33'	+07'	72°	22°52'	+08'	72°	23°10'	+09'	72°	23°28'	+10'	73°	23°45'	+11'	73°	24°02'	+12'	74°	24°19'	+13'	74°	22
23	22°40'	+06'	71°	23°00'	+07'	71°	23°19'	+08'	71°	23°38'	+09'	72°	23°56'	+11'	72°	24°14'	+12'	73°	24°32'	+13'	73°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

71° 289° LHA

Latitude SAME as Declination

71° 289° LHA

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

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

72° 288° LHA

Latitude SAME as Declination

72° 288° LHA

Table with columns for Dec°, Hc°, d', Z° and rows for degrees 0 to 23. It contains astronomical data for a specific latitude and declination.

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 columns for Dec°, Hc°, d', Z° and rows for degrees 0 to 23. It contains astronomical data for a specific latitude and declination.

73° 287° LHA

Latitude SAME as Declination

73° 287° LHA

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

74° 286° LHA

Latitude SAME as Declination

74° 286° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	15°31'	+15'	94°	15°26'	+16'	94°	15°22'	+17'	95°	15°17'	+18'	95°	15°12'	+19'	95°	15°06'	+20'	95°	15°01'	+21'	96°	0
1	15°46'	+15'	93°	15°42'	+16'	93°	15°39'	+17'	94°	15°35'	+18'	94°	15°31'	+19'	94°	15°27'	+20'	94°	15°22'	+21'	95°	1
2	16°00'	+14'	92°	15°58'	+15'	92°	15°56'	+16'	93°	15°53'	+18'	93°	15°50'	+19'	93°	15°46'	+20'	93°	15°43'	+21'	94°	2
3	16°15'	+14'	91°	16°14'	+15'	91°	16°12'	+16'	92°	16°10'	+17'	92°	16°08'	+18'	92°	16°06'	+19'	92°	16°03'	+20'	93°	3
4	16°29'	+14'	90°	16°29'	+15'	90°	16°28'	+16'	91°	16°28'	+17'	91°	16°27'	+18'	91°	16°25'	+19'	91°	16°24'	+20'	92°	4
5	16°43'	+13'	89°	16°44'	+15'	89°	16°44'	+16'	90°	16°45'	+17'	90°	16°45'	+18'	90°	16°44'	+19'	90°	16°44'	+20'	91°	5
6	16°56'	+13'	88°	16°58'	+14'	88°	17°00'	+15'	89°	17°01'	+16'	89°	17°02'	+17'	89°	17°03'	+18'	89°	17°04'	+20'	90°	6
7	17°09'	+13'	87°	17°12'	+14'	87°	17°15'	+15'	87°	17°18'	+16'	88°	17°20'	+17'	88°	17°22'	+18'	88°	17°23'	+19'	89°	7
8	17°22'	+13'	86°	17°26'	+14'	86°	17°30'	+15'	86°	17°34'	+16'	87°	17°37'	+17'	87°	17°40'	+18'	87°	17°42'	+19'	88°	8
9	17°35'	+12'	85°	17°40'	+13'	85°	17°45'	+14'	85°	17°49'	+15'	86°	17°54'	+17'	86°	17°58'	+18'	86°	18°01'	+19'	87°	9
10	17°47'	+12'	84°	17°53'	+13'	84°	17°59'	+14'	84°	18°05'	+15'	85°	18°10'	+16'	85°	18°15'	+17'	85°	18°20'	+18'	86°	10
11	17°59'	+12'	83°	18°06'	+13'	83°	18°13'	+14'	83°	18°20'	+15'	84°	18°26'	+16'	84°	18°32'	+17'	84°	18°38'	+18'	85°	11
12	18°10'	+11'	82°	18°19'	+12'	82°	18°27'	+13'	82°	18°35'	+14'	83°	18°42'	+16'	83°	18°49'	+17'	83°	18°56'	+18'	84°	12
13	18°22'	+11'	81°	18°31'	+12'	81°	18°40'	+13'	81°	18°49'	+14'	82°	18°58'	+15'	82°	19°06'	+16'	82°	19°14'	+17'	83°	13
14	18°33'	+11'	80°	18°43'	+12'	80°	18°53'	+13'	80°	19°03'	+14'	81°	19°13'	+15'	81°	19°22'	+16'	81°	19°31'	+17'	82°	14
15	18°43'	+10'	79°	18°55'	+11'	79°	19°06'	+12'	79°	19°17'	+13'	80°	19°28'	+15'	80°	19°38'	+16'	80°	19°48'	+17'	81°	15
16	18°53'	+10'	78°	19°06'	+11'	78°	19°19'	+12'	78°	19°31'	+13'	79°	19°42'	+14'	79°	19°54'	+15'	79°	20°05'	+16'	80°	16
17	19°03'	+10'	77°	19°17'	+11'	77°	19°31'	+12'	77°	19°44'	+13'	78°	19°56'	+14'	78°	20°09'	+15'	78°	20°21'	+16'	79°	17
18	19°13'	+09'	76°	19°28'	+10'	76°	19°42'	+11'	76°	19°56'	+12'	77°	20°10'	+13'	77°	20°24'	+14'	77°	20°37'	+16'	78°	18
19	19°22'	+09'	74°	19°38'	+10'	75°	19°54'	+11'	75°	20°09'	+12'	75°	20°24'	+13'	76°	20°38'	+14'	76°	20°52'	+15'	77°	19
20	19°31'	+08'	73°	19°48'	+10'	74°	20°05'	+11'	74°	20°21'	+12'	74°	20°37'	+13'	75°	20°52'	+14'	75°	21°07'	+15'	76°	20
21	19°39'	+08'	72°	19°57'	+09'	73°	20°15'	+10'	73°	20°32'	+11'	73°	20°49'	+12'	74°	21°06'	+13'	74°	21°22'	+14'	75°	21
22	19°47'	+08'	71°	20°07'	+09'	72°	20°25'	+10'	72°	20°44'	+11'	72°	21°02'	+12'	73°	21°19'	+13'	73°	21°37'	+14'	73°	22
23	19°55'	+07'	70°	20°15'	+08'	71°	20°35'	+09'	71°	20°55'	+10'	71°	21°14'	+12'	72°	21°32'	+13'	72°	21°51'	+14'	72°	23
Dec°	14			15			16			17			18			19			20			Dec°

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	14°33'	+15'	94°	14°29'	+16'	94°	14°24'	+17'	94°	14°20'	+18'	94°	14°15'	+19'	95°	14°10'	+20'	95°	14°05'	+21'	95°	0
1	14°48'	+15'	93°	14°45'	+16'	93°	14°41'	+17'	93°	14°38'	+18'	93°	14°34'	+19'	94°	14°30'	+20'	94°	14°26'	+21'	94°	1
2	15°02'	+14'	92°	15°00'	+15'	92°	14°58'	+16'	92°	14°56'	+17'	93°	14°53'	+19'	93°	14°50'	+20'	93°	14°46'	+21'	93°	2
3	15°16'	+14'	91°	15°16'	+15'	91°	15°14'	+16'	91°	15°13'	+17'	92°	15°11'	+18'	92°	15°09'	+19'	92°	15°07'	+20'	92°	3
4	15°31'	+14'	90°	15°31'	+15'	90°	15°31'	+16'	90°	15°30'	+17'	91°	15°30'	+18'	91°	15°29'	+19'	91°	15°27'	+20'	91°	4
5	15°44'	+14'	89°	15°46'	+15'	89°	15°47'	+16'	89°	15°47'	+17'	90°	15°48'	+18'	90°	15°48'	+19'	90°	15°47'	+20'	90°	5
6	15°58'	+13'	88°	16°00'	+14'	88°	16°02'	+15'	88°	16°04'	+16'	89°	16°05'	+17'	89°	16°06'	+18'	89°	16°07'	+20'	89°	6
7	16°11'	+13'	87°	16°14'	+14'	87°	16°18'	+15'	87°	16°20'	+16'	88°	16°23'	+17'	88°	16°25'	+18'	88°	16°27'	+19'	88°	7
8	16°24'	+13'	86°	16°28'	+14'	86°	16°33'	+15'	86°	16°36'	+16'	87°	16°40'	+17'	87°	16°43'	+18'	87°	16°46'	+19'	87°	8
9	16°37'	+12'	85°	16°42'	+13'	85°	16°47'	+14'	85°	16°52'	+16'	86°	16°57'	+17'	86°	17°01'	+18'	86°	17°05'	+19'	86°	9
10	16°49'	+12'	84°	16°56'	+13'	84°	17°02'	+14'	84°	17°08'	+15'	85°	17°13'	+16'	85°	17°19'	+17'	85°	17°24'	+18'	85°	10
11	17°01'	+12'	83°	17°09'	+13'	83°	17°16'	+14'	83°	17°23'	+15'	83°	17°30'	+16'	84°	17°36'	+17'	84°	17°42'	+18'	84°	11
12	17°13'	+11'	82°	17°22'	+12'	82°	17°30'	+14'	82°	17°38'	+15'	82°	17°46'	+16'	83°	17°53'	+17'	83°	18°00'	+18'	83°	12
13	17°24'	+11'	81°	17°34'	+12'	81°	17°43'	+13'	81°	17°52'	+14'	81°	18°01'	+15'	82°	18°10'	+16'	82°	18°18'	+17'	82°	13
14	17°35'	+11'	79°	17°46'	+12'	80°	17°57'	+13'	80°	18°07'	+14'	80°	18°17'	+15'	81°	18°26'	+16'	81°	18°35'	+17'	81°	14
15	17°46'	+10'	78°	17°58'	+12'	79°	18°10'	+13'	79°	18°21'	+14'	79°	18°32'	+15'	80°	18°42'	+16'	80°	18°52'	+17'	80°	15
16	17°57'	+10'	77°	18°10'	+11'	78°	18°22'	+12'	78°	18°34'	+13'	78°	18°46'	+14'	79°	18°58'	+15'	79°	19°09'	+16'	79°	16
17	18°07'	+10'	76°	18°21'	+11'	77°	18°34'	+12'	77°	18°48'	+13'	77°	19°01'	+14'	78°	19°13'	+15'	78°	19°26'	+16'	78°	17
18	18°17'	+09'	75°	18°32'	+11'	76°	18°46'	+12'	76°	19°01'	+13'	76°	19°15'	+14'	77°	19°28'	+15'	77°	19°42'	+16'	77°	18
19	18°26'	+09'	74°	18°42'	+10'	75°	18°58'	+11'	75°	19°13'	+12'	75°	19°28'	+13'	76°	19°43'	+14'	76°	19°57'	+15'	76°	19
20	18°35'	+09'	73°	18°52'	+10'	74°	19°09'	+11'	74°	19°26'	+12'	74°	19°42'	+13'	75°	19°57'	+14'	75°	20°13'	+15'	75°	20
21	18°44'	+08'	72°	19°02'	+09'	73°	19°20'	+11'	73°	19°37'	+12'	73°	19°55'	+13'	74°	20°11'	+14'	74°	20°28'	+15'	74°	21
22	18°52'	+08'	71°	19°12'	+09'	71°	19°30'	+10'	72°	19°49'	+11'	72°	20°07'	+12'	73°	20°25'	+13'	73°	20°43'	+14'	73°	22
23	19°00'	+08'	70°	19°21'	+09'	70°	19°41'	+10'	71°	20°00'	+11'	71°	20°19'	+12'	71°	20°38'	+13'	72°	20°57'	+14'	72°	23
Dec°	14			15			16			17			18			19			20			Dec°

75° 285° LHA

Latitude SAME as Declination

75° 285° LHA

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

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

76° 284° LHA

Latitude SAME as Declination

76° 284° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	13°35'	+15'	93°	13°31'	+16'	94°	13°27'	+17'	94°	13°23'	+18'	94°	13°18'	+19'	94°	13°13'	+20'	95°	13°08'	+21'	95°	0
1	13°49'	+15'	92°	13°47'	+16'	93°	13°44'	+17'	93°	13°41'	+18'	93°	13°37'	+19'	93°	13°33'	+20'	94°	13°29'	+21'	94°	1
2	14°04'	+14'	91°	14°02'	+15'	92°	14°00'	+16'	92°	13°58'	+17'	92°	13°56'	+18'	92°	13°53'	+19'	93°	13°50'	+21'	93°	2
3	14°18'	+14'	90°	14°18'	+15'	91°	14°17'	+16'	91°	14°16'	+17'	91°	14°14'	+18'	91°	14°13'	+19'	92°	14°11'	+20'	92°	3
4	14°32'	+14'	89°	14°33'	+15'	90°	14°33'	+16'	90°	14°33'	+17'	90°	14°32'	+18'	90°	14°32'	+19'	91°	14°31'	+20'	91°	4
5	14°46'	+14'	88°	14°48'	+15'	89°	14°49'	+16'	89°	14°50'	+17'	89°	14°50'	+18'	90°	14°51'	+19'	90°	14°51'	+20'	90°	5
6	15°00'	+13'	87°	15°02'	+14'	88°	15°05'	+15'	88°	15°06'	+16'	88°	15°08'	+17'	89°	15°10'	+19'	89°	15°11'	+20'	89°	6
7	15°13'	+13'	86°	15°17'	+14'	87°	15°20'	+15'	87°	15°23'	+16'	87°	15°26'	+17'	88°	15°28'	+18'	88°	15°30'	+19'	88°	7
8	15°26'	+13'	85°	15°31'	+14'	86°	15°35'	+15'	86°	15°39'	+16'	86°	15°43'	+17'	87°	15°46'	+18'	87°	15°50'	+19'	87°	8
9	15°39'	+12'	84°	15°44'	+14'	85°	15°50'	+15'	85°	15°55'	+16'	85°	16°00'	+17'	86°	16°04'	+18'	86°	16°09'	+19'	86°	9
10	15°51'	+12'	83°	15°58'	+13'	84°	16°04'	+14'	84°	16°11'	+15'	84°	16°16'	+16'	85°	16°22'	+17'	85°	16°27'	+18'	85°	10
11	16°03'	+12'	82°	16°11'	+13'	83°	16°19'	+14'	83°	16°26'	+15'	83°	16°33'	+16'	84°	16°39'	+17'	84°	16°46'	+18'	84°	11
12	16°15'	+12'	81°	16°24'	+13'	82°	16°33'	+14'	82°	16°41'	+15'	82°	16°49'	+16'	83°	16°57'	+17'	83°	17°04'	+18'	83°	12
13	16°27'	+11'	80°	16°37'	+12'	81°	16°46'	+13'	81°	16°56'	+14'	81°	17°05'	+15'	82°	17°13'	+17'	82°	17°22'	+18'	82°	13
14	16°38'	+11'	79°	16°49'	+12'	80°	17°00'	+13'	80°	17°10'	+14'	80°	17°20'	+15'	81°	17°30'	+16'	81°	17°39'	+17'	81°	14
15	16°49'	+11'	78°	17°01'	+12'	79°	17°13'	+13'	79°	17°24'	+14'	79°	17°35'	+15'	79°	17°46'	+16'	80°	17°57'	+17'	80°	15
16	17°00'	+10'	77°	17°13'	+11'	78°	17°26'	+12'	78°	17°38'	+14'	78°	17°50'	+15'	78°	18°02'	+16'	79°	18°14'	+17'	79°	16
17	17°10'	+10'	76°	17°24'	+11'	77°	17°38'	+12'	77°	17°52'	+13'	77°	18°05'	+14'	77°	18°18'	+15'	78°	18°30'	+16'	78°	17
18	17°20'	+10'	75°	17°35'	+11'	75°	17°50'	+12'	76°	18°05'	+13'	76°	18°19'	+14'	76°	18°33'	+15'	77°	18°47'	+16'	77°	18
19	17°30'	+09'	74°	17°46'	+10'	74°	18°02'	+12'	75°	18°18'	+13'	75°	18°33'	+14'	75°	18°48'	+15'	76°	19°03'	+16'	76°	19
20	17°39'	+09'	73°	17°57'	+10'	73°	18°14'	+11'	74°	18°30'	+12'	74°	18°47'	+13'	74°	19°03'	+14'	75°	19°18'	+15'	75°	20
21	17°49'	+09'	72°	18°07'	+10'	72°	18°25'	+11'	73°	18°43'	+12'	73°	19°00'	+13'	73°	19°17'	+14'	74°	19°34'	+15'	74°	21
22	17°57'	+08'	71°	18°17'	+09'	71°	18°36'	+10'	72°	18°54'	+12'	72°	19°13'	+13'	72°	19°31'	+14'	73°	19°49'	+15'	73°	22
23	18°06'	+08'	70°	18°26'	+09'	70°	18°46'	+10'	71°	19°06'	+11'	71°	19°25'	+12'	71°	19°44'	+13'	72°	20°03'	+14'	72°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	12°36'	+15'	93°	12°33'	+16'	93°	12°29'	+17'	94°	12°25'	+18'	94°	12°21'	+19'	94°	12°17'	+20'	94°	12°12'	+21'	95°	0
1	12°51'	+15'	92°	12°49'	+16'	92°	12°46'	+17'	93°	12°43'	+18'	93°	12°40'	+19'	93°	12°37'	+20'	93°	12°33'	+21'	94°	1
2	13°06'	+14'	91°	13°04'	+15'	91°	13°03'	+16'	92°	13°01'	+17'	92°	12°59'	+18'	92°	12°56'	+19'	92°	12°54'	+20'	93°	2
3	13°20'	+14'	90°	13°20'	+15'	90°	13°19'	+16'	91°	13°18'	+17'	91°	13°17'	+18'	91°	13°16'	+19'	91°	13°14'	+20'	92°	3
4	13°34'	+14'	89°	13°35'	+15'	89°	13°35'	+16'	90°	13°35'	+17'	90°	13°35'	+18'	90°	13°35'	+19'	90°	13°35'	+20'	91°	4
5	13°48'	+14'	88°	13°50'	+15'	88°	13°51'	+16'	89°	13°52'	+17'	89°	13°53'	+18'	89°	13°54'	+19'	89°	13°55'	+20'	90°	5
6	14°02'	+13'	87°	14°04'	+14'	87°	14°07'	+15'	88°	14°09'	+16'	88°	14°11'	+18'	88°	14°13'	+19'	88°	14°14'	+20'	89°	6
7	14°15'	+13'	86°	14°19'	+14'	86°	14°22'	+15'	87°	14°26'	+16'	87°	14°29'	+17'	87°	14°31'	+18'	87°	14°34'	+19'	88°	7
8	14°28'	+13'	85°	14°33'	+14'	85°	14°38'	+15'	86°	14°42'	+16'	86°	14°46'	+17'	86°	14°50'	+18'	86°	14°53'	+19'	87°	8
9	14°41'	+13'	84°	14°47'	+14'	84°	14°52'	+15'	85°	14°58'	+16'	85°	15°03'	+17'	85°	15°08'	+18'	86°	15°12'	+19'	86°	9
10	14°53'	+12'	83°	15°00'	+13'	83°	15°07'	+14'	84°	15°14'	+15'	84°	15°20'	+16'	84°	15°26'	+18'	85°	15°31'	+19'	85°	10
11	15°06'	+12'	82°	15°14'	+13'	82°	15°22'	+14'	83°	15°29'	+15'	83°	15°36'	+16'	83°	15°43'	+17'	84°	15°50'	+18'	84°	11
12	15°18'	+12'	81°	15°27'	+13'	81°	15°36'	+14'	82°	15°44'	+15'	82°	15°52'	+16'	82°	16°00'	+17'	83°	16°08'	+18'	83°	12
13	15°29'	+11'	80°	15°40'	+13'	80°	15°49'	+14'	81°	15°59'	+15'	81°	16°08'	+16'	81°	16°17'	+17'	82°	16°26'	+18'	82°	13
14	15°41'	+11'	79°	15°52'	+12'	79°	16°03'	+13'	80°	16°14'	+14'	80°	16°24'	+15'	80°	16°34'	+16'	81°	16°44'	+17'	81°	14
15	15°52'	+11'	78°	16°04'	+12'	78°	16°16'	+13'	79°	16°28'	+14'	79°	16°39'	+15'	79°	16°50'	+16'	80°	17°01'	+17'	80°	15
16	16°03'	+11'	77°	16°16'	+12'	77°	16°29'	+13'	78°	16°42'	+14'	78°	16°54'	+15'	78°	17°07'	+16'	79°	17°18'	+17'	79°	16
17	16°14'	+10'	76°	16°28'	+11'	76°	16°42'	+12'	77°	16°56'	+13'	77°	17°09'	+14'	77°	17°22'	+16'	78°	17°35'	+17'	78°	17
18	16°24'	+10'	75°	16°39'	+11'	75°	16°54'	+12'	76°	17°09'	+13'	76°	17°24'	+14'	76°	17°38'	+15'	76°	17°52'	+16'	77°	18
19	16°34'	+10'	74°	16°50'	+11'	74°	17°07'	+12'	75°	17°22'	+13'	75°	17°38'	+14'	75°	17°53'	+15'	75°	18°08'	+16'	76°	19
20	16°44'	+09'	73°	17°01'	+10'	73°	17°18'	+11'	74°	17°35'	+13'	74°	17°52'	+14'	74°	18°08'	+15'	74°	18°24'	+16'	75°	20
21	16°53'	+09'	72°	17°12'	+10'	72°	17°30'	+11'	73°	17°48'	+12'	73°	18°05'	+13'	73°	18°23'	+14'	73°	18°39'	+15'	74°	21
22	17°02'	+09'	71°	17°22'	+10'	71°	17°41'	+11'	71°	18°00'	+12'	72°	18°18'	+13'	72°	18°37'	+14'	72°	18°55'	+15'	73°	22
23	17°11'	+08'	70°	17°32'	+09'	70°	17°52'	+11'	70°	18°12'	+12'	71°	18°31'	+13'	71°	18°51'	+14'	71°	19°10'	+15'	72°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

77° 283° LHA

Latitude SAME as Declination

77° 283° LHA

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

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

78° 282° LHA

Latitude SAME as Declination

78° 282° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	11°38'	+15'	93°	11°35'	+16'	93°	11°32'	+17'	93°	11°28'	+18'	94°	11°24'	+19'	94°	11°20'	+20'	94°	11°16'	+21'	94°	0
1	11°53'	+15'	92°	11°51'	+16'	92°	11°48'	+17'	92°	11°46'	+18'	93°	11°43'	+19'	93°	11°40'	+20'	93°	11°37'	+21'	93°	1
2	12°08'	+14'	91°	12°06'	+15'	91°	12°05'	+16'	91°	12°04'	+17'	92°	12°02'	+18'	92°	12°00'	+19'	92°	11°57'	+20'	92°	2
3	12°22'	+14'	90°	12°22'	+15'	90°	12°21'	+16'	90°	12°21'	+17'	91°	12°20'	+18'	91°	12°19'	+19'	91°	12°18'	+20'	91°	3
4	12°36'	+14'	89°	12°37'	+15'	89°	12°38'	+16'	89°	12°38'	+17'	90°	12°38'	+18'	90°	12°38'	+19'	90°	12°38'	+20'	90°	4
5	12°50'	+14'	88°	12°52'	+15'	88°	12°54'	+16'	88°	12°55'	+17'	89°	12°56'	+18'	89°	12°57'	+19'	89°	12°58'	+20'	89°	5
6	13°03'	+13'	87°	13°06'	+14'	87°	13°09'	+15'	87°	13°12'	+17'	88°	13°14'	+18'	88°	13°16'	+19'	88°	13°18'	+20'	88°	6
7	13°17'	+13'	86°	13°21'	+14'	86°	13°25'	+15'	86°	13°28'	+16'	87°	13°32'	+17'	87°	13°35'	+18'	87°	13°38'	+19'	87°	7
8	13°30'	+13'	85°	13°35'	+14'	85°	13°40'	+15'	85°	13°45'	+16'	86°	13°49'	+17'	86°	13°53'	+18'	86°	13°57'	+19'	86°	8
9	13°43'	+13'	84°	13°49'	+14'	84°	13°55'	+15'	84°	14°01'	+16'	85°	14°06'	+17'	85°	14°11'	+18'	85°	14°16'	+19'	85°	9
10	13°56'	+12'	83°	14°03'	+13'	83°	14°10'	+15'	83°	14°16'	+16'	84°	14°23'	+17'	84°	14°29'	+18'	84°	14°35'	+19'	84°	10
11	14°08'	+12'	82°	14°16'	+13'	82°	14°24'	+14'	82°	14°32'	+15'	83°	14°40'	+16'	83°	14°47'	+17'	83°	14°54'	+18'	83°	11
12	14°20'	+12'	81°	14°30'	+13'	81°	14°39'	+14'	81°	14°47'	+15'	82°	14°56'	+16'	82°	15°04'	+17'	82°	15°12'	+18'	83°	12
13	14°32'	+12'	80°	14°43'	+13'	80°	14°53'	+14'	80°	15°02'	+15'	81°	15°12'	+16'	81°	15°21'	+17'	81°	15°30'	+18'	82°	13
14	14°44'	+11'	79°	14°55'	+12'	79°	15°06'	+13'	79°	15°17'	+15'	80°	15°28'	+16'	80°	15°38'	+17'	80°	15°48'	+18'	81°	14
15	14°55'	+11'	78°	15°08'	+12'	78°	15°20'	+13'	78°	15°32'	+14'	79°	15°43'	+15'	79°	15°55'	+16'	79°	16°06'	+17'	80°	15
16	15°06'	+11'	77°	15°20'	+12'	77°	15°33'	+13'	77°	15°46'	+14'	78°	15°59'	+15'	78°	16°11'	+16'	78°	16°23'	+17'	79°	16
17	15°17'	+11'	76°	15°32'	+12'	76°	15°46'	+13'	76°	16°00'	+14'	77°	16°14'	+15'	77°	16°27'	+16'	77°	16°40'	+17'	78°	17
18	15°28'	+10'	75°	15°43'	+11'	75°	15°59'	+12'	75°	16°14'	+13'	76°	16°28'	+14'	76°	16°43'	+15'	76°	16°57'	+16'	77°	18
19	15°38'	+10'	74°	15°55'	+11'	74°	16°11'	+12'	74°	16°27'	+13'	75°	16°43'	+14'	75°	16°58'	+15'	75°	17°13'	+16'	76°	19
20	15°48'	+10'	73°	16°06'	+11'	73°	16°23'	+12'	73°	16°40'	+13'	74°	16°57'	+14'	74°	17°13'	+15'	74°	17°30'	+16'	75°	20
21	15°58'	+09'	72°	16°16'	+10'	72°	16°35'	+11'	72°	16°53'	+12'	73°	17°11'	+14'	73°	17°28'	+15'	73°	17°45'	+16'	74°	21
22	16°07'	+09'	71°	16°27'	+10'	71°	16°46'	+11'	71°	17°05'	+12'	72°	17°24'	+13'	72°	17°43'	+14'	72°	18°01'	+15'	72°	22
23	16°16'	+09'	70°	16°37'	+10'	70°	16°57'	+11'	70°	17°18'	+12'	71°	17°37'	+13'	71°	17°57'	+14'	71°	18°16'	+15'	71°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	10°40'	+15'	93°	10°37'	+16'	93°	10°34'	+17'	93°	10°31'	+18'	93°	10°27'	+19'	93°	10°24'	+20'	94°	10°20'	+21'	94°	0
1	10°55'	+14'	92°	10°53'	+16'	92°	10°51'	+17'	92°	10°49'	+18'	92°	10°46'	+19'	92°	10°43'	+20'	93°	10°41'	+21'	93°	1
2	11°09'	+14'	91°	11°08'	+15'	91°	11°07'	+16'	91°	11°06'	+17'	91°	11°05'	+18'	92°	11°03'	+19'	92°	11°01'	+20'	92°	2
3	11°24'	+14'	90°	11°24'	+15'	90°	11°24'	+16'	90°	11°24'	+17'	90°	11°23'	+18'	91°	11°22'	+19'	91°	11°22'	+20'	91°	3
4	11°38'	+14'	89°	11°39'	+15'	89°	11°40'	+16'	89°	11°41'	+17'	89°	11°41'	+18'	90°	11°42'	+19'	90°	11°42'	+20'	90°	4
5	11°52'	+14'	88°	11°54'	+15'	88°	11°56'	+16'	88°	11°58'	+17'	88°	11°59'	+18'	89°	12°01'	+19'	89°	12°02'	+20'	89°	5
6	12°05'	+13'	87°	12°09'	+15'	87°	12°12'	+16'	87°	12°14'	+17'	87°	12°17'	+18'	88°	12°19'	+19'	88°	12°22'	+20'	88°	6
7	12°19'	+13'	86°	12°23'	+14'	86°	12°27'	+15'	86°	12°31'	+16'	86°	12°35'	+17'	87°	12°38'	+18'	87°	12°41'	+19'	87°	7
8	12°32'	+13'	85°	12°37'	+14'	85°	12°43'	+15'	85°	12°47'	+16'	85°	12°52'	+17'	86°	12°57'	+18'	86°	13°01'	+19'	86°	8
9	12°45'	+13'	84°	12°51'	+14'	84°	12°58'	+15'	84°	13°04'	+16'	84°	13°09'	+17'	85°	13°15'	+18'	85°	13°20'	+19'	85°	9
10	12°58'	+13'	83°	13°05'	+14'	83°	13°13'	+15'	83°	13°19'	+16'	83°	13°26'	+17'	84°	13°33'	+18'	84°	13°39'	+19'	84°	10
11	13°10'	+12'	82°	13°19'	+13'	82°	13°27'	+14'	82°	13°35'	+15'	82°	13°43'	+16'	83°	13°50'	+18'	83°	13°58'	+19'	83°	11
12	13°23'	+12'	81°	13°32'	+13'	81°	13°42'	+14'	81°	13°51'	+15'	81°	13°59'	+16'	82°	14°08'	+17'	82°	14°16'	+18'	82°	12
13	13°35'	+12'	80°	13°45'	+13'	80°	13°56'	+14'	80°	14°06'	+15'	80°	14°16'	+16'	81°	14°25'	+17'	81°	14°34'	+18'	81°	13
14	13°47'	+12'	79°	13°58'	+13'	79°	14°10'	+14'	79°	14°21'	+15'	79°	14°32'	+16'	80°	14°42'	+17'	80°	14°53'	+18'	80°	14
15	13°58'	+11'	78°	14°11'	+12'	78°	14°23'	+13'	78°	14°35'	+14'	78°	14°47'	+15'	79°	14°59'	+17'	79°	15°10'	+18'	79°	15
16	14°10'	+11'	77°	14°23'	+12'	77°	14°37'	+13'	77°	14°50'	+14'	77°	15°03'	+15'	78°	15°15'	+16'	78°	15°28'	+17'	78°	16
17	14°21'	+11'	76°	14°35'	+12'	76°	14°50'	+13'	76°	15°04'	+14'	76°	15°18'	+15'	77°	15°32'	+16'	77°	15°45'	+17'	77°	17
18	14°32'	+11'	75°	14°47'	+12'	75°	15°03'	+13'	75°	15°18'	+14'	75°	15°33'	+15'	76°	15°48'	+16'	76°	16°02'	+17'	76°	18
19	14°42'	+10'	74°	14°59'	+11'	74°	15°15'	+12'	74°	15°32'	+13'	74°	15°48'	+14'	75°	16°03'	+15'	75°	16°19'	+16'	75°	19
20	14°53'	+10'	73°	15°10'	+11'	73°	15°28'	+12'	73°	15°45'	+13'	73°	16°02'	+14'	74°	16°19'	+15'	74°	16°35'	+16'	74°	20
21	15°03'	+10'	72°	15°21'	+11'	72°	15°40'	+12'	72°	15°58'	+13'	72°	16°16'	+14'	73°	16°34'	+15'	73°	16°51'	+16'	73°	21
22	15°12'	+09'	71°	15°32'	+11'	71°	15°52'	+12'	71°	16°11'	+13'	71°	16°30'	+14'	72°	16°49'	+15'	72°	17°07'	+16'	72°	22
23	15°22'	+09'	70°	15°43'	+10'	70°	16°03'	+11'	70°	16°24'	+12'	70°	16°44'	+13'	71°	17°03'	+14'	71°	17°23'	+15'	71°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

79° 281° LHA

Latitude SAME as Declination

79° 281° LHA

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

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

80° 280° LHA

Latitude SAME as Declination

80° 280° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	9°42'	+15'	92°	9°39'	+16'	93°	9°37'	+17'	93°	9°34'	+18'	93°	9°30'	+19'	93°	9°27'	+20'	93°	9°23'	+21'	93°	0
1	9°57'	+14'	91°	9°55'	+15'	92°	9°53'	+17'	92°	9°51'	+18'	92°	9°49'	+19'	92°	9°47'	+20'	92°	9°44'	+21'	92°	1
2	10°11'	+14'	90°	10°11'	+15'	91°	10°10'	+16'	91°	10°09'	+17'	91°	10°08'	+18'	91°	10°06'	+19'	91°	10°05'	+20'	92°	2
3	10°25'	+14'	89°	10°26'	+15'	90°	10°26'	+16'	90°	10°26'	+17'	90°	10°26'	+18'	90°	10°26'	+19'	90°	10°25'	+20'	91°	3
4	10°40'	+14'	88°	10°41'	+15'	89°	10°42'	+16'	89°	10°43'	+17'	89°	10°44'	+18'	89°	10°45'	+19'	89°	10°45'	+20'	90°	4
5	10°53'	+14'	88°	10°56'	+15'	88°	10°58'	+16'	88°	11°00'	+17'	88°	11°02'	+18'	88°	11°04'	+19'	88°	11°05'	+20'	89°	5
6	11°07'	+14'	87°	11°11'	+15'	87°	11°14'	+16'	87°	11°17'	+17'	87°	11°20'	+18'	87°	11°23'	+19'	88°	11°25'	+20'	88°	6
7	11°21'	+13'	86°	11°25'	+14'	86°	11°30'	+15'	86°	11°34'	+16'	86°	11°38'	+17'	86°	11°41'	+18'	87°	11°45'	+19'	87°	7
8	11°34'	+13'	85°	11°40'	+14'	85°	11°45'	+15'	85°	11°50'	+16'	85°	11°55'	+17'	85°	12°00'	+18'	86°	12°04'	+19'	86°	8
9	11°47'	+13'	84°	11°54'	+14'	84°	12°00'	+15'	84°	12°06'	+16'	84°	12°12'	+17'	84°	12°18'	+18'	85°	12°24'	+19'	85°	9
10	12°00'	+13'	83°	12°08'	+14'	83°	12°15'	+15'	83°	12°22'	+16'	83°	12°30'	+17'	83°	12°36'	+18'	84°	12°43'	+19'	84°	10
11	12°13'	+12'	82°	12°22'	+14'	82°	12°30'	+15'	82°	12°38'	+16'	82°	12°46'	+17'	82°	12°54'	+18'	83°	13°02'	+19'	83°	11
12	12°25'	+12'	81°	12°35'	+13'	81°	12°45'	+14'	81°	12°54'	+15'	81°	13°03'	+16'	81°	13°12'	+17'	82°	13°20'	+18'	82°	12
13	12°38'	+12'	80°	12°48'	+13'	80°	12°59'	+14'	80°	13°09'	+15'	80°	13°19'	+16'	80°	13°29'	+17'	81°	13°39'	+18'	81°	13
14	12°50'	+12'	79°	13°01'	+13'	79°	13°13'	+14'	79°	13°24'	+15'	79°	13°36'	+16'	79°	13°46'	+17'	80°	13°57'	+18'	80°	14
15	13°01'	+12'	78°	13°14'	+13'	78°	13°27'	+14'	78°	13°39'	+15'	78°	13°51'	+16'	78°	14°03'	+17'	79°	14°15'	+18'	79°	15
16	13°13'	+11'	77°	13°27'	+12'	77°	13°41'	+13'	77°	13°54'	+14'	77°	14°07'	+15'	77°	14°20'	+16'	78°	14°33'	+17'	78°	16
17	13°24'	+11'	76°	13°39'	+12'	76°	13°54'	+13'	76°	14°08'	+14'	76°	14°23'	+15'	76°	14°36'	+16'	77°	14°50'	+17'	77°	17
18	13°36'	+11'	74°	13°51'	+12'	75°	14°07'	+13'	75°	14°23'	+14'	75°	14°38'	+15'	75°	14°53'	+16'	76°	15°07'	+17'	76°	18
19	13°46'	+11'	73°	14°03'	+12'	74°	14°20'	+13'	74°	14°36'	+14'	74°	14°53'	+15'	74°	15°09'	+16'	75°	15°24'	+17'	75°	19
20	13°57'	+10'	72°	14°15'	+11'	73°	14°33'	+12'	73°	14°50'	+13'	73°	15°07'	+14'	73°	15°24'	+15'	74°	15°41'	+16'	74°	20
21	14°07'	+10'	71°	14°26'	+11'	72°	14°45'	+12'	72°	15°04'	+13'	72°	15°22'	+14'	72°	15°40'	+15'	73°	15°57'	+16'	73°	21
22	14°17'	+10'	70°	14°37'	+11'	71°	14°57'	+12'	71°	15°17'	+13'	71°	15°36'	+14'	71°	15°55'	+15'	72°	16°14'	+16'	72°	22
23	14°27'	+10'	69°	14°48'	+11'	70°	15°09'	+12'	70°	15°30'	+13'	70°	15°50'	+14'	70°	16°10'	+15'	71°	16°29'	+16'	71°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	8°44'	+15'	92°	8°41'	+16'	92°	8°39'	+17'	92°	8°36'	+18'	93°	8°33'	+19'	93°	8°30'	+20'	93°	8°27'	+21'	93°	0
1	8°58'	+14'	91°	8°57'	+15'	91°	8°56'	+17'	92°	8°54'	+18'	92°	8°52'	+19'	92°	8°50'	+20'	92°	8°48'	+21'	92°	1
2	9°13'	+14'	90°	9°13'	+15'	90°	9°12'	+16'	91°	9°11'	+17'	91°	9°11'	+18'	91°	9°10'	+19'	91°	9°08'	+20'	91°	2
3	9°27'	+14'	89°	9°28'	+15'	89°	9°28'	+16'	90°	9°29'	+17'	90°	9°29'	+18'	90°	9°29'	+19'	90°	9°29'	+20'	90°	3
4	9°41'	+14'	88°	9°43'	+15'	88°	9°45'	+16'	89°	9°46'	+17'	89°	9°47'	+18'	89°	9°48'	+19'	89°	9°49'	+20'	89°	4
5	9°55'	+14'	87°	9°58'	+15'	87°	10°01'	+16'	88°	10°03'	+17'	88°	10°05'	+18'	88°	10°07'	+19'	88°	10°09'	+20'	88°	5
6	10°09'	+14'	86°	10°13'	+15'	86°	10°16'	+16'	87°	10°20'	+17'	87°	10°23'	+18'	87°	10°26'	+19'	87°	10°29'	+20'	87°	6
7	10°23'	+13'	85°	10°27'	+14'	85°	10°32'	+15'	86°	10°37'	+17'	86°	10°41'	+18'	86°	10°45'	+19'	86°	10°49'	+20'	86°	7
8	10°36'	+13'	84°	10°42'	+14'	84°	10°48'	+15'	85°	10°53'	+16'	85°	10°58'	+17'	85°	11°03'	+18'	85°	11°08'	+19'	85°	8
9	10°49'	+13'	83°	10°56'	+14'	84°	11°03'	+15'	84°	11°09'	+16'	84°	11°16'	+17'	84°	11°22'	+18'	84°	11°28'	+19'	84°	9
10	11°02'	+13'	82°	11°10'	+14'	83°	11°18'	+15'	83°	11°26'	+16'	83°	11°33'	+17'	83°	11°40'	+18'	83°	11°47'	+19'	84°	10
11	11°15'	+13'	81°	11°24'	+14'	82°	11°33'	+15'	82°	11°41'	+16'	82°	11°50'	+17'	82°	11°58'	+18'	82°	12°06'	+19'	83°	11
12	11°28'	+12'	80°	11°38'	+13'	81°	11°48'	+15'	81°	11°57'	+16'	81°	12°07'	+17'	81°	12°16'	+18'	81°	12°25'	+19'	82°	12
13	11°40'	+12'	79°	11°51'	+13'	80°	12°02'	+14'	80°	12°13'	+15'	80°	12°23'	+16'	80°	12°33'	+17'	80°	12°43'	+18'	81°	13
14	11°53'	+12'	78°	12°05'	+13'	79°	12°16'	+14'	79°	12°28'	+15'	79°	12°39'	+16'	79°	12°51'	+17'	79°	13°01'	+18'	80°	14
15	12°05'	+12'	77°	12°18'	+13'	78°	12°31'	+14'	78°	12°43'	+15'	78°	12°56'	+16'	78°	13°08'	+17'	78°	13°20'	+18'	79°	15
16	12°16'	+12'	76°	12°31'	+13'	77°	12°44'	+14'	77°	12°58'	+15'	77°	13°11'	+16'	77°	13°25'	+17'	77°	13°38'	+18'	78°	16
17	12°28'	+11'	75°	12°43'	+12'	76°	12°58'	+13'	76°	13°13'	+14'	76°	13°27'	+15'	76°	13°41'	+16'	76°	13°55'	+17'	77°	17
18	12°39'	+11'	74°	12°56'	+12'	75°	13°11'	+13'	75°	13°27'	+14'	75°	13°43'	+15'	75°	13°58'	+16'	75°	14°13'	+17'	76°	18
19	12°51'	+11'	73°	13°08'	+12'	74°	13°25'	+13'	74°	13°41'	+14'	74°	13°58'	+15'	74°	14°14'	+16'	74°	14°30'	+17'	75°	19
20	13°01'	+11'	72°	13°20'	+12'	73°	13°38'	+13'	73°	13°55'	+14'	73°	14°13'	+15'	73°	14°30'	+16'	73°	14°47'	+17'	74°	20
21	13°12'	+10'	71°	13°31'	+11'	72°	13°50'	+12'	72°	14°09'	+13'	72°	14°27'	+14'	72°	14°46'	+15'	72°	15°04'	+16'	73°	21
22	13°23'	+10'	70°	13°43'	+11'	70°	14°03'	+12'	71°	14°22'	+13'	71°	14°42'	+14'	71°	15°01'	+15'	71°	15°20'	+16'	72°	22
23	13°33'	+10'	69°	13°54'	+11'	69°	14°15'	+12'	70°	14°36'	+13'	70°	14°56'	+14'	70°	15°16'	+15'	70°	15°36'	+16'	71°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

81° 279° LHA

Latitude SAME as Declination

81° 279° LHA

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

82° 278° LHA

Latitude SAME as Declination

82° 278° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	7°46'	+15'	92°	7°44'	+16'	92°	7°41'	+17'	92°	7°39'	+18'	92°	7°36'	+19'	92°	7°34'	+20'	93°	7°31'	+21'	93°	0
1	8°00'	+14'	91°	7°59'	+15'	91°	7°58'	+16'	91°	7°57'	+18'	91°	7°55'	+19'	92°	7°53'	+20'	92°	7°52'	+21'	92°	1
2	8°15'	+14'	90°	8°15'	+15'	90°	8°14'	+16'	90°	8°14'	+17'	90°	8°14'	+18'	91°	8°13'	+19'	91°	8°12'	+20'	91°	2
3	8°29'	+14'	89°	8°30'	+15'	89°	8°31'	+16'	89°	8°31'	+17'	89°	8°32'	+18'	90°	8°32'	+19'	90°	8°32'	+20'	90°	3
4	8°43'	+14'	88°	8°45'	+15'	88°	8°47'	+16'	88°	8°49'	+17'	88°	8°50'	+18'	89°	8°51'	+19'	89°	8°53'	+20'	89°	4
5	8°57'	+14'	87°	9°00'	+15'	87°	9°03'	+16'	87°	9°06'	+17'	88°	9°08'	+18'	88°	9°11'	+19'	88°	9°13'	+20'	88°	5
6	9°11'	+14'	86°	9°15'	+15'	86°	9°19'	+16'	86°	9°23'	+17'	87°	9°26'	+18'	87°	9°29'	+19'	87°	9°33'	+20'	87°	6
7	9°25'	+14'	85°	9°30'	+15'	85°	9°35'	+16'	85°	9°39'	+17'	86°	9°44'	+18'	86°	9°48'	+19'	86°	9°52'	+20'	86°	7
8	9°38'	+13'	84°	9°44'	+14'	84°	9°50'	+15'	84°	9°56'	+16'	85°	10°02'	+17'	85°	10°07'	+18'	85°	10°12'	+19'	85°	8
9	9°52'	+13'	83°	9°59'	+14'	83°	10°06'	+15'	83°	10°12'	+16'	84°	10°19'	+17'	84°	10°25'	+18'	84°	10°32'	+19'	84°	9
10	10°05'	+13'	82°	10°13'	+14'	82°	10°21'	+15'	82°	10°29'	+16'	83°	10°36'	+17'	83°	10°44'	+18'	83°	10°51'	+19'	83°	10
11	10°18'	+13'	81°	10°27'	+14'	81°	10°36'	+15'	81°	10°45'	+16'	82°	10°53'	+17'	82°	11°02'	+18'	82°	11°10'	+19'	82°	11
12	10°31'	+13'	80°	10°41'	+14'	80°	10°51'	+15'	80°	11°01'	+16'	81°	11°10'	+17'	81°	11°20'	+18'	81°	11°29'	+19'	81°	12
13	10°43'	+12'	79°	10°54'	+13'	79°	11°05'	+14'	79°	11°16'	+15'	80°	11°27'	+17'	80°	11°37'	+18'	80°	11°48'	+19'	80°	13
14	10°56'	+12'	78°	11°08'	+13'	78°	11°20'	+14'	79°	11°32'	+15'	79°	11°43'	+16'	79°	11°55'	+17'	79°	12°06'	+18'	79°	14
15	11°08'	+12'	77°	11°21'	+13'	77°	11°34'	+14'	78°	11°47'	+15'	78°	12°00'	+16'	78°	12°12'	+17'	78°	12°24'	+18'	78°	15
16	11°20'	+12'	76°	11°34'	+13'	76°	11°48'	+14'	77°	12°02'	+15'	77°	12°16'	+16'	77°	12°29'	+17'	77°	12°42'	+18'	77°	16
17	11°32'	+12'	75°	11°47'	+13'	75°	12°02'	+14'	76°	12°17'	+15'	76°	12°32'	+16'	76°	12°46'	+17'	76°	13°00'	+18'	76°	17
18	11°43'	+11'	74°	12°00'	+12'	74°	12°16'	+13'	75°	12°32'	+14'	75°	12°47'	+15'	75°	13°03'	+16'	75°	13°18'	+17'	75°	18
19	11°55'	+11'	73°	12°12'	+12'	73°	12°29'	+13'	74°	12°46'	+14'	74°	13°03'	+15'	74°	13°19'	+16'	74°	13°36'	+17'	74°	19
20	12°06'	+11'	72°	12°24'	+12'	72°	12°42'	+13'	73°	13°00'	+14'	73°	13°18'	+15'	73°	13°36'	+16'	73°	13°53'	+17'	73°	20
21	12°17'	+11'	71°	12°36'	+12'	71°	12°56'	+13'	72°	13°14'	+14'	72°	13°33'	+15'	72°	13°52'	+16'	72°	14°10'	+17'	72°	21
22	12°28'	+11'	70°	12°48'	+12'	70°	13°08'	+13'	71°	13°28'	+14'	71°	13°48'	+15'	71°	14°07'	+16'	71°	14°26'	+16'	71°	22
23	12°38'	+10'	69°	13°00'	+11'	69°	13°21'	+12'	70°	13°42'	+13'	70°	14°02'	+14'	70°	14°23'	+15'	70°	14°43'	+16'	70°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

82° 278° LHA

Latitude SAME as Declination

82° 278° LHA

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

83° 277° LHA

Latitude SAME as Declination

83° 277° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	6°47'	+15'	92°	6°46'	+16'	92°	6°44'	+17'	92°	6°42'	+18'	92°	6°39'	+19'	92°	6°37'	+20'	92°	6°35'	+21'	92°	0
1	7°02'	+14'	91°	7°01'	+15'	91°	7°00'	+16'	91°	6°59'	+17'	91°	6°58'	+18'	91°	6°57'	+19'	91°	6°55'	+20'	91°	1
2	7°16'	+14'	90°	7°17'	+15'	90°	7°17'	+16'	90°	7°17'	+17'	90°	7°16'	+18'	90°	7°16'	+19'	90°	7°16'	+20'	91°	2
3	7°31'	+14'	89°	7°32'	+15'	89°	7°33'	+16'	89°	7°34'	+17'	89°	7°35'	+18'	89°	7°35'	+19'	89°	7°36'	+20'	90°	3
4	7°45'	+14'	88°	7°47'	+15'	88°	7°49'	+16'	88°	7°51'	+17'	88°	7°53'	+18'	88°	7°55'	+19'	88°	7°56'	+20'	89°	4
5	7°59'	+14'	87°	8°02'	+15'	87°	8°05'	+16'	87°	8°08'	+17'	87°	8°11'	+18'	87°	8°14'	+19'	88°	8°16'	+20'	88°	5
6	8°13'	+14'	86°	8°17'	+15'	86°	8°21'	+16'	86°	8°25'	+17'	86°	8°29'	+18'	86°	8°33'	+19'	87°	8°36'	+20'	87°	6
7	8°27'	+14'	85°	8°32'	+15'	85°	8°37'	+16'	85°	8°42'	+17'	85°	8°47'	+18'	85°	8°52'	+19'	86°	8°56'	+20'	86°	7
8	8°40'	+13'	84°	8°47'	+14'	84°	8°53'	+16'	84°	8°59'	+17'	84°	9°05'	+18'	84°	9°10'	+19'	85°	9°16'	+20'	85°	8
9	8°54'	+13'	83°	9°01'	+14'	83°	9°08'	+15'	83°	9°15'	+16'	83°	9°22'	+17'	84°	9°29'	+18'	84°	9°35'	+19'	84°	9
10	9°07'	+13'	82°	9°15'	+14'	82°	9°24'	+15'	82°	9°32'	+16'	82°	9°40'	+17'	83°	9°47'	+18'	83°	9°55'	+19'	83°	10
11	9°20'	+13'	81°	9°30'	+14'	81°	9°39'	+15'	81°	9°48'	+16'	81°	9°57'	+17'	82°	10°06'	+18'	82°	10°14'	+19'	82°	11
12	9°33'	+13'	80°	9°44'	+14'	80°	9°54'	+15'	80°	10°04'	+16'	80°	10°14'	+17'	81°	10°24'	+18'	81°	10°33'	+19'	81°	12
13	9°46'	+13'	79°	9°57'	+14'	79°	10°09'	+15'	79°	10°20'	+16'	79°	10°31'	+17'	80°	10°41'	+18'	80°	10°52'	+19'	80°	13
14	9°59'	+12'	78°	10°11'	+13'	78°	10°23'	+14'	78°	10°36'	+16'	78°	10°47'	+17'	79°	10°59'	+18'	79°	11°11'	+19'	79°	14
15	10°11'	+12'	77°	10°25'	+13'	77°	10°38'	+14'	77°	10°51'	+15'	77°	11°04'	+16'	78°	11°17'	+17'	78°	11°29'	+18'	78°	15
16	10°23'	+12'	76°	10°38'	+13'	76°	10°52'	+14'	76°	11°06'	+15'	76°	11°20'	+16'	77°	11°34'	+17'	77°	11°48'	+18'	77°	16
17	10°36'	+12'	75°	10°51'	+13'	75°	11°06'	+14'	75°	11°21'	+15'	75°	11°36'	+16'	76°	11°51'	+17'	76°	12°06'	+18'	76°	17
18	10°47'	+12'	74°	11°04'	+13'	74°	11°20'	+14'	74°	11°36'	+15'	75°	11°52'	+16'	75°	12°08'	+17'	75°	12°24'	+18'	75°	18
19	10°59'	+12'	73°	11°17'	+13'	73°	11°34'	+14'	73°	11°51'	+15'	74°	12°08'	+16'	74°	12°25'	+16'	74°	12°41'	+17'	74°	19
20	11°11'	+11'	72°	11°29'	+12'	72°	11°48'	+13'	72°	12°06'	+14'	73°	12°24'	+15'	73°	12°41'	+16'	73°	12°59'	+17'	73°	20
21	11°22'	+11'	71°	11°42'	+12'	71°	12°01'	+13'	71°	12°20'	+14'	72°	12°39'	+15'	72°	12°58'	+16'	72°	13°16'	+17'	72°	21
22	11°33'	+11'	70°	11°54'	+12'	70°	12°14'	+13'	70°	12°34'	+14'	71°	12°54'	+15'	71°	13°14'	+16'	71°	13°33'	+17'	71°	22
23	11°44'	+11'	69°	12°06'	+12'	69°	12°27'	+13'	69°	12°48'	+14'	70°	13°09'	+15'	70°	13°29'	+16'	70°	13°50'	+17'	70°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

83° 277° LHA

Latitude SAME as Declination

83° 277° LHA

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

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

84° 276° LHA

Latitude SAME as Declination

84° 276° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°49'	+15'	91°	5°48'	+16'	92°	5°46'	+17'	92°	5°44'	+18'	92°	5°42'	+19'	92°	5°40'	+20'	92°	5°38'	+21'	92°	0
1	6°04'	+14'	90°	6°03'	+15'	91°	6°03'	+16'	91°	6°02'	+17'	91°	6°01'	+18'	91°	6°00'	+19'	91°	5°59'	+20'	91°	1
2	6°18'	+14'	90°	6°19'	+15'	90°	6°19'	+16'	90°	6°19'	+17'	90°	6°19'	+18'	90°	6°19'	+19'	90°	6°19'	+20'	90°	2
3	6°33'	+14'	89°	6°34'	+15'	89°	6°35'	+16'	89°	6°37'	+17'	89°	6°38'	+18'	89°	6°39'	+19'	89°	6°40'	+20'	89°	3
4	6°47'	+14'	88°	6°49'	+15'	88°	6°52'	+16'	88°	6°54'	+17'	88°	6°56'	+18'	88°	6°58'	+19'	88°	7°00'	+20'	88°	4
5	7°01'	+14'	87°	7°04'	+15'	87°	7°08'	+16'	87°	7°11'	+17'	87°	7°14'	+18'	87°	7°17'	+19'	87°	7°20'	+20'	87°	5
6	7°15'	+14'	86°	7°19'	+15'	86°	7°24'	+16'	86°	7°28'	+17'	86°	7°32'	+18'	86°	7°36'	+19'	86°	7°40'	+20'	86°	6
7	7°29'	+14'	85°	7°34'	+15'	85°	7°40'	+16'	85°	7°45'	+17'	85°	7°50'	+18'	85°	7°55'	+19'	85°	8°00'	+20'	85°	7
8	7°42'	+14'	84°	7°49'	+15'	84°	7°55'	+16'	84°	8°02'	+17'	84°	8°08'	+18'	84°	8°14'	+19'	84°	8°20'	+20'	84°	8
9	7°56'	+13'	83°	8°04'	+14'	83°	8°11'	+15'	83°	8°18'	+16'	83°	8°26'	+17'	83°	8°33'	+18'	83°	8°39'	+19'	84°	9
10	8°09'	+13'	82°	8°18'	+14'	82°	8°27'	+15'	82°	8°35'	+16'	82°	8°43'	+17'	82°	8°51'	+18'	82°	8°59'	+19'	83°	10
11	8°23'	+13'	81°	8°32'	+14'	81°	8°42'	+15'	81°	8°51'	+16'	81°	9°00'	+17'	81°	9°09'	+18'	81°	9°18'	+19'	82°	11
12	8°36'	+13'	80°	8°47'	+14'	80°	8°57'	+15'	80°	9°07'	+16'	80°	9°18'	+17'	80°	9°28'	+18'	80°	9°37'	+19'	81°	12
13	8°49'	+13'	79°	9°01'	+14'	79°	9°12'	+15'	79°	9°23'	+16'	79°	9°35'	+17'	79°	9°46'	+18'	80°	9°56'	+19'	80°	13
14	9°02'	+13'	78°	9°14'	+14'	78°	9°27'	+15'	78°	9°39'	+16'	78°	9°52'	+17'	78°	10°04'	+18'	79°	10°15'	+19'	79°	14
15	9°14'	+13'	77°	9°28'	+14'	77°	9°42'	+15'	77°	9°55'	+16'	77°	10°08'	+17'	77°	10°21'	+18'	78°	10°34'	+19'	78°	15
16	9°27'	+12'	76°	9°42'	+13'	76°	9°56'	+14'	76°	10°11'	+15'	76°	10°25'	+16'	76°	10°39'	+17'	77°	10°53'	+18'	77°	16
17	9°39'	+12'	75°	9°55'	+13'	75°	10°11'	+14'	75°	10°26'	+15'	75°	10°41'	+16'	75°	10°56'	+17'	76°	11°11'	+18'	76°	17
18	9°52'	+12'	74°	10°08'	+13'	74°	10°25'	+14'	74°	10°41'	+15'	74°	10°57'	+16'	74°	11°13'	+17'	75°	11°29'	+18'	75°	18
19	10°04'	+12'	73°	10°21'	+13'	73°	10°39'	+14'	73°	10°56'	+15'	73°	11°13'	+16'	73°	11°30'	+17'	74°	11°47'	+18'	74°	19
20	10°15'	+12'	72°	10°34'	+13'	72°	10°53'	+14'	72°	11°11'	+15'	72°	11°29'	+16'	72°	11°47'	+17'	73°	12°05'	+18'	73°	20
21	10°27'	+11'	71°	10°47'	+12'	71°	11°06'	+13'	71°	11°26'	+14'	71°	11°45'	+15'	71°	12°04'	+16'	72°	12°22'	+17'	72°	21
22	10°38'	+11'	70°	10°59'	+12'	70°	11°20'	+13'	70°	11°40'	+14'	70°	12°00'	+15'	71°	12°20'	+16'	71°	12°40'	+17'	71°	22
23	10°50'	+11'	69°	11°11'	+12'	69°	11°33'	+13'	69°	11°54'	+14'	69°	12°15'	+15'	70°	12°36'	+16'	70°	12°57'	+17'	70°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°51'	+15'	91°	4°50'	+16'	91°	4°48'	+17'	91°	4°47'	+18'	91°	4°45'	+19'	92°	4°44'	+20'	92°	4°42'	+21'	92°	0
1	5°06'	+14'	90°	5°05'	+15'	90°	5°05'	+16'	90°	5°04'	+17'	91°	5°04'	+18'	91°	5°03'	+19'	91°	5°02'	+20'	91°	1
2	5°20'	+14'	89°	5°21'	+15'	89°	5°21'	+16'	89°	5°22'	+17'	90°	5°22'	+18'	90°	5°23'	+19'	90°	5°23'	+20'	90°	2
3	5°34'	+14'	88°	5°36'	+15'	88°	5°38'	+16'	88°	5°39'	+17'	89°	5°41'	+18'	89°	5°42'	+19'	89°	5°43'	+20'	89°	3
4	5°49'	+14'	87°	5°51'	+15'	87°	5°54'	+16'	88°	5°57'	+17'	88°	5°59'	+18'	88°	6°01'	+19'	88°	6°04'	+20'	88°	4
5	6°03'	+14'	86°	6°07'	+15'	86°	6°10'	+16'	87°	6°14'	+17'	87°	6°17'	+18'	87°	6°21'	+19'	87°	6°24'	+20'	87°	5
6	6°17'	+14'	85°	6°22'	+15'	85°	6°26'	+16'	86°	6°31'	+17'	86°	6°35'	+18'	86°	6°40'	+19'	86°	6°44'	+20'	86°	6
7	6°31'	+14'	84°	6°37'	+15'	84°	6°42'	+16'	85°	6°48'	+17'	85°	6°53'	+18'	85°	6°59'	+19'	85°	7°04'	+20'	85°	7
8	6°45'	+14'	83°	6°51'	+15'	84°	6°58'	+16'	84°	7°05'	+17'	84°	7°11'	+18'	84°	7°17'	+19'	84°	7°24'	+20'	84°	8
9	6°58'	+14'	82°	7°06'	+15'	83°	7°14'	+16'	83°	7°21'	+17'	83°	7°29'	+18'	83°	7°36'	+19'	83°	7°43'	+20'	83°	9
10	7°12'	+13'	81°	7°21'	+14'	82°	7°29'	+15'	82°	7°38'	+16'	82°	7°47'	+17'	82°	7°55'	+18'	82°	8°03'	+19'	82°	10
11	7°25'	+13'	80°	7°35'	+14'	81°	7°45'	+15'	81°	7°55'	+16'	81°	8°04'	+17'	81°	8°13'	+18'	81°	8°23'	+19'	81°	11
12	7°39'	+13'	79°	7°50'	+14'	80°	8°00'	+15'	80°	8°11'	+16'	80°	8°21'	+17'	80°	8°32'	+18'	80°	8°42'	+19'	80°	12
13	7°52'	+13'	78°	8°04'	+14'	79°	8°16'	+15'	79°	8°27'	+16'	79°	8°39'	+17'	79°	8°50'	+18'	79°	9°01'	+19'	79°	13
14	8°05'	+13'	78°	8°18'	+14'	78°	8°31'	+15'	78°	8°43'	+16'	78°	8°56'	+17'	78°	9°08'	+18'	78°	9°20'	+19'	78°	14
15	8°18'	+13'	77°	8°32'	+14'	77°	8°45'	+15'	77°	8°59'	+16'	77°	9°13'	+17'	77°	9°26'	+18'	77°	9°39'	+19'	77°	15
16	8°31'	+13'	76°	8°45'	+14'	76°	9°00'	+15'	76°	9°15'	+16'	76°	9°29'	+17'	76°	9°44'	+18'	76°	9°58'	+19'	76°	16
17	8°43'	+12'	75°	8°59'	+13'	75°	9°15'	+14'	75°	9°30'	+15'	75°	9°46'	+16'	75°	10°01'	+17'	75°	10°16'	+18'	76°	17
18	8°56'	+12'	74°	9°13'	+13'	74°	9°29'	+14'	74°	9°46'	+15'	74°	10°02'	+16'	74°	10°19'	+17'	74°	10°35'	+18'	75°	18
19	9°08'	+12'	73°	9°26'	+13'	73°	9°44'	+14'	73°	10°01'	+15'	73°	10°19'	+16'	73°	10°36'	+17'	73°	10°53'	+18'	74°	19
20	9°20'	+12'	72°	9°39'	+13'	72°	9°58'	+14'	72°	10°16'	+15'	72°	10°35'	+16'	72°	10°53'	+17'	72°	11°11'	+18'	73°	20
21	9°32'	+12'	71°	9°52'	+13'	71°	10°12'	+14'	71°	10°31'	+15'	71°	10°51'	+16'	71°	11°10'	+17'	71°	11°29'	+18'	72°	21
22	9°44'	+12'	70°	10°05'	+13'	70°	10°25'	+14'	70°	10°46'	+15'	70°	11°06'	+16'	70°	11°26'	+16'	70°	11°46'	+17'	71°	22
23	9°56'	+11'	69°	10°17'	+12'	69°	10°39'	+13'	69°	11°01'	+14'	69°	11°22'	+15'	69°	11°43'	+16'	69°	12°04'	+17'	70°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

85° 275° LHA

Latitude SAME as Declination

85° 275° LHA

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

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

86° 274° LHA

Latitude SAME as Declination

86° 274° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	3°53'	+15'	91°	3°52'	+16'	91°	3°51'	+17'	91°	3°49'	+18'	91°	3°48'	+19'	91°	3°47'	+20'	91°	3°46'	+21'	91°	0
1	4°07'	+14'	90°	4°07'	+15'	90°	4°07'	+16'	90°	4°07'	+17'	90°	4°07'	+18'	90°	4°06'	+19'	90°	4°06'	+20'	90°	1
2	4°22'	+14'	89°	4°23'	+15'	89°	4°24'	+16'	89°	4°25'	+17'	89°	4°25'	+18'	89°	4°26'	+19'	89°	4°27'	+20'	89°	2
3	4°36'	+14'	88°	4°38'	+15'	88°	4°40'	+16'	88°	4°42'	+17'	88°	4°44'	+18'	88°	4°45'	+19'	88°	4°47'	+20'	89°	3
4	4°50'	+14'	87°	4°53'	+15'	87°	4°56'	+16'	87°	4°59'	+17'	87°	5°02'	+18'	87°	5°05'	+19'	88°	5°07'	+20'	88°	4
5	5°05'	+14'	86°	5°09'	+15'	86°	5°13'	+16'	86°	5°17'	+17'	86°	5°20'	+18'	86°	5°24'	+19'	87°	5°27'	+20'	87°	5
6	5°19'	+14'	85°	5°24'	+15'	85°	5°29'	+16'	85°	5°34'	+17'	85°	5°38'	+18'	86°	5°43'	+19'	86°	5°48'	+20'	86°	6
7	5°33'	+14'	84°	5°39'	+15'	84°	5°45'	+16'	84°	5°51'	+17'	84°	5°56'	+18'	85°	6°02'	+19'	85°	6°08'	+20'	85°	7
8	5°47'	+14'	83°	5°54'	+15'	83°	6°01'	+16'	83°	6°08'	+17'	83°	6°14'	+18'	84°	6°21'	+19'	84°	6°28'	+20'	84°	8
9	6°01'	+14'	82°	6°09'	+15'	82°	6°17'	+16'	82°	6°25'	+17'	83°	6°32'	+18'	83°	6°40'	+19'	83°	6°47'	+20'	83°	9
10	6°14'	+14'	81°	6°23'	+15'	81°	6°32'	+16'	81°	6°41'	+17'	82°	6°50'	+18'	82°	6°59'	+19'	82°	7°07'	+20'	82°	10
11	6°28'	+14'	80°	6°38'	+15'	80°	6°48'	+16'	80°	6°58'	+17'	81°	7°08'	+18'	81°	7°17'	+19'	81°	7°27'	+19'	81°	11
12	6°41'	+13'	79°	6°53'	+14'	79°	7°04'	+15'	79°	7°14'	+16'	80°	7°25'	+17'	80°	7°36'	+18'	80°	7°46'	+19'	80°	12
13	6°55'	+13'	78°	7°07'	+14'	78°	7°19'	+15'	79°	7°31'	+16'	79°	7°43'	+17'	79°	7°54'	+18'	79°	8°06'	+19'	79°	13
14	7°08'	+13'	77°	7°21'	+14'	77°	7°34'	+15'	78°	7°47'	+16'	78°	8°00'	+17'	78°	8°12'	+18'	78°	8°25'	+19'	78°	14
15	7°21'	+13'	76°	7°35'	+14'	76°	7°49'	+15'	77°	8°03'	+16'	77°	8°17'	+17'	77°	8°31'	+18'	77°	8°44'	+19'	77°	15
16	7°34'	+13'	75°	7°49'	+14'	75°	8°04'	+15'	76°	8°19'	+16'	76°	8°34'	+17'	76°	8°49'	+18'	76°	9°03'	+19'	76°	16
17	7°47'	+13'	74°	8°03'	+14'	74°	8°19'	+15'	75°	8°35'	+16'	75°	8°51'	+17'	75°	9°06'	+18'	75°	9°22'	+19'	75°	17
18	8°00'	+13'	73°	8°17'	+14'	73°	8°34'	+15'	74°	8°51'	+16'	74°	9°07'	+17'	74°	9°24'	+18'	74°	9°40'	+18'	74°	18
19	8°12'	+12'	72°	8°31'	+13'	72°	8°49'	+14'	73°	9°06'	+15'	73°	9°24'	+16'	73°	9°42'	+17'	73°	9°59'	+18'	73°	19
20	8°25'	+12'	71°	8°44'	+13'	72°	9°03'	+14'	72°	9°22'	+15'	72°	9°40'	+16'	72°	9°59'	+17'	72°	10°17'	+18'	72°	20
21	8°37'	+12'	70°	8°57'	+13'	71°	9°17'	+14'	71°	9°37'	+15'	71°	9°57'	+16'	71°	10°16'	+17'	71°	10°35'	+18'	71°	21
22	8°49'	+12'	69°	9°10'	+13'	70°	9°31'	+14'	70°	9°52'	+15'	70°	10°13'	+16'	70°	10°33'	+17'	70°	10°53'	+18'	70°	22
23	9°01'	+12'	68°	9°23'	+13'	69°	9°45'	+14'	69°	10°07'	+15'	69°	10°29'	+16'	69°	10°50'	+17'	69°	11°11'	+18'	69°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	2°55'	+15'	91°	2°54'	+16'	91°	2°53'	+17'	91°	2°52'	+18'	91°	2°51'	+19'	91°	2°50'	+20'	91°	2°49'	+21'	91°	0
1	3°09'	+14'	90°	3°09'	+15'	90°	3°10'	+16'	90°	3°10'	+17'	90°	3°10'	+18'	90°	3°10'	+19'	90°	3°10'	+20'	90°	1
2	3°24'	+14'	89°	3°25'	+15'	89°	3°26'	+16'	89°	3°27'	+17'	89°	3°28'	+18'	89°	3°29'	+19'	89°	3°30'	+20'	89°	2
3	3°38'	+14'	88°	3°40'	+15'	88°	3°42'	+16'	88°	3°45'	+17'	88°	3°47'	+18'	88°	3°49'	+19'	88°	3°51'	+20'	88°	3
4	3°52'	+14'	87°	3°56'	+15'	87°	3°59'	+16'	87°	4°02'	+17'	87°	4°05'	+18'	87°	4°08'	+19'	87°	4°11'	+20'	87°	4
5	4°07'	+14'	86°	4°11'	+15'	86°	4°15'	+16'	86°	4°19'	+17'	86°	4°23'	+18'	86°	4°27'	+19'	86°	4°31'	+20'	86°	5
6	4°21'	+14'	85°	4°26'	+15'	85°	4°31'	+16'	85°	4°36'	+17'	85°	4°42'	+18'	85°	4°47'	+19'	85°	4°51'	+20'	85°	6
7	4°35'	+14'	84°	4°41'	+15'	84°	4°47'	+16'	84°	4°54'	+17'	84°	5°00'	+18'	84°	5°06'	+19'	84°	5°12'	+20'	84°	7
8	4°49'	+14'	83°	4°56'	+15'	83°	5°04'	+16'	83°	5°11'	+17'	83°	5°18'	+18'	83°	5°25'	+19'	83°	5°32'	+20'	83°	8
9	5°03'	+14'	82°	5°11'	+15'	82°	5°20'	+16'	82°	5°28'	+17'	82°	5°36'	+18'	82°	5°44'	+19'	82°	5°52'	+20'	83°	9
10	5°17'	+14'	81°	5°26'	+15'	81°	5°35'	+16'	81°	5°45'	+17'	81°	5°54'	+18'	81°	6°03'	+19'	81°	6°11'	+20'	82°	10
11	5°31'	+14'	80°	5°41'	+15'	80°	5°51'	+16'	80°	6°01'	+17'	80°	6°11'	+18'	80°	6°21'	+19'	81°	6°31'	+20'	81°	11
12	5°44'	+14'	79°	5°56'	+15'	79°	6°07'	+16'	79°	6°18'	+17'	79°	6°29'	+18'	79°	6°40'	+19'	80°	6°51'	+20'	80°	12
13	5°58'	+13'	78°	6°10'	+14'	78°	6°22'	+15'	78°	6°35'	+16'	78°	6°47'	+17'	78°	6°59'	+18'	79°	7°10'	+19'	79°	13
14	6°11'	+13'	77°	6°25'	+14'	77°	6°38'	+15'	77°	6°51'	+16'	77°	7°04'	+17'	78°	7°17'	+18'	78°	7°30'	+19'	78°	14
15	6°25'	+13'	76°	6°39'	+14'	76°	6°53'	+15'	76°	7°07'	+16'	76°	7°21'	+17'	77°	7°35'	+18'	77°	7°49'	+19'	77°	15
16	6°38'	+13'	75°	6°53'	+14'	75°	7°09'	+15'	75°	7°24'	+16'	75°	7°39'	+17'	76°	7°54'	+18'	76°	8°08'	+19'	76°	16
17	6°51'	+13'	74°	7°07'	+14'	74°	7°24'	+15'	74°	7°40'	+16'	74°	7°56'	+17'	75°	8°12'	+18'	75°	8°27'	+19'	75°	17
18	7°04'	+13'	73°	7°21'	+14'	73°	7°39'	+15'	73°	7°56'	+16'	74°	8°13'	+17'	74°	8°30'	+18'	74°	8°46'	+19'	74°	18
19	7°17'	+13'	72°	7°35'	+14'	72°	7°54'	+15'	72°	8°12'	+16'	73°	8°30'	+17'	73°	8°47'	+18'	73°	9°05'	+19'	73°	19
20	7°30'	+13'	71°	7°49'	+14'	71°	8°08'	+15'	71°	8°27'	+16'	72°	8°46'	+17'	72°	9°05'	+17'	72°	9°24'	+18'	72°	20
21	7°42'	+13'	70°	8°03'	+13'	70°	8°23'	+14'	70°	8°43'	+15'	71°	9°03'	+16'	71°	9°22'	+17'	71°	9°42'	+18'	71°	21
22	7°55'	+12'	69°	8°16'	+13'	69°	8°37'	+14'	69°	8°58'	+15'	70°	9°19'	+16'	70°	9°40'	+17'	70°	10°00'	+18'	70°	22
23	8°07'	+12'	68°	8°29'	+13'	68°	8°52'	+14'	68°	9°13'	+15'	69°	9°35'	+16'	69°	9°57'	+17'	69°	10°18'	+18'	69°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

87° 273° LHA

Latitude SAME as Declination

87° 273° LHA

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

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

88° 272° LHA

Latitude SAME as Declination

88° 272° LHA

Dec°	14			15			16			17			18			19			20			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	1°56'	+15'	90°	1°56'	+16'	91°	1°55'	+17'	91°	1°55'	+18'	91°	1°54'	+19'	91°	1°53'	+20'	91°	1°53'	+21'	91°	0			
1	2°11'	+14'	90°	2°11'	+15'	90°	2°12'	+16'	90°	2°12'	+17'	90°	2°13'	+18'	90°	2°13'	+19'	90°	2°13'	+20'	90°	1			
2	2°25'	+14'	89°	2°27'	+15'	89°	2°28'	+16'	89°	2°30'	+17'	89°	2°31'	+18'	89°	2°32'	+19'	89°	2°34'	+20'	89°	2			
3	2°40'	+14'	88°	2°42'	+15'	88°	2°45'	+16'	88°	2°47'	+17'	88°	2°50'	+18'	88°	2°52'	+19'	88°	2°54'	+20'	88°	3			
4	2°54'	+14'	87°	2°58'	+15'	87°	3°01'	+16'	87°	3°05'	+17'	87°	3°08'	+18'	87°	3°11'	+19'	87°	3°15'	+20'	87°	4			
5	3°09'	+14'	86°	3°13'	+15'	86°	3°18'	+16'	86°	3°22'	+17'	86°	3°26'	+18'	86°	3°31'	+19'	86°	3°35'	+20'	86°	5			
6	3°23'	+14'	85°	3°28'	+15'	85°	3°34'	+16'	85°	3°39'	+17'	85°	3°45'	+18'	85°	3°50'	+19'	85°	3°55'	+20'	85°	6			
7	3°37'	+14'	84°	3°44'	+15'	84°	3°50'	+16'	84°	3°57'	+17'	84°	4°03'	+18'	84°	4°09'	+19'	84°	4°15'	+20'	84°	7			
8	3°51'	+14'	83°	3°59'	+15'	83°	4°06'	+16'	83°	4°14'	+17'	83°	4°21'	+18'	83°	4°28'	+19'	83°	4°36'	+20'	83°	8			
9	4°05'	+14'	82°	4°14'	+15'	82°	4°22'	+16'	82°	4°31'	+17'	82°	4°39'	+18'	82°	4°47'	+19'	82°	4°56'	+20'	82°	9			
10	4°19'	+14'	81°	4°29'	+15'	81°	4°38'	+16'	81°	4°48'	+17'	81°	4°57'	+18'	81°	5°06'	+19'	81°	5°16'	+20'	81°	10			
11	4°33'	+14'	80°	4°44'	+15'	80°	4°54'	+16'	80°	5°05'	+17'	80°	5°15'	+18'	80°	5°25'	+19'	80°	5°36'	+20'	80°	11			
12	4°47'	+14'	79°	4°59'	+15'	79°	5°10'	+16'	79°	5°22'	+17'	79°	5°33'	+18'	79°	5°44'	+19'	79°	5°55'	+20'	79°	12			
13	5°01'	+14'	78°	5°14'	+15'	78°	5°26'	+16'	78°	5°38'	+17'	78°	5°51'	+18'	78°	6°03'	+19'	78°	6°15'	+20'	78°	13			
14	5°15'	+14'	77°	5°28'	+15'	77°	5°42'	+16'	77°	5°55'	+17'	77°	6°08'	+18'	77°	6°22'	+19'	77°	6°35'	+20'	77°	14			
15	5°28'	+14'	76°	5°43'	+14'	76°	5°57'	+15'	76°	6°12'	+16'	76°	6°26'	+17'	76°	6°40'	+18'	76°	6°54'	+19'	77°	15			
16	5°42'	+13'	75°	5°57'	+14'	75°	6°13'	+15'	75°	6°28'	+16'	75°	6°43'	+17'	75°	6°59'	+18'	75°	7°14'	+19'	76°	16			
17	5°55'	+13'	74°	6°12'	+14'	74°	6°28'	+15'	74°	6°45'	+16'	74°	7°01'	+17'	74°	7°17'	+18'	74°	7°33'	+19'	75°	17			
18	6°08'	+13'	73°	6°26'	+14'	73°	6°43'	+15'	73°	7°01'	+16'	73°	7°18'	+17'	73°	7°35'	+18'	74°	7°52'	+19'	74°	18			
19	6°22'	+13'	72°	6°40'	+14'	72°	6°59'	+15'	72°	7°17'	+16'	72°	7°35'	+17'	72°	7°53'	+18'	73°	8°11'	+19'	73°	19			
20	6°35'	+13'	71°	6°54'	+14'	71°	7°14'	+15'	71°	7°33'	+16'	71°	7°52'	+17'	71°	8°11'	+18'	72°	8°30'	+19'	72°	20			
21	6°48'	+13'	70°	7°08'	+14'	70°	7°29'	+15'	70°	7°49'	+16'	70°	8°09'	+17'	70°	8°29'	+18'	71°	8°49'	+19'	71°	21			
22	7°01'	+13'	69°	7°22'	+14'	69°	7°43'	+15'	69°	8°04'	+16'	69°	8°26'	+17'	70°	8°47'	+18'	70°	9°07'	+18'	70°	22			
23	7°13'	+13'	68°	7°36'	+14'	68°	7°58'	+15'	68°	8°20'	+15'	68°	8°42'	+16'	69°	9°04'	+17'	69°	9°26'	+18'	69°	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°
	14			15			16			17			18			19			20						

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°	14			15			16			17			18			19			20			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	0°58'	+15'	90°	0°58'	+16'	90°	0°58'	+17'	90°	0°57'	+18'	90°	0°57'	+19'	90°	0°57'	+20'	90°	0°56'	+21'	90°	0			
1	1°13'	+14'	89°	1°13'	+16'	89°	1°14'	+17'	89°	1°15'	+18'	89°	1°16'	+19'	89°	1°16'	+20'	89°	1°17'	+20'	89°	1			
2	1°27'	+14'	88°	1°29'	+15'	88°	1°31'	+16'	88°	1°32'	+17'	88°	1°34'	+18'	88°	1°36'	+19'	88°	1°37'	+20'	88°	2			
3	1°42'	+14'	87°	1°44'	+15'	87°	1°47'	+16'	87°	1°50'	+17'	87°	1°53'	+18'	87°	1°55'	+19'	87°	1°58'	+20'	88°	3			
4	1°56'	+14'	86°	2°00'	+15'	86°	2°04'	+16'	86°	2°07'	+17'	86°	2°11'	+18'	87°	2°15'	+19'	87°	2°18'	+20'	87°	4			
5	2°11'	+14'	85°	2°15'	+15'	85°	2°20'	+16'	85°	2°25'	+17'	86°	2°29'	+18'	86°	2°34'	+19'	86°	2°39'	+20'	86°	5			
6	2°25'	+14'	84°	2°31'	+15'	84°	2°36'	+16'	85°	2°42'	+17'	85°	2°48'	+18'	85°	2°53'	+19'	85°	2°59'	+20'	85°	6			
7	2°39'	+14'	83°	2°46'	+15'	83°	2°53'	+16'	84°	3°00'	+17'	84°	3°06'	+18'	84°	3°13'	+19'	84°	3°19'	+20'	84°	7			
8	2°53'	+14'	82°	3°01'	+15'	83°	3°09'	+16'	83°	3°17'	+17'	83°	3°24'	+18'	83°	3°32'	+19'	83°	3°40'	+20'	83°	8			
9	3°08'	+14'	81°	3°17'	+15'	82°	3°25'	+16'	82°	3°34'	+17'	82°	3°43'	+18'	82°	3°51'	+19'	82°	4°00'	+20'	82°	9			
10	3°22'	+14'	81°	3°32'	+15'	81°	3°41'	+16'	81°	3°51'	+17'	81°	4°01'	+18'	81°	4°10'	+19'	81°	4°20'	+20'	81°	10			
11	3°36'	+14'	80°	3°47'	+15'	80°	3°58'	+16'	80°	4°08'	+17'	80°	4°19'	+18'	80°	4°30'	+19'	80°	4°40'	+20'	80°	11			
12	3°50'	+14'	79°	4°02'	+15'	79°	4°14'	+16'	79°	4°25'	+17'	79°	4°37'	+18'	79°	4°49'	+19'	79°	5°00'	+20'	79°	12			
13	4°04'	+14'	78°	4°17'	+15'	78°	4°30'	+16'	78°	4°42'	+17'	78°	4°55'	+18'	78°	5°07'	+19'	78°	5°20'	+20'	78°	13			
14	4°18'	+14'	77°	4°32'	+15'	77°	4°46'	+16'	77°	4°59'	+17'	77°	5°13'	+18'	77°	5°26'	+19'	77°	5°40'	+20'	77°	14			
15	4°32'	+14'	76°	4°47'	+15'	76°	5°01'	+16'	76°	5°16'	+17'	76°	5°31'	+18'	76°	5°45'	+19'	76°	5°59'	+20'	76°	15			
16	4°46'	+14'	75°	5°01'	+15'	75°	5°17'	+16'	75°	5°33'	+17'	75°	5°48'	+18'	75°	6°04'	+19'	75°	6°19'	+20'	75°	16			
17	4°59'	+14'	74°	5°16'	+15'	74°	5°33'	+16'	74°	5°49'	+17'	74°	6°06'	+17'	74°	6°22'	+18'	74°	6°39'	+19'	74°	17			
18	5°13'	+14'	73°	5°31'	+14'	73°	5°48'	+15'	73°	6°06'	+16'	73°	6°23'	+17'	73°	6°41'	+18'	73°	6°58'	+19'	73°	18			
19	5°26'	+13'	72°	5°45'	+14'	72°	6°04'	+15'	72°	6°22'	+16'	72°	6°41'	+17'	72°	6°59'	+18'	72°	7°17'	+19'	72°	19			
20	5°40'	+13'	71°	5°59'	+14'	71°	6°19'	+15'	71°	6°39'	+16'	71°	6°58'	+17'	71°	7°17'	+18'	71°	7°36'	+19'	71°	20			
21	5°53'	+13'	70°	6°14'	+14'	70°	6°34'	+15'	70°	6°55'	+16'	70°	7°15'	+17'	70°	7°35'	+18'	70°	7°56'	+19'	70°	21			
22	6°06'	+13'	69°	6°28'	+14'	69°	6°49'	+15'	69°	7°11'	+16'	69°	7°32'	+17'	69°	7°53'	+18'	69°	8°14'	+19'	70°	22			
23	6°19'	+13'	68°	6°42'	+14'	68°	7°04'	+15'	68°	7°27'	+16'	68°	7°49'	+17'	68°	8°11'	+18'	68°	8°33'	+19'	69°	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°
	14			15			16			17			18			19			20						

89° 271° LHA

Latitude SAME as Declination

89° 271° LHA

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

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

90° 270° LHA

Latitude SAME or CONTRARY as Declination

90° 270° LHA

Dec°	14			15			16			17			18			19			20			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'	+15'	90°	0°00'	+16'	90°	0°00'	+17'	90°	0°00'	+18'	90°	0°00'	+19'	90°	0°00'	+20'	90°	0°00'	+21'	90°	0
1	0°15'	+15'	89°	0°16'	+16'	89°	0°17'	+17'	89°	0°18'	+18'	89°	0°19'	+19'	89°	0°20'	+20'	89°	0°21'	+21'	89°	1
2	0°29'	+15'	88°	0°31'	+16'	88°	0°33'	+17'	88°	0°35'	+18'	88°	0°37'	+19'	88°	0°39'	+20'	88°	0°41'	+21'	88°	2
3	0°44'	+14'	87°	0°47'	+16'	87°	0°50'	+17'	87°	0°53'	+18'	87°	0°56'	+19'	87°	0°59'	+20'	87°	1°02'	+20'	87°	3
4	0°58'	+14'	86°	1°02'	+15'	86°	1°06'	+16'	86°	1°10'	+17'	86°	1°14'	+18'	86°	1°18'	+19'	86°	1°22'	+20'	86°	4
5	1°12'	+14'	85°	1°18'	+15'	85°	1°23'	+16'	85°	1°28'	+17'	85°	1°33'	+18'	85°	1°38'	+19'	85°	1°42'	+20'	85°	5
6	1°27'	+14'	84°	1°33'	+15'	84°	1°39'	+16'	84°	1°45'	+17'	84°	1°51'	+18'	84°	1°57'	+19'	84°	2°03'	+20'	84°	6
7	1°41'	+14'	83°	1°48'	+15'	83°	1°56'	+16'	83°	2°03'	+17'	83°	2°09'	+18'	83°	2°16'	+19'	83°	2°23'	+20'	83°	7
8	1°56'	+14'	82°	2°04'	+15'	82°	2°12'	+16'	82°	2°20'	+17'	82°	2°28'	+18'	82°	2°36'	+19'	82°	2°44'	+20'	82°	8
9	2°10'	+14'	81°	2°19'	+15'	81°	2°28'	+16'	81°	2°37'	+17'	81°	2°46'	+18'	81°	2°55'	+19'	81°	3°04'	+20'	82°	9
10	2°24'	+14'	80°	2°35'	+15'	80°	2°45'	+16'	80°	2°55'	+17'	80°	3°05'	+18'	80°	3°14'	+19'	81°	3°24'	+20'	81°	10
11	2°39'	+14'	79°	2°50'	+15'	79°	3°01'	+16'	79°	3°12'	+17'	79°	3°23'	+18'	80°	3°34'	+19'	80°	3°45'	+20'	80°	11
12	2°53'	+14'	78°	3°05'	+15'	78°	3°17'	+16'	78°	3°29'	+17'	79°	3°41'	+18'	79°	3°53'	+19'	79°	4°05'	+20'	79°	12
13	3°07'	+14'	77°	3°20'	+15'	77°	3°33'	+16'	77°	3°46'	+17'	78°	3°59'	+18'	78°	4°12'	+19'	78°	4°25'	+20'	78°	13
14	3°21'	+14'	76°	3°35'	+15'	76°	3°49'	+16'	77°	4°03'	+17'	77°	4°17'	+18'	77°	4°31'	+19'	77°	4°45'	+20'	77°	14
15	3°35'	+14'	75°	3°50'	+15'	75°	4°05'	+16'	76°	4°20'	+17'	76°	4°35'	+18'	76°	4°50'	+19'	76°	5°05'	+20'	76°	15
16	3°49'	+14'	74°	4°05'	+15'	75°	4°21'	+16'	75°	4°37'	+17'	75°	4°53'	+18'	75°	5°09'	+19'	75°	5°25'	+20'	75°	16
17	4°03'	+14'	73°	4°20'	+15'	74°	4°37'	+16'	74°	4°54'	+17'	74°	5°11'	+18'	74°	5°28'	+19'	74°	5°44'	+20'	74°	17
18	4°17'	+14'	73°	4°35'	+15'	73°	4°53'	+16'	73°	5°11'	+17'	73°	5°29'	+18'	73°	5°46'	+19'	73°	6°04'	+20'	73°	18
19	4°31'	+14'	72°	4°50'	+15'	72°	5°09'	+16'	72°	5°28'	+17'	72°	5°46'	+18'	72°	6°05'	+19'	72°	6°24'	+19'	72°	19
20	4°45'	+14'	71°	5°05'	+15'	71°	5°25'	+16'	71°	5°44'	+17'	71°	6°04'	+17'	71°	6°24'	+18'	71°	6°43'	+19'	71°	20
21	4°58'	+14'	70°	5°19'	+15'	70°	5°40'	+15'	70°	6°01'	+16'	70°	6°21'	+17'	70°	6°42'	+18'	70°	7°02'	+19'	70°	21
22	5°12'	+13'	69°	5°34'	+14'	69°	5°56'	+15'	69°	6°17'	+16'	69°	6°39'	+17'	69°	7°00'	+18'	69°	7°22'	+19'	69°	22
23	5°25'	+13'	68°	5°48'	+14'	68°	6°11'	+15'	68°	6°34'	+16'	68°	6°56'	+17'	68°	7°19'	+18'	68°	7°41'	+19'	68°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°58'	-15'	90°	0°58'	-16'	90°	0°58'	-17'	90°	0°57'	-18'	90°	0°57'	-19'	90°	0°57'	-20'	90°	0°56'	-21'	90°	0
1	0°44'	-15'	91°	0°42'	-16'	91°	0°41'	-17'	91°	0°40'	-18'	91°	0°39'	-19'	91°	0°37'	-20'	91°	0°36'	-21'	91°	1
2	0°29'	-15'	92°	0°27'	-16'	92°	0°25'	-17'	92°	0°22'	-18'	92°	0°20'	-19'	92°	<u>0°18'</u>	-20'	92°	<u>0°15'</u>	-21'	92°	2
3	0°15'	-15'	93°	<u>0°11'</u>	-16'	93°	<u>0°08'</u>	-17'	93°	<u>0°05'</u>	-18'	93°	<u>0°01'</u>	-19'	93°	0°02'	+20'	87°	0°05'	+21'	87°	3
4	<u>0°00'</u>	-15'	94°	0°04'	+16'	86°	0°09'	+17'	86°	0°13'	+18'	86°	0°17'	+19'	86°	0°21'	+20'	86°	0°26'	+21'	86°	4
5	0°14'	+15'	85°	0°20'	+16'	85°	0°25'	+17'	85°	0°30'	+18'	85°	0°36'	+19'	85°	0°41'	+20'	85°	0°46'	+21'	85°	5
6	0°29'	+15'	84°	0°35'	+16'	84°	0°42'	+17'	84°	0°48'	+18'	84°	0°54'	+19'	84°	1°01'	+20'	84°	1°07'	+21'	84°	6
7	0°44'	+15'	83°	0°51'	+16'	83°	0°58'	+17'	83°	1°06'	+18'	83°	1°13'	+19'	83°	1°20'	+20'	83°	1°27'	+20'	83°	7
8	0°58'	+15'	82°	1°06'	+16'	82°	1°15'	+17'	82°	1°23'	+18'	82°	1°31'	+18'	82°	1°40'	+19'	82°	1°48'	+20'	82°	8
9	1°13'	+14'	81°	1°22'	+15'	81°	1°31'	+16'	81°	1°41'	+17'	81°	1°50'	+18'	81°	1°59'	+19'	81°	2°08'	+20'	81°	9
10	1°27'	+14'	80°	1°37'	+15'	80°	1°48'	+16'	80°	1°58'	+17'	80°	2°08'	+18'	80°	2°19'	+19'	80°	2°29'	+20'	80°	10
11	1°42'	+14'	79°	1°53'	+15'	79°	2°04'	+16'	79°	2°15'	+17'	79°	2°27'	+18'	79°	2°38'	+19'	79°	2°49'	+20'	79°	11
12	1°56'	+14'	78°	2°08'	+15'	78°	2°21'	+16'	78°	2°33'	+17'	78°	2°45'	+18'	78°	2°57'	+19'	78°	3°09'	+20'	78°	12
13	2°10'	+14'	77°	2°24'	+15'	77°	2°37'	+16'	77°	2°50'	+17'	77°	3°03'	+18'	77°	3°17'	+19'	77°	3°30'	+20'	77°	13
14	2°25'	+14'	76°	2°39'	+15'	76°	2°53'	+16'	76°	3°08'	+17'	76°	3°22'	+18'	76°	3°36'	+19'	76°	3°50'	+20'	76°	14
15	2°39'	+14'	75°	2°54'	+15'	75°	3°10'	+16'	75°	3°25'	+17'	75°	3°40'	+18'	75°	3°55'	+19'	75°	4°10'	+20'	76°	15
16	2°53'	+14'	74°	3°10'	+15'	74°	3°26'	+16'	74°	3°42'	+17'	74°	3°58'	+18'	74°	4°14'	+19'	75°	4°30'	+20'	75°	16
17	3°08'	+14'	73°	3°25'	+15'	73°	3°42'	+16'	73°	3°59'	+17'	73°	4°16'	+18'	74°	4°33'	+19'	74°	4°50'	+20'	74°	17
18	3°22'	+14'	72°	3°40'	+15'	72°	3°58'	+16'	72°	4°16'	+17'	72°	4°34'	+18'	73°	4°52'	+19'	73°	5°10'	+20'	73°	18
19	3°36'	+14'	71°	3°55'	+15'	71°	4°14'	+16'	71°	4°33'	+17'	72°	4°52'	+18'	72°	5°11'	+19'	72°	5°30'	+20'	72°	19
20	3°50'	+14'	70°	4°10'	+15'	70°	4°30'	+16'	70°	4°50'	+17'	71°	5°10'	+18'	71°	5°30'	+19'	71°	5°50'	+20'	71°	20
21	4°04'	+14'	69°	4°25'	+15'	69°	4°46'	+16'	70°	5°07'	+17'	70°	5°28'	+18'	70°	5°49'	+19'	70°	6°09'	+20'	70°	21
22	4°18'	+14'	68°	4°40'	+15'	68°	5°02'	+16'	69°	5°24'	+17'	69°	5°46'	+18'	69°	6°07'	+19'	69°	6°29'	+19'	69°	22
23	4°32'	+14'	67°	4°55'	+15'	67°	5°18'	+16'	68°	5°40'	+17'	68°	6°03'	+18'	68°	6°26'	+18'	68°	6°48'	+19'	68°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

91° 269° LHA

Latitude SAME as DECLINATION

91° 269° LHA

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

88° 272° LHA

Latitude CONTRARY to Declination

88° 272° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	1°56'	-15'	90°	1°56'	-16'	91°	1°55'	-17'	91°	1°55'	-18'	91°	1°54'	-19'	91°	1°53'	-20'	91°	1°53'	-21'	91°	0
1	1°42'	-15'	91°	1°40'	-16'	91°	1°39'	-17'	92°	1°37'	-18'	92°	1°36'	-19'	92°	1°34'	-20'	92°	1°32'	-21'	92°	1
2	1°27'	-15'	92°	1°25'	-16'	92°	1°22'	-17'	92°	1°20'	-18'	92°	1°17'	-19'	93°	1°14'	-20'	93°	1°12'	-21'	93°	2
3	1°13'	-15'	93°	1°09'	-16'	93°	1°06'	-17'	93°	1°02'	-18'	93°	0°58'	-19'	93°	0°55'	-20'	93°	0°51'	-21'	94°	3
4	0°58'	-15'	94°	0°54'	-16'	94°	0°49'	-17'	94°	0°44'	-18'	94°	0°40'	-19'	94°	0°35'	-20'	94°	0°30'	-21'	94°	4
5	0°43'	-15'	95°	0°38'	-16'	95°	0°32'	-17'	95°	0°27'	-18'	95°	0°21'	-19'	95°	<u>0°15'</u>	-20'	95°	<u>0°10'</u>	-21'	95°	5
6	0°29'	-15'	96°	0°22'	-16'	96°	<u>0°16'</u>	-17'	96°	<u>0°09'</u>	-18'	96°	<u>0°02'</u>	-19'	96°	0°04'	+20'	84°	0°11'	+21'	84°	6
7	<u>0°14'</u>	-15'	97°	<u>0°07'</u>	-16'	97°	0°01'	+17'	83°	0°09'	+18'	83°	0°16'	+19'	83°	0°24'	+20'	83°	0°31'	+21'	83°	7
8	0°00'	+15'	82°	0°09'	+16'	82°	0°18'	+17'	82°	0°26'	+18'	82°	0°35'	+19'	82°	0°43'	+20'	82°	0°52'	+21'	82°	8
9	0°15'	+15'	81°	0°25'	+16'	81°	0°34'	+17'	81°	0°44'	+18'	81°	0°53'	+19'	81°	1°03'	+20'	81°	1°13'	+21'	81°	9
10	0°30'	+15'	80°	0°40'	+16'	80°	0°51'	+17'	80°	1°02'	+18'	80°	1°12'	+19'	80°	1°23'	+20'	80°	1°33'	+21'	80°	10
11	0°44'	+15'	79°	0°56'	+16'	79°	1°08'	+17'	79°	1°19'	+18'	79°	1°31'	+19'	79°	1°42'	+20'	79°	1°54'	+21'	79°	11
12	0°59'	+15'	78°	1°12'	+16'	78°	1°24'	+17'	78°	1°37'	+18'	78°	1°49'	+19'	78°	2°02'	+20'	78°	2°14'	+20'	78°	12
13	1°14'	+15'	77°	1°27'	+16'	77°	1°41'	+17'	77°	1°54'	+18'	77°	2°08'	+19'	77°	2°21'	+19'	77°	2°35'	+20'	77°	13
14	1°28'	+15'	76°	1°43'	+16'	76°	1°57'	+17'	76°	2°12'	+17'	76°	2°26'	+18'	76°	2°41'	+19'	76°	2°55'	+20'	76°	14
15	1°43'	+15'	75°	1°58'	+16'	75°	2°14'	+16'	75°	2°29'	+17'	75°	2°45'	+18'	75°	3°00'	+19'	75°	3°16'	+20'	75°	15
16	1°57'	+15'	74°	2°14'	+15'	74°	2°30'	+16'	74°	2°47'	+17'	74°	3°03'	+18'	74°	3°20'	+19'	74°	3°36'	+20'	74°	16
17	2°12'	+14'	73°	2°29'	+15'	73°	2°47'	+16'	73°	3°04'	+17'	73°	3°22'	+18'	73°	3°39'	+19'	73°	3°56'	+20'	73°	17
18	2°26'	+14'	72°	2°45'	+15'	72°	3°03'	+16'	72°	3°22'	+17'	72°	3°40'	+18'	72°	3°58'	+19'	72°	4°16'	+20'	72°	18
19	2°41'	+14'	71°	3°00'	+15'	71°	3°20'	+16'	71°	3°39'	+17'	71°	3°58'	+18'	71°	4°17'	+19'	71°	4°36'	+20'	71°	19
20	2°55'	+14'	70°	3°16'	+15'	70°	3°36'	+16'	70°	3°56'	+17'	70°	4°16'	+18'	70°	4°36'	+19'	70°	4°57'	+20'	70°	20
21	3°09'	+14'	69°	3°31'	+15'	69°	3°52'	+16'	69°	4°13'	+17'	69°	4°34'	+18'	69°	4°56'	+19'	69°	5°17'	+20'	70°	21
22	3°24'	+14'	68°	3°46'	+15'	68°	4°08'	+16'	68°	4°30'	+17'	68°	4°53'	+18'	68°	5°15'	+19'	69°	5°36'	+20'	69°	22
23	3°38'	+14'	67°	4°01'	+15'	67°	4°24'	+16'	67°	4°47'	+17'	67°	5°10'	+18'	67°	5°33'	+19'	68°	5°56'	+20'	68°	23

92° 268° LHA

Latitude SAME as DECLINATION

92° 268° LHA

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

87° 273° LHA

Latitude CONTRARY to Declination

87° 273° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	2°55'	-15'	91°	2°54'	-16'	91°	2°53'	-17'	91°	2°52'	-18'	91°	2°51'	-19'	91°	2°50'	-20'	91°	2°49'	-21'	91°	0
1	2°40'	-15'	92°	2°38'	-16'	92°	2°36'	-17'	92°	2°35'	-18'	92°	2°33'	-19'	92°	2°31'	-20'	92°	2°29'	-21'	92°	1
2	2°25'	-15'	93°	2°23'	-16'	93°	2°20'	-17'	93°	2°17'	-18'	93°	2°14'	-19'	93°	2°11'	-20'	93°	2°08'	-21'	93°	2
3	2°11'	-15'	94°	2°07'	-16'	94°	2°03'	-17'	94°	1°59'	-18'	94°	1°55'	-19'	94°	1°51'	-20'	94°	1°47'	-21'	94°	3
4	1°56'	-15'	95°	1°51'	-16'	95°	1°46'	-17'	95°	1°42'	-18'	95°	1°37'	-19'	95°	1°32'	-20'	95°	1°27'	-21'	95°	4
5	1°41'	-15'	96°	1°36'	-16'	96°	1°30'	-17'	96°	1°24'	-18'	96°	1°18'	-19'	96°	1°12'	-20'	96°	1°06'	-21'	96°	5
6	1°27'	-15'	97°	1°20'	-16'	97°	1°13'	-17'	97°	1°06'	-18'	97°	0°59'	-19'	97°	0°52'	-20'	97°	0°45'	-21'	97°	6
7	1°12'	-15'	98°	1°04'	-16'	98°	0°56'	-17'	98°	0°48'	-18'	98°	0°40'	-19'	98°	0°32'	-20'	98°	0°25'	-21'	98°	7
8	0°57'	-15'	98°	0°48'	-16'	99°	0°39'	-17'	99°	0°30'	-18'	99°	0°22'	-19'	99°	<u>0°13'</u>	-20'	99°	<u>0°04'</u>	-21'	99°	8
9	0°42'	-15'	99°	0°32'	-16'	99°	0°23'	-17'	99°	<u>0°13'</u>	-18'	99°	<u>0°03'</u>	-19'	99°	0°07'	+20'	81°	0°17'	+21'	81°	9
10	0°28'	-15'	100°	0°17'	-16'	100°	<u>0°06'</u>	-17'	100°	0°05'	+18'	80°	0°16'	+19'	80°	0°27'	+20'	80°	0°38'	+21'	80°	10
11	<u>0°13'</u>	-15'	101°	<u>0°01'</u>	-16'	101°	0°11'	+17'	79°	0°23'	+18'	79°	0°35'	+19'	79°	0°47'	+20'	79°	0°58'	+21'	79°	11
12	0°02'	+15'	78°	0°15'	+16'	78°	0°28'	+17'	78°	0°41'	+18'	78°	0°53'	+19'	78°	1°06'	+20'	78°	1°19'	+21'	78°	12
13	0°17'	+15'	77°	0°31'	+16'	77°	0°45'	+17'	77°	0°58'	+18'	77°	1°12'	+19'	77°	1°26'	+20'	77°	1°40'	+21'	77°	13
14	0°32'	+15'	76°	0°47'	+16'	76°	1°01'	+17'	76°	1°16'	+18'	76°	1°31'	+19'	76°	1°46'	+20'	76°	2°00'	+21'	76°	14
15	0°47'	+15'	75°	1°02'	+16'	75°	1°18'	+17'	75°	1°34'	+18'	75°	1°50'	+19'	75°	2°05'	+20'	75°	2°21'	+21'	75°	15
16	1°01'	+15'	74°	1°18'	+16'	74°	1°35'	+17'	74°	1°52'	+18'	74°	2°08'	+19'	74°	2°25'	+20'	74°	2°42'	+21'	74°	16
17	1°16'	+15'	73°	1°34'	+16'	73°	1°52'	+17'	73°	2°09'	+18'	73°	2°27'	+19'	73°	2°45'	+20'	73°	3°02'	+20'	73°	17
18	1°31'	+15'	72°	1°50'	+16'	72°	2°08'	+17'	72°	2°27'	+18'	72°	2°46'	+19'	72°	3°04'	+19'	72°	3°23'	+20'	72°	18
19	1°46'	+15'	71°	2°05'	+16'	71°	2°25'	+17'	71°	2°45'	+18'	71°	3°04'	+19'	71°	3°24'	+19'	71°	3°43'	+20'	71°	19
20	2°00'	+15'	70°	2°21'	+16'	70°	2°42'	+17'	70°	3°02'	+18'	70°	3°23'	+18'	70°	3°43'	+19'	70°	4°03'	+20'	70°	20
21	2°15'	+15'	69°	2°37'	+16'	69°	2°58'	+17'	69°	3°20'	+17'	69°	3°41'	+18'	69°	4°02'	+19'	69°	4°24'	+20'	69°	21
22	2°30'	+15'	68°	2°52'	+16'	68°	3°15'	+16'	68°	3°37'	+17'	68°	3°59'	+18'	68°	4°22'	+19'	68°	4°44'	+20'	68°	22
23	2°44'	+15'	67°	3°08'	+15'	67°	3°31'	+16'	67°	3°55'	+17'	67°	4°18'	+18'	67°	4°41'	+19'	67°	5°04'	+20'	67°	23

93° 267° LHA

Latitude SAME as DECLINATION

93° 267° LHA

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

86° 274° LHA

Latitude CONTRARY to Declination

86° 274° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	3°53'	-15'	91°	3°52'	-16'	91°	3°51'	-17'	91°	3°49'	-18'	91°	3°48'	-19'	91°	3°47'	-20'	91°	3°46'	-21'	91°	0
1	3°38'	-15'	92°	3°36'	-16'	92°	3°34'	-17'	92°	3°32'	-18'	92°	3°30'	-19'	92°	3°27'	-20'	92°	3°25'	-21'	92°	1
2	3°24'	-15'	93°	3°21'	-16'	93°	3°17'	-17'	93°	3°14'	-18'	93°	3°11'	-19'	93°	3°08'	-20'	93°	3°04'	-21'	93°	2
3	3°09'	-15'	94°	3°05'	-16'	94°	3°01'	-17'	94°	2°56'	-18'	94°	2°52'	-19'	94°	2°48'	-20'	94°	2°44'	-21'	94°	3
4	2°54'	-15'	95°	2°49'	-16'	95°	2°44'	-17'	95°	2°39'	-18'	95°	2°33'	-19'	95°	2°28'	-20'	95°	2°23'	-21'	95°	4
5	2°39'	-15'	96°	2°33'	-16'	96°	2°27'	-17'	96°	2°21'	-18'	96°	2°15'	-19'	96°	2°08'	-20'	96°	2°02'	-21'	96°	5
6	2°25'	-15'	97°	2°17'	-16'	97°	2°10'	-17'	97°	2°03'	-18'	97°	1°56'	-19'	97°	1°49'	-20'	97°	1°41'	-21'	97°	6
7	2°10'	-15'	98°	2°01'	-16'	98°	1°53'	-17'	98°	1°45'	-18'	98°	1°37'	-19'	98°	1°29'	-20'	98°	1°20'	-21'	98°	7
8	1°55'	-15'	99°	1°46'	-16'	99°	1°36'	-17'	99°	1°27'	-18'	99°	1°18'	-19'	99°	1°09'	-20'	99°	1°00'	-21'	99°	8
9	1°40'	-15'	100°	1°30'	-16'	100°	1°19'	-17'	100°	1°09'	-18'	100°	0°59'	-19'	100°	0°49'	-20'	100°	0°39'	-21'	100°	9
10	1°25'	-15'	101°	1°14'	-16'	101°	1°02'	-17'	101°	0°51'	-18'	101°	0°40'	-19'	101°	0°29'	-20'	101°	0°18'	-21'	101°	10
11	1°10'	-15'	102°	0°58'	-16'	102°	0°45'	-17'	102°	0°33'	-18'	102°	0°21'	-19'	102°	0°09'	-20'	102°	0°03'	+21'	78°	11
12	0°55'	-15'	103°	0°42'	-16'	103°	0°28'	-17'	103°	0°15'	-18'	103°	0°02'	-19'	103°	0°11'	+20'	77°	0°24'	+21'	77°	12
13	0°40'	-15'	104°	0°26'	-16'	104°	0°11'	-17'	104°	0°03'	+18'	76°	0°17'	+19'	76°	0°31'	+20'	76°	0°45'	+21'	76°	13
14	0°25'	-15'	105°	0°10'	-16'	105°	0°06'	+17'	75°	0°21'	+18'	75°	0°36'	+19'	75°	0°51'	+20'	75°	1°06'	+21'	75°	14
15	0°10'	-15'	106°	0°07'	+16'	74°	0°23'	+17'	74°	0°39'	+18'	75°	0°55'	+19'	75°	1°11'	+20'	75°	1°27'	+21'	75°	15
16	0°06'	+15'	74°	0°23'	+16'	74°	0°40'	+17'	74°	0°57'	+18'	74°	1°14'	+19'	74°	1°31'	+20'	74°	1°47'	+21'	74°	16
17	0°21'	+15'	73°	0°39'	+16'	73°	0°57'	+17'	73°	1°15'	+18'	73°	1°33'	+19'	73°	1°50'	+20'	73°	2°08'	+21'	73°	17
18	0°36'	+15'	72°	0°55'	+16'	72°	1°14'	+17'	72°	1°33'	+18'	72°	1°51'	+19'	72°	2°10'	+20'	72°	2°29'	+21'	72°	18
19	0°51'	+15'	71°	1°11'	+16'	71°	1°31'	+17'	71°	1°50'	+18'	71°	2°10'	+19'	71°	2°30'	+20'	71°	2°50'	+21'	71°	19
20	1°06'	+15'	70°	1°27'	+16'	70°	1°47'	+17'	70°	2°08'	+18'	70°	2°29'	+19'	70°	2°50'	+20'	70°	3°10'	+21'	70°	20
21	1°21'	+15'	69°	1°43'	+16'	69°	2°04'	+17'	69°	2°26'	+18'	69°	2°48'	+19'	69°	3°10'	+20'	69°	3°31'	+21'	69°	21
22	1°36'	+15'	68°	1°59'	+16'	68°	2°21'	+17'	68°	2°44'	+18'	68°	3°07'	+19'	68°	3°29'	+20'	68°	3°52'	+21'	68°	22
23	1°51'	+15'	67°	2°14'	+16'	67°	2°38'	+17'	67°	3°02'	+18'	67°	3°25'	+19'	67°	3°49'	+20'	67°	4°12'	+20'	67°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

94° 266° LHA

Latitude SAME as DECLINATION

94° 266° LHA

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

85° 275° LHA

Latitude CONTRARY to Declination

85° 275° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°51'	-15'	91°	4°50'	-16'	91°	4°48'	-17'	91°	4°47'	-18'	91°	4°45'	-19'	92°	4°44'	-20'	92°	4°42'	-21'	92°	0
1	4°36'	-15'	92°	4°34'	-16'	92°	4°32'	-17'	92°	4°29'	-18'	92°	4°27'	-19'	93°	4°24'	-20'	93°	4°21'	-21'	93°	1
2	4°22'	-15'	93°	4°18'	-16'	93°	4°15'	-17'	93°	4°11'	-18'	93°	4°08'	-19'	93°	4°04'	-20'	94°	4°01'	-21'	94°	2
3	4°07'	-15'	94°	4°03'	-16'	94°	3°58'	-17'	94°	3°54'	-18'	94°	3°49'	-19'	94°	3°44'	-20'	94°	3°40'	-21'	95°	3
4	3°52'	-15'	95°	3°47'	-16'	95°	3°41'	-17'	95°	3°36'	-18'	95°	3°30'	-19'	95°	3°25'	-20'	95°	3°19'	-21'	95°	4
5	3°37'	-15'	96°	3°31'	-16'	96°	3°24'	-17'	96°	3°18'	-18'	96°	3°11'	-19'	96°	3°05'	-20'	96°	2°58'	-21'	96°	5
6	3°22'	-15'	97°	3°15'	-16'	97°	3°07'	-17'	97°	3°00'	-18'	97°	2°52'	-19'	97°	2°45'	-20'	97°	2°37'	-21'	97°	6
7	3°07'	-15'	98°	2°59'	-16'	98°	2°50'	-17'	98°	2°42'	-18'	98°	2°33'	-19'	98°	2°25'	-20'	98°	2°16'	-21'	98°	7
8	2°52'	-15'	99°	2°43'	-16'	99°	2°33'	-17'	99°	2°24'	-18'	99°	2°14'	-19'	99°	2°05'	-20'	99°	1°55'	-21'	99°	8
9	2°37'	-15'	100°	2°27'	-16'	100°	2°16'	-17'	100°	2°06'	-18'	100°	1°55'	-19'	100°	1°45'	-20'	100°	1°34'	-21'	100°	9
10	2°22'	-15'	101°	2°11'	-16'	101°	1°59'	-17'	101°	1°48'	-18'	101°	1°36'	-19'	101°	1°25'	-20'	101°	1°13'	-21'	101°	10
11	2°07'	-15'	102°	1°54'	-16'	102°	1°42'	-17'	102°	1°29'	-18'	102°	1°17'	-19'	102°	1°05'	-20'	102°	0°52'	-21'	102°	11
12	1°51'	-15'	103°	1°38'	-16'	103°	1°25'	-17'	103°	1°11'	-18'	103°	0°58'	-19'	103°	0°44'	-20'	103°	0°31'	-21'	103°	12
13	1°36'	-15'	104°	1°22'	-16'	104°	1°07'	-17'	104°	0°53'	-18'	104°	0°39'	-19'	104°	0°24'	-20'	104°	0°10'	-21'	104°	13
14	1°21'	-15'	105°	1°06'	-16'	105°	0°50'	-17'	105°	0°35'	-18'	105°	0°19'	-19'	105°	0°04'	-20'	105°	0°11'	+21'	75°	14
15	1°06'	-15'	106°	0°49'	-16'	106°	0°33'	-17'	106°	0°17'	-18'	106°	0°00'	-19'	106°	0°16'	+20'	74°	0°32'	+21'	74°	15
16	0°50'	-15'	107°	0°33'	-16'	107°	0°16'	-17'	107°	0°02'	+18'	73°	0°19'	+19'	73°	0°36'	+20'	73°	0°53'	+21'	73°	16
17	0°35'	-15'	108°	0°17'	-16'	108°	0°02'	+17'	72°	0°20'	+18'	72°	0°38'	+19'	72°	0°56'	+20'	72°	1°15'	+21'	72°	17
18	0°19'	-15'	109°	0°00'	-16'	109°	0°19'	+17'	71°	0°38'	+18'	71°	0°57'	+19'	71°	1°16'	+20'	71°	1°36'	+21'	71°	18
19	0°04'	-15'	110°	0°16'	+16'	70°	0°36'	+17'	70°	0°56'	+18'	70°	1°16'	+19'	70°	1°37'	+20'	70°	1°57'	+21'	70°	19
20	0°11'	+15'	69°	0°32'	+16'	69°	0°53'	+17'	69°	1°15'	+18'	69°	1°36'	+19'	69°	1°57'	+20'	69°	2°18'	+21'	70°	20
21	0°27'	+15'	68°	0°49'	+16'	68°	1°11'	+17'	68°	1°33'	+18'	68°	1°55'	+19'	69°	2°17'	+20'	69°	2°39'	+21'	69°	21
22	0°42'	+15'	67°	1°05'	+16'	67°	1°28'	+17'	68°	1°51'	+18'	68°	2°14'	+19'	68°	2°37'	+20'	68°	2°59'	+21'	68°	22
23	0°57'	+15'	67°	1°21'	+16'	67°	1°45'	+17'	67°	2°09'	+18'	67°	2°33'	+19'	67°	2°57'	+20'	67°	3°20'	+21'	67°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

95° 265° LHA

Latitude SAME as DECLINATION

95° 265° LHA

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

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

84° 276° LHA

Latitude CONTRARY to Declination

84° 276° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°49'	-15'	91°	5°48'	-16'	92°	5°46'	-17'	92°	5°44'	-18'	92°	5°42'	-19'	92°	5°40'	-20'	92°	5°38'	-21'	92°	0
1	5°35'	-15'	92°	5°32'	-16'	93°	5°29'	-17'	93°	5°27'	-18'	93°	5°24'	-19'	93°	5°21'	-20'	93°	5°18'	-21'	93°	1
2	5°20'	-15'	93°	5°16'	-16'	93°	5°13'	-17'	94°	5°09'	-18'	94°	5°05'	-19'	94°	5°01'	-20'	94°	4°57'	-21'	94°	2
3	5°05'	-15'	94°	5°00'	-16'	94°	4°56'	-17'	95°	4°51'	-18'	95°	4°46'	-19'	95°	4°41'	-20'	95°	4°36'	-21'	95°	3
4	4°50'	-15'	95°	4°45'	-16'	95°	4°39'	-17'	96°	4°33'	-18'	96°	4°27'	-19'	96°	4°21'	-20'	96°	4°15'	-21'	96°	4
5	4°35'	-15'	96°	4°29'	-16'	96°	4°22'	-17'	96°	4°15'	-18'	97°	4°08'	-19'	97°	4°01'	-20'	97°	3°54'	-21'	97°	5
6	4°20'	-15'	97°	4°12'	-16'	97°	4°05'	-17'	97°	3°57'	-18'	98°	3°49'	-19'	98°	3°41'	-20'	98°	3°33'	-21'	98°	6
7	4°05'	-15'	98°	3°56'	-16'	98°	3°48'	-17'	98°	3°39'	-18'	98°	3°30'	-19'	99°	3°21'	-20'	99°	3°12'	-21'	99°	7
8	3°50'	-15'	99°	3°40'	-16'	99°	3°30'	-17'	99°	3°21'	-18'	99°	3°11'	-19'	99°	3°01'	-20'	100°	2°51'	-21'	100°	8
9	3°34'	-15'	100°	3°24'	-16'	100°	3°13'	-17'	100°	3°02'	-18'	100°	2°51'	-19'	100°	2°41'	-20'	100°	2°30'	-21'	101°	9
10	3°19'	-15'	101°	3°07'	-16'	101°	2°56'	-17'	101°	2°44'	-18'	101°	2°32'	-19'	101°	2°20'	-20'	101°	2°08'	-21'	101°	10
11	3°04'	-15'	102°	2°51'	-16'	102°	2°38'	-17'	102°	2°26'	-18'	102°	2°13'	-19'	102°	2°00'	-20'	102°	1°47'	-21'	102°	11
12	2°48'	-16'	103°	2°35'	-16'	103°	2°21'	-17'	103°	2°07'	-18'	103°	1°53'	-19'	103°	1°40'	-20'	103°	1°26'	-21'	103°	12
13	2°33'	-16'	104°	2°18'	-17'	104°	2°03'	-17'	104°	1°49'	-18'	104°	1°34'	-19'	104°	1°19'	-20'	104°	1°05'	-21'	104°	13
14	2°17'	-16'	105°	2°02'	-17'	105°	1°46'	-18'	105°	1°30'	-18'	105°	1°15'	-19'	105°	0°59'	-20'	105°	0°43'	-21'	105°	14
15	2°02'	-16'	106°	1°45'	-17'	106°	1°28'	-18'	106°	1°12'	-19'	106°	0°55'	-19'	106°	0°39'	-20'	106°	0°22'	-21'	106°	15
16	1°46'	-16'	107°	1°28'	-17'	107°	1°11'	-18'	107°	0°53'	-19'	107°	0°36'	-19'	107°	<u>0°18' -20' 107°</u>	<u>0°01' -21' 107°</u>					16
17	1°30'	-16'	108°	1°12'	-17'	108°	0°53'	-18'	108°	0°35'	-19'	108°	<u>0°16' -19' 108°</u>	0°02'	+20'	72°	0°21'	+21'	72°			17
18	1°15'	-16'	109°	0°55'	-17'	109°	0°36'	-18'	109°	<u>0°16' -19' 109°</u>	0°03'	+19'	71°	0°23'	+20'	71°	0°42'	+21'	71°			18
19	0°59'	-16'	110°	0°39'	-17'	110°	0°18'	-18'	110°	0°02'	+19'	70°	0°23'	+19'	70°	0°43'	+20'	70°	1°04'	+21'	70°	19
20	0°43'	-16'	111°	0°22'	-17'	111°	<u>0°01' -18' 111°</u>	0°21'	+19'	69°	0°42'	+19'	69°	1°04'	+20'	69°	1°25'	+21'	69°			20
21	0°27'	-16'	112°	<u>0°05' -17' 112°</u>	0°17'	+18'	68°	0°39'	+19'	68°	1°02'	+19'	68°	1°24'	+20'	68°	1°46'	+21'	68°			21
22	<u>0°12' -16' 113°</u>	0°11'	+17'	67°	0°35'	+18'	67°	0°58'	+19'	67°	1°21'	+19'	67°	1°44'	+20'	67°	2°07'	+21'	67°			22
23	0°04'	+16'	66°	0°28'	+17'	66°	0°52'	+18'	66°	1°16'	+18'	66°	1°41'	+19'	66°	2°05'	+20'	66°	2°29'	+21'	66°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

96° 264° LHA

Latitude SAME as DECLINATION

96° 264° 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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	6°47'	-15'	92°	6°46'	-16'	92°	6°44'	-17'	92°	6°42'	-18'	92°	6°39'	-19'	92°	6°37'	-20'	92°	6°35'	-21'	92°	0
1	6°33'	-15'	93°	6°30'	-16'	93°	6°27'	-17'	93°	6°24'	-18'	93°	6°21'	-19'	93°	6°17'	-20'	93°	6°14'	-21'	93°	1
2	6°18'	-15'	94°	6°14'	-16'	94°	6°10'	-17'	94°	6°06'	-18'	94°	6°02'	-19'	94°	5°57'	-20'	94°	5°53'	-21'	94°	2
3	6°03'	-15'	95°	5°58'	-16'	95°	5°53'	-17'	95°	5°48'	-18'	95°	5°43'	-19'	95°	5°38'	-20'	95°	5°32'	-21'	95°	3
4	5°48'	-15'	96°	5°42'	-16'	96°	5°36'	-17'	96°	5°30'	-18'	96°	5°24'	-19'	96°	5°18'	-20'	96°	5°11'	-21'	96°	4
5	5°33'	-15'	97°	5°26'	-16'	97°	5°19'	-17'	97°	5°12'	-18'	97°	5°05'	-19'	97°	4°57'	-20'	97°	4°50'	-21'	97°	5
6	5°18'	-15'	98°	5°10'	-16'	98°	5°02'	-17'	98°	4°54'	-18'	98°	4°46'	-19'	98°	4°37'	-20'	98°	4°29'	-21'	98°	6
7	5°03'	-15'	99°	4°54'	-16'	99°	4°45'	-17'	99°	4°35'	-18'	99°	4°26'	-19'	99°	4°17'	-20'	99°	4°08'	-21'	99°	7
8	4°47'	-15'	99°	4°37'	-16'	100°	4°27'	-17'	100°	4°17'	-18'	100°	4°07'	-19'	100°	3°57'	-20'	100°	3°46'	-21'	100°	8
9	4°32'	-16'	100°	4°21'	-17'	101°	4°10'	-18'	101°	3°59'	-18'	101°	3°48'	-19'	101°	3°36'	-20'	101°	3°25'	-21'	101°	9
10	4°16'	-16'	101°	4°04'	-17'	101°	3°52'	-18'	102°	3°40'	-19'	102°	3°28'	-20'	102°	3°16'	-20'	102°	3°04'	-21'	102°	10
11	4°01'	-16'	102°	3°48'	-17'	102°	3°35'	-18'	103°	3°22'	-19'	103°	3°09'	-20'	103°	2°55'	-21'	103°	2°42'	-21'	103°	11
12	3°45'	-16'	103°	3°31'	-17'	103°	3°17'	-18'	103°	3°03'	-19'	104°	2°49'	-20'	104°	2°35'	-21'	104°	2°21'	-22'	104°	12
13	3°29'	-16'	104°	3°14'	-17'	104°	2°59'	-18'	104°	2°44'	-19'	104°	2°29'	-20'	105°	2°14'	-21'	105°	1°59'	-22'	105°	13
14	3°13'	-16'	105°	2°57'	-17'	105°	2°42'	-18'	105°	2°26'	-19'	105°	2°10'	-20'	105°	1°54'	-21'	106°	1°38'	-22'	106°	14
15	2°57'	-16'	106°	2°41'	-17'	106°	2°24'	-18'	106°	2°07'	-19'	106°	1°50'	-20'	106°	1°33'	-21'	106°	1°16'	-22'	106°	15
16	2°42'	-16'	107°	2°24'	-17'	107°	2°06'	-18'	107°	1°48'	-19'	107°	1°30'	-20'	107°	1°12'	-21'	107°	0°54'	-22'	107°	16
17	2°26'	-16'	108°	2°07'	-17'	108°	1°48'	-18'	108°	1°29'	-19'	108°	1°10'	-20'	108°	0°52'	-21'	108°	0°33'	-22'	108°	17
18	2°10'	-16'	109°	1°50'	-17'	109°	1°30'	-18'	109°	1°10'	-19'	109°	0°51'	-20'	109°	0°31'	-21'	109°	<u>0°11' -22' 109°</u>			18
19	1°54'	-16'	110°	1°33'	-17'	110°	1°12'	-18'	110°	0°52'	-19'	110°	0°31'	-20'	110°	<u>0°10' -21' 110°</u>	0°11'	+22'	70°			19
20	1°38'	-16'	111°	1°16'	-17'	111°	0°54'	-18'	111°	0°33'	-19'	111°	<u>0°11' -20' 111°</u>	0°11'	+21'	69°	0°32'	+22'	69°			20
21	1°21'	-16'	112°	0°59'	-17'	112°	0°36'	-18'	112°	<u>0°14' -19' 112°</u>	0°09'	+20'	68°	0°31'	+21'	68°	0°54'	+22'	68°			21
22	1°05'	-16'	113°	0°42'	-17'	113°	0°18'	-18'	113°	0°05'	+19'	67°	0°29'	+20'	67°	0°52'	+21'	67°	1°15'	+22'	67°	22
23	<u>0°49' -16' 114°</u>	<u>0°25' -17' 114°</u>	<u>0°00' -18' 114°</u>	0°24'	+19'	66°	0°48'	+20'	66°	1°13'	+21'	66°	1°37'	+22'	66°							23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

97° 263° LHA

Latitude SAME as DECLINATION

97° 263° LHA

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

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

82° 278° LHA

Latitude CONTRARY to Declination

82° 278° LHA

Table with 24 rows (Dec 0-23) and 10 columns (Hc, d, Z for each hour 14-20). Values are in degrees and minutes. Includes a final row for Dec and a bottom row for hours 14-20.

98° 262° LHA

Latitude SAME as DECLINATION

98° 262° 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

Table with 24 rows (Dec 0-23) and 10 columns (Hc, d, Z for each hour 14-20). Values are in degrees and minutes. Includes a final row for Dec and a bottom row for hours 14-20.

99° 261° LHA

Latitude SAME as DECLINATION

99° 261° LHA

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

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

80° 280° LHA

Latitude CONTRARY to Declination

80° 280° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	9°42'	-15'	92°	9°39'	-16'	93°	9°37'	-17'	93°	9°34'	-18'	93°	9°30'	-19'	93°	9°27'	-20'	93°	9°23'	-21'	93°	0
1	9°27'	-15'	93°	9°24'	-16'	94°	9°20'	-17'	94°	9°16'	-18'	94°	9°11'	-19'	94°	9°07'	-20'	94°	9°03'	-21'	94°	1
2	9°12'	-15'	94°	9°08'	-16'	95°	9°03'	-17'	95°	8°58'	-18'	95°	8°52'	-19'	95°	8°47'	-20'	95°	8°42'	-21'	95°	2
3	8°57'	-15'	95°	8°51'	-16'	96°	8°45'	-17'	96°	8°39'	-18'	96°	8°33'	-19'	96°	8°27'	-20'	96°	8°20'	-21'	96°	3
4	8°42'	-15'	96°	8°35'	-16'	97°	8°28'	-17'	97°	8°21'	-18'	97°	8°14'	-19'	97°	8°07'	-20'	97°	7°59'	-21'	97°	4
5	8°26'	-16'	97°	8°19'	-17'	97°	8°11'	-18'	98°	8°03'	-19'	98°	7°54'	-20'	98°	7°46'	-21'	98°	7°38'	-22'	98°	5
6	8°11'	-16'	98°	8°02'	-17'	98°	7°53'	-18'	99°	7°44'	-19'	99°	7°35'	-20'	99°	7°26'	-21'	99°	7°16'	-22'	99°	6
7	7°55'	-16'	99°	7°45'	-17'	99°	7°35'	-18'	100°	7°25'	-19'	100°	7°15'	-20'	100°	7°05'	-21'	100°	6°54'	-22'	100°	7
8	7°39'	-16'	100°	7°28'	-17'	100°	7°18'	-18'	101°	7°07'	-19'	101°	6°55'	-20'	101°	6°44'	-21'	101°	6°33'	-22'	101°	8
9	7°23'	-16'	101°	7°11'	-17'	101°	7°00'	-18'	101°	6°48'	-19'	102°	6°35'	-20'	102°	6°23'	-21'	102°	6°11'	-22'	102°	9
10	7°07'	-16'	102°	6°54'	-17'	102°	6°41'	-18'	102°	6°28'	-19'	103°	6°15'	-20'	103°	6°02'	-21'	103°	5°49'	-22'	103°	10
11	6°51'	-16'	103°	6°37'	-17'	103°	6°23'	-18'	103°	6°09'	-19'	104°	5°55'	-20'	104°	5°41'	-21'	104°	5°27'	-22'	104°	11
12	6°35'	-16'	104°	6°20'	-17'	104°	6°05'	-18'	104°	5°50'	-19'	104°	5°35'	-20'	105°	5°20'	-21'	105°	5°05'	-22'	105°	12
13	6°18'	-17'	105°	6°02'	-18'	105°	5°47'	-19'	105°	5°31'	-19'	105°	5°15'	-20'	106°	4°59'	-21'	106°	4°42'	-22'	106°	13
14	6°01'	-17'	106°	5°45'	-18'	106°	5°28'	-19'	106°	5°11'	-20'	106°	4°54'	-21'	106°	4°37'	-21'	107°	4°20'	-22'	107°	14
15	5°45'	-17'	107°	5°27'	-18'	107°	5°09'	-19'	107°	4°52'	-20'	107°	4°34'	-21'	107°	4°16'	-22'	107°	3°58'	-22'	108°	15
16	5°28'	-17'	108°	5°09'	-18'	108°	4°51'	-19'	108°	4°32'	-20'	108°	4°13'	-21'	108°	3°54'	-22'	108°	3°35'	-22'	108°	16
17	5°11'	-17'	109°	4°52'	-18'	109°	4°32'	-19'	109°	4°12'	-20'	109°	3°53'	-21'	109°	3°33'	-22'	109°	3°13'	-23'	109°	17
18	4°54'	-17'	110°	4°34'	-18'	110°	4°13'	-19'	110°	3°53'	-20'	110°	3°32'	-21'	110°	3°11'	-22'	110°	2°50'	-23'	110°	18
19	4°37'	-17'	111°	4°16'	-18'	111°	3°54'	-19'	111°	3°33'	-20'	111°	3°11'	-21'	111°	2°49'	-22'	111°	2°28'	-23'	111°	19
20	4°20'	-17'	112°	3°58'	-18'	112°	3°35'	-19'	112°	3°13'	-20'	112°	2°50'	-21'	112°	2°28'	-22'	112°	2°05'	-23'	112°	20
21	4°03'	-17'	113°	3°40'	-18'	113°	3°16'	-19'	113°	2°53'	-20'	113°	2°29'	-21'	113°	2°06'	-22'	113°	1°42'	-23'	113°	21
22	3°46'	-17'	114°	3°21'	-18'	114°	2°57'	-19'	114°	2°33'	-20'	114°	2°08'	-21'	114°	1°44'	-22'	114°	1°20'	-23'	114°	22
23	3°28'	-17'	115°	3°03'	-18'	115°	2°38'	-19'	115°	2°13'	-20'	115°	1°48'	-21'	115°	1°22'	-22'	115°	0°57'	-23'	115°	23

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	10°40'	-15'	93°	10°37'	-16'	93°	10°34'	-17'	93°	10°31'	-18'	93°	10°27'	-19'	93°	10°24'	-20'	94°	10°20'	-21'	94°	0
1	10°25'	-15'	94°	10°21'	-16'	94°	10°17'	-17'	94°	10°13'	-18'	94°	10°08'	-19'	94°	10°04'	-20'	95°	9°59'	-21'	95°	1
2	10°10'	-15'	95°	10°05'	-16'	95°	10°00'	-17'	95°	9°55'	-18'	95°	9°49'	-19'	95°	9°44'	-20'	96°	9°38'	-21'	96°	2
3	9°55'	-15'	96°	9°49'	-16'	96°	9°43'	-17'	96°	9°37'	-18'	96°	9°30'	-19'	96°	9°23'	-20'	96°	9°16'	-21'	97°	3
4	9°40'	-16'	97°	9°33'	-17'	97°	9°25'	-18'	97°	9°18'	-19'	97°	9°11'	-20'	97°	9°03'	-21'	97°	8°55'	-22'	98°	4
5	9°24'	-16'	98°	9°16'	-17'	98°	9°08'	-18'	98°	9°00'	-19'	98°	8°51'	-20'	98°	8°42'	-21'	98°	8°33'	-22'	99°	5
6	9°08'	-16'	99°	8°59'	-17'	99°	8°50'	-18'	99°	8°41'	-19'	99°	8°31'	-20'	99°	8°22'	-21'	99°	8°12'	-22'	99°	6
7	8°52'	-16'	100°	8°42'	-17'	100°	8°32'	-18'	100°	8°22'	-19'	100°	8°11'	-20'	100°	8°01'	-21'	100°	7°50'	-22'	100°	7
8	8°36'	-16'	101°	8°25'	-17'	101°	8°14'	-18'	101°	8°03'	-19'	101°	7°51'	-20'	101°	7°40'	-21'	101°	7°28'	-22'	101°	8
9	8°20'	-16'	102°	8°08'	-17'	102°	7°56'	-18'	102°	7°44'	-19'	102°	7°31'	-20'	102°	7°19'	-21'	102°	7°06'	-22'	102°	9
10	8°04'	-16'	102°	7°51'	-17'	103°	7°38'	-18'	103°	7°24'	-19'	103°	7°11'	-20'	103°	6°57'	-21'	103°	6°44'	-22'	103°	10
11	7°48'	-17'	103°	7°34'	-18'	104°	7°19'	-19'	104°	7°05'	-20'	104°	6°51'	-20'	104°	6°36'	-21'	104°	6°22'	-22'	104°	11
12	7°31'	-17'	104°	7°16'	-18'	105°	7°01'	-19'	105°	6°46'	-20'	105°	6°30'	-21'	105°	6°15'	-22'	105°	5°59'	-22'	105°	12
13	7°14'	-17'	105°	6°58'	-18'	106°	6°42'	-19'	106°	6°26'	-20'	106°	6°10'	-21'	106°	5°53'	-22'	106°	5°37'	-23'	106°	13
14	6°57'	-17'	106°	6°40'	-18'	106°	6°23'	-19'	107°	6°06'	-20'	107°	5°49'	-21'	107°	5°32'	-22'	107°	5°14'	-23'	107°	14
15	6°40'	-17'	107°	6°23'	-18'	107°	6°04'	-19'	108°	5°46'	-20'	108°	5°28'	-21'	108°	5°10'	-22'	108°	4°51'	-23'	108°	15
16	6°23'	-17'	108°	6°04'	-18'	108°	5°46'	-19'	108°	5°26'	-20'	109°	5°07'	-21'	109°	4°48'	-22'	109°	4°29'	-23'	109°	16
17	6°06'	-17'	109°	5°46'	-18'	109°	5°26'	-19'	109°	5°06'	-20'	110°	4°46'	-21'	110°	4°26'	-22'	110°	4°06'	-23'	110°	17
18	5°49'	-17'	110°	5°28'	-18'	110°	5°07'	-19'	110°	4°46'	-20'	110°	4°25'	-21'	111°	4°04'	-22'	111°	3°43'	-23'	111°	18
19	5°32'	-17'	111°	5°10'	-18'	111°	4°48'	-19'	111°	4°26'	-20'	111°	4°04'	-21'	111°	3°42'	-22'	112°	3°20'	-23'	112°	19
20	5°14'	-18'	112°	4°51'	-18'	112°	4°29'	-19'	112°	4°06'	-20'	112°	3°43'	-21'	112°	3°20'	-22'	112°	2°57'	-23'	113°	20
21	4°57'	-18'	113°	4°33'	-19'	113°	4°09'	-19'	113°	3°46'	-20'	113°	3°22'	-21'	113°	2°58'	-22'	113°	2°34'	-23'	113°	21
22	4°39'	-18'	114°	4°14'	-19'	114°	3°50'	-20'	114°	3°25'	-20'	114°	3°01'	-21'	114°	2°36'	-22'	114°	2°11'	-23'	114°	22
23	4°21'	-18'	115°	3°56'	-19'	115°	3°30'	-20'	115°	3°05'	-20'	115°	2°39'	-21'	115°	2°14'	-22'	115°	1°48'	-23'	115°	23

79° 281° LHA

Latitude CONTRARY to DECLINATION

79° 281° LHA

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

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

78° 282° LHA

Latitude CONTRARY to Declination

78° 282° LHA

Table with columns for Dec° (0-23) and sub-columns for 14, 15, 16, 17, 18, 19, 20, and Dec°. Each cell contains three values (Hc°, d', Z°).

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

Table with columns for Dec° (0-23) and sub-columns for 14, 15, 16, 17, 18, 19, 20, and Dec°. Each cell contains three values (Hc°, d', Z°).

77° 283° LHA

Latitude CONTRARY to DECLINATION

77° 283° LHA

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

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

76° 284° LHA

Latitude CONTRARY to Declination

76° 284° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	13°35'	-15'	93°	13°31'	-16'	94°	13°27'	-17'	94°	13°23'	-18'	94°	13°18'	-19'	94°	13°13'	-20'	95°	13°08'	-21'	95°	0
1	13°20'	-15'	94°	13°15'	-16'	95°	13°10'	-17'	95°	13°04'	-18'	95°	12°59'	-19'	95°	12°53'	-20'	96°	12°47'	-21'	96°	1
2	13°04'	-16'	95°	12°58'	-17'	96°	12°52'	-18'	96°	12°46'	-19'	96°	12°40'	-20'	96°	12°33'	-21'	97°	12°26'	-22'	97°	2
3	12°49'	-16'	96°	12°42'	-17'	97°	12°35'	-18'	97°	12°28'	-19'	97°	12°20'	-20'	97°	12°12'	-21'	98°	12°04'	-22'	98°	3
4	12°33'	-16'	97°	12°25'	-17'	98°	12°17'	-18'	98°	12°09'	-19'	98°	12°00'	-20'	98°	11°51'	-21'	98°	11°42'	-22'	99°	4
5	12°17'	-16'	98°	12°08'	-17'	99°	11°59'	-18'	99°	11°50'	-19'	99°	11°40'	-20'	99°	11°30'	-21'	99°	11°20'	-22'	100°	5
6	12°01'	-16'	99°	11°51'	-17'	100°	11°41'	-18'	100°	11°31'	-19'	100°	11°20'	-20'	100°	11°09'	-21'	100°	10°58'	-22'	101°	6
7	11°45'	-17'	100°	11°34'	-18'	101°	11°22'	-19'	101°	11°11'	-20'	101°	11°00'	-21'	101°	10°48'	-22'	101°	10°36'	-22'	102°	7
8	11°28'	-17'	101°	11°16'	-18'	102°	11°04'	-19'	102°	10°52'	-20'	102°	10°39'	-21'	102°	10°26'	-22'	102°	10°14'	-23'	102°	8
9	11°11'	-17'	102°	10°58'	-18'	103°	10°45'	-19'	103°	10°32'	-20'	103°	10°18'	-21'	103°	10°05'	-22'	103°	9°51'	-23'	103°	9
10	10°54'	-17'	103°	10°40'	-18'	103°	10°26'	-19'	104°	10°12'	-20'	104°	9°57'	-21'	104°	9°43'	-22'	104°	9°28'	-23'	104°	10
11	10°37'	-17'	104°	10°22'	-18'	104°	10°07'	-19'	105°	9°52'	-20'	105°	9°36'	-21'	105°	9°21'	-22'	105°	9°05'	-23'	105°	11
12	10°20'	-17'	105°	10°04'	-18'	105°	9°48'	-19'	106°	9°32'	-20'	106°	9°15'	-21'	106°	8°59'	-22'	106°	8°42'	-23'	106°	12
13	10°02'	-18'	106°	9°45'	-19'	106°	9°28'	-20'	107°	9°11'	-21'	107°	8°54'	-21'	107°	8°36'	-22'	107°	8°19'	-23'	107°	13
14	9°45'	-18'	107°	9°27'	-19'	107°	9°09'	-20'	108°	8°51'	-21'	108°	8°32'	-22'	108°	8°14'	-23'	108°	7°55'	-23'	108°	14
15	9°27'	-18'	108°	9°08'	-19'	108°	8°49'	-20'	108°	8°30'	-21'	109°	8°11'	-22'	109°	7°51'	-23'	109°	7°32'	-24'	109°	15
16	9°09'	-18'	109°	8°49'	-19'	109°	8°29'	-20'	109°	8°09'	-21'	110°	7°49'	-22'	110°	7°29'	-23'	110°	7°08'	-24'	110°	16
17	8°51'	-18'	110°	8°30'	-19'	110°	8°09'	-20'	110°	7°48'	-21'	111°	7°27'	-22'	111°	7°06'	-23'	111°	6°45'	-24'	111°	17
18	8°32'	-18'	111°	8°11'	-19'	111°	7°49'	-20'	111°	7°27'	-21'	111°	7°05'	-22'	112°	6°43'	-23'	112°	6°21'	-24'	112°	18
19	8°14'	-19'	112°	7°51'	-19'	112°	7°29'	-20'	112°	7°06'	-21'	112°	6°43'	-22'	113°	6°20'	-23'	113°	5°57'	-24'	113°	19
20	7°55'	-19'	113°	7°32'	-20'	113°	7°08'	-21'	113°	6°45'	-21'	113°	6°21'	-22'	113°	5°57'	-23'	114°	5°33'	-24'	114°	20
21	7°37'	-19'	114°	7°12'	-20'	114°	6°48'	-21'	114°	6°23'	-22'	114°	5°58'	-22'	114°	5°34'	-23'	114°	5°09'	-24'	115°	21
22	7°18'	-19'	115°	6°53'	-20'	115°	6°27'	-21'	115°	6°02'	-22'	115°	5°36'	-23'	115°	5°10'	-23'	115°	4°44'	-24'	115°	22
23	6°59'	-19'	116°	6°33'	-20'	116°	6°06'	-21'	116°	5°40'	-22'	116°	5°13'	-23'	116°	4°47'	-23'	116°	4°20'	-24'	116°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	14°33'	-15'	94°	14°29'	-16'	94°	14°24'	-17'	94°	14°20'	-18'	94°	14°15'	-19'	95°	14°10'	-20'	95°	14°05'	-21'	95°	0
1	14°18'	-15'	95°	14°12'	-16'	95°	14°07'	-17'	95°	14°02'	-18'	95°	13°56'	-19'	96°	13°50'	-20'	96°	13°43'	-21'	96°	1
2	14°02'	-16'	96°	13°56'	-17'	96°	13°50'	-18'	96°	13°43'	-19'	96°	13°36'	-20'	97°	13°29'	-21'	97°	13°22'	-22'	97°	2
3	13°47'	-16'	97°	13°39'	-17'	97°	13°32'	-18'	97°	13°24'	-19'	97°	13°17'	-20'	98°	13°08'	-21'	98°	13°00'	-22'	98°	3
4	13°31'	-16'	98°	13°23'	-17'	98°	13°14'	-18'	98°	13°06'	-19'	98°	12°57'	-20'	99°	12°48'	-21'	99°	12°38'	-22'	99°	4
5	13°15'	-16'	99°	13°05'	-17'	99°	12°56'	-18'	99°	12°46'	-19'	99°	12°36'	-20'	100°	12°26'	-21'	100°	12°16'	-22'	100°	5
6	12°58'	-17'	100°	12°48'	-18'	100°	12°38'	-19'	100°	12°27'	-20'	100°	12°16'	-21'	101°	12°05'	-22'	101°	11°54'	-23'	101°	6
7	12°42'	-17'	101°	12°31'	-18'	101°	12°19'	-19'	101°	12°07'	-20'	101°	11°56'	-21'	102°	11°44'	-22'	102°	11°31'	-23'	102°	7
8	12°25'	-17'	102°	12°13'	-18'	102°	12°00'	-19'	102°	11°48'	-20'	102°	11°35'	-21'	102°	11°22'	-22'	103°	11°09'	-23'	103°	8
9	12°08'	-17'	103°	11°55'	-18'	103°	11°41'	-19'	103°	11°28'	-20'	103°	11°14'	-21'	103°	11°00'	-22'	104°	10°46'	-23'	104°	9
10	11°51'	-17'	104°	11°37'	-18'	104°	11°22'	-19'	104°	11°08'	-20'	104°	10°53'	-21'	104°	10°38'	-22'	105°	10°23'	-23'	105°	10
11	11°33'	-18'	105°	11°18'	-19'	105°	11°03'	-20'	105°	10°47'	-21'	105°	10°32'	-21'	105°	10°16'	-22'	106°	9°59'	-23'	106°	11
12	11°16'	-18'	106°	11°00'	-19'	106°	10°43'	-20'	106°	10°27'	-21'	106°	10°10'	-22'	106°	9°53'	-23'	106°	9°36'	-24'	107°	12
13	10°58'	-18'	107°	10°41'	-19'	107°	10°24'	-20'	107°	10°06'	-21'	107°	9°48'	-22'	107°	9°31'	-23'	107°	9°13'	-24'	108°	13
14	10°40'	-18'	107°	10°22'	-19'	108°	10°04'	-20'	108°	9°45'	-21'	108°	9°27'	-22'	108°	9°08'	-23'	108°	8°49'	-24'	108°	14
15	10°22'	-18'	108°	10°03'	-19'	109°	9°44'	-20'	109°	9°24'	-21'	109°	9°05'	-22'	109°	8°45'	-23'	109°	8°25'	-24'	109°	15
16	10°04'	-18'	109°	9°44'	-19'	110°	9°23'	-20'	110°	9°03'	-21'	110°	8°43'	-22'	110°	8°22'	-23'	110°	8°01'	-24'	110°	16
17	9°45'	-19'	110°	9°24'	-20'	111°	9°03'	-21'	111°	8°42'	-21'	111°	8°20'	-22'	111°	7°59'	-23'	111°	7°37'	-24'	111°	17
18	9°27'	-19'	111°	9°05'	-20'	112°	8°43'	-21'	112°	8°20'	-22'	112°	7°58'	-22'	112°	7°36'	-23'	112°	7°13'	-24'	112°	18
19	9°08'	-19'	112°	8°45'	-20'	112°	8°22'	-21'	113°	7°59'	-22'	113°	7°36'	-23'	113°	7°12'	-23'	113°	6°49'	-24'	113°	19
20	8°49'	-19'	113°	8°25'	-20'	113°	8°01'	-21'	114°	7°37'	-22'	114°	7°13'	-23'	114°	6°49'	-24'	114°	6°24'	-24'	114°	20
21	8°30'	-19'	114°	8°05'	-20'	114°	7°40'	-21'	115°	7°15'	-22'	115°	6°50'	-23'	115°	6°25'	-24'	115°	6°00'	-25'	115°	21
22	8°11'	-19'	115°	7°45'	-20'	115°	7°19'	-21'	115°	6°53'	-22'	116°	6°27'	-23'	116°	6°01'	-24'	116°	5°35'	-25'	116°	22
23	7°51'	-19'	116°	7°25'	-20'	116°	6°58'	-21'	116°	6°31'	-22'	117°	6°05'	-23'	117°	5°38'	-24'	117°	5°11'	-25'	117°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

75° 285° LHA

Latitude CONTRARY to DECLINATION

75° 285° 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 CONTRARY to Declination

74° 286° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	15°31'	-15'	94°	15°26'	-16'	94°	15°22'	-17'	95°	15°17'	-18'	95°	15°12'	-19'	95°	15°06'	-20'	95°	15°01'	-21'	96°	0
1	15°16'	-15'	95°	15°10'	-17'	95°	15°05'	-18'	96°	14°59'	-19'	96°	14°53'	-20'	96°	14°46'	-21'	96°	14°39'	-22'	97°	1
2	15°00'	-16'	96°	14°54'	-17'	96°	14°47'	-18'	97°	14°40'	-19'	97°	14°33'	-20'	97°	14°25'	-21'	97°	14°18'	-22'	98°	2
3	14°44'	-16'	97°	14°37'	-17'	97°	14°29'	-18'	97°	14°21'	-19'	98°	14°13'	-20'	98°	14°05'	-21'	98°	13°56'	-22'	98°	3
4	14°28'	-16'	98°	14°20'	-17'	98°	14°11'	-18'	98°	14°02'	-19'	99°	13°53'	-20'	99°	13°44'	-21'	99°	13°34'	-22'	99°	4
5	14°12'	-16'	99°	14°03'	-18'	99°	13°53'	-19'	99°	13°43'	-20'	100°	13°33'	-21'	100°	13°22'	-22'	100°	13°12'	-22'	100°	5
6	13°56'	-17'	100°	13°45'	-18'	100°	13°34'	-19'	100°	13°23'	-20'	101°	13°12'	-21'	101°	13°01'	-22'	101°	12°49'	-23'	101°	6
7	13°39'	-17'	101°	13°27'	-18'	101°	13°16'	-19'	101°	13°04'	-20'	102°	12°51'	-21'	102°	12°39'	-22'	102°	12°26'	-23'	102°	7
8	13°22'	-17'	102°	13°09'	-18'	102°	12°57'	-19'	102°	12°44'	-20'	103°	12°31'	-21'	103°	12°17'	-22'	103°	12°03'	-23'	103°	8
9	13°05'	-17'	103°	12°51'	-18'	103°	12°38'	-19'	103°	12°24'	-20'	104°	12°09'	-21'	104°	11°55'	-22'	104°	11°40'	-23'	104°	9
10	12°47'	-18'	104°	12°33'	-19'	104°	12°18'	-20'	104°	12°03'	-21'	105°	11°48'	-22'	105°	11°33'	-22'	105°	11°17'	-23'	105°	10
11	12°30'	-18'	105°	12°14'	-19'	105°	11°59'	-20'	105°	11°43'	-21'	105°	11°26'	-22'	106°	11°10'	-23'	106°	10°54'	-24'	106°	11
12	12°12'	-18'	106°	11°55'	-19'	106°	11°39'	-20'	106°	11°22'	-21'	106°	11°05'	-22'	107°	10°47'	-23'	107°	10°30'	-24'	107°	12
13	11°54'	-18'	107°	11°36'	-19'	107°	11°19'	-20'	107°	11°01'	-21'	107°	10°43'	-22'	108°	10°25'	-23'	108°	10°06'	-24'	108°	13
14	11°36'	-18'	108°	11°17'	-19'	108°	10°59'	-20'	108°	10°40'	-21'	108°	10°21'	-22'	109°	10°02'	-23'	109°	9°42'	-24'	109°	14
15	11°17'	-19'	109°	10°58'	-20'	109°	10°38'	-21'	109°	10°18'	-21'	109°	9°59'	-22'	109°	9°38'	-23'	110°	9°18'	-24'	110°	15
16	10°59'	-19'	110°	10°38'	-20'	110°	10°18'	-21'	110°	9°57'	-22'	110°	9°36'	-23'	110°	9°15'	-23'	111°	8°54'	-24'	111°	16
17	10°40'	-19'	111°	10°18'	-20'	111°	9°57'	-21'	111°	9°35'	-22'	111°	9°14'	-23'	111°	8°52'	-24'	112°	8°30'	-25'	112°	17
18	10°21'	-19'	112°	9°59'	-20'	112°	9°36'	-21'	112°	9°14'	-22'	112°	8°51'	-23'	112°	8°28'	-24'	112°	8°05'	-25'	113°	18
19	10°02'	-19'	113°	9°38'	-20'	113°	9°15'	-21'	113°	8°52'	-22'	113°	8°28'	-23'	113°	8°04'	-24'	113°	7°40'	-25'	113°	19
20	9°42'	-19'	114°	9°18'	-20'	114°	8°54'	-21'	114°	8°30'	-22'	114°	8°05'	-23'	114°	7°40'	-24'	114°	7°16'	-25'	114°	20
21	9°23'	-20'	115°	8°58'	-21'	115°	8°33'	-21'	115°	8°07'	-22'	115°	7°42'	-23'	115°	7°17'	-24'	115°	6°51'	-25'	115°	21
22	9°03'	-20'	116°	8°37'	-21'	116°	8°11'	-22'	116°	7°45'	-22'	116°	7°19'	-23'	116°	6°52'	-24'	116°	6°26'	-25'	116°	22
23	<u>8°43'</u>	<u>-20'</u>	<u>116°</u>	<u>8°17'</u>	<u>-21'</u>	<u>117°</u>	<u>7°50'</u>	<u>-22'</u>	<u>117°</u>	<u>7°23'</u>	<u>-23'</u>	<u>117°</u>	<u>6°55'</u>	<u>-23'</u>	<u>117°</u>	<u>6°28'</u>	<u>-24'</u>	<u>117°</u>	<u>6°01'</u>	<u>-25'</u>	<u>117°</u>	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	16°29'	-15'	94°	16°24'	-16'	95°	16°19'	-17'	95°	16°14'	-18'	95°	16°09'	-19'	95°	16°03'	-20'	96°	15°57'	-21'	96°	0
1	16°14'	-16'	95°	16°08'	-17'	96°	16°02'	-18'	96°	15°56'	-19'	96°	15°49'	-20'	96°	15°42'	-21'	97°	15°35'	-22'	97°	1
2	15°58'	-16'	96°	15°51'	-17'	97°	15°44'	-18'	97°	15°37'	-19'	97°	15°30'	-20'	97°	15°22'	-21'	98°	15°14'	-22'	98°	2
3	15°42'	-16'	97°	15°34'	-17'	98°	15°26'	-18'	98°	15°18'	-19'	98°	15°10'	-20'	98°	15°01'	-21'	99°	14°52'	-22'	99°	3
4	15°26'	-16'	98°	15°17'	-17'	99°	15°08'	-18'	99°	14°59'	-19'	99°	14°49'	-20'	99°	14°40'	-21'	100°	14°29'	-22'	100°	4
5	15°10'	-17'	99°	15°00'	-18'	100°	14°50'	-19'	100°	14°39'	-20'	100°	14°29'	-21'	100°	14°18'	-22'	101°	14°07'	-23'	101°	5
6	14°53'	-17'	100°	14°42'	-18'	100°	14°31'	-19'	101°	14°20'	-20'	101°	14°08'	-21'	101°	13°56'	-22'	102°	13°44'	-23'	102°	6
7	14°36'	-17'	101°	14°24'	-18'	101°	14°12'	-19'	102°	14°00'	-20'	102°	13°47'	-21'	102°	13°34'	-22'	102°	13°21'	-23'	103°	7
8	14°19'	-17'	102°	14°06'	-18'	102°	13°53'	-19'	103°	13°40'	-20'	103°	13°26'	-21'	103°	13°12'	-22'	103°	12°58'	-23'	104°	8
9	14°02'	-18'	103°	13°48'	-19'	103°	13°34'	-20'	104°	13°19'	-21'	104°	13°05'	-22'	104°	12°50'	-23'	104°	12°35'	-24'	105°	9
10	13°44'	-18'	104°	13°29'	-19'	104°	13°14'	-20'	105°	12°59'	-21'	105°	12°43'	-22'	105°	12°27'	-23'	105°	12°11'	-24'	106°	10
11	13°26'	-18'	105°	13°10'	-19'	105°	12°54'	-20'	106°	12°38'	-21'	106°	12°21'	-22'	106°	12°05'	-23'	106°	11°48'	-24'	106°	11
12	13°08'	-18'	106°	12°51'	-19'	106°	12°34'	-20'	107°	12°17'	-21'	107°	11°59'	-22'	107°	11°42'	-23'	107°	11°24'	-24'	107°	12
13	12°50'	-19'	107°	12°32'	-20'	107°	12°14'	-20'	108°	11°56'	-21'	108°	11°37'	-22'	108°	11°19'	-23'	108°	11°00'	-24'	108°	13
14	12°31'	-19'	108°	12°12'	-20'	108°	11°53'	-21'	109°	11°34'	-22'	109°	11°15'	-23'	109°	10°55'	-23'	109°	10°36'	-24'	109°	14
15	12°12'	-19'	109°	11°53'	-20'	109°	11°33'	-21'	109°	11°13'	-22'	110°	10°52'	-23'	110°	10°32'	-24'	110°	10°11'	-25'	110°	15
16	11°53'	-19'	110°	11°33'	-20'	110°	11°12'	-21'	110°	10°51'	-22'	111°	10°30'	-23'	111°	10°08'	-24'	111°	9°47'	-25'	111°	16
17	11°34'	-19'	111°	11°13'	-20'	111°	10°51'	-21'	111°	10°29'	-22'	112°	10°07'	-23'	112°	9°44'	-24'	112°	9°22'	-25'	112°	17
18	11°15'	-20'	112°	10°52'	-20'	112°	10°30'	-21'	112°	10°07'	-22'	113°	9°44'	-23'	113°	9°20'	-24'	113°	8°57'	-25'	113°	18
19	10°55'	-20'	113°	10°32'	-21'	113°	10°08'	-22'	113°	9°44'	-22'	113°	9°20'	-23'	114°	8°56'	-24'	114°	8°32'	-25'	114°	19
20	10°36'	-20'	114°	10°11'	-21'	114°	9°47'	-22'	114°	9°22'	-23'	114°	8°57'	-23'	115°	8°32'	-24'	115°	8°07'	-25'	115°	20
21	10°16'	-20'	115°	9°50'	-21'	115°	9°25'	-22'	115°	8°59'	-23'	115°	8°34'	-24'	115°	8°08'	-24'	116°	7°42'	-25'	116°	21
22	9°56'	-20'	116°	9°29'	-21'	116°	9°03'	-22'	116°	8°37'	-23'	116°	8°10'	-24'	116°	7°43'	-25'	117°	7°16'	-25'	117°	22
23	<u>9°35'</u>	<u>-20'</u>	<u>117°</u>	<u>9°08'</u>	<u>-21'</u>	<u>117°</u>	<u>8°41'</u>	<u>-22'</u>	<u>117°</u>	<u>8°14'</u>	<u>-23'</u>	<u>117°</u>	<u>7°46'</u>	<u>-24'</u>	<u>117°</u>	<u>7°19'</u>	<u>-25'</u>	<u>117°</u>	<u>6°51'</u>	<u>-26'</u>	<u>118°</u>	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

73° 287° LHA

Latitude CONTRARY to DECLINATION

73° 287° LHA

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

72° 288° LHA

Latitude CONTRARY to Declination

72° 288° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	17°27'	-15'	94°	17°22'	-16'	95°	17°17'	-17'	95°	17°11'	-19'	95°	17°05'	-20'	96°	16°59'	-21'	96°	16°53'	-22'	96°	0
1	17°12'	-16'	96°	17°06'	-17'	96°	16°59'	-18'	96°	16°53'	-19'	96°	16°46'	-20'	97°	16°39'	-21'	97°	16°31'	-22'	97°	1
2	16°56'	-16'	97°	16°49'	-17'	97°	16°42'	-18'	97°	16°34'	-19'	97°	16°26'	-20'	98°	16°18'	-21'	98°	16°09'	-22'	98°	2
3	16°40'	-16'	98°	16°32'	-17'	98°	16°24'	-18'	98°	16°15'	-19'	98°	16°06'	-20'	99°	15°57'	-21'	99°	15°47'	-22'	99°	3
4	16°24'	-17'	99°	16°15'	-18'	99°	16°05'	-19'	99°	15°56'	-20'	99°	15°46'	-21'	100°	15°35'	-22'	100°	15°25'	-23'	100°	4
5	16°07'	-17'	100°	15°57'	-18'	100°	15°47'	-19'	100°	15°36'	-20'	100°	15°25'	-21'	101°	15°14'	-22'	101°	15°02'	-23'	101°	5
6	15°50'	-17'	101°	15°39'	-18'	101°	15°28'	-19'	101°	15°16'	-20'	101°	15°04'	-21'	102°	14°52'	-22'	102°	14°39'	-23'	102°	6
7	15°33'	-17'	102°	15°21'	-18'	102°	15°09'	-19'	102°	14°56'	-20'	102°	14°43'	-21'	103°	14°30'	-22'	103°	14°16'	-23'	103°	7
8	15°16'	-18'	103°	15°03'	-19'	103°	14°49'	-20'	103°	14°36'	-21'	103°	14°22'	-22'	104°	14°07'	-23'	104°	13°53'	-24'	104°	8
9	14°58'	-18'	104°	14°44'	-19'	104°	14°30'	-20'	104°	14°15'	-21'	104°	14°00'	-22'	105°	13°45'	-23'	105°	13°29'	-24'	105°	9
10	14°40'	-18'	104°	14°25'	-19'	105°	14°10'	-20'	105°	13°54'	-21'	105°	13°38'	-22'	105°	13°22'	-23'	106°	13°06'	-24'	106°	10
11	14°22'	-18'	105°	14°06'	-19'	106°	13°50'	-20'	106°	13°33'	-21'	106°	13°16'	-22'	106°	12°59'	-23'	107°	12°42'	-24'	107°	11
12	14°04'	-19'	106°	13°47'	-20'	107°	13°29'	-21'	107°	13°12'	-22'	107°	12°54'	-22'	107°	12°36'	-23'	108°	12°18'	-24'	108°	12
13	13°45'	-19'	107°	13°27'	-20'	108°	13°09'	-21'	108°	12°50'	-22'	108°	12°31'	-23'	108°	12°12'	-24'	109°	11°53'	-25'	109°	13
14	13°26'	-19'	108°	13°07'	-20'	109°	12°48'	-21'	109°	12°28'	-22'	109°	12°09'	-23'	109°	11°49'	-24'	109°	11°29'	-25'	110°	14
15	13°07'	-19'	109°	12°47'	-20'	110°	12°27'	-21'	110°	12°07'	-22'	110°	11°46'	-23'	110°	11°25'	-24'	110°	11°04'	-25'	111°	15
16	12°48'	-19'	110°	12°27'	-20'	111°	12°06'	-21'	111°	11°44'	-22'	111°	11°23'	-23'	111°	11°01'	-24'	111°	10°39'	-25'	112°	16
17	12°28'	-20'	111°	12°07'	-21'	112°	11°44'	-22'	112°	11°22'	-22'	112°	11°00'	-23'	112°	10°37'	-24'	112°	10°14'	-25'	112°	17
18	12°09'	-20'	112°	11°46'	-21'	112°	11°23'	-22'	113°	11°00'	-23'	113°	10°36'	-24'	113°	10°13'	-24'	113°	9°49'	-25'	113°	18
19	11°49'	-20'	113°	11°25'	-21'	113°	11°01'	-22'	114°	10°37'	-23'	114°	10°13'	-24'	114°	9°48'	-25'	114°	9°24'	-25'	114°	19
20	11°29'	-20'	114°	11°04'	-21'	114°	10°39'	-22'	115°	10°14'	-23'	115°	9°49'	-24'	115°	9°24'	-25'	115°	8°58'	-26'	115°	20
21	11°08'	-20'	115°	10°43'	-21'	115°	10°17'	-22'	116°	9°51'	-23'	116°	9°25'	-24'	116°	8°59'	-25'	116°	8°32'	-26'	116°	21
22	10°48'	-21'	116°	10°21'	-22'	116°	9°55'	-22'	116°	9°28'	-23'	117°	9°01'	-24'	117°	8°34'	-25'	117°	8°07'	-26'	117°	22
23	10°27'	-21'	117°	10°00'	-22'	117°	9°32'	-23'	117°	9°05'	-23'	118°	8°37'	-24'	118°	8°09'	-25'	118°	7°41'	-26'	118°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

72° 288° LHA

Latitude CONTRARY to DECLINATION

72° 288° LHA

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

71° 289° LHA

Latitude CONTRARY to Declination

71° 289° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	18°25'	-15'	95°	18°20'	-17'	95°	18°14'	-18'	95°	18°08'	-19'	96°	18°02'	-20'	96°	17°56'	-21'	96°	17°49'	-22'	97°	0
1	18°09'	-16'	96°	18°03'	-17'	96°	17°57'	-18'	96°	17°50'	-19'	97°	17°43'	-20'	97°	17°35'	-21'	97°	17°27'	-22'	98°	1
2	17°54'	-16'	97°	17°46'	-17'	97°	17°39'	-18'	97°	17°31'	-19'	98°	17°23'	-20'	98°	17°14'	-21'	98°	17°05'	-22'	99°	2
3	17°38'	-16'	98°	17°29'	-17'	98°	17°21'	-18'	98°	17°12'	-20'	99°	17°02'	-21'	99°	16°53'	-22'	99°	16°43'	-23'	100°	3
4	17°21'	-17'	99°	17°12'	-18'	99°	17°02'	-19'	99°	16°52'	-20'	100°	16°42'	-21'	100°	16°31'	-22'	100°	16°20'	-23'	101°	4
5	17°04'	-17'	100°	16°54'	-18'	100°	16°43'	-19'	100°	16°32'	-20'	101°	16°21'	-21'	101°	16°09'	-22'	101°	15°58'	-23'	102°	5
6	16°47'	-17'	101°	16°36'	-18'	101°	16°24'	-19'	101°	16°12'	-20'	102°	16°00'	-21'	102°	15°47'	-22'	102°	15°35'	-23'	103°	6
7	16°30'	-18'	102°	16°18'	-19'	102°	16°05'	-20'	102°	15°52'	-21'	103°	15°39'	-22'	103°	15°25'	-23'	103°	15°11'	-24'	103°	7
8	16°13'	-18'	103°	15°59'	-19'	103°	15°45'	-20'	103°	15°31'	-21'	104°	15°17'	-22'	104°	15°03'	-23'	104°	14°48'	-24'	104°	8
9	15°55'	-18'	104°	15°40'	-19'	104°	15°26'	-20'	104°	15°11'	-21'	105°	14°55'	-22'	105°	14°40'	-23'	105°	14°24'	-24'	105°	9
10	15°37'	-18'	105°	15°21'	-19'	105°	15°05'	-20'	105°	14°49'	-21'	106°	14°33'	-22'	106°	14°17'	-23'	106°	14°00'	-24'	106°	10
11	15°18'	-19'	106°	15°02'	-20'	106°	14°45'	-21'	106°	14°28'	-22'	107°	14°11'	-23'	107°	13°53'	-23'	107°	13°36'	-24'	107°	11
12	15°00'	-19'	107°	14°42'	-20'	107°	14°24'	-21'	107°	14°06'	-22'	108°	13°48'	-23'	108°	13°30'	-24'	108°	13°11'	-25'	108°	12
13	14°41'	-19'	108°	14°22'	-20'	108°	14°04'	-21'	108°	13°45'	-22'	108°	13°26'	-23'	109°	13°06'	-24'	109°	12°47'	-25'	109°	13
14	14°22'	-19'	109°	14°02'	-20'	109°	13°42'	-21'	109°	13°23'	-22'	109°	13°03'	-23'	110°	12°42'	-24'	110°	12°22'	-25'	110°	14
15	14°02'	-20'	110°	13°42'	-21'	110°	13°21'	-22'	110°	13°00'	-22'	110°	12°39'	-23'	111°	12°18'	-24'	111°	11°57'	-25'	111°	15
16	13°42'	-20'	111°	13°21'	-21'	111°	13°00'	-22'	111°	12°38'	-23'	111°	12°16'	-24'	112°	11°54'	-24'	112°	11°32'	-25'	112°	16
17	13°23'	-20'	112°	13°00'	-21'	112°	12°38'	-22'	112°	12°15'	-23'	112°	11°52'	-24'	112°	11°29'	-25'	113°	11°06'	-26'	113°	17
18	13°03'	-20'	113°	12°39'	-21'	113°	12°16'	-22'	113°	11°52'	-23'	113°	11°29'	-24'	113°	11°05'	-25'	114°	10°41'	-26'	114°	18
19	12°42'	-20'	114°	12°18'	-21'	114°	11°54'	-22'	114°	11°29'	-23'	114°	11°05'	-24'	114°	10°40'	-25'	115°	10°15'	-26'	115°	19
20	12°22'	-21'	115°	11°57'	-22'	115°	11°32'	-23'	115°	11°06'	-23'	115°	10°41'	-24'	115°	10°15'	-25'	115°	9°49'	-26'	116°	20
21	12°01'	-21'	116°	11°35'	-22'	116°	11°09'	-23'	116°	10°43'	-24'	116°	10°16'	-24'	116°	9°50'	-25'	116°	9°23'	-26'	117°	21
22	11°40'	-21'	116°	11°13'	-22'	117°	10°46'	-23'	117°	10°19'	-24'	117°	9°52'	-25'	117°	9°24'	-25'	117°	8°57'	-26'	117°	22
23	11°19'	-21'	117°	10°51'	-22'	118°	10°24'	-23'	118°	9°55'	-24'	118°	9°27'	-25'	118°	8°59'	-26'	118°	8°31'	-26'	118°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

71° 289° LHA

Latitude CONTRARY to DECLINATION

71° 289° LHA

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

70° 290° LHA

Latitude CONTRARY to Declination

70° 290° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	19°23'	-16'	95°	19°17'	-17'	95°	19°12'	-18'	96°	19°05'	-19'	96°	18°59'	-20'	96°	18°52'	-21'	97°	18°45'	-22'	97°	0
1	19°07'	-16'	96°	19°01'	-17'	96°	18°54'	-18'	97°	18°47'	-19'	97°	18°39'	-20'	97°	18°31'	-21'	98°	18°23'	-22'	98°	1
2	18°51'	-16'	97°	18°44'	-17'	97°	18°36'	-18'	98°	18°28'	-19'	98°	18°19'	-20'	98°	18°10'	-21'	99°	18°01'	-22'	99°	2
3	18°35'	-17'	98°	18°27'	-18'	98°	18°18'	-19'	99°	18°08'	-20'	99°	17°59'	-21'	99°	17°49'	-22'	100°	17°38'	-23'	100°	3
4	18°19'	-17'	99°	18°09'	-18'	99°	17°59'	-19'	100°	17°49'	-20'	100°	17°38'	-21'	100°	17°27'	-22'	101°	17°16'	-23'	101°	4
5	18°02'	-17'	100°	17°51'	-18'	100°	17°40'	-19'	101°	17°29'	-20'	101°	17°17'	-21'	101°	17°05'	-22'	102°	16°53'	-23'	102°	5
6	17°45'	-17'	101°	17°33'	-19'	101°	17°21'	-20'	102°	17°08'	-21'	102°	16°56'	-22'	102°	16°43'	-23'	103°	16°30'	-24'	103°	6
7	17°27'	-18'	102°	17°14'	-19'	102°	17°01'	-20'	103°	16°48'	-21'	103°	16°34'	-22'	103°	16°20'	-23'	104°	16°06'	-24'	104°	7
8	17°09'	-18'	103°	16°56'	-19'	103°	16°41'	-20'	104°	16°27'	-21'	104°	16°12'	-22'	104°	15°57'	-23'	105°	15°42'	-24'	105°	8
9	16°51'	-18'	104°	16°36'	-19'	104°	16°21'	-20'	105°	16°06'	-21'	105°	15°50'	-22'	105°	15°34'	-23'	106°	15°18'	-24'	106°	9
10	16°33'	-19'	105°	16°17'	-20'	105°	16°01'	-21'	106°	15°45'	-22'	106°	15°28'	-23'	106°	15°11'	-24'	106°	14°54'	-24'	107°	10
11	16°14'	-19'	106°	15°57'	-20'	106°	15°40'	-21'	107°	15°23'	-22'	107°	15°05'	-23'	107°	14°48'	-24'	107°	14°29'	-25'	108°	11
12	15°55'	-19'	107°	15°37'	-20'	107°	15°19'	-21'	108°	15°01'	-22'	108°	14°43'	-23'	108°	14°24'	-24'	108°	14°05'	-25'	109°	12
13	15°36'	-19'	108°	15°17'	-20'	108°	14°58'	-21'	109°	14°39'	-22'	109°	14°20'	-23'	109°	14°00'	-24'	109°	13°40'	-25'	110°	13
14	15°17'	-20'	109°	14°57'	-21'	109°	14°37'	-22'	110°	14°17'	-23'	110°	13°56'	-24'	110°	13°36'	-24'	110°	13°15'	-25'	110°	14
15	14°57'	-20'	110°	14°36'	-21'	110°	14°15'	-22'	111°	13°54'	-23'	111°	13°33'	-24'	111°	13°11'	-25'	111°	12°49'	-26'	111°	15
16	14°37'	-20'	111°	14°15'	-21'	111°	13°53'	-22'	111°	13°31'	-23'	112°	13°09'	-24'	112°	12°46'	-25'	112°	12°24'	-26'	112°	16
17	14°17'	-20'	112°	13°54'	-21'	112°	13°31'	-22'	112°	13°08'	-23'	113°	12°45'	-24'	113°	12°22'	-25'	113°	11°58'	-26'	113°	17
18	13°56'	-21'	113°	13°33'	-22'	113°	13°09'	-23'	113°	12°45'	-23'	114°	12°21'	-24'	114°	11°57'	-25'	114°	11°32'	-26'	114°	18
19	13°36'	-21'	114°	13°11'	-22'	114°	12°46'	-23'	114°	12°22'	-24'	115°	11°57'	-25'	115°	11°31'	-25'	115°	11°06'	-26'	115°	19
20	13°15'	-21'	115°	12°49'	-22'	115°	12°24'	-23'	115°	11°58'	-24'	115°	11°32'	-25'	116°	11°06'	-26'	116°	10°40'	-26'	116°	20
21	12°54'	-21'	116°	12°27'	-22'	116°	12°01'	-23'	116°	11°34'	-24'	116°	11°07'	-25'	117°	10°40'	-26'	117°	10°13'	-27'	117°	21
22	12°32'	-22'	117°	12°05'	-22'	117°	11°38'	-23'	117°	11°10'	-24'	117°	10°43'	-25'	118°	10°15'	-26'	118°	9°47'	-27'	118°	22
23	12°11'	-22'	118°	11°43'	-23'	118°	11°14'	-23'	118°	10°46'	-24'	118°	10°18'	-25'	118°	9°49'	-26'	119°	9°20'	-27'	119°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

70° 290° LHA

Latitude CONTRARY to DECLINATION

70° 290° LHA

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

69° 291° LHA

Latitude CONTRARY to Declination

69° 291° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	20°21'	-16'	95°	20°15'	-17'	96°	20°09'	-18'	96°	20°03'	-19'	96°	19°56'	-20'	97°	19°48'	-21'	97°	19°41'	-22'	97°	0
1	20°05'	-16'	96°	19°58'	-17'	97°	19°51'	-18'	97°	19°44'	-19'	97°	19°36'	-20'	98°	19°27'	-21'	98°	19°19'	-22'	98°	1
2	19°49'	-16'	97°	19°41'	-17'	98°	19°33'	-18'	98°	19°24'	-20'	98°	19°16'	-21'	99°	19°06'	-22'	99°	18°57'	-23'	99°	2
3	19°33'	-17'	98°	19°24'	-18'	99°	19°15'	-19'	99°	19°05'	-20'	99°	18°55'	-21'	100°	18°45'	-22'	100°	18°34'	-23'	100°	3
4	19°16'	-17'	99°	19°06'	-18'	100°	18°56'	-19'	100°	18°45'	-20'	100°	18°34'	-21'	101°	18°23'	-22'	101°	18°11'	-23'	101°	4
5	18°59'	-17'	100°	18°48'	-18'	101°	18°37'	-19'	101°	18°25'	-20'	101°	18°13'	-21'	102°	18°01'	-22'	102°	17°48'	-23'	102°	5
6	18°42'	-18'	101°	18°30'	-19'	102°	18°17'	-20'	102°	18°05'	-21'	102°	17°51'	-22'	103°	17°38'	-23'	103°	17°24'	-24'	103°	6
7	18°24'	-18'	102°	18°11'	-19'	103°	17°58'	-20'	103°	17°44'	-21'	103°	17°30'	-22'	104°	17°15'	-23'	104°	17°01'	-24'	104°	7
8	18°06'	-18'	103°	17°52'	-19'	104°	17°37'	-20'	104°	17°23'	-21'	104°	17°08'	-22'	105°	16°52'	-23'	105°	16°37'	-24'	105°	8
9	17°48'	-19'	104°	17°33'	-20'	105°	17°17'	-21'	105°	17°01'	-22'	105°	16°45'	-23'	106°	16°29'	-24'	106°	16°12'	-25'	106°	9
10	17°29'	-19'	105°	17°13'	-20'	106°	16°56'	-21'	106°	16°40'	-22'	106°	16°23'	-23'	107°	16°05'	-24'	107°	15°48'	-25'	107°	10
11	17°10'	-19'	106°	16°53'	-20'	107°	16°36'	-21'	107°	16°18'	-22'	107°	16°00'	-23'	108°	15°42'	-24'	108°	15°23'	-25'	108°	11
12	16°51'	-20'	107°	16°33'	-20'	108°	16°14'	-21'	108°	15°56'	-22'	108°	15°37'	-23'	109°	15°18'	-24'	109°	14°58'	-25'	109°	12
13	16°31'	-20'	108°	16°12'	-21'	109°	15°53'	-22'	109°	15°33'	-23'	109°	15°13'	-24'	109°	14°53'	-25'	110°	14°33'	-25'	110°	13
14	16°12'	-20'	109°	15°52'	-21'	110°	15°31'	-22'	110°	15°11'	-23'	110°	14°50'	-24'	110°	14°29'	-25'	111°	14°07'	-26'	111°	14
15	15°52'	-20'	110°	15°30'	-21'	111°	15°09'	-22'	111°	14°48'	-23'	111°	14°26'	-24'	111°	14°04'	-25'	112°	13°42'	-26'	112°	15
16	15°31'	-21'	111°	15°09'	-22'	112°	14°47'	-22'	112°	14°25'	-23'	112°	14°02'	-24'	112°	13°39'	-25'	113°	13°16'	-26'	113°	16
17	15°11'	-21'	112°	14°48'	-22'	113°	14°25'	-23'	113°	14°01'	-24'	113°	13°38'	-25'	113°	13°14'	-25'	113°	12°50'	-26'	114°	17
18	14°50'	-21'	113°	14°26'	-22'	114°	14°02'	-23'	114°	13°38'	-24'	114°	13°13'	-25'	114°	12°48'	-26'	114°	12°23'	-26'	115°	18
19	14°29'	-21'	114°	14°04'	-22'	114°	13°39'	-23'	115°	13°14'	-24'	115°	12°48'	-25'	115°	12°23'	-26'	115°	11°57'	-27'	116°	19
20	14°07'	-22'	115°	13°42'	-22'	115°	13°16'	-23'	116°	12°50'	-24'	116°	12°23'	-25'	116°	11°57'	-26'	116°	11°30'	-27'	116°	20
21	13°46'	-22'	116°	13°19'	-23'	116°	12°53'	-24'	117°	12°26'	-24'	117°	11°58'	-25'	117°	11°31'	-26'	117°	11°04'	-27'	117°	21
22	13°24'	-22'	117°	12°57'	-23'	117°	12°29'	-24'	118°	12°01'	-25'	118°	11°33'	-25'	118°	11°05'	-26'	118°	10°37'	-27'	118°	22
23	13°02'	-22'	118°	12°34'	-23'	118°	12°05'	-24'	118°	11°37'	-25'	119°	11°08'	-26'	119°	10°39'	-26'	119°	10°09'	-27'	119°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

69° 291° LHA

Latitude CONTRARY to DECLINATION

69° 291° LHA

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

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

68° 292° LHA

Latitude CONTRARY to Declination

68° 292° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	21°19'	-16'	96°	21°13'	-17'	96°	21°06'	-18'	96°	21°00'	-19'	97°	20°52'	-20'	97°	20°45'	-21'	97°	20°37'	-22'	98°	0
1	21°03'	-16'	97°	20°56'	-17'	97°	20°48'	-18'	97°	20°41'	-19'	98°	20°32'	-20'	98°	20°24'	-21'	98°	20°15'	-22'	99°	1
2	20°47'	-17'	98°	20°39'	-18'	98°	20°30'	-19'	98°	20°21'	-20'	99°	20°12'	-21'	99°	20°02'	-22'	99°	19°52'	-23'	100°	2
3	20°30'	-17'	99°	20°21'	-18'	99°	20°12'	-19'	99°	20°02'	-20'	100°	19°51'	-21'	100°	19°40'	-22'	100°	19°29'	-23'	101°	3
4	20°14'	-17'	100°	20°03'	-18'	100°	19°53'	-19'	100°	19°42'	-20'	101°	19°30'	-21'	101°	19°18'	-22'	101°	19°06'	-23'	102°	4
5	19°56'	-18'	101°	19°45'	-19'	101°	19°33'	-20'	101°	19°21'	-21'	102°	19°09'	-22'	102°	18°56'	-23'	102°	18°43'	-24'	103°	5
6	19°39'	-18'	102°	19°26'	-19'	102°	19°14'	-20'	102°	19°01'	-21'	103°	18°47'	-22'	103°	18°33'	-23'	103°	18°19'	-24'	104°	6
7	19°21'	-18'	103°	19°07'	-19'	103°	18°54'	-20'	103°	18°40'	-21'	104°	18°25'	-22'	104°	18°10'	-23'	104°	17°55'	-24'	105°	7
8	19°03'	-19'	104°	18°48'	-20'	104°	18°33'	-21'	104°	18°18'	-22'	105°	18°03'	-23'	105°	17°47'	-24'	105°	17°31'	-25'	106°	8
9	18°44'	-19'	105°	18°29'	-20'	105°	18°13'	-21'	105°	17°57'	-22'	106°	17°40'	-23'	106°	17°24'	-24'	106°	17°06'	-25'	107°	9
10	18°25'	-19'	106°	18°09'	-20'	106°	17°52'	-21'	106°	17°35'	-22'	107°	17°17'	-23'	107°	17°00'	-24'	107°	16°42'	-25'	108°	10
11	18°06'	-20'	107°	17°48'	-21'	107°	17°31'	-21'	107°	17°13'	-22'	108°	16°54'	-23'	108°	16°36'	-24'	108°	16°17'	-25'	109°	11
12	17°46'	-20'	108°	17°28'	-21'	108°	17°09'	-22'	108°	16°50'	-23'	109°	16°31'	-24'	109°	16°11'	-25'	109°	15°51'	-26'	109°	12
13	17°27'	-20'	109°	17°07'	-21'	109°	16°47'	-22'	109°	16°27'	-23'	110°	16°07'	-24'	110°	15°47'	-25'	110°	15°26'	-26'	110°	13
14	17°06'	-20'	110°	16°46'	-21'	110°	16°25'	-22'	110°	16°04'	-23'	111°	15°43'	-24'	111°	15°22'	-25'	111°	15°00'	-26'	111°	14
15	16°46'	-21'	111°	16°25'	-22'	111°	16°03'	-23'	111°	15°41'	-24'	112°	15°19'	-24'	112°	14°57'	-25'	112°	14°34'	-26'	112°	15
16	16°25'	-21'	112°	16°03'	-22'	112°	15°40'	-23'	112°	15°18'	-24'	112°	14°55'	-25'	113°	14°31'	-26'	113°	14°08'	-26'	113°	16
17	16°04'	-21'	113°	15°41'	-22'	113°	15°18'	-23'	113°	14°54'	-24'	113°	14°30'	-25'	114°	14°06'	-26'	114°	13°41'	-27'	114°	17
18	15°43'	-21'	114°	15°19'	-22'	114°	14°55'	-23'	114°	14°30'	-24'	114°	14°05'	-25'	115°	13°40'	-26'	115°	13°15'	-27'	115°	18
19	15°22'	-22'	115°	14°57'	-23'	115°	14°31'	-24'	115°	14°06'	-24'	115°	13°40'	-25'	116°	13°14'	-26'	116°	12°48'	-27'	116°	19
20	15°00'	-22'	116°	14°34'	-23'	116°	14°08'	-24'	116°	13°41'	-25'	116°	13°15'	-26'	116°	12°48'	-26'	117°	12°21'	-27'	117°	20
21	14°38'	-22'	117°	14°11'	-23'	117°	13°44'	-24'	117°	13°17'	-25'	117°	12°49'	-26'	117°	12°21'	-27'	118°	11°54'	-27'	118°	21
22	14°16'	-22'	117°	13°48'	-23'	118°	13°20'	-24'	118°	12°52'	-25'	118°	12°23'	-26'	118°	11°55'	-27'	119°	11°26'	-28'	119°	22
23	13°53'	-23'	118°	13°25'	-24'	119°	12°56'	-24'	119°	12°27'	-25'	119°	11°58'	-26'	119°	11°28'	-27'	119°	10°59'	-28'	120°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	22°17'	-16'	96°	22°10'	-17'	96°	22°04'	-18'	97°	21°56'	-19'	97°	21°49'	-20'	97°	21°41'	-21'	98°	21°32'	-22'	98°	0
1	22°01'	-16'	97°	21°53'	-17'	97°	21°46'	-18'	98°	21°37'	-19'	98°	21°29'	-21'	98°	21°20'	-22'	99°	21°10'	-23'	99°	1
2	21°45'	-17'	98°	21°36'	-18'	98°	21°27'	-19'	99°	21°18'	-20'	99°	21°08'	-21'	99°	20°58'	-22'	100°	20°48'	-23'	100°	2
3	21°28'	-17'	99°	21°18'	-18'	99°	21°08'	-19'	100°	20°58'	-20'	100°	20°47'	-21'	100°	20°36'	-22'	101°	20°25'	-23'	101°	3
4	21°11'	-17'	100°	21°00'	-18'	100°	20°49'	-20'	101°	20°38'	-21'	101°	20°26'	-22'	101°	20°14'	-23'	102°	20°01'	-24'	102°	4
5	20°53'	-18'	101°	20°42'	-19'	101°	20°30'	-20'	102°	20°17'	-21'	102°	20°05'	-22'	102°	19°51'	-23'	103°	19°38'	-24'	103°	5
6	20°36'	-18'	102°	20°23'	-19'	102°	20°10'	-20'	103°	19°56'	-21'	103°	19°43'	-22'	103°	19°28'	-23'	104°	19°14'	-24'	104°	6
7	20°18'	-18'	103°	20°04'	-20'	103°	19°50'	-21'	104°	19°35'	-22'	104°	19°20'	-23'	104°	19°05'	-24'	105°	18°50'	-25'	105°	7
8	19°59'	-19'	104°	19°44'	-20'	104°	19°29'	-21'	105°	19°14'	-22'	105°	18°58'	-23'	105°	18°42'	-24'	106°	18°25'	-25'	106°	8
9	19°40'	-19'	105°	19°24'	-20'	105°	19°08'	-21'	106°	18°52'	-22'	106°	18°35'	-23'	106°	18°18'	-24'	107°	18°00'	-25'	107°	9
10	19°21'	-20'	106°	19°04'	-21'	106°	18°47'	-21'	107°	18°30'	-22'	107°	18°12'	-23'	107°	17°54'	-24'	108°	17°35'	-25'	108°	10
11	19°02'	-20'	107°	18°44'	-21'	107°	18°26'	-22'	108°	18°07'	-23'	108°	17°48'	-24'	108°	17°29'	-25'	109°	17°10'	-26'	109°	11
12	18°42'	-20'	108°	18°23'	-21'	108°	18°04'	-22'	109°	17°44'	-23'	109°	17°25'	-24'	109°	17°05'	-25'	110°	16°44'	-26'	110°	12
13	18°22'	-20'	109°	18°02'	-21'	109°	17°42'	-22'	110°	17°21'	-23'	110°	17°01'	-24'	110°	16°40'	-25'	111°	16°19'	-26'	111°	13
14	18°01'	-21'	110°	17°40'	-22'	110°	17°19'	-23'	111°	16°58'	-24'	111°	16°36'	-25'	111°	16°15'	-25'	112°	15°52'	-26'	112°	14
15	17°40'	-21'	111°	17°19'	-22'	111°	16°57'	-23'	112°	16°34'	-24'	112°	16°12'	-25'	112°	15°49'	-26'	112°	15°26'	-27'	113°	15
16	17°19'	-21'	112°	16°57'	-22'	112°	16°34'	-23'	113°	16°11'	-24'	113°	15°47'	-25'	113°	15°23'	-26'	113°	14°59'	-27'	114°	16
17	16°58'	-22'	113°	16°34'	-23'	113°	16°11'	-23'	114°	15°46'	-24'	114°	15°22'	-25'	114°	14°57'	-26'	114°	14°33'	-27'	115°	17
18	16°36'	-22'	114°	16°12'	-23'	114°	15°47'	-24'	115°	15°22'	-25'	115°	14°57'	-25'	115°	14°31'	-26'	115°	14°06'	-27'	115°	18
19	16°15'	-22'	115°	15°49'	-23'	115°	15°23'	-24'	115°	14°57'	-25'	116°	14°31'	-26'	116°	14°05'	-27'	116°	13°38'	-27'	116°	19
20	15°52'	-22'	116°	15°26'	-23'	116°	14°59'	-24'	116°	14°33'	-25'	117°	14°06'	-26'	117°	13°38'	-27'	117°	13°11'	-28'	117°	20
21	15°30'	-23'	117°	15°03'	-24'	117°	14°35'	-24'	117°	14°08'	-25'	118°	13°40'	-26'	118°	13°12'	-27'	118°	12°43'	-28'	118°	21
22	15°07'	-23'	118°	14°39'	-24'	118°	14°11'	-25'	118°	13°42'	-25'	119°	13°14'	-26'	119°	12°45'	-27'	119°	12°15'	-28'	119°	22
23	14°44'	-23'	119°	14°15'	-24'	119°	13°46'	-25'	119°	13°17'	-26'	119°	12°47'	-27'	120°	12°17'	-27'	120°	11°47'	-28'	120°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

67° 293° LHA

Latitude CONTRARY to DECLINATION

67° 293° LHA

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

66° 294° LHA

Latitude CONTRARY to Declination

66° 294° LHA

Table with 24 rows and columns for declination (0-23) and local hour angle (14-20). Each cell contains three values: Hc, d', Z°.

66° 294° LHA

Latitude CONTRARY to DECLINATION

66° 294° LHA

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

65° 295° LHA

Latitude CONTRARY to Declination

65° 295° LHA

Table with 24 rows and columns for declination (0-23) and local hour angle (14-20). Each cell contains three values: Hc, d', Z°.

65° 295° LHA

Latitude CONTRARY to DECLINATION

65° 295° LHA

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

64° 296° LHA

Latitude CONTRARY to Declination

64° 296° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	25°10'	-16'	97°	25°03'	-17'	97°	24°55'	-18'	98°	24°47'	-20'	98°	24°38'	-21'	99°	24°29'	-22'	99°	24°20'	-23'	99°	0
1	24°54'	-17'	98°	24°46'	-18'	98°	24°37'	-19'	99°	24°28'	-20'	99°	24°18'	-21'	100°	24°08'	-22'	100°	23°57'	-23'	100°	1
2	24°37'	-17'	99°	24°28'	-18'	99°	24°18'	-19'	100°	24°08'	-20'	100°	23°57'	-21'	101°	23°45'	-22'	101°	23°34'	-24'	101°	2
3	24°20'	-18'	100°	24°10'	-19'	100°	23°59'	-20'	101°	23°47'	-21'	101°	23°35'	-22'	102°	23°23'	-23'	102°	23°10'	-24'	102°	3
4	24°03'	-18'	101°	23°51'	-19'	101°	23°39'	-20'	102°	23°26'	-21'	102°	23°14'	-22'	103°	23°00'	-23'	103°	22°46'	-24'	103°	4
5	23°45'	-18'	102°	23°32'	-19'	102°	23°19'	-21'	103°	23°05'	-22'	103°	22°51'	-23'	104°	22°37'	-24'	104°	22°22'	-25'	104°	5
6	23°26'	-19'	103°	23°12'	-20'	103°	22°58'	-21'	104°	22°44'	-22'	104°	22°29'	-23'	105°	22°13'	-24'	105°	21°57'	-25'	105°	6
7	23°07'	-19'	104°	22°53'	-20'	104°	22°37'	-21'	105°	22°22'	-22'	105°	22°06'	-23'	106°	21°49'	-24'	106°	21°33'	-25'	106°	7
8	22°48'	-20'	105°	22°32'	-21'	105°	22°16'	-22'	106°	21°59'	-23'	106°	21°42'	-24'	107°	21°25'	-25'	107°	21°07'	-26'	107°	8
9	22°28'	-20'	106°	22°12'	-21'	107°	21°54'	-22'	107°	21°37'	-23'	107°	21°19'	-24'	108°	21°00'	-25'	108°	20°42'	-26'	108°	9
10	22°08'	-20'	107°	21°51'	-21'	108°	21°32'	-22'	108°	21°14'	-23'	108°	20°55'	-24'	109°	20°35'	-25'	109°	20°16'	-26'	109°	10
11	21°48'	-21'	108°	21°29'	-22'	109°	21°10'	-23'	109°	20°50'	-24'	109°	20°30'	-25'	110°	20°10'	-26'	110°	19°49'	-27'	110°	11
12	21°27'	-21'	109°	21°07'	-22'	110°	20°47'	-23'	110°	20°27'	-24'	110°	20°06'	-25'	111°	19°44'	-26'	111°	19°23'	-27'	111°	12
13	21°06'	-21'	110°	20°45'	-22'	111°	20°24'	-23'	111°	20°02'	-24'	111°	19°41'	-25'	112°	19°18'	-26'	112°	18°56'	-27'	112°	13
14	20°45'	-22'	111°	20°23'	-23'	112°	20°01'	-24'	112°	19°38'	-25'	112°	19°15'	-26'	113°	18°52'	-27'	113°	18°29'	-27'	113°	14
15	20°23'	-22'	112°	20°00'	-23'	112°	19°37'	-24'	113°	19°13'	-25'	113°	18°50'	-26'	113°	18°26'	-27'	114°	18°01'	-28'	114°	15
16	20°01'	-22'	113°	19°37'	-23'	113°	19°13'	-24'	114°	18°48'	-25'	114°	18°24'	-26'	114°	17°59'	-27'	115°	17°34'	-28'	115°	16
17	19°38'	-23'	114°	19°13'	-24'	114°	18°48'	-25'	115°	18°23'	-26'	115°	17°58'	-26'	115°	17°32'	-27'	116°	17°06'	-28'	116°	17
18	19°15'	-23'	115°	18°50'	-24'	115°	18°24'	-25'	116°	17°58'	-26'	116°	17°31'	-27'	116°	17°04'	-28'	117°	16°37'	-28'	117°	18
19	18°52'	-23'	116°	18°26'	-24'	116°	17°59'	-25'	117°	17°32'	-26'	117°	17°04'	-27'	117°	16°37'	-28'	118°	16°09'	-29'	118°	19
20	18°29'	-24'	117°	18°01'	-25'	117°	17°34'	-26'	118°	17°06'	-26'	118°	16°37'	-27'	118°	16°09'	-28'	118°	15°40'	-29'	119°	20
21	18°05'	-24'	118°	17°37'	-25'	118°	17°08'	-26'	119°	16°39'	-27'	119°	16°10'	-27'	119°	15°41'	-28'	119°	15°11'	-29'	120°	21
22	17°41'	-24'	119°	17°12'	-25'	119°	16°42'	-26'	120°	16°13'	-27'	120°	15°43'	-28'	120°	15°13'	-29'	120°	14°42'	-29'	121°	22
23	17°17'	-25'	120°	16°47'	-25'	120°	16°16'	-26'	120°	15°46'	-27'	121°	15°15'	-28'	121°	14°44'	-29'	121°	14°13'	-30'	121°	23

64° 296° LHA

Latitude CONTRARY to DECLINATION

64° 296° LHA

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

63° 297° LHA

Latitude CONTRARY to Declination

63° 297° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°08'	-16'	97°	26°01'	-18'	98°	25°52'	-19'	98°	25°44'	-20'	98°	25°35'	-21'	99°	25°25'	-22'	99°	25°15'	-23'	100°	0
1	25°52'	-17'	98°	25°43'	-18'	99°	25°34'	-19'	99°	25°24'	-20'	100°	25°14'	-21'	100°	25°03'	-22'	100°	24°52'	-23'	101°	1
2	25°35'	-17'	99°	25°25'	-18'	100°	25°15'	-20'	100°	25°04'	-21'	101°	24°53'	-22'	101°	24°41'	-23'	101°	24°29'	-24'	102°	2
3	25°18'	-18'	100°	25°07'	-19'	101°	24°55'	-20'	101°	24°43'	-21'	102°	24°31'	-22'	102°	24°18'	-23'	102°	24°05'	-24'	103°	3
4	25°00'	-18'	101°	24°48'	-19'	102°	24°35'	-20'	102°	24°22'	-21'	103°	24°09'	-22'	103°	23°55'	-23'	104°	23°41'	-24'	104°	4
5	24°42'	-19'	102°	24°28'	-20'	103°	24°15'	-21'	103°	24°01'	-22'	104°	23°47'	-23'	104°	23°32'	-24'	105°	23°17'	-25'	105°	5
6	24°23'	-19'	103°	24°09'	-20'	104°	23°54'	-21'	104°	23°39'	-22'	105°	23°24'	-23'	105°	23°08'	-24'	106°	22°52'	-25'	106°	6
7	24°04'	-20'	104°	23°49'	-21'	105°	23°33'	-22'	105°	23°17'	-23'	106°	23°01'	-24'	106°	22°44'	-25'	106°	22°27'	-26'	107°	7
8	23°44'	-20'	105°	23°28'	-21'	106°	23°11'	-22'	106°	22°54'	-23'	107°	22°37'	-24'	107°	22°19'	-25'	107°	22°01'	-26'	108°	8
9	23°24'	-20'	106°	23°07'	-21'	107°	22°49'	-22'	107°	22°31'	-23'	108°	22°13'	-24'	108°	21°54'	-25'	108°	21°35'	-26'	109°	9
10	23°04'	-21'	107°	22°46'	-22'	108°	22°27'	-23'	108°	22°08'	-24'	109°	21°49'	-25'	109°	21°29'	-26'	109°	21°09'	-27'	110°	10
11	22°43'	-21'	109°	22°24'	-22'	109°	22°04'	-23'	109°	21°44'	-24'	110°	21°24'	-25'	110°	21°03'	-26'	110°	20°42'	-27'	111°	11
12	22°22'	-21'	110°	22°02'	-22'	110°	21°41'	-23'	110°	21°20'	-24'	111°	20°59'	-25'	111°	20°37'	-26'	111°	20°15'	-27'	112°	12
13	22°01'	-22'	111°	21°39'	-23'	111°	21°18'	-24'	111°	20°56'	-25'	112°	20°34'	-26'	112°	20°11'	-27'	112°	19°48'	-28'	113°	13
14	21°39'	-22'	112°	21°17'	-23'	112°	20°54'	-24'	112°	20°31'	-25'	113°	20°08'	-26'	113°	19°44'	-27'	113°	19°20'	-28'	114°	14
15	21°17'	-23'	113°	20°53'	-24'	113°	20°30'	-24'	113°	20°06'	-25'	114°	19°42'	-26'	114°	19°17'	-27'	114°	18°53'	-28'	115°	15
16	20°54'	-23'	114°	20°30'	-24'	114°	20°05'	-25'	114°	19°41'	-26'	115°	19°16'	-27'	115°	18°50'	-27'	115°	18°25'	-28'	115°	16
17	20°31'	-23'	115°	20°06'	-24'	115°	19°41'	-25'	115°	19°15'	-26'	116°	18°49'	-27'	116°	18°23'	-28'	116°	17°56'	-29'	116°	17
18	20°08'	-24'	116°	19°42'	-24'	116°	19°16'	-25'	116°	18°49'	-26'	116°	18°22'	-27'	117°	17°55'	-28'	117°	17°28'	-29'	117°	18
19	19°44'	-24'	116°	19°17'	-25'	117°	18°50'	-26'	117°	18°23'	-27'	117°	17°55'	-27'	118°	17°27'	-28'	118°	16°59'	-29'	118°	19
20	19°20'	-24'	117°	18°53'	-25'	118°	18°25'	-26'	118°	17°56'	-27'	118°	17°28'	-28'	119°	16°59'	-29'	119°	16°30'	-29'	119°	20
21	18°56'	-24'	118°	18°28'	-25'	119°	17°59'	-26'	119°	17°29'	-27'	119°	17°00'	-28'	120°	16°30'	-29'	120°	16°00'	-30'	120°	21
22	18°32'	-25'	119°	18°02'	-26'	120°	17°32'	-27'	120°	17°02'	-27'	120°	16°32'	-28'	120°	16°01'	-29'	121°	15°31'	-30'	121°	22
23	18°07'	-25'	120°	17°37'	-26'	121°	17°06'	-27'	121°	16°35'	-28'	121°	16°04'	-28'	121°	15°32'	-29'	122°	15°01'	-30'	122°	23

63° 297° LHA

Latitude CONTRARY to DECLINATION

63° 297° LHA

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

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

62° 298° LHA

Latitude CONTRARY to Declination

62° 298° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	27°06'	-17'	97°	26°58'	-18'	98°	26°50'	-19'	98°	26°41'	-20'	99°	26°31'	-21'	99°	26°21'	-22'	100°	26°11'	-23'	100°	0
1	26°49'	-17'	98°	26°40'	-18'	99°	26°31'	-19'	99°	26°21'	-20'	100°	26°10'	-21'	100°	25°59'	-22'	101°	25°48'	-24'	101°	1
2	26°32'	-18'	99°	26°22'	-19'	100°	26°12'	-20'	100°	26°00'	-21'	101°	25°49'	-22'	101°	25°37'	-23'	102°	25°24'	-24'	102°	2
3	26°15'	-18'	101°	26°04'	-19'	101°	25°52'	-20'	102°	25°40'	-21'	102°	25°27'	-22'	102°	25°14'	-23'	103°	25°00'	-24'	103°	3
4	25°57'	-18'	102°	25°45'	-20'	102°	25°32'	-21'	103°	25°18'	-22'	103°	25°05'	-23'	103°	24°50'	-24'	104°	24°36'	-25'	104°	4
5	25°38'	-19'	103°	25°25'	-20'	103°	25°11'	-21'	104°	24°57'	-22'	104°	24°42'	-23'	104°	24°27'	-24'	105°	24°11'	-25'	105°	5
6	25°19'	-19'	104°	25°05'	-20'	104°	24°50'	-21'	105°	24°35'	-22'	105°	24°19'	-24'	106°	24°03'	-25'	106°	23°46'	-26'	106°	6
7	25°00'	-20'	105°	24°45'	-21'	105°	24°29'	-22'	106°	24°12'	-23'	106°	23°55'	-24'	107°	23°38'	-25'	107°	23°20'	-26'	107°	7
8	24°40'	-20'	106°	24°24'	-21'	106°	24°07'	-22'	107°	23°49'	-23'	107°	23°31'	-24'	108°	23°13'	-25'	108°	22°55'	-26'	108°	8
9	24°20'	-21'	107°	24°03'	-22'	107°	23°44'	-23'	108°	23°26'	-24'	108°	23°07'	-25'	109°	22°48'	-26'	109°	22°28'	-27'	109°	9
10	23°59'	-21'	108°	23°41'	-22'	108°	23°22'	-23'	109°	23°02'	-24'	109°	22°43'	-25'	110°	22°22'	-26'	110°	22°02'	-27'	110°	10
11	23°38'	-21'	109°	23°19'	-22'	109°	22°59'	-23'	110°	22°38'	-24'	110°	22°18'	-25'	110°	21°56'	-26'	111°	21°35'	-27'	111°	11
12	23°17'	-22'	110°	22°56'	-23'	110°	22°35'	-24'	111°	22°14'	-25'	111°	21°52'	-26'	111°	21°30'	-27'	112°	21°08'	-28'	112°	12
13	22°55'	-22'	111°	22°34'	-23'	111°	22°12'	-24'	112°	21°49'	-25'	112°	21°26'	-26'	112°	21°03'	-27'	113°	20°40'	-28'	113°	13
14	22°33'	-23'	112°	22°10'	-24'	112°	21°47'	-25'	113°	21°24'	-25'	113°	21°00'	-26'	113°	20°36'	-27'	114°	20°12'	-28'	114°	14
15	22°10'	-23'	113°	21°47'	-24'	113°	21°23'	-25'	114°	20°59'	-26'	114°	20°34'	-27'	114°	20°09'	-28'	115°	19°44'	-28'	115°	15
16	21°47'	-23'	114°	21°23'	-24'	114°	20°58'	-25'	115°	20°33'	-26'	115°	20°07'	-27'	115°	19°42'	-28'	116°	19°15'	-29'	116°	16
17	21°24'	-24'	115°	20°59'	-25'	115°	20°33'	-26'	116°	20°07'	-26'	116°	19°40'	-27'	116°	19°14'	-28'	117°	18°47'	-29'	117°	17
18	21°00'	-24'	116°	20°34'	-25'	116°	20°07'	-26'	117°	19°40'	-27'	117°	19°13'	-28'	117°	18°45'	-28'	118°	18°18'	-29'	118°	18
19	20°36'	-24'	117°	20°09'	-25'	117°	19°42'	-26'	118°	19°14'	-27'	118°	18°45'	-28'	118°	18°17'	-29'	118°	17°48'	-30'	119°	19
20	20°12'	-25'	118°	19°44'	-26'	118°	19°15'	-26'	118°	18°47'	-27'	119°	18°18'	-28'	119°	17°48'	-29'	119°	17°19'	-30'	120°	20
21	19°47'	-25'	119°	19°18'	-26'	119°	18°49'	-27'	119°	18°19'	-28'	120°	17°49'	-28'	120°	17°19'	-29'	120°	16°49'	-30'	121°	21
22	19°22'	-25'	120°	18°52'	-26'	120°	18°22'	-27'	120°	17°52'	-28'	121°	17°21'	-29'	121°	16°50'	-29'	121°	16°19'	-30'	121°	22
23	18°57'	-26'	121°	18°26'	-26'	121°	17°55'	-27'	121°	17°24'	-28'	122°	16°52'	-29'	122°	16°21'	-30'	122°	15°49'	-30'	122°	23

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	28°04'	-17'	98°	27°55'	-18'	98°	27°47'	-19'	99°	27°37'	-20'	99°	27°27'	-21'	100°	27°17'	-22'	100°	27°06'	-23'	101°	0
1	27°47'	-17'	99°	27°38'	-18'	99°	27°28'	-19'	100°	27°17'	-21'	100°	27°06'	-22'	101°	26°55'	-23'	101°	26°43'	-24'	102°	1
2	27°30'	-18'	100°	27°19'	-19'	100°	27°08'	-20'	101°	26°57'	-21'	101°	26°45'	-22'	102°	26°32'	-23'	102°	26°19'	-24'	103°	2
3	27°12'	-18'	101°	27°00'	-19'	101°	26°48'	-20'	102°	26°36'	-21'	102°	26°23'	-23'	103°	26°09'	-24'	103°	25°55'	-25'	104°	3
4	26°54'	-19'	102°	26°41'	-20'	102°	26°28'	-21'	103°	26°14'	-22'	103°	26°00'	-23'	104°	25°45'	-24'	104°	25°30'	-25'	105°	4
5	26°35'	-19'	103°	26°21'	-20'	104°	26°07'	-21'	104°	25°52'	-22'	104°	25°37'	-23'	105°	25°21'	-24'	105°	25°05'	-25'	106°	5
6	26°16'	-20'	104°	26°01'	-21'	105°	25°46'	-22'	105°	25°30'	-23'	105°	25°14'	-24'	106°	24°57'	-25'	106°	24°40'	-26'	107°	6
7	25°56'	-20'	105°	25°40'	-21'	106°	25°24'	-22'	106°	25°07'	-23'	107°	24°50'	-24'	107°	24°32'	-25'	107°	24°14'	-26'	108°	7
8	25°36'	-21'	106°	25°19'	-22'	107°	25°02'	-23'	107°	24°44'	-24'	108°	24°26'	-25'	108°	24°07'	-26'	108°	23°48'	-27'	109°	8
9	25°16'	-21'	107°	24°58'	-22'	108°	24°39'	-23'	108°	24°21'	-24'	109°	24°01'	-25'	109°	23°42'	-26'	109°	23°21'	-27'	110°	9
10	24°55'	-21'	108°	24°36'	-22'	109°	24°16'	-23'	109°	23°57'	-24'	110°	23°36'	-25'	110°	23°16'	-26'	110°	22°55'	-27'	111°	10
11	24°33'	-22'	109°	24°13'	-23'	110°	23°53'	-24'	110°	23°32'	-25'	111°	23°11'	-26'	111°	22°49'	-27'	111°	22°27'	-28'	112°	11
12	24°12'	-22'	110°	23°51'	-23'	111°	23°29'	-24'	111°	23°07'	-25'	112°	22°45'	-26'	112°	22°23'	-27'	112°	22°00'	-28'	113°	12
13	23°49'	-23'	111°	23°27'	-24'	112°	23°05'	-25'	112°	22°42'	-25'	113°	22°19'	-26'	113°	21°56'	-27'	113°	21°32'	-28'	114°	13
14	23°27'	-23'	112°	23°04'	-24'	113°	22°40'	-25'	113°	22°17'	-26'	113°	21°53'	-27'	114°	21°28'	-28'	114°	21°03'	-29'	115°	14
15	23°04'	-23'	113°	22°40'	-24'	114°	22°16'	-25'	114°	21°51'	-26'	114°	21°26'	-27'	115°	21°01'	-28'	115°	20°35'	-29'	116°	15
16	22°40'	-24'	114°	22°16'	-25'	115°	21°50'	-26'	115°	21°25'	-27'	115°	20°59'	-27'	116°	20°33'	-28'	116°	20°06'	-29'	116°	16
17	22°17'	-24'	115°	21°51'	-25'	116°	21°25'	-26'	116°	20°58'	-27'	116°	20°31'	-28'	117°	20°04'	-29'	117°	19°37'	-29'	117°	17
18	21°53'	-24'	116°	21°26'	-25'	117°	20°59'	-26'	117°	20°31'	-27'	117°	20°04'	-28'	118°	19°36'	-29'	118°	19°07'	-30'	118°	18
19	21°28'	-25'	117°	21°01'	-26'	118°	20°33'	-27'	118°	20°04'	-27'	118°	19°36'	-28'	119°	19°07'	-29'	119°	18°38'	-30'	119°	19
20	21°03'	-25'	118°	20°35'	-26'	119°	20°06'	-27'	119°	19°37'	-28'	119°	19°07'	-29'	120°	18°38'	-29'	120°	18°08'	-30'	120°	20
21	20°38'	-25'	119°	20°09'	-26'	120°	19°39'	-27'	120°	19°09'	-28'	120°	18°39'	-29'	120°	18°08'	-30'	121°	17°37'	-31'	121°	21
22	20°13'	-26'	120°	19°43'	-27'	121°	19°12'	-27'	121°	18°41'	-28'	121°	18°10'	-29'	121°	17°38'	-30'	122°	17°07'	-31'	122°	22
23	19°47'	-26'	121°	19°16'	-27'	121°	18°44'	-28'	122°	18°13'	-29'	122°	17°41'	-29'	122°	17°09'	-30'	123°	16°36'	-31'	123°	23

61° 299° LHA

Latitude CONTRARY to DECLINATION

61° 299° LHA

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

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

58° 302° LHA

Latitude CONTRARY to Declination

58° 302° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	30°57'	-17'	99°	30°47'	-18'	99°	30°37'	-19'	100°	30°27'	-21'	100°	30°16'	-22'	101°	30°04'	-23'	101°	29°52'	-24'	102°	0
1	30°39'	-18'	100°	30°29'	-19'	100°	30°18'	-20'	101°	30°06'	-21'	101°	29°54'	-22'	102°	29°41'	-23'	103°	29°28'	-24'	103°	1
2	30°22'	-18'	101°	30°10'	-19'	101°	29°58'	-21'	102°	29°45'	-22'	103°	29°32'	-23'	103°	29°18'	-24'	104°	29°04'	-25'	104°	2
3	30°03'	-19'	102°	29°51'	-20'	102°	29°37'	-21'	103°	29°23'	-22'	104°	29°09'	-23'	104°	28°54'	-24'	105°	28°39'	-25'	105°	3
4	29°44'	-19'	103°	29°31'	-21'	104°	29°16'	-22'	104°	29°01'	-23'	105°	28°46'	-24'	105°	28°30'	-25'	106°	28°13'	-26'	106°	4
5	29°25'	-20'	104°	29°10'	-21'	105°	28°55'	-22'	105°	28°39'	-23'	106°	28°22'	-24'	106°	28°05'	-25'	107°	27°47'	-26'	107°	5
6	29°05'	-20'	105°	28°49'	-22'	106°	28°32'	-23'	106°	28°15'	-24'	107°	27°58'	-25'	107°	27°40'	-26'	108°	27°21'	-27'	108°	6
7	28°45'	-21'	106°	28°27'	-22'	107°	28°10'	-23'	107°	27°52'	-24'	108°	27°33'	-25'	108°	27°14'	-26'	109°	26°55'	-27'	109°	7
8	28°24'	-21'	107°	28°05'	-23'	108°	27°47'	-24'	108°	27°28'	-25'	109°	27°08'	-26'	109°	26°48'	-27'	110°	26°27'	-28'	110°	8
9	28°02'	-22'	108°	27°43'	-23'	109°	27°23'	-24'	109°	27°03'	-25'	110°	26°42'	-26'	110°	26°21'	-27'	111°	26°00'	-28'	111°	9
10	27°40'	-22'	109°	27°20'	-23'	110°	26°59'	-24'	110°	26°38'	-25'	111°	26°16'	-26'	111°	25°54'	-27'	112°	25°32'	-28'	112°	10
11	27°18'	-23'	110°	26°56'	-24'	111°	26°35'	-25'	111°	26°13'	-26'	112°	25°50'	-27'	112°	25°27'	-28'	113°	25°04'	-29'	113°	11
12	26°55'	-23'	112°	26°33'	-24'	112°	26°10'	-25'	112°	25°47'	-26'	113°	25°23'	-27'	113°	24°59'	-28'	114°	24°35'	-29'	114°	12
13	26°31'	-24'	113°	26°08'	-25'	113°	25°45'	-26'	113°	25°20'	-27'	114°	24°56'	-28'	114°	24°31'	-29'	115°	24°06'	-29'	115°	13
14	26°08'	-24'	114°	25°43'	-25'	114°	25°19'	-26'	114°	24°54'	-27'	115°	24°28'	-28'	115°	24°03'	-29'	116°	23°36'	-30'	116°	14
15	25°43'	-25'	115°	25°18'	-26'	115°	24°53'	-27'	115°	24°27'	-27'	116°	24°00'	-28'	116°	23°34'	-29'	117°	23°07'	-30'	117°	15
16	25°19'	-25'	116°	24°53'	-26'	116°	24°26'	-27'	116°	23°59'	-28'	117°	23°32'	-29'	117°	23°04'	-30'	118°	22°36'	-30'	118°	16
17	24°54'	-25'	117°	24°27'	-26'	117°	23°59'	-27'	117°	23°31'	-28'	118°	23°03'	-29'	118°	22°35'	-30'	119°	22°06'	-31'	119°	17
18	24°28'	-26'	118°	24°00'	-27'	118°	23°32'	-28'	118°	23°03'	-29'	119°	22°34'	-29'	119°	22°05'	-30'	119°	21°35'	-31'	120°	18
19	24°03'	-26'	119°	23°34'	-27'	119°	23°04'	-28'	119°	22°35'	-29'	120°	22°05'	-30'	120°	21°35'	-31'	120°	21°04'	-31'	121°	19
20	23°36'	-27'	120°	23°07'	-27'	120°	22°36'	-28'	120°	22°06'	-29'	121°	21°35'	-30'	121°	21°04'	-31'	121°	20°33'	-32'	122°	20
21	23°10'	-27'	121°	22°39'	-28'	121°	22°08'	-29'	121°	21°37'	-29'	122°	21°05'	-30'	122°	20°33'	-31'	122°	20°01'	-32'	123°	21
22	22°43'	-27'	122°	22°11'	-28'	122°	21°39'	-29'	122°	21°07'	-30'	123°	20°35'	-31'	123°	20°02'	-31'	123°	19°29'	-32'	123°	22
23	<u>22°15'</u>	<u>-28'</u>	<u>122°</u>	<u>21°43'</u>	<u>-28'</u>	<u>123°</u>	<u>21°10'</u>	<u>-29'</u>	<u>123°</u>	<u>20°37'</u>	<u>-30'</u>	<u>123°</u>	<u>20°04'</u>	<u>-31'</u>	<u>124°</u>	<u>19°31'</u>	<u>-32'</u>	<u>124°</u>	<u>18°57'</u>	<u>-32'</u>	<u>124°</u>	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	31°54'	-17'	99°	31°44'	-19'	100°	31°34'	-20'	100°	31°23'	-21'	101°	31°12'	-22'	101°	31°00'	-23'	102°	30°47'	-24'	103°	0
1	1°14'	-18'	100°	1°12'	-19'	101°	1°11'	-20'	101°	1°09'	-21'	102°	1°07'	-22'	102°	1°05'	-24'	103°	1°04'	-25'	104°	1
2	31°19'	-19'	101°	31°07'	-20'	102°	30°54'	-21'	102°	30°41'	-22'	103°	30°27'	-23'	104°	30°13'	-24'	104°	29°58'	-25'	105°	2
3	31°00'	-19'	102°	30°47'	-20'	103°	30°33'	-21'	103°	30°19'	-22'	104°	30°04'	-24'	105°	29°49'	-25'	105°	29°33'	-26'	106°	3
4	30°41'	-20'	103°	30°27'	-21'	104°	30°12'	-22'	105°	29°57'	-23'	105°	29°41'	-24'	106°	29°24'	-25'	106°	29°07'	-26'	107°	4
5	30°21'	-20'	104°	30°06'	-21'	105°	29°50'	-22'	106°	29°34'	-23'	106°	29°17'	-25'	107°	28°59'	-26'	107°	28°41'	-27'	108°	5
6	30°01'	-21'	106°	29°45'	-22'	106°	29°28'	-23'	107°	29°10'	-24'	107°	28°52'	-25'	108°	28°34'	-26'	108°	28°15'	-27'	109°	6
7	29°40'	-21'	107°	29°23'	-22'	107°	29°05'	-23'	108°	28°46'	-24'	108°	28°27'	-25'	109°	28°08'	-26'	109°	27°48'	-27'	110°	7
8	29°19'	-22'	108°	29°01'	-23'	108°	28°41'	-24'	109°	28°22'	-25'	109°	28°02'	-26'	110°	27°41'	-27'	110°	27°20'	-28'	111°	8
9	28°57'	-22'	109°	28°38'	-23'	109°	28°18'	-24'	110°	27°57'	-25'	110°	27°36'	-26'	111°	27°14'	-27'	111°	26°52'	-28'	112°	9
10	28°35'	-23'	110°	28°14'	-24'	110°	27°53'	-25'	111°	27°32'	-26'	111°	27°10'	-27'	112°	26°47'	-28'	112°	26°24'	-29'	113°	10
11	28°12'	-23'	111°	27°51'	-24'	111°	27°28'	-25'	112°	27°06'	-26'	112°	26°43'	-27'	113°	26°19'	-28'	113°	25°55'	-29'	114°	11
12	27°49'	-24'	112°	27°26'	-25'	112°	27°03'	-26'	113°	26°40'	-27'	113°	26°15'	-28'	114°	25°51'	-29'	114°	25°26'	-29'	115°	12
13	27°25'	-24'	113°	27°01'	-25'	113°	26°37'	-26'	114°	26°13'	-27'	114°	25°48'	-28'	115°	25°22'	-29'	115°	24°57'	-30'	116°	13
14	27°01'	-25'	114°	26°36'	-26'	114°	26°11'	-27'	115°	25°46'	-27'	115°	25°20'	-28'	116°	24°54'	-29'	116°	24°27'	-30'	117°	14
15	26°36'	-25'	115°	26°11'	-26'	115°	25°45'	-27'	116°	25°18'	-28'	116°	24°51'	-29'	117°	24°24'	-30'	117°	23°57'	-31'	118°	15
16	26°11'	-25'	116°	25°45'	-26'	116°	25°18'	-27'	117°	24°50'	-28'	117°	24°23'	-29'	118°	23°55'	-30'	118°	23°26'	-31'	119°	16
17	25°46'	-26'	117°	25°18'	-27'	117°	24°50'	-28'	118°	24°22'	-29'	118°	23°53'	-30'	119°	23°24'	-30'	119°	22°55'	-31'	119°	17
18	25°20'	-26'	118°	24°51'	-27'	118°	24°23'	-28'	119°	23°53'	-29'	119°	23°24'	-30'	120°	22°54'	-31'	120°	22°24'	-32'	120°	18
19	24°54'	-27'	119°	24°24'	-28'	119°	23°55'	-28'	120°	23°24'	-29'	120°	22°54'	-30'	121°	22°23'	-31'	121°	21°52'	-32'	121°	19
20	24°27'	-27'	120°	23°57'	-28'	120°	23°26'	-29'	121°	22°55'	-30'	121°	22°24'	-31'	122°	21°52'	-31'	122°	21°21'	-32'	122°	20
21	24°00'	-27'	121°	23°29'	-28'	121°	22°57'	-29'	122°	22°25'	-30'	122°	21°53'	-31'	122°	21°21'	-32'	123°	20°48'	-32'	123°	21
22	23°32'	-28'	122°	23°00'	-29'	122°	22°28'	-29'	123°	21°55'	-30'	123°	21°23'	-31'	123°	20°49'	-32'	124°	20°16'	-33'	124°	22
23	<u>23°04'</u>	<u>-28'</u>	<u>123°</u>	<u>22°32'</u>	<u>-29'</u>	<u>123°</u>	<u>21°59'</u>	<u>-30'</u>	<u>124°</u>	<u>21°25'</u>	<u>-31'</u>	<u>124°</u>	<u>20°52'</u>	<u>-31'</u>	<u>124°</u>	<u>20°18'</u>	<u>-32'</u>	<u>125°</u>	<u>19°43'</u>	<u>-33'</u>	<u>125°</u>	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

57° 303° LHA

Latitude CONTRARY to DECLINATION

57° 303° LHA

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

56° 304° LHA

Latitude CONTRARY to Declination

56° 304° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	32°52'	-18'	99°	32°42'	-19'	100°	32°31'	-20'	101°	32°20'	-21'	101°	32°08'	-22'	102°	31°55'	-23'	102°	31°42'	-24'	103°	0
1	32°34'	-18'	100°	32°23'	-19'	101°	32°11'	-20'	102°	31°59'	-22'	102°	31°46'	-23'	103°	31°32'	-24'	103°	31°18'	-25'	104°	1
2	32°16'	-19'	102°	32°03'	-20'	102°	31°51'	-21'	103°	31°37'	-22'	103°	31°23'	-23'	104°	31°08'	-24'	105°	30°53'	-25'	105°	2
3	31°57'	-19'	103°	31°44'	-21'	103°	31°29'	-22'	104°	31°15'	-23'	104°	31°00'	-24'	105°	30°44'	-25'	106°	30°27'	-26'	106°	3
4	31°38'	-20'	104°	31°23'	-21'	104°	31°08'	-22'	105°	30°52'	-23'	106°	30°36'	-24'	106°	30°19'	-25'	107°	30°01'	-26'	107°	4
5	31°18'	-21'	105°	31°02'	-22'	105°	30°46'	-23'	106°	30°29'	-24'	107°	30°11'	-25'	107°	29°53'	-26'	108°	29°35'	-27'	108°	5
6	30°57'	-21'	106°	30°40'	-22'	107°	30°23'	-23'	107°	30°05'	-24'	108°	29°47'	-25'	108°	29°28'	-26'	109°	29°08'	-27'	109°	6
7	30°36'	-22'	107°	30°18'	-23'	108°	30°00'	-24'	108°	29°41'	-25'	109°	29°21'	-26'	109°	29°01'	-27'	110°	28°41'	-28'	110°	7
8	30°14'	-22'	108°	29°55'	-23'	109°	29°36'	-24'	109°	29°16'	-25'	110°	28°55'	-26'	110°	28°34'	-27'	111°	28°13'	-28'	111°	8
9	29°52'	-23'	109°	29°32'	-24'	110°	29°12'	-25'	110°	28°51'	-26'	111°	28°29'	-27'	111°	28°07'	-28'	112°	27°45'	-29'	112°	9
10	29°30'	-23'	110°	29°09'	-24'	111°	28°47'	-25'	111°	28°25'	-26'	112°	28°02'	-27'	112°	27°39'	-28'	113°	27°16'	-29'	113°	10
11	29°06'	-24'	111°	28°44'	-25'	112°	28°22'	-26'	112°	27°59'	-27'	113°	27°35'	-28'	113°	27°11'	-29'	114°	26°47'	-30'	114°	11
12	28°43'	-24'	112°	28°20'	-25'	113°	27°56'	-26'	113°	27°32'	-27'	114°	27°08'	-28'	114°	26°43'	-29'	115°	26°17'	-30'	115°	12
13	28°19'	-25'	113°	27°55'	-26'	114°	27°30'	-27'	114°	27°05'	-28'	115°	26°40'	-28'	115°	26°14'	-29'	116°	25°47'	-30'	116°	13
14	27°54'	-25'	114°	27°29'	-26'	115°	27°03'	-27'	115°	26°37'	-28'	116°	26°11'	-29'	116°	25°44'	-30'	117°	25°17'	-31'	117°	14
15	27°29'	-26'	115°	27°03'	-26'	116°	26°36'	-27'	116°	26°10'	-28'	117°	25°42'	-29'	117°	25°15'	-30'	118°	24°46'	-31'	118°	15
16	27°03'	-26'	117°	26°36'	-27'	117°	26°09'	-28'	117°	25°41'	-29'	118°	25°13'	-30'	118°	24°44'	-30'	119°	24°15'	-31'	119°	16
17	26°37'	-26'	118°	26°10'	-27'	118°	25°41'	-28'	118°	25°13'	-29'	119°	24°43'	-30'	119°	24°14'	-31'	120°	23°44'	-32'	120°	17
18	26°11'	-27'	119°	25°42'	-28'	119°	25°13'	-29'	119°	24°43'	-29'	120°	24°13'	-30'	120°	23°43'	-31'	121°	23°12'	-32'	121°	18
19	25°44'	-27'	120°	25°15'	-28'	120°	24°44'	-29'	120°	24°14'	-30'	121°	23°43'	-31'	121°	23°12'	-31'	121°	22°40'	-32'	122°	19
20	25°17'	-28'	121°	24°46'	-28'	121°	24°15'	-29'	121°	23°44'	-30'	122°	23°12'	-31'	122°	22°40'	-32'	122°	22°08'	-33'	123°	20
21	24°49'	-28'	121°	24°18'	-29'	122°	23°46'	-30'	122°	23°14'	-31'	123°	22°41'	-31'	123°	22°09'	-32'	123°	21°36'	-33'	124°	21
22	24°22'	-28'	122°	23°49'	-29'	123°	23°16'	-30'	123°	22°43'	-31'	124°	22°10'	-32'	124°	21°37'	-32'	124°	21°03'	-33'	125°	22
23	<u>23°53'</u>	<u>-29'</u>	<u>123°</u>	<u>23°20'</u>	<u>-30'</u>	<u>124°</u>	<u>22°46'</u>	<u>-30'</u>	<u>124°</u>	<u>22°13'</u>	<u>-31'</u>	<u>124°</u>	<u>21°39'</u>	<u>-32'</u>	<u>125°</u>	<u>21°04'</u>	<u>-33'</u>	<u>125°</u>	<u>20°29'</u>	<u>-33'</u>	<u>125°</u>	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

56° 304° LHA

Latitude CONTRARY to DECLINATION

56° 304° LHA

55° 305° LHA

Latitude CONTRARY to Declination

55° 305° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	33°49'	-18'	100°	33°39'	-19'	100°	33°28'	-20'	101°	33°16'	-21'	102°	33°04'	-22'	102°	32°51'	-24'	103°	32°37'	-25'	103°	0
1	33°31'	-18'	101°	33°20'	-20'	101°	33°07'	-21'	102°	32°55'	-22'	103°	32°41'	-23'	103°	32°27'	-24'	104°	32°12'	-25'	105°	1
2	33°13'	-19'	102°	33°00'	-20'	103°	32°47'	-21'	103°	32°33'	-22'	104°	32°18'	-24'	104°	32°03'	-25'	105°	31°47'	-26'	106°	2
3	32°54'	-20'	103°	32°40'	-21'	104°	32°25'	-22'	104°	32°10'	-23'	105°	31°55'	-24'	105°	31°38'	-25'	106°	31°21'	-26'	107°	3
4	32°34'	-20'	104°	32°19'	-21'	105°	32°04'	-22'	105°	31°47'	-24'	106°	31°30'	-25'	107°	31°13'	-26'	107°	30°55'	-27'	108°	4
5	32°14'	-21'	105°	31°58'	-22'	106°	31°41'	-23'	106°	31°24'	-24'	107°	31°06'	-25'	108°	30°47'	-26'	108°	30°28'	-27'	109°	5
6	31°53'	-21'	106°	31°36'	-22'	107°	31°18'	-24'	108°	31°00'	-25'	108°	30°41'	-26'	109°	30°21'	-27'	109°	30°01'	-28'	110°	6
7	31°32'	-22'	107°	31°13'	-23'	108°	30°54'	-24'	109°	30°35'	-25'	109°	30°15'	-26'	110°	29°54'	-27'	110°	29°33'	-28'	111°	7
8	31°10'	-22'	109°	30°50'	-24'	109°	30°30'	-25'	110°	30°10'	-26'	110°	29°49'	-27'	111°	29°27'	-28'	111°	29°05'	-29'	112°	8
9	30°47'	-23'	110°	30°27'	-24'	110°	30°06'	-25'	111°	29°44'	-26'	111°	29°22'	-27'	112°	29°00'	-28'	112°	28°37'	-29'	113°	9
10	30°24'	-24'	111°	30°03'	-25'	111°	29°41'	-26'	112°	29°18'	-27'	112°	28°55'	-28'	113°	28°32'	-29'	113°	28°08'	-29'	114°	10
11	30°01'	-24'	112°	29°38'	-25'	112°	29°15'	-26'	113°	28°52'	-27'	113°	28°27'	-28'	114°	28°03'	-29'	114°	27°38'	-30'	115°	11
12	29°37'	-25'	113°	29°13'	-26'	113°	28°49'	-27'	114°	28°24'	-28'	114°	27°59'	-28'	115°	27°34'	-29'	115°	27°08'	-30'	116°	12
13	29°12'	-25'	114°	28°47'	-26'	114°	28°22'	-27'	115°	27°57'	-28'	115°	27°31'	-29'	116°	27°05'	-30'	116°	26°38'	-31'	117°	13
14	28°47'	-26'	115°	28°21'	-26'	115°	27°55'	-27'	116°	27°29'	-28'	116°	27°02'	-29'	117°	26°35'	-30'	117°	26°07'	-31'	118°	14
15	28°21'	-26'	116°	27°55'	-27'	116°	27°28'	-28'	117°	27°01'	-29'	117°	26°33'	-30'	118°	26°05'	-31'	118°	25°36'	-31'	119°	15
16	27°55'	-26'	117°	27°28'	-27'	117°	27°00'	-28'	118°	26°32'	-29'	118°	26°03'	-30'	119°	25°34'	-31'	119°	25°05'	-32'	120°	16
17	27°29'	-27'	118°	27°01'	-28'	118°	26°32'	-29'	119°	26°03'	-30'	119°	25°33'	-30'	120°	25°03'	-31'	120°	24°33'	-32'	121°	17
18	27°02'	-27'	119°	26°33'	-28'	119°	26°03'	-29'	120°	25°33'	-30'	120°	25°03'	-31'	121°	24°32'	-32'	121°	24°01'	-32'	121°	18
19	26°35'	-28'	120°	26°05'	-29'	120°	25°34'	-29'	121°	25°03'	-30'	121°	24°32'	-31'	122°	24°00'	-32'	122°	23°28'	-33'	122°	19
20	26°07'	-28'	121°	25°36'	-29'	121°	25°05'	-30'	122°	24°33'	-31'	122°	24°01'	-31'	123°	23°28'	-32'	123°	22°55'	-33'	123°	20
21	25°39'	-29'	122°	25°07'	-29'	122°	24°35'	-30'	123°	24°02'	-31'	123°	23°29'	-32'	124°	22°56'	-33'	124°	22°22'	-33'	124°	21
22	25°11'	-29'	123°	24°38'	-30'	123°	24°05'	-31'	124°	23°31'	-31'	124°	22°57'	-32'	124°	22°23'	-33'	125°	21°49'	-34'	125°	22
23	<u>24°42'</u>	<u>-29'</u>	<u>124°</u>	<u>24°08'</u>	<u>-30'</u>	<u>124°</u>	<u>23°34'</u>	<u>-31'</u>	<u>125°</u>	<u>23°00'</u>	<u>-32'</u>	<u>125°</u>	<u>22°25'</u>	<u>-32'</u>	<u>125°</u>	<u>21°50'</u>	<u>-33'</u>	<u>126°</u>	<u>21°15'</u>	<u>-34'</u>	<u>126°</u>	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

55° 305° LHA

Latitude CONTRARY to DECLINATION

55° 305° LHA

54° 306° LHA

Latitude CONTRARY to Declination

54° 306° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	34°46'	-18'	100°	34°36'	-19'	101°	34°24'	-20'	101°	34°12'	-22'	102°	33°59'	-23'	103°	33°46'	-24'	103°	33°32'	-25'	104°	0
1	34°28'	-19'	101°	34°16'	-20'	102°	34°04'	-21'	102°	33°51'	-22'	103°	33°37'	-23'	104°	33°22'	-24'	104°	33°07'	-25'	105°	1
2	34°10'	-19'	102°	33°57'	-20'	103°	33°43'	-22'	104°	33°28'	-23'	104°	33°13'	-24'	105°	32°58'	-25'	106°	32°41'	-26'	106°	2
3	33°50'	-20'	103°	33°36'	-21'	104°	33°21'	-22'	105°	33°06'	-23'	105°	32°50'	-24'	106°	32°33'	-25'	107°	32°15'	-27'	107°	3
4	33°31'	-21'	105°	33°15'	-22'	105°	32°59'	-23'	106°	32°42'	-24'	106°	32°25'	-25'	107°	32°07'	-26'	108°	31°49'	-27'	108°	4
5	33°10'	-21'	106°	32°53'	-22'	106°	32°36'	-23'	107°	32°19'	-24'	108°	32°00'	-25'	108°	31°41'	-27'	109°	31°22'	-28'	109°	5
6	32°49'	-22'	107°	32°31'	-23'	107°	32°13'	-24'	108°	31°54'	-25'	109°	31°35'	-26'	109°	31°15'	-27'	110°	30°54'	-28'	110°	6
7	32°27'	-22'	108°	32°08'	-23'	109°	31°49'	-24'	109°	31°29'	-25'	110°	31°09'	-27'	110°	30°48'	-28'	111°	30°26'	-29'	111°	7
8	32°05'	-23'	109°	31°45'	-24'	110°	31°25'	-25'	110°	31°04'	-26'	111°	30°42'	-27'	111°	30°20'	-28'	112°	29°57'	-29'	112°	8
9	31°42'	-23'	110°	31°21'	-24'	111°	31°00'	-25'	111°	30°38'	-27'	112°	30°15'	-28'	112°	29°52'	-28'	113°	29°28'	-29'	113°	9
10	31°19'	-24'	111°	30°57'	-25'	112°	30°34'	-26'	112°	30°11'	-27'	113°	29°48'	-28'	113°	29°24'	-29'	114°	28°59'	-30'	114°	10
11	30°55'	-24'	112°	30°32'	-25'	113°	30°08'	-26'	113°	29°44'	-27'	114°	29°20'	-28'	114°	28°55'	-29'	115°	28°29'	-30'	115°	11
12	30°30'	-25'	113°	30°06'	-26'	114°	29°42'	-27'	114°	29°17'	-28'	115°	28°51'	-29'	115°	28°25'	-30'	116°	27°59'	-31'	116°	12
13	30°05'	-25'	114°	29°40'	-26'	115°	29°15'	-27'	115°	28°49'	-28'	116°	28°22'	-29'	116°	27°55'	-30'	117°	27°28'	-31'	117°	13
14	29°40'	-26'	115°	29°14'	-27'	116°	28°47'	-28'	116°	28°20'	-29'	117°	27°53'	-30'	117°	27°25'	-31'	118°	26°57'	-32'	118°	14
15	29°14'	-26'	116°	28°47'	-27'	117°	28°19'	-28'	117°	27°51'	-29'	118°	27°23'	-30'	118°	26°54'	-31'	119°	26°25'	-32'	119°	15
16	28°47'	-27'	117°	28°19'	-28'	118°	27°51'	-29'	118°	27°22'	-30'	119°	26°53'	-31'	119°	26°23'	-31'	120°	25°53'	-32'	120°	16
17	28°20'	-27'	118°	27°51'	-28'	119°	27°22'	-29'	119°	26°53'	-30'	120°	26°22'	-31'	120°	25°52'	-32'	121°	25°21'	-33'	121°	17
18	27°53'	-28'	119°	27°23'	-29'	120°	26°53'	-30'	120°	26°22'	-30'	121°	25°52'	-31'	121°	25°20'	-32'	122°	24°49'	-33'	122°	18
19	27°25'	-28'	120°	26°54'	-29'	121°	26°23'	-30'	121°	25°52'	-31'	122°	25°20'	-32'	122°	24°48'	-32'	123°	24°16'	-33'	123°	19
20	26°57'	-29'	121°	26°25'	-30'	122°	25°53'	-30'	122°	25°21'	-31'	123°	24°49'	-32'	123°	24°16'	-33'	124°	23°42'	-34'	124°	20
21	26°28'	-29'	122°	25°56'	-30'	123°	25°23'	-31'	123°	24°50'	-32'	124°	24°17'	-32'	124°	23°43'	-33'	124°	23°09'	-34'	125°	21
22	25°59'	-29'	123°	25°26'	-30'	124°	24°52'	-31'	124°	24°19'	-32'	125°	23°44'	-33'	125°	23°10'	-33'	125°	22°35'	-34'	126°	22
23	25°30'	-30'	124°	24°56'	-31'	125°	24°21'	-31'	125°	23°47'	-32'	126°	23°12'	-33'	126°	22°36'	-34'	126°	22°01'	-34'	127°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

54° 306° LHA

Latitude CONTRARY to DECLINATION

54° 306° LHA

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

53° 307° LHA

Latitude CONTRARY to Declination

53° 307° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	35°44'	-18'	100°	35°33'	-19'	101°	35°21'	-21'	102°	35°08'	-22'	102°	34°55'	-23'	103°	34°41'	-24'	104°	34°26'	-25'	104°	0
1	35°25'	-19'	102°	35°13'	-20'	102°	35°00'	-21'	103°	34°46'	-22'	104°	34°32'	-24'	104°	34°17'	-25'	105°	34°01'	-26'	106°	1
2	35°07'	-20'	103°	34°53'	-21'	103°	34°39'	-22'	104°	34°24'	-23'	105°	34°08'	-24'	105°	33°52'	-25'	106°	33°35'	-26'	107°	2
3	34°47'	-20'	104°	34°32'	-21'	104°	34°17'	-22'	105°	34°01'	-24'	106°	33°44'	-25'	106°	33°27'	-26'	107°	33°09'	-27'	108°	3
4	34°27'	-21'	105°	34°11'	-22'	106°	33°54'	-23'	106°	33°37'	-24'	107°	33°20'	-25'	108°	33°01'	-26'	108°	32°42'	-27'	109°	4
5	34°06'	-21'	106°	33°49'	-23'	107°	33°31'	-24'	107°	33°13'	-25'	108°	32°54'	-26'	109°	32°35'	-27'	109°	32°15'	-28'	110°	5
6	33°45'	-22'	107°	33°26'	-23'	108°	33°08'	-24'	108°	32°48'	-25'	109°	32°28'	-26'	110°	32°08'	-27'	110°	31°47'	-28'	111°	6
7	33°22'	-23'	108°	33°03'	-24'	109°	32°43'	-25'	110°	32°23'	-26'	110°	32°02'	-27'	111°	31°41'	-28'	111°	31°18'	-29'	112°	7
8	33°00'	-23'	109°	32°40'	-24'	110°	32°19'	-25'	111°	31°57'	-26'	111°	31°35'	-27'	112°	31°13'	-28'	112°	30°49'	-29'	113°	8
9	32°37'	-24'	111°	32°15'	-25'	111°	31°53'	-26'	112°	31°31'	-27'	112°	31°08'	-28'	113°	30°44'	-29'	113°	30°20'	-30'	114°	9
10	32°13'	-24'	112°	31°50'	-25'	112°	31°27'	-26'	113°	31°04'	-27'	113°	30°40'	-28'	114°	30°15'	-29'	114°	29°50'	-30'	115°	10
11	31°48'	-25'	113°	31°25'	-26'	113°	31°01'	-27'	114°	30°36'	-28'	114°	30°11'	-29'	115°	29°46'	-30'	115°	29°20'	-31'	116°	11
12	31°23'	-25'	114°	30°59'	-26'	114°	30°34'	-27'	115°	30°09'	-28'	115°	29°43'	-29'	116°	29°16'	-30'	116°	28°49'	-31'	117°	12
13	30°58'	-26'	115°	30°33'	-27'	115°	30°07'	-28'	116°	29°40'	-29'	116°	29°13'	-30'	117°	28°46'	-31'	117°	28°18'	-32'	118°	13
14	30°32'	-26'	116°	30°06'	-27'	116°	29°39'	-28'	117°	29°11'	-29'	117°	28°43'	-30'	118°	28°15'	-31'	118°	27°46'	-32'	119°	14
15	30°06'	-27'	117°	29°38'	-28'	117°	29°10'	-29'	118°	28°42'	-30'	118°	28°13'	-31'	119°	27°44'	-31'	119°	27°14'	-32'	120°	15
16	29°39'	-27'	118°	29°10'	-28'	118°	28°42'	-29'	119°	28°12'	-30'	119°	27°43'	-31'	120°	27°13'	-32'	120°	26°42'	-33'	121°	16
17	29°11'	-28'	119°	28°42'	-29'	119°	28°12'	-30'	120°	27°42'	-31'	120°	27°12'	-31'	121°	26°41'	-32'	121°	26°09'	-33'	122°	17
18	28°43'	-28'	120°	28°13'	-29'	120°	27°43'	-30'	121°	27°12'	-31'	121°	26°40'	-32'	122°	26°08'	-33'	122°	25°36'	-33'	123°	18
19	28°15'	-29'	121°	27°44'	-30'	121°	27°13'	-30'	122°	26°41'	-31'	122°	26°08'	-32'	123°	25°36'	-33'	123°	25°03'	-34'	124°	19
20	27°46'	-29'	122°	27°14'	-30'	122°	26°42'	-31'	123°	26°09'	-32'	123°	25°36'	-33'	124°	25°03'	-33'	124°	24°29'	-34'	124°	20
21	27°17'	-30'	123°	26°44'	-30'	123°	26°11'	-31'	124°	25°38'	-32'	124°	25°04'	-33'	125°	24°29'	-34'	125°	23°55'	-34'	125°	21
22	26°48'	-30'	124°	26°14'	-31'	124°	25°40'	-32'	125°	25°06'	-32'	125°	24°31'	-33'	126°	23°56'	-34'	126°	23°21'	-35'	126°	22
23	26°18'	-30'	125°	25°43'	-31'	125°	25°08'	-32'	126°	24°33'	-33'	126°	23°58'	-34'	126°	23°22'	-34'	127°	22°46'	-35'	127°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

53° 307° LHA

Latitude CONTRARY to DECLINATION

53° 307° LHA

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

52° 308° LHA

Latitude CONTRARY to Declination

52° 308° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	36°41'	-18'	101°	36°29'	-20'	101°	36°17'	-21'	102°	36°04'	-22'	103°	35°50'	-23'	104°	35°36'	-24'	104°	35°21'	-25'	105°	0
1	36°22'	-19'	102°	36°10'	-20'	103°	35°56'	-22'	103°	35°42'	-23'	104°	35°27'	-24'	105°	35°12'	-25'	105°	34°55'	-26'	106°	1
2	36°03'	-20'	103°	35°49'	-21'	104°	35°35'	-22'	104°	35°19'	-23'	105°	35°03'	-24'	106°	34°47'	-26'	107°	34°29'	-27'	107°	2
3	35°43'	-20'	104°	35°28'	-22'	105°	35°13'	-23'	106°	34°56'	-24'	106°	34°39'	-25'	107°	34°21'	-26'	108°	34°03'	-27'	108°	3
4	35°23'	-21'	105°	35°07'	-22'	106°	34°50'	-23'	107°	34°32'	-25'	107°	34°14'	-26'	108°	33°55'	-27'	109°	33°35'	-28'	109°	4
5	35°02'	-22'	107°	34°44'	-23'	107°	34°26'	-24'	108°	34°08'	-25'	109°	33°48'	-26'	109°	33°28'	-27'	110°	33°08'	-28'	110°	5
6	34°40'	-22'	108°	34°22'	-24'	108°	34°02'	-25'	109°	33°43'	-26'	110°	33°22'	-27'	110°	33°01'	-28'	111°	32°39'	-29'	111°	6
7	34°18'	-23'	109°	33°58'	-24'	109°	33°38'	-25'	110°	33°17'	-26'	111°	32°55'	-27'	111°	32°33'	-28'	112°	32°11'	-29'	112°	7
8	33°55'	-24'	110°	33°34'	-25'	111°	33°13'	-26'	111°	32°51'	-27'	112°	32°28'	-28'	112°	32°05'	-29'	113°	31°41'	-30'	113°	8
9	33°31'	-24'	111°	33°09'	-25'	112°	32°47'	-26'	112°	32°24'	-27'	113°	32°00'	-28'	113°	31°36'	-29'	114°	31°12'	-30'	115°	9
10	33°07'	-25'	112°	32°44'	-26'	113°	32°20'	-27'	113°	31°56'	-28'	114°	31°32'	-29'	114°	31°07'	-30'	115°	30°41'	-31'	116°	10
11	32°42'	-25'	113°	32°18'	-26'	114°	31°54'	-27'	114°	31°29'	-28'	115°	31°03'	-29'	115°	30°37'	-30'	116°	30°10'	-31'	117°	11
12	32°17'	-26'	114°	31°52'	-27'	115°	31°26'	-28'	115°	31°00'	-29'	116°	30°34'	-30'	116°	30°07'	-31'	117°	29°39'	-32'	118°	12
13	31°51'	-26'	115°	31°25'	-27'	116°	30°58'	-28'	116°	30°31'	-29'	117°	30°04'	-30'	117°	29°36'	-31'	118°	29°08'	-32'	118°	13
14	31°24'	-27'	116°	30°57'	-28'	117°	30°30'	-29'	117°	30°02'	-30'	118°	29°34'	-31'	118°	29°05'	-32'	119°	28°36'	-32'	119°	14
15	30°57'	-27'	117°	30°30'	-28'	118°	30°01'	-29'	118°	29°32'	-30'	119°	29°03'	-31'	119°	28°33'	-32'	120°	28°03'	-33'	120°	15
16	30°30'	-28'	118°	30°01'	-29'	119°	29°32'	-30'	119°	29°02'	-31'	120°	28°32'	-32'	120°	28°01'	-32'	121°	27°30'	-33'	121°	16
17	30°02'	-28'	119°	29°32'	-29'	120°	29°02'	-30'	120°	28°32'	-31'	121°	28°00'	-32'	121°	27°29'	-33'	122°	26°57'	-34'	122°	17
18	29°34'	-29'	121°	29°03'	-30'	121°	28°32'	-31'	121°	28°00'	-31'	122°	27°29'	-32'	122°	26°56'	-33'	123°	26°24'	-34'	123°	18
19	29°05'	-29'	122°	28°33'	-30'	122°	28°01'	-31'	122°	27°29'	-32'	123°	26°56'	-33'	123°	26°23'	-33'	124°	25°50'	-34'	124°	19
20	28°36'	-30'	123°	28°03'	-31'	123°	27°30'	-31'	123°	26°57'	-32'	124°	26°24'	-33'	124°	25°50'	-34'	125°	25°15'	-35'	125°	20
21	28°06'	-30'	123°	27°33'	-31'	124°	26°59'	-32'	124°	26°25'	-33'	125°	25°51'	-33'	125°	25°16'	-34'	126°	24°41'	-35'	126°	21
22	27°36'	-31'	124°	27°02'	-31'	125°	26°27'	-32'	125°	25°52'	-33'	126°	25°17'	-34'	126°	24°42'	-34'	126°	24°06'	-35'	127°	22
23	27°05'	-31'	125°	26°30'	-32'	126°	25°55'	-33'	126°	25°19'	-33'	127°	24°43'	-34'	127°	24°07'	-35'	127°	23°31'	-36'	128°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

52° 308° LHA

Latitude CONTRARY to DECLINATION

52° 308° LHA

51° 309° LHA

Latitude CONTRARY to Declination

51° 309° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	37°38'	-19'	101°	37°26'	-20'	102°	37°13'	-21'	103°	37°00'	-22'	103°	36°46'	-23'	104°	36°31'	-25'	105°	36°15'	-26'	105°	0
1	37°19'	-19'	102°	37°06'	-21'	103°	36°52'	-22'	104°	36°38'	-23'	104°	36°22'	-24'	105°	36°06'	-25'	106°	35°49'	-26'	107°	1
2	37°00'	-20'	103°	36°46'	-21'	104°	36°31'	-22'	105°	36°15'	-24'	106°	35°58'	-25'	106°	35°41'	-26'	107°	35°23'	-27'	108°	2
3	36°40'	-21'	105°	36°24'	-22'	105°	36°08'	-23'	106°	35°51'	-24'	107°	35°33'	-25'	107°	35°15'	-26'	108°	34°56'	-28'	109°	3
4	36°19'	-21'	106°	36°02'	-23'	107°	35°45'	-24'	107°	35°27'	-25'	108°	35°08'	-26'	109°	34°49'	-27'	109°	34°29'	-28'	110°	4
5	35°58'	-22'	107°	35°40'	-23'	108°	35°21'	-24'	108°	35°02'	-25'	109°	34°42'	-27'	110°	34°22'	-28'	110°	34°00'	-29'	111°	5
6	35°35'	-23'	108°	35°16'	-24'	109°	34°57'	-25'	109°	34°37'	-26'	110°	34°16'	-27'	111°	33°54'	-28'	111°	33°32'	-29'	112°	6
7	35°13'	-23'	109°	34°53'	-25'	110°	34°32'	-26'	111°	34°10'	-27'	111°	33°48'	-28'	112°	33°26'	-29'	112°	33°03'	-30'	113°	7
8	34°49'	-24'	110°	34°28'	-25'	111°	34°06'	-26'	112°	33°44'	-27'	112°	33°21'	-28'	113°	32°57'	-29'	113°	32°33'	-30'	114°	8
9	34°25'	-25'	111°	34°03'	-26'	112°	33°40'	-27'	113°	33°17'	-28'	113°	32°53'	-29'	114°	32°28'	-30'	115°	32°03'	-31'	115°	9
10	34°01'	-25'	113°	33°37'	-26'	113°	33°13'	-27'	114°	32°49'	-28'	114°	32°24'	-29'	115°	31°58'	-30'	116°	31°32'	-31'	116°	10
11	33°35'	-26'	114°	33°11'	-27'	114°	32°46'	-28'	115°	32°21'	-29'	115°	31°54'	-30'	116°	31°28'	-31'	117°	31°01'	-32'	117°	11
12	33°10'	-26'	115°	32°44'	-27'	115°	32°18'	-28'	116°	31°52'	-29'	116°	31°25'	-30'	117°	30°57'	-31'	118°	30°29'	-32'	118°	12
13	32°43'	-27'	116°	32°17'	-28'	116°	31°50'	-29'	117°	31°22'	-30'	118°	30°54'	-31'	118°	30°26'	-32'	119°	29°57'	-33'	119°	13
14	32°16'	-27'	117°	31°49'	-28'	117°	31°21'	-29'	118°	30°53'	-30'	119°	30°24'	-31'	119°	29°54'	-32'	120°	29°25'	-33'	120°	14
15	31°49'	-28'	118°	31°21'	-29'	118°	30°52'	-30'	119°	30°22'	-31'	120°	29°53'	-32'	120°	29°22'	-32'	121°	28°52'	-33'	121°	15
16	31°21'	-28'	119°	30°52'	-29'	120°	30°22'	-30'	120°	29°52'	-31'	121°	29°21'	-32'	121°	28°50'	-33'	121°	28°18'	-34'	122°	16
17	30°53'	-29'	120°	30°22'	-30'	121°	29°52'	-31'	121°	29°21'	-32'	122°	28°49'	-32'	122°	28°17'	-33'	122°	27°45'	-34'	123°	17
18	30°24'	-29'	121°	29°53'	-30'	122°	29°21'	-31'	122°	28°49'	-32'	122°	28°17'	-33'	123°	27°44'	-34'	123°	27°11'	-34'	124°	18
19	29°54'	-30'	122°	29°22'	-31'	123°	28°50'	-32'	123°	28°17'	-32'	123°	27°44'	-33'	124°	27°10'	-34'	124°	26°36'	-35'	125°	19
20	29°25'	-30'	123°	28°52'	-31'	124°	28°18'	-32'	124°	27°45'	-33'	124°	27°11'	-34'	125°	26°36'	-34'	125°	26°01'	-35'	126°	20
21	28°54'	-31'	124°	28°21'	-32'	124°	27°46'	-32'	125°	27°12'	-33'	125°	26°37'	-34'	126°	26°02'	-35'	126°	25°26'	-35'	127°	21
22	28°24'	-31'	125°	27°49'	-32'	125°	27°14'	-33'	126°	26°39'	-34'	126°	26°03'	-34'	127°	25°27'	-35'	127°	24°51'	-36'	127°	22
23	27°53'	-32'	126°	27°17'	-32'	126°	26°41'	-33'	127°	26°05'	-34'	127°	25°29'	-35'	128°	24°52'	-35'	128°	24°15'	-36'	128°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

51° 309° LHA

Latitude CONTRARY to DECLINATION

51° 309° LHA

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

50° 310° LHA

Latitude CONTRARY to Declination

50° 310° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	38°35'	-19'	101°	38°23'	-20'	102°	38°10'	-21'	103°	37°56'	-23'	104°	37°41'	-24'	105°	37°26'	-25'	105°	37°10'	-26'	106°	0
1	38°16'	-20'	103°	38°03'	-21'	103°	37°48'	-22'	104°	37°33'	-23'	105°	37°17'	-24'	106°	37°01'	-26'	106°	36°43'	-27'	107°	1
2	37°57'	-20'	104°	37°42'	-22'	105°	37°26'	-23'	105°	37°10'	-24'	106°	36°53'	-25'	107°	36°35'	-26'	108°	36°17'	-27'	108°	2
3	37°36'	-21'	105°	37°20'	-22'	106°	37°03'	-23'	107°	36°46'	-25'	107°	36°28'	-26'	108°	36°09'	-27'	109°	35°49'	-28'	109°	3
4	37°15'	-22'	106°	36°58'	-23'	107°	36°40'	-24'	108°	36°21'	-25'	108°	36°02'	-26'	109°	35°42'	-27'	110°	35°22'	-28'	110°	4
5	36°53'	-22'	107°	36°35'	-24'	108°	36°16'	-25'	109°	35°56'	-26'	110°	35°36'	-27'	110°	35°15'	-28'	111°	34°53'	-29'	112°	5
6	36°31'	-23'	109°	36°11'	-24'	109°	35°51'	-25'	110°	35°30'	-26'	111°	35°09'	-28'	111°	34°47'	-29'	112°	34°24'	-30'	113°	6
7	36°08'	-24'	110°	35°47'	-25'	110°	35°26'	-26'	111°	35°04'	-27'	112°	34°41'	-28'	112°	34°18'	-29'	113°	33°54'	-30'	114°	7
8	35°44'	-24'	111°	35°22'	-26'	112°	35°00'	-27'	112°	34°37'	-28'	113°	34°13'	-29'	113°	33°49'	-30'	114°	33°24'	-31'	115°	8
9	35°19'	-25'	112°	34°57'	-26'	113°	34°33'	-27'	113°	34°09'	-28'	114°	33°45'	-29'	115°	33°19'	-30'	115°	32°54'	-31'	116°	9
10	34°54'	-26'	113°	34°30'	-27'	114°	34°06'	-28'	114°	33°41'	-29'	115°	33°15'	-30'	116°	32°49'	-31'	116°	32°22'	-32'	117°	10
11	34°29'	-26'	114°	34°04'	-27'	115°	33°38'	-28'	115°	33°12'	-29'	116°	32°46'	-30'	117°	32°19'	-31'	117°	31°51'	-32'	118°	11
12	34°02'	-27'	115°	33°36'	-28'	116°	33°10'	-29'	116°	32°43'	-30'	117°	32°15'	-31'	118°	31°47'	-32'	118°	31°19'	-33'	119°	12
13	33°36'	-27'	116°	33°09'	-28'	117°	32°41'	-29'	118°	32°13'	-30'	118°	31°45'	-31'	119°	31°16'	-32'	119°	30°46'	-33'	120°	13
14	33°08'	-28'	117°	32°40'	-29'	118°	32°12'	-30'	119°	31°43'	-31'	119°	31°14'	-32'	120°	30°44'	-33'	120°	30°13'	-33'	121°	14
15	32°40'	-28'	118°	32°11'	-29'	119°	31°42'	-30'	120°	31°12'	-31'	120°	30°42'	-32'	121°	30°11'	-33'	121°	29°40'	-34'	122°	15
16	32°12'	-29'	120°	31°42'	-30'	120°	31°12'	-31'	121°	30°41'	-32'	121°	30°10'	-33'	122°	29°38'	-33'	122°	29°06'	-34'	123°	16
17	31°43'	-29'	121°	31°12'	-30'	121°	30°41'	-31'	122°	30°09'	-32'	122°	29°37'	-33'	123°	29°05'	-34'	123°	28°32'	-35'	124°	17
18	31°14'	-30'	122°	30°42'	-31'	122°	30°10'	-32'	123°	29°37'	-33'	123°	29°04'	-33'	124°	28°31'	-34'	124°	27°57'	-35'	124°	18
19	30°44'	-30'	123°	30°11'	-31'	123°	29°38'	-32'	124°	29°05'	-33'	124°	28°31'	-34'	124°	27°57'	-35'	125°	27°22'	-35'	125°	19
20	30°13'	-31'	124°	29°40'	-32'	124°	29°06'	-33'	125°	28°32'	-33'	125°	27°57'	-34'	125°	27°22'	-35'	126°	26°47'	-36'	126°	20
21	29°42'	-31'	125°	29°08'	-32'	125°	28°34'	-33'	125°	27°59'	-34'	126°	27°23'	-34'	126°	26°47'	-35'	127°	26°11'	-36'	127°	21
22	29°11'	-32'	126°	28°36'	-32'	126°	28°01'	-33'	126°	27°25'	-34'	127°	26°49'	-35'	127°	26°12'	-36'	128°	25°35'	-36'	128°	22
23	28°40'	-32'	127°	28°04'	-33'	127°	27°27'	-34'	127°	26°51'	-34'	128°	26°14'	-35'	128°	25°37'	-36'	129°	24°59'	-37'	129°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	39°32'	-19'	102°	39°19'	-20'	103°	39°06'	-22'	103°	38°51'	-23'	104°	38°36'	-24'	105°	38°20'	-25'	106°	38°04'	-26'	107°	0
1	39°13'	-20'	103°	38°59'	-21'	104°	38°44'	-22'	105°	38°29'	-24'	105°	38°12'	-25'	106°	37°55'	-26'	107°	37°37'	-27'	108°	1
2	38°53'	-21'	104°	38°38'	-22'	105°	38°22'	-23'	106°	38°05'	-24'	107°	37°47'	-25'	107°	37°29'	-27'	108°	37°10'	-28'	109°	2
3	38°32'	-21'	106°	38°16'	-23'	106°	37°59'	-24'	107°	37°41'	-25'	108°	37°22'	-26'	109°	37°03'	-27'	109°	36°43'	-28'	110°	3
4	38°11'	-22'	107°	37°53'	-23'	107°	37°35'	-24'	108°	37°16'	-26'	109°	36°56'	-27'	110°	36°35'	-28'	110°	36°14'	-29'	111°	4
5	37°49'	-23'	108°	37°30'	-24'	109°	37°10'	-25'	109°	36°50'	-26'	110°	36°29'	-27'	111°	36°08'	-28'	111°	35°45'	-29'	112°	5
6	37°26'	-24'	109°	37°06'	-25'	110°	36°45'	-26'	110°	36°24'	-27'	111°	36°02'	-28'	112°	35°39'	-29'	113°	35°16'	-30'	113°	6
7	37°02'	-24'	110°	36°41'	-25'	111°	36°19'	-26'	112°	35°57'	-27'	112°	35°34'	-29'	113°	35°10'	-30'	114°	34°46'	-31'	114°	7
8	36°38'	-25'	111°	36°16'	-26'	112°	35°53'	-27'	113°	35°30'	-28'	113°	35°05'	-29'	114°	34°41'	-30'	115°	34°15'	-31'	115°	8
9	36°13'	-25'	112°	35°50'	-27'	113°	35°26'	-28'	114°	35°01'	-29'	114°	34°36'	-30'	115°	34°11'	-31'	116°	33°44'	-32'	116°	9
10	35°48'	-26'	114°	35°23'	-27'	114°	34°58'	-28'	115°	34°33'	-29'	116°	34°07'	-30'	116°	33°40'	-31'	117°	33°13'	-32'	117°	10
11	35°22'	-27'	115°	34°56'	-28'	115°	34°30'	-29'	116°	34°04'	-30'	117°	33°37'	-31'	117°	33°09'	-32'	118°	32°41'	-33'	118°	11
12	34°55'	-27'	116°	34°28'	-28'	116°	34°02'	-29'	117°	33°34'	-30'	118°	33°06'	-31'	118°	32°37'	-32'	119°	32°08'	-33'	119°	12
13	34°28'	-28'	117°	34°00'	-29'	117°	33°32'	-30'	118°	33°04'	-31'	119°	32°35'	-32'	119°	32°05'	-33'	120°	31°35'	-33'	120°	13
14	34°00'	-28'	118°	33°31'	-29'	119°	33°02'	-30'	119°	32°33'	-31'	120°	32°03'	-32'	120°	31°33'	-33'	121°	31°02'	-34'	121°	14
15	33°31'	-29'	119°	33°02'	-30'	120°	32°32'	-31'	120°	32°02'	-32'	121°	31°31'	-33'	121°	31°00'	-33'	122°	30°28'	-34'	122°	15
16	33°02'	-29'	120°	32°32'	-30'	121°	32°01'	-31'	121°	31°30'	-32'	122°	30°58'	-33'	122°	30°26'	-34'	123°	29°53'	-35'	123°	16
17	32°33'	-30'	121°	32°02'	-31'	122°	31°30'	-32'	122°	30°58'	-33'	123°	30°25'	-33'	123°	29°52'	-34'	124°	29°19'	-35'	124°	17
18	32°03'	-30'	122°	31°31'	-31'	123°	30°58'	-32'	123°	30°25'	-33'	124°	29°52'	-34'	124°	29°18'	-35'	125°	28°44'	-35'	125°	18
19	31°33'	-31'	123°	31°00'	-32'	124°	30°26'	-33'	124°	29°52'	-33'	125°	29°18'	-34'	125°	28°43'	-35'	126°	28°08'	-36'	126°	19
20	31°02'	-31'	124°	30°28'	-32'	125°	29°53'	-33'	125°	29°19'	-34'	126°	28°44'	-35'	126°	28°08'	-35'	126°	27°32'	-36'	127°	20
21	30°30'	-32'	125°	29°55'	-33'	126°	29°20'	-33'	126°	28°45'	-34'	127°	28°09'	-35'	127°	27°33'	-36'	127°	26°56'	-37'	128°	21
22	29°58'	-32'	126°	29°23'	-33'	127°	28°47'	-34'	127°	28°11'	-35'	127°	27°34'	-35'	128°	26°57'	-36'	128°	26°20'	-37'	129°	22
23	29°26'	-33'	127°	28°50'	-33'	128°	28°13'	-34'	128°	27°36'	-35'	128°	26°59'	-36'	129°	26°21'	-36'	129°	25°43'	-37'	130°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

49° 311° LHA

Latitude CONTRARY to 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

48° 312° LHA

Latitude CONTRARY to Declination

48° 312° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	40°29'	-19'	102°	40°16'	-21'	103°	40°02'	-22'	104°	39°47'	-23'	105°	39°31'	-24'	106°	39°15'	-26'	106°	38°58'	-27'	107°	0
1	40°10'	-20'	104°	39°55'	-22'	104°	39°40'	-23'	105°	39°24'	-24'	106°	39°07'	-25'	107°	38°49'	-26'	108°	38°31'	-27'	108°	1
2	39°49'	-21'	105°	39°34'	-22'	106°	39°17'	-23'	106°	39°00'	-25'	107°	38°42'	-26'	108°	38°23'	-27'	109°	38°03'	-28'	109°	2
3	39°28'	-22'	106°	39°11'	-23'	107°	38°54'	-24'	108°	38°35'	-25'	108°	38°16'	-26'	109°	37°56'	-28'	110°	37°35'	-29'	111°	3
4	39°07'	-23'	107°	38°48'	-24'	108°	38°30'	-25'	109°	38°10'	-26'	109°	37°50'	-27'	110°	37°29'	-28'	111°	37°07'	-29'	112°	4
5	38°44'	-23'	108°	38°25'	-24'	109°	38°05'	-26'	110°	37°44'	-27'	111°	37°22'	-28'	111°	37°00'	-29'	112°	36°38'	-30'	113°	5
6	38°21'	-24'	110°	38°00'	-25'	110°	37°39'	-26'	111°	37°17'	-27'	112°	36°55'	-28'	112°	36°32'	-29'	113°	36°08'	-30'	114°	6
7	37°57'	-25'	111°	37°35'	-26'	111°	37°13'	-27'	112°	36°50'	-28'	113°	36°26'	-29'	114°	36°02'	-30'	114°	35°37'	-31'	115°	7
8	37°32'	-25'	112°	37°10'	-26'	113°	36°46'	-27'	113°	36°22'	-29'	114°	35°57'	-30'	115°	35°32'	-31'	115°	35°06'	-32'	116°	8
9	37°07'	-26'	113°	36°43'	-27'	114°	36°19'	-28'	114°	35°54'	-29'	115°	35°28'	-30'	116°	35°02'	-31'	116°	34°35'	-32'	117°	9
10	36°41'	-27'	114°	36°16'	-28'	115°	35°51'	-29'	115°	35°25'	-30'	116°	34°58'	-31'	117°	34°31'	-32'	117°	34°03'	-33'	118°	10
11	36°14'	-27'	115°	35°48'	-28'	116°	35°22'	-29'	117°	34°55'	-30'	117°	34°27'	-31'	118°	33°59'	-32'	118°	33°30'	-33'	119°	11
12	35°47'	-28'	116°	35°20'	-29'	117°	34°53'	-30'	118°	34°25'	-31'	118°	33°56'	-32'	119°	33°27'	-33'	119°	32°57'	-34'	120°	12
13	35°19'	-28'	117°	34°51'	-29'	118°	34°23'	-30'	119°	33°54'	-31'	119°	33°24'	-32'	120°	32°54'	-33'	120°	32°24'	-34'	121°	13
14	34°51'	-29'	119°	34°22'	-30'	119°	33°53'	-31'	120°	33°23'	-32'	120°	32°52'	-33'	121°	32°21'	-34'	121°	31°50'	-34'	122°	14
15	34°22'	-29'	120°	33°52'	-30'	120°	33°22'	-31'	121°	32°51'	-32'	121°	32°19'	-33'	122°	31°48'	-34'	122°	31°15'	-35'	123°	15
16	33°53'	-30'	121°	33°22'	-31'	121°	32°50'	-32'	122°	32°19'	-33'	122°	31°46'	-34'	123°	31°14'	-34'	123°	30°40'	-35'	124°	16
17	33°23'	-31'	122°	32°51'	-31'	122°	32°19'	-32'	123°	31°46'	-33'	123°	31°13'	-34'	124°	30°39'	-35'	124°	30°05'	-36'	125°	17
18	32°52'	-31'	123°	32°19'	-32'	123°	31°46'	-33'	124°	31°13'	-34'	124°	30°39'	-34'	125°	30°04'	-35'	125°	29°30'	-36'	126°	18
19	32°21'	-31'	124°	31°48'	-32'	124°	31°14'	-33'	125°	30°39'	-34'	125°	30°04'	-35'	126°	29°29'	-36'	126°	28°54'	-36'	127°	19
20	31°50'	-32'	125°	31°15'	-33'	125°	30°40'	-34'	126°	30°05'	-34'	126°	29°30'	-35'	127°	28°54'	-36'	127°	28°17'	-37'	128°	20
21	31°18'	-32'	126°	30°42'	-33'	126°	30°07'	-34'	127°	29°31'	-35'	127°	28°54'	-36'	128°	28°18'	-36'	128°	27°40'	-37'	128°	21
22	30°45'	-33'	127°	30°09'	-34'	127°	29°33'	-34'	128°	28°56'	-35'	128°	28°19'	-36'	128°	27°41'	-37'	129°	27°03'	-37'	129°	22
23	30°12'	-33'	128°	29°36'	-34'	128°	28°58'	-35'	129°	28°21'	-36'	129°	27°43'	-36'	129°	27°05'	-37'	130°	26°26'	-38'	130°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	41°26'	-20'	103°	41°12'	-21'	104°	40°58'	-22'	104°	40°42'	-24'	105°	40°26'	-25'	106°	40°09'	-26'	107°	39°51'	-27'	108°	0
1	41°06'	-21'	104°	40°51'	-22'	105°	40°36'	-23'	106°	40°19'	-24'	106°	40°02'	-25'	107°	39°43'	-27'	108°	39°24'	-28'	109°	1
2	40°46'	-21'	105°	40°29'	-23'	106°	40°12'	-24'	107°	39°55'	-25'	108°	39°36'	-26'	108°	39°17'	-27'	109°	38°57'	-28'	110°	2
3	40°24'	-22'	106°	40°07'	-23'	107°	39°49'	-25'	108°	39°30'	-26'	109°	39°10'	-27'	110°	38°49'	-28'	110°	38°28'	-29'	111°	3
4	40°02'	-23'	108°	39°43'	-24'	108°	39°24'	-25'	109°	39°04'	-26'	110°	38°43'	-28'	111°	38°21'	-29'	112°	37°59'	-30'	112°	4
5	39°39'	-24'	109°	39°19'	-25'	110°	38°59'	-26'	110°	38°38'	-27'	111°	38°16'	-28'	112°	37°53'	-29'	113°	37°29'	-30'	113°	5
6	39°16'	-24'	110°	38°55'	-26'	111°	38°33'	-27'	112°	38°10'	-28'	112°	37°47'	-29'	113°	37°24'	-30'	114°	36°59'	-31'	114°	6
7	38°51'	-25'	111°	38°29'	-26'	112°	38°06'	-27'	113°	37°43'	-28'	113°	37°19'	-29'	114°	36°54'	-30'	115°	36°28'	-31'	115°	7
8	38°26'	-26'	112°	38°03'	-27'	113°	37°39'	-28'	114°	37°14'	-29'	115°	36°49'	-30'	115°	36°23'	-31'	116°	35°57'	-32'	117°	8
9	38°00'	-26'	114°	37°36'	-27'	114°	37°11'	-29'	115°	36°45'	-30'	116°	36°19'	-31'	116°	35°52'	-32'	117°	35°25'	-33'	118°	9
10	37°34'	-27'	115°	37°09'	-28'	115°	36°43'	-29'	116°	36°16'	-30'	117°	35°49'	-31'	117°	35°21'	-32'	118°	34°52'	-33'	119°	10
11	37°07'	-28'	116°	36°40'	-29'	116°	36°13'	-30'	117°	35°46'	-31'	118°	35°17'	-32'	118°	34°49'	-33'	119°	34°19'	-34'	120°	11
12	36°39'	-28'	117°	36°12'	-29'	118°	35°44'	-30'	118°	35°15'	-31'	119°	34°46'	-32'	119°	34°16'	-33'	120°	33°46'	-34'	121°	12
13	36°11'	-29'	118°	35°42'	-30'	119°	35°13'	-31'	119°	34°44'	-32'	120°	34°14'	-33'	120°	33°43'	-34'	121°	33°12'	-34'	122°	13
14	35°42'	-29'	119°	35°13'	-30'	120°	34°43'	-31'	120°	34°12'	-32'	121°	33°41'	-33'	121°	33°09'	-34'	122°	32°37'	-35'	123°	14
15	35°13'	-30'	120°	34°42'	-31'	121°	34°11'	-32'	121°	33°40'	-33'	122°	33°08'	-34'	122°	32°35'	-35'	123°	32°02'	-35'	124°	15
16	34°43'	-31'	121°	34°11'	-31'	122°	33°39'	-32'	122°	33°07'	-33'	123°	32°34'	-34'	123°	32°01'	-35'	124°	31°27'	-36'	125°	16
17	34°12'	-31'	122°	33°40'	-32'	123°	33°07'	-33'	123°	32°34'	-34'	124°	32°00'	-35'	124°	31°26'	-35'	125°	30°51'	-36'	125°	17
18	33°41'	-32'	123°	33°08'	-32'	124°	32°34'	-33'	124°	32°00'	-34'	125°	31°25'	-35'	125°	30°51'	-36'	126°	30°15'	-37'	126°	18
19	33°09'	-32'	124°	32°35'	-33'	125°	32°01'	-34'	125°	31°26'	-35'	126°	30°51'	-35'	126°	30°15'	-36'	127°	29°39'	-37'	127°	19
20	32°37'	-33'	125°	32°02'	-33'	126°	31°27'	-34'	126°	30°51'	-35'	127°	30°15'	-36'	127°	29°39'	-37'	128°	29°02'	-37'	128°	20
21	32°05'	-33'	126°	31°29'	-34'	127°	30°53'	-35'	127°	30°16'	-35'	128°	29°39'	-36'	128°	29°02'	-37'	129°	28°24'	-38'	129°	21
22	31°32'	-33'	127°	30°55'	-34'	128°	30°18'	-35'	128°	29°41'	-36'	129°	29°03'	-37'	129°	28°25'	-37'	130°	27°47'	-38'	130°	22
23	30°58'	-34'	128°	30°21'	-35'	129°	29°43'	-35'	129°	29°05'	-36'	130°	28°27'	-37'	130°	27°48'	-38'	130°	27°09'	-38'	131°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

47° 313° LHA

Latitude CONTRARY to 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

46° 314° LHA

Latitude CONTRARY to Declination

46° 314° LHA

Table with columns for Dec (0-23), Hc, d, Z for each hour (14-20), and Dec. It shows celestial navigation data for a specific latitude and declination.

46° 314° LHA

Latitude CONTRARY to 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

45° 315° LHA

Latitude CONTRARY to Declination

45° 315° LHA

Table with columns for Dec (0-23), Hc, d, Z for each hour (14-20), and Dec. It shows celestial navigation data for a specific latitude and declination.

45° 315° LHA

Latitude CONTRARY to DECLINATION

45° 315° LHA

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

44° 316° LHA

Latitude CONTRARY to Declination

44° 316° LHA

Table with 12 columns (Dec, 14-20, Dec) and 23 rows of astronomical data. Each cell contains three values: Hc°, d', Z°. The table is bordered and includes a final 'Dec°' column on the right.

44° 316° LHA

Latitude CONTRARY to DECLINATION

44° 316° LHA

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

43° 317° LHA

Latitude CONTRARY to Declination

43° 317° LHA

Table with 12 columns (Dec, 14-20, Dec) and 23 rows of astronomical data. Each cell contains three values: Hc°, d', Z°. The table is bordered and includes a final 'Dec°' column on the right.

43° 317° LHA

Latitude CONTRARY to 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

42° 318° LHA

Latitude CONTRARY to Declination

42° 318° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	46°09'	-21'	105°	45°53'	-23'	106°	45°35'	-24'	107°	45°17'	-25'	108°	44°58'	-27'	109°	44°38'	-28'	110°	44°18'	-29'	111°	0
1	45°47'	-22'	106°	45°30'	-24'	107°	45°11'	-25'	108°	44°52'	-26'	109°	44°32'	-27'	110°	44°11'	-29'	111°	43°49'	-30'	112°	1
2	45°25'	-23'	108°	45°06'	-25'	109°	44°46'	-26'	110°	44°26'	-27'	111°	44°04'	-28'	111°	43°42'	-29'	112°	43°19'	-31'	113°	2
3	45°02'	-24'	109°	44°42'	-25'	110°	44°21'	-27'	111°	43°59'	-28'	112°	43°36'	-29'	113°	43°13'	-30'	114°	42°48'	-31'	114°	3
4	44°37'	-25'	110°	44°16'	-26'	111°	43°54'	-27'	112°	43°31'	-29'	113°	43°07'	-30'	114°	42°42'	-31'	115°	42°17'	-32'	116°	4
5	44°12'	-26'	112°	43°50'	-27'	112°	43°26'	-28'	113°	43°02'	-29'	114°	42°37'	-30'	115°	42°11'	-32'	116°	41°45'	-33'	117°	5
6	43°47'	-27'	113°	43°23'	-28'	114°	42°58'	-29'	115°	42°33'	-30'	115°	42°07'	-31'	116°	41°40'	-32'	117°	41°12'	-33'	118°	6
7	43°20'	-27'	114°	42°55'	-29'	115°	42°29'	-30'	116°	42°03'	-31'	117°	41°36'	-32'	117°	41°08'	-33'	118°	40°39'	-34'	119°	7
8	42°52'	-28'	115°	42°26'	-29'	116°	42°00'	-30'	117°	41°32'	-31'	118°	41°04'	-32'	118°	40°35'	-34'	119°	40°05'	-34'	120°	8
9	42°24'	-29'	116°	41°57'	-30'	117°	41°29'	-31'	118°	41°01'	-32'	119°	40°31'	-33'	120°	40°01'	-34'	120°	39°31'	-35'	121°	9
10	41°55'	-30'	118°	41°27'	-31'	118°	40°58'	-32'	119°	40°28'	-33'	120°	39°58'	-34'	121°	39°27'	-35'	121°	38°56'	-36'	122°	10
11	41°26'	-30'	119°	40°56'	-31'	120°	40°26'	-32'	120°	39°56'	-33'	121°	39°24'	-34'	122°	38°53'	-35'	122°	38°20'	-36'	123°	11
12	40°55'	-31'	120°	40°25'	-32'	121°	39°54'	-33'	121°	39°22'	-34'	122°	38°50'	-35'	123°	38°17'	-36'	124°	37°44'	-37'	124°	12
13	40°24'	-32'	121°	39°53'	-33'	122°	39°21'	-34'	123°	38°48'	-35'	123°	38°15'	-35'	124°	37°41'	-36'	125°	37°07'	-37'	125°	13
14	39°53'	-32'	122°	39°20'	-33'	123°	38°47'	-34'	124°	38°14'	-35'	124°	37°40'	-36'	125°	37°05'	-37'	126°	36°30'	-38'	126°	14
15	39°20'	-33'	123°	38°47'	-34'	124°	38°13'	-35'	125°	37°39'	-36'	125°	37°04'	-36'	126°	36°28'	-37'	127°	35°52'	-38'	127°	15
16	38°47'	-33'	124°	38°13'	-34'	125°	37°38'	-35'	126°	37°03'	-36'	126°	36°27'	-37'	127°	35°51'	-38'	127°	35°14'	-39'	128°	16
17	38°14'	-34'	125°	37°39'	-35'	126°	37°03'	-36'	127°	36°27'	-37'	127°	35°50'	-37'	128°	35°13'	-38'	128°	34°36'	-39'	129°	17
18	37°40'	-35'	126°	37°04'	-35'	127°	36°27'	-36'	128°	35°50'	-37'	128°	35°13'	-38'	129°	34°35'	-39'	129°	33°57'	-39'	130°	18
19	37°05'	-35'	128°	36°28'	-36'	128°	35°51'	-37'	129°	35°13'	-38'	129°	34°35'	-38'	130°	33°57'	-39'	130°	33°18'	-40'	131°	19
20	36°30'	-36'	129°	35°52'	-36'	129°	35°14'	-37'	130°	34°36'	-38'	130°	33°57'	-39'	131°	33°18'	-39'	131°	32°38'	-40'	132°	20
21	35°54'	-36'	130°	35°16'	-37'	130°	34°37'	-38'	131°	33°58'	-38'	131°	33°18'	-39'	132°	32°38'	-40'	132°	31°58'	-40'	133°	21
22	35°18'	-37'	131°	34°39'	-37'	131°	34°00'	-38'	132°	33°20'	-39'	132°	32°39'	-39'	133°	31°58'	-40'	133°	31°17'	-41'	133°	22
23	<u>34°42'</u>	<u>-37'</u>	<u>131°</u>	<u>34°02'</u>	<u>-38'</u>	<u>132°</u>	<u>33°21'</u>	<u>-38'</u>	<u>132°</u>	<u>32°41'</u>	<u>-39'</u>	<u>133°</u>	<u>32°00'</u>	<u>-40'</u>	<u>133°</u>	<u>31°18'</u>	<u>-40'</u>	<u>134°</u>	<u>30°37'</u>	<u>-41'</u>	<u>134°</u>	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	47°05'	-22'	106°	46°48'	-23'	107°	46°30'	-24'	108°	46°12'	-26'	109°	45°52'	-27'	110°	45°32'	-28'	111°	45°10'	-30'	111°	0
1	46°43'	-23'	107°	46°25'	-24'	108°	46°06'	-25'	109°	45°46'	-27'	110°	45°25'	-28'	111°	45°03'	-29'	112°	44°41'	-30'	113°	1
2	46°20'	-24'	108°	46°01'	-25'	109°	45°41'	-26'	110°	45°19'	-28'	111°	44°57'	-29'	112°	44°34'	-30'	113°	44°10'	-31'	114°	2
3	45°56'	-25'	110°	45°36'	-26'	111°	45°14'	-27'	111°	44°52'	-28'	112°	44°29'	-29'	113°	44°04'	-31'	114°	43°39'	-32'	115°	3
4	45°32'	-25'	111°	45°10'	-27'	112°	44°47'	-28'	113°	44°24'	-29'	114°	43°59'	-30'	115°	43°34'	-31'	115°	43°08'	-32'	116°	4
5	45°06'	-26'	112°	44°43'	-28'	113°	44°19'	-29'	114°	43°54'	-30'	115°	43°29'	-31'	116°	43°02'	-32'	117°	42°35'	-33'	117°	5
6	44°40'	-27'	113°	44°16'	-28'	114°	43°51'	-29'	115°	43°25'	-31'	116°	42°58'	-32'	117°	42°30'	-33'	118°	42°02'	-34'	119°	6
7	44°13'	-28'	115°	43°47'	-29'	116°	43°21'	-30'	116°	42°54'	-31'	117°	42°26'	-32'	118°	41°58'	-33'	119°	41°28'	-34'	120°	7
8	43°45'	-29'	116°	43°18'	-30'	117°	42°51'	-31'	118°	42°23'	-32'	118°	41°54'	-33'	119°	41°24'	-34'	120°	40°54'	-35'	121°	8
9	43°16'	-30'	117°	42°48'	-31'	118°	42°20'	-32'	119°	41°51'	-33'	120°	41°21'	-34'	120°	40°50'	-35'	121°	40°19'	-36'	122°	9
10	42°47'	-30'	118°	42°18'	-31'	119°	41°48'	-32'	120°	41°18'	-33'	121°	40°47'	-34'	121°	40°15'	-35'	122°	39°43'	-36'	123°	10
11	42°16'	-31'	120°	41°47'	-32'	120°	41°16'	-33'	121°	40°45'	-34'	122°	40°13'	-35'	123°	39°40'	-36'	123°	39°07'	-37'	124°	11
12	41°46'	-32'	121°	41°15'	-33'	121°	40°43'	-34'	122°	40°11'	-35'	123°	39°38'	-35'	124°	39°04'	-36'	124°	38°30'	-37'	125°	12
13	41°14'	-32'	122°	40°42'	-33'	123°	40°09'	-34'	123°	39°36'	-35'	124°	39°02'	-36'	125°	38°28'	-37'	125°	37°53'	-38'	126°	13
14	40°42'	-33'	123°	40°09'	-34'	124°	39°35'	-35'	124°	39°01'	-36'	125°	38°26'	-37'	126°	37°51'	-37'	126°	37°15'	-38'	127°	14
15	40°09'	-34'	124°	39°35'	-34'	125°	39°00'	-35'	125°	38°25'	-36'	126°	37°50'	-37'	127°	37°14'	-38'	127°	36°37'	-39'	128°	15
16	39°35'	-34'	125°	39°00'	-35'	126°	38°25'	-36'	126°	37°49'	-37'	127°	37°13'	-38'	128°	36°36'	-38'	128°	35°59'	-39'	129°	16
17	39°01'	-35'	126°	38°25'	-36'	127°	37°49'	-36'	127°	37°12'	-37'	128°	36°35'	-38'	129°	35°58'	-39'	129°	35°19'	-40'	130°	17
18	38°26'	-35'	127°	37°50'	-36'	128°	37°13'	-37'	128°	36°35'	-38'	129°	35°57'	-38'	130°	35°19'	-39'	130°	34°40'	-40'	131°	18
19	37°51'	-36'	128°	37°14'	-37'	129°	36°36'	-37'	129°	35°58'	-38'	130°	35°19'	-39'	131°	34°40'	-40'	131°	34°00'	-40'	132°	19
20	37°15'	-36'	129°	36°37'	-37'	130°	35°59'	-38'	130°	35°19'	-39'	131°	34°40'	-39'	131°	34°00'	-40'	132°	33°20'	-41'	132°	20
21	36°39'	-37'	130°	36°00'	-38'	131°	35°21'	-38'	131°	34°41'	-39'	132°	34°01'	-40'	132°	33°20'	-40'	133°	32°39'	-41'	133°	21
22	36°02'	-37'	131°	35°23'	-38'	132°	34°42'	-39'	132°	34°02'	-39'	133°	33°21'	-40'	133°	32°40'	-41'	134°	31°58'	-41'	134°	22
23	<u>35°25'</u>	<u>-38'</u>	<u>132°</u>	<u>34°45'</u>	<u>-38'</u>	<u>133°</u>	<u>34°04'</u>	<u>-39'</u>	<u>133°</u>	<u>33°23'</u>	<u>-40'</u>	<u>134°</u>	<u>32°41'</u>	<u>-40'</u>	<u>134°</u>	<u>31°59'</u>	<u>-41'</u>	<u>135°</u>	<u>31°17'</u>	<u>-42'</u>	<u>135°</u>	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°

41° 319° LHA

Latitude CONTRARY to DECLINATION

41° 319° LHA

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

40° 320° LHA

Latitude CONTRARY to Declination

40° 320° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	48°01'	-22'	106°	47°44'	-24'	107°	47°25'	-25'	108°	47°06'	-26'	109°	46°46'	-28'	110°	46°25'	-29'	111°	46°03'	-30'	112°	0
1	47°39'	-23'	107°	47°20'	-25'	109°	47°00'	-26'	110°	46°40'	-27'	111°	46°18'	-28'	112°	45°56'	-30'	112°	45°33'	-31'	113°	1
2	47°15'	-24'	109°	46°55'	-25'	110°	46°35'	-27'	111°	46°13'	-28'	112°	45°50'	-29'	113°	45°26'	-30'	114°	45°02'	-32'	115°	2
3	46°51'	-25'	110°	46°30'	-26'	111°	46°08'	-28'	112°	45°45'	-29'	113°	45°21'	-30'	114°	44°56'	-31'	115°	44°30'	-32'	116°	3
4	46°26'	-26'	111°	46°04'	-27'	112°	45°40'	-28'	113°	45°16'	-30'	114°	44°51'	-31'	115°	44°25'	-32'	116°	43°58'	-33'	117°	4
5	46°00'	-27'	113°	45°36'	-28'	114°	45°12'	-29'	115°	44°46'	-30'	116°	44°20'	-32'	116°	43°53'	-33'	117°	43°25'	-34'	118°	5
6	45°33'	-28'	114°	45°08'	-29'	115°	44°43'	-30'	116°	44°16'	-31'	117°	43°49'	-32'	118°	43°20'	-33'	118°	42°51'	-34'	119°	6
7	45°06'	-29'	115°	44°40'	-30'	116°	44°13'	-31'	117°	43°45'	-32'	118°	43°16'	-33'	119°	42°47'	-34'	120°	42°17'	-35'	120°	7
8	44°37'	-29'	117°	44°10'	-30'	117°	43°42'	-32'	118°	43°13'	-33'	119°	42°43'	-34'	120°	42°13'	-35'	121°	41°42'	-36'	122°	8
9	44°08'	-30'	118°	43°39'	-31'	119°	43°10'	-32'	119°	42°40'	-33'	120°	42°10'	-34'	121°	41°38'	-35'	122°	41°06'	-36'	123°	9
10	43°38'	-31'	119°	43°08'	-32'	120°	42°38'	-33'	121°	42°07'	-34'	121°	41°36'	-35'	122°	41°03'	-36'	123°	40°30'	-37'	124°	10
11	43°07'	-32'	120°	42°36'	-33'	121°	42°05'	-34'	122°	41°33'	-35'	123°	41°01'	-35'	123°	40°27'	-36'	124°	39°54'	-37'	125°	11
12	42°35'	-32'	121°	42°04'	-33'	122°	41°32'	-34'	123°	40°59'	-35'	124°	40°25'	-36'	124°	39°51'	-37'	125°	39°16'	-38'	126°	12
13	42°03'	-33'	122°	41°31'	-34'	123°	40°57'	-35'	124°	40°24'	-36'	125°	39°49'	-37'	125°	39°14'	-37'	126°	38°39'	-38'	127°	13
14	41°30'	-34'	124°	40°57'	-34'	124°	40°23'	-35'	125°	39°48'	-36'	126°	39°13'	-37'	126°	38°37'	-38'	127°	38°00'	-39'	128°	14
15	40°57'	-34'	125°	40°22'	-35'	125°	39°47'	-36'	126°	39°12'	-37'	127°	38°35'	-38'	127°	37°59'	-38'	128°	37°21'	-39'	129°	15
16	40°23'	-35'	126°	39°47'	-36'	126°	39°11'	-36'	127°	38°35'	-37'	128°	37°58'	-38'	128°	37°20'	-39'	129°	36°42'	-40'	130°	16
17	39°48'	-35'	127°	39°12'	-36'	128°	38°35'	-37'	128°	37°57'	-38'	129°	37°20'	-39'	129°	36°41'	-39'	130°	36°03'	-40'	131°	17
18	39°13'	-36'	128°	38°35'	-37'	129°	37°58'	-38'	129°	37°20'	-38'	130°	36°41'	-39'	130°	36°02'	-40'	131°	35°22'	-41'	131°	18
19	38°37'	-36'	129°	37°59'	-37'	130°	37°20'	-38'	130°	36°41'	-39'	131°	36°02'	-39'	131°	35°22'	-40'	132°	34°42'	-41'	132°	19
20	38°00'	-37'	130°	37°21'	-38'	131°	36°42'	-38'	131°	36°03'	-39'	132°	35°22'	-40'	132°	34°42'	-41'	133°	34°01'	-41'	133°	20
21	37°23'	-37'	131°	36°44'	-38'	132°	36°04'	-39'	132°	35°23'	-40'	133°	34°43'	-40'	133°	34°01'	-41'	134°	33°20'	-42'	134°	21
22	36°46'	-38'	132°	36°06'	-39'	132°	35°25'	-39'	133°	34°44'	-40'	134°	34°02'	-41'	134°	33°20'	-41'	134°	32°38'	-42'	135°	22
23	36°08'	-38'	133°	35°27'	-39'	133°	34°46'	-40'	134°	34°04'	-40'	134°	33°22'	-41'	135°	32°39'	-42'	135°	31°56'	-42'	136°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

40° 320° LHA

Latitude CONTRARY to DECLINATION

40° 320° LHA

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

39° 321° LHA

Latitude CONTRARY to Declination

39° 321° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	48°57'	-23'	107°	48°39'	-24'	108°	48°20'	-25'	109°	48°00'	-27'	110°	47°39'	-28'	111°	47°17'	-29'	112°	46°55'	-30'	113°	0
1	48°34'	-24'	108°	48°15'	-25'	109°	47°55'	-26'	110°	47°34'	-28'	111°	47°11'	-29'	112°	46°48'	-30'	113°	46°24'	-31'	114°	1
2	48°10'	-25'	109°	47°50'	-26'	110°	47°28'	-27'	111°	47°06'	-28'	112°	46°43'	-30'	113°	46°18'	-31'	114°	45°53'	-32'	115°	2
3	47°46'	-26'	111°	47°24'	-27'	112°	47°01'	-28'	113°	46°37'	-29'	114°	46°13'	-31'	115°	45°47'	-32'	116°	45°21'	-33'	117°	3
4	47°20'	-26'	112°	46°57'	-28'	113°	46°33'	-29'	114°	46°08'	-30'	115°	45°42'	-31'	116°	45°16'	-32'	117°	44°48'	-34'	118°	4
5	46°54'	-27'	113°	46°29'	-29'	114°	46°04'	-30'	115°	45°38'	-31'	116°	45°11'	-32'	117°	44°43'	-33'	118°	44°15'	-34'	119°	5
6	46°26'	-28'	115°	46°01'	-29'	116°	45°34'	-31'	117°	45°07'	-32'	118°	44°39'	-33'	118°	44°10'	-34'	119°	43°40'	-35'	120°	6
7	45°58'	-29'	116°	45°31'	-30'	117°	45°04'	-31'	118°	44°35'	-32'	119°	44°06'	-34'	120°	43°36'	-35'	120°	43°05'	-36'	121°	7
8	45°29'	-30'	117°	45°01'	-31'	118°	44°32'	-32'	119°	44°03'	-33'	120°	43°33'	-34'	121°	43°02'	-35'	122°	42°30'	-36'	122°	8
9	44°59'	-31'	118°	44°30'	-32'	119°	44°00'	-33'	120°	43°30'	-34'	121°	42°58'	-35'	122°	42°26'	-36'	123°	41°54'	-37'	123°	9
10	44°28'	-31'	120°	43°58'	-32'	121°	43°28'	-34'	121°	42°56'	-34'	122°	42°24'	-35'	123°	41°51'	-36'	124°	41°17'	-37'	124°	10
11	43°57'	-32'	121°	43°26'	-33'	122°	42°54'	-34'	123°	42°21'	-35'	123°	41°48'	-36'	124°	41°14'	-37'	125°	40°40'	-38'	125°	11
12	43°25'	-33'	122°	42°53'	-34'	123°	42°20'	-35'	124°	41°46'	-36'	124°	41°12'	-37'	125°	40°37'	-38'	126°	40°02'	-38'	126°	12
13	42°52'	-34'	123°	42°19'	-34'	124°	41°45'	-35'	125°	41°11'	-36'	125°	40°35'	-37'	126°	40°00'	-38'	127°	39°24'	-39'	127°	13
14	42°19'	-34'	124°	41°44'	-35'	125°	41°10'	-36'	126°	40°34'	-37'	126°	39°58'	-38'	127°	39°22'	-39'	128°	38°45'	-39'	128°	14
15	41°44'	-35'	125°	41°09'	-36'	126°	40°34'	-37'	127°	39°57'	-37'	128°	39°21'	-38'	128°	38°43'	-39'	129°	38°05'	-40'	129°	15
16	41°10'	-35'	127°	40°34'	-36'	127°	39°57'	-37'	128°	39°20'	-38'	129°	38°42'	-39'	129°	38°04'	-40'	130°	37°25'	-40'	130°	16
17	40°34'	-36'	128°	39°57'	-37'	128°	39°20'	-38'	129°	38°42'	-38'	130°	38°04'	-39'	130°	37°25'	-40'	131°	36°45'	-41'	131°	17
18	39°58'	-37'	129°	39°21'	-37'	129°	38°42'	-38'	130°	38°04'	-39'	131°	37°24'	-40'	131°	36°45'	-40'	132°	36°05'	-41'	132°	18
19	39°22'	-37'	130°	38°43'	-38'	130°	38°04'	-39'	131°	37°25'	-39'	131°	36°45'	-40'	132°	36°04'	-41'	133°	35°23'	-41'	133°	19
20	38°45'	-38'	131°	38°05'	-38'	131°	37°25'	-39'	132°	36°45'	-40'	132°	36°05'	-41'	133°	35°23'	-41'	133°	34°42'	-42'	134°	20
21	38°07'	-38'	132°	37°27'	-39'	132°	36°46'	-40'	133°	36°05'	-40'	133°	35°24'	-41'	134°	34°42'	-42'	134°	34°00'	-42'	135°	21
22	37°29'	-39'	133°	36°48'	-39'	133°	36°07'	-40'	134°	35°25'	-41'	134°	34°43'	-41'	135°	34°01'	-42'	135°	33°18'	-43'	136°	22
23	36°50'	-39'	134°	36°09'	-40'	134°	35°27'	-40'	135°	34°44'	-41'	135°	34°02'	-42'	136°	33°19'	-42'	136°	32°35'	-43'	137°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

39° 321° LHA

Latitude CONTRARY to DECLINATION

39° 321° LHA

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

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

38° 322° LHA

Latitude CONTRARY to Declination

38° 322° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	49°52'	-23'	107°	49°34'	-24'	108°	49°15'	-26'	109°	48°54'	-27'	111°	48°33'	-28'	112°	48°10'	-30'	113°	47°46'	-31'	114°	0
1	49°29'	-24'	109°	49°10'	-25'	110°	48°49'	-27'	111°	48°27'	-28'	112°	48°04'	-29'	113°	47°40'	-31'	114°	47°15'	-32'	115°	1
2	49°05'	-25'	110°	48°44'	-26'	111°	48°22'	-28'	112°	47°59'	-29'	113°	47°35'	-30'	114°	47°10'	-31'	115°	46°44'	-33'	116°	2
3	48°40'	-26'	111°	48°18'	-27'	112°	47°54'	-29'	113°	47°30'	-30'	114°	47°04'	-31'	115°	46°38'	-32'	116°	46°11'	-33'	117°	3
4	48°14'	-27'	113°	47°50'	-28'	114°	47°26'	-30'	115°	47°00'	-31'	116°	46°33'	-32'	117°	46°06'	-33'	118°	45°38'	-34'	119°	4
5	47°47'	-28'	114°	47°22'	-29'	115°	46°56'	-30'	116°	46°29'	-32'	117°	46°02'	-33'	118°	45°33'	-34'	119°	45°04'	-35'	120°	5
6	47°19'	-29'	115°	46°53'	-30'	116°	46°26'	-31'	117°	45°58'	-32'	118°	45°29'	-33'	119°	44°59'	-34'	120°	44°29'	-35'	121°	6
7	46°50'	-30'	117°	46°23'	-31'	118°	45°55'	-32'	119°	45°25'	-33'	119°	44°56'	-34'	120°	44°25'	-35'	121°	43°53'	-36'	122°	7
8	46°21'	-30'	118°	45°52'	-32'	119°	45°23'	-33'	120°	44°52'	-34'	121°	44°21'	-35'	121°	43°50'	-36'	122°	43°17'	-37'	123°	8
9	45°50'	-31'	119°	45°20'	-32'	120°	44°50'	-33'	121°	44°19'	-34'	122°	43°47'	-35'	123°	43°14'	-36'	123°	42°41'	-37'	124°	9
10	45°19'	-32'	120°	44°48'	-33'	121°	44°17'	-34'	122°	43°44'	-35'	123°	43°11'	-36'	124°	42°38'	-37'	125°	42°03'	-38'	125°	10
11	44°47'	-33'	122°	44°15'	-34'	122°	43°42'	-35'	123°	43°09'	-36'	124°	42°35'	-37'	125°	42°01'	-38'	126°	41°25'	-38'	126°	11
12	44°14'	-33'	123°	43°41'	-34'	124°	43°08'	-35'	124°	42°33'	-36'	125°	41°59'	-37'	126°	41°23'	-38'	127°	40°47'	-39'	127°	12
13	43°41'	-34'	124°	43°07'	-35'	125°	42°32'	-36'	125°	41°57'	-37'	126°	41°21'	-38'	127°	40°45'	-39'	128°	40°08'	-39'	128°	13
14	43°06'	-35'	125°	42°32'	-36'	126°	41°56'	-37'	127°	41°20'	-38'	127°	40°43'	-38'	128°	40°06'	-39'	129°	39°29'	-40'	129°	14
15	42°32'	-35'	126°	41°56'	-36'	127°	41°20'	-37'	128°	40°43'	-38'	128°	40°05'	-39'	129°	39°27'	-40'	130°	38°49'	-40'	130°	15
16	41°56'	-36'	127°	41°20'	-37'	128°	40°42'	-38'	129°	40°05'	-39'	129°	39°26'	-39'	130°	38°47'	-40'	131°	38°08'	-41'	131°	16
17	41°20'	-37'	128°	40°43'	-37'	129°	40°05'	-38'	130°	39°26'	-39'	130°	38°47'	-40'	131°	38°07'	-41'	132°	37°27'	-41'	132°	17
18	40°43'	-37'	129°	40°05'	-38'	130°	39°26'	-39'	131°	38°47'	-40'	131°	38°07'	-40'	132°	37°27'	-41'	132°	36°46'	-42'	133°	18
19	40°06'	-38'	130°	39°27'	-39'	131°	38°47'	-39'	132°	38°07'	-40'	132°	37°27'	-41'	133°	36°46'	-41'	133°	36°04'	-42'	134°	19
20	39°29'	-38'	131°	38°49'	-39'	132°	38°08'	-40'	133°	37°27'	-40'	133°	36°46'	-41'	134°	36°04'	-42'	134°	35°22'	-42'	135°	20
21	38°50'	-39'	132°	38°10'	-39'	133°	37°28'	-40'	134°	36°47'	-41'	134°	36°05'	-42'	135°	35°22'	-42'	135°	34°40'	-43'	136°	21
22	38°12'	-39'	133°	37°30'	-40'	134°	36°48'	-41'	135°	36°06'	-41'	135°	35°23'	-42'	136°	34°40'	-43'	136°	33°57'	-43'	137°	22
23	37°32'	-40'	134°	36°50'	-40'	135°	36°08'	-41'	135°	35°25'	-42'	136°	34°41'	-42'	136°	33°58'	-43'	137°	33°14'	-43'	137°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	50°48'	-24'	108°	50°29'	-25'	109°	50°09'	-26'	110°	49°48'	-28'	111°	49°25'	-29'	112°	49°02'	-30'	113°	48°38'	-31'	114°	0
1	50°24'	-25'	109°	50°04'	-26'	110°	49°43'	-27'	111°	49°20'	-29'	113°	48°56'	-30'	114°	48°32'	-31'	115°	48°06'	-32'	116°	1
2	50°00'	-26'	111°	49°38'	-27'	112°	49°15'	-28'	113°	48°51'	-30'	114°	48°27'	-31'	115°	48°01'	-32'	116°	47°34'	-33'	117°	2
3	49°34'	-27'	112°	49°11'	-28'	113°	48°47'	-29'	114°	48°22'	-30'	115°	47°56'	-32'	116°	47°29'	-33'	117°	47°01'	-34'	118°	3
4	49°08'	-28'	113°	48°43'	-29'	114°	48°18'	-30'	116°	47°51'	-31'	117°	47°24'	-32'	118°	46°56'	-34'	118°	46°27'	-35'	119°	4
5	48°40'	-28'	115°	48°14'	-30'	116°	47°48'	-31'	117°	47°20'	-32'	118°	46°52'	-33'	119°	46°23'	-34'	120°	45°52'	-35'	121°	5
6	48°12'	-29'	116°	47°45'	-31'	117°	47°17'	-32'	118°	46°48'	-33'	119°	46°19'	-34'	120°	45°48'	-35'	121°	45°17'	-36'	122°	6
7	47°42'	-30'	117°	47°14'	-31'	118°	46°45'	-33'	119°	46°15'	-34'	120°	45°45'	-35'	121°	45°13'	-36'	122°	44°41'	-37'	123°	7
8	47°12'	-31'	119°	46°43'	-32'	120°	46°13'	-33'	121°	45°42'	-34'	121°	45°10'	-35'	122°	44°38'	-36'	123°	44°04'	-37'	124°	8
9	46°41'	-32'	120°	46°10'	-33'	121°	45°39'	-34'	122°	45°07'	-35'	123°	44°35'	-36'	123°	44°01'	-37'	124°	43°27'	-38'	125°	9
10	46°09'	-33'	121°	45°37'	-34'	122°	45°05'	-35'	123°	44°32'	-36'	124°	43°59'	-37'	125°	43°24'	-38'	125°	42°49'	-38'	126°	10
11	45°36'	-33'	122°	45°04'	-34'	123°	44°30'	-35'	124°	43°56'	-36'	125°	43°22'	-37'	126°	42°47'	-38'	126°	42°11'	-39'	127°	11
12	45°03'	-34'	124°	44°29'	-35'	124°	43°55'	-36'	125°	43°20'	-37'	126°	42°45'	-38'	127°	42°08'	-39'	127°	41°32'	-40'	128°	12
13	44°29'	-35'	125°	43°54'	-36'	126°	43°19'	-37'	126°	42°43'	-38'	127°	42°07'	-38'	128°	41°30'	-39'	128°	40°52'	-40'	129°	13
14	43°54'	-35'	126°	43°18'	-36'	127°	42°42'	-37'	127°	42°06'	-38'	128°	41°28'	-39'	129°	40°50'	-40'	129°	40°12'	-41'	130°	14
15	43°18'	-36'	127°	42°42'	-37'	128°	42°05'	-38'	128°	41°27'	-39'	129°	40°49'	-40'	130°	40°11'	-40'	130°	39°31'	-41'	131°	15
16	42°42'	-37'	128°	42°05'	-38'	129°	41°27'	-38'	129°	40°49'	-39'	130°	40°10'	-40'	131°	39°30'	-41'	131°	38°50'	-41'	132°	16
17	42°06'	-37'	129°	41°27'	-38'	130°	40°49'	-39'	131°	40°09'	-40'	131°	39°30'	-40'	132°	38°49'	-41'	132°	38°09'	-42'	133°	17
18	41°28'	-38'	130°	40°49'	-39'	131°	40°10'	-39'	132°	39°30'	-40'	132°	38°49'	-41'	133°	38°08'	-42'	133°	37°27'	-42'	134°	18
19	40°50'	-38'	131°	40°11'	-39'	132°	39°30'	-40'	132°	38°49'	-41'	133°	38°08'	-41'	134°	37°27'	-42'	134°	36°45'	-43'	135°	19
20	40°12'	-39'	132°	39°31'	-40'	133°	38°50'	-40'	133°	38°09'	-41'	134°	37°27'	-42'	135°	36°45'	-42'	135°	36°02'	-43'	136°	20
21	39°33'	-39'	133°	38°52'	-40'	134°	38°10'	-41'	134°	37°28'	-42'	135°	36°45'	-42'	135°	36°02'	-43'	136°	35°19'	-43'	136°	21
22	38°54'	-40'	134°	38°12'	-41'	135°	37°29'	-41'	135°	36°46'	-42'	136°	36°03'	-43'	136°	35°19'	-43'	137°	34°35'	-44'	137°	22
23	38°14'	-40'	135°	37°31'	-41'	136°	36°48'	-42'	136°	36°04'	-42'	137°	35°20'	-43'	137°	34°36'	-44'	138°	33°52'	-44'	138°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

37° 323° LHA

Latitude CONTRARY to DECLINATION

37° 323° 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 CONTRARY to Declination

36° 324° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	51°43'	-24'	108°	51°24'	-25'	110°	51°03'	-27'	111°	50°41'	-28'	112°	50°18'	-30'	113°	49°54'	-31'	114°	49°29'	-32'	115°	0
1	51°19'	-25'	110°	50°58'	-26'	111°	50°36'	-28'	112°	50°13'	-29'	113°	49°49'	-30'	114°	49°23'	-32'	115°	48°57'	-33'	117°	1
2	50°54'	-26'	111°	50°32'	-27'	112°	50°08'	-29'	114°	49°44'	-30'	115°	49°18'	-31'	116°	48°52'	-33'	117°	48°24'	-34'	118°	2
3	50°28'	-27'	113°	50°04'	-28'	114°	49°39'	-30'	115°	49°14'	-31'	116°	48°47'	-32'	117°	48°19'	-33'	118°	47°50'	-34'	119°	3
4	50°01'	-28'	114°	49°36'	-29'	115°	49°10'	-31'	116°	48°43'	-32'	117°	48°15'	-33'	118°	47°46'	-34'	119°	47°16'	-35'	120°	4
5	49°33'	-29'	116°	49°06'	-30'	117°	48°39'	-32'	118°	48°11'	-33'	119°	47°42'	-34'	120°	47°12'	-35'	120°	46°41'	-36'	121°	5
6	49°04'	-30'	117°	48°36'	-31'	118°	48°08'	-32'	119°	47°38'	-33'	120°	47°08'	-35'	121°	46°37'	-36'	122°	46°05'	-37'	123°	6
7	48°34'	-31'	118°	48°05'	-32'	119°	47°35'	-33'	120°	47°05'	-34'	121°	46°33'	-35'	122°	46°01'	-36'	123°	45°28'	-37'	124°	7
8	48°03'	-32'	119°	47°33'	-33'	120°	47°02'	-34'	121°	46°30'	-35'	122°	45°58'	-36'	123°	45°25'	-37'	124°	44°51'	-38'	125°	8
9	47°31'	-33'	121°	47°00'	-34'	122°	46°28'	-35'	123°	45°55'	-36'	123°	45°22'	-37'	124°	44°48'	-38'	125°	44°13'	-39'	126°	9
10	46°58'	-33'	122°	46°26'	-34'	123°	45°53'	-35'	124°	45°20'	-36'	125°	44°45'	-37'	125°	44°10'	-38'	126°	43°34'	-39'	127°	10
11	46°25'	-34'	123°	45°52'	-35'	124°	45°18'	-36'	125°	44°43'	-37'	126°	44°08'	-38'	126°	43°32'	-39'	127°	42°55'	-40'	128°	11
12	45°51'	-35'	124°	45°17'	-36'	125°	44°42'	-37'	126°	44°06'	-38'	127°	43°30'	-39'	128°	42°53'	-39'	128°	42°16'	-40'	129°	12
13	45°16'	-35'	126°	44°41'	-36'	126°	44°05'	-37'	127°	43°29'	-38'	128°	42°51'	-39'	129°	42°14'	-40'	129°	41°35'	-41'	130°	13
14	44°41'	-36'	127°	44°05'	-37'	127°	43°28'	-38'	128°	42°50'	-39'	129°	42°12'	-40'	130°	41°34'	-40'	130°	40°55'	-41'	131°	14
15	44°05'	-37'	128°	43°28'	-38'	129°	42°50'	-39'	129°	42°12'	-39'	130°	41°33'	-40'	131°	40°53'	-41'	131°	40°14'	-42'	132°	15
16	43°28'	-37'	129°	42°50'	-38'	130°	42°11'	-39'	130°	41°32'	-40'	131°	40°53'	-41'	132°	40°13'	-41'	132°	39°32'	-42'	133°	16
17	42°50'	-38'	130°	42°12'	-39'	131°	41°32'	-40'	131°	40°52'	-40'	132°	40°12'	-41'	133°	39°31'	-42'	133°	38°50'	-43'	134°	17
18	42°12'	-39'	131°	41°33'	-39'	132°	40°53'	-40'	132°	40°12'	-41'	133°	39°31'	-42'	134°	38°49'	-42'	134°	38°07'	-43'	135°	18
19	41°34'	-39'	132°	40°53'	-40'	133°	40°13'	-41'	133°	39°31'	-41'	134°	38°49'	-42'	134°	38°07'	-43'	135°	37°24'	-43'	136°	19
20	40°55'	-40'	133°	40°14'	-40'	134°	39°32'	-41'	134°	38°50'	-42'	135°	38°07'	-42'	135°	37°24'	-43'	136°	36°41'	-44'	136°	20
21	40°15'	-40'	134°	39°33'	-41'	135°	38°51'	-42'	135°	38°08'	-42'	136°	37°25'	-43'	136°	36°41'	-43'	137°	35°57'	-44'	137°	21
22	39°35'	-41'	135°	38°52'	-41'	136°	38°09'	-42'	136°	37°26'	-43'	137°	36°42'	-43'	137°	35°58'	-44'	138°	35°13'	-44'	138°	22
23	38°54'	-41'	136°	38°11'	-42'	137°	37°27'	-42'	137°	36°43'	-43'	138°	35°59'	-44'	138°	35°14'	-44'	139°	34°29'	-45'	139°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	52°38'	-24'	109°	52°18'	-26'	110°	51°57'	-27'	111°	51°34'	-29'	113°	51°10'	-30'	114°	50°46'	-31'	115°	50°20'	-33'	116°	0
1	52°14'	-26'	111°	51°52'	-27'	112°	51°29'	-28'	113°	51°05'	-30'	114°	50°40'	-31'	115°	50°14'	-32'	116°	49°47'	-33'	117°	1
2	51°48'	-27'	112°	51°25'	-28'	113°	51°01'	-29'	114°	50°36'	-31'	115°	50°09'	-32'	117°	49°42'	-33'	118°	49°14'	-34'	119°	2
3	51°22'	-28'	113°	50°57'	-29'	115°	50°32'	-30'	116°	50°05'	-32'	117°	49°37'	-33'	118°	49°09'	-34'	119°	48°40'	-35'	120°	3
4	50°54'	-29'	115°	50°28'	-30'	116°	50°01'	-31'	117°	49°33'	-32'	118°	49°05'	-34'	119°	48°35'	-35'	120°	48°04'	-36'	121°	4
5	50°25'	-30'	116°	49°58'	-31'	117°	49°30'	-32'	118°	49°01'	-33'	119°	48°31'	-34'	120°	48°00'	-36'	121°	47°29'	-37'	122°	5
6	49°55'	-31'	118°	49°27'	-32'	119°	48°58'	-33'	120°	48°28'	-34'	121°	47°57'	-35'	122°	47°25'	-36'	123°	46°52'	-37'	123°	6
7	49°25'	-32'	119°	48°55'	-33'	120°	48°25'	-34'	121°	47°54'	-35'	122°	47°21'	-36'	123°	46°49'	-37'	124°	46°15'	-38'	125°	7
8	48°53'	-32'	120°	48°23'	-34'	121°	47°51'	-35'	122°	47°19'	-36'	123°	46°46'	-37'	124°	46°12'	-38'	125°	45°37'	-39'	126°	8
9	48°21'	-33'	122°	47°49'	-34'	122°	47°16'	-35'	123°	46°43'	-36'	124°	46°09'	-37'	125°	45°34'	-38'	126°	44°58'	-39'	127°	9
10	47°48'	-34'	123°	47°15'	-35'	124°	46°41'	-36'	125°	46°07'	-37'	125°	45°32'	-38'	126°	44°56'	-39'	127°	44°19'	-40'	128°	10
11	47°14'	-35'	124°	46°40'	-36'	125°	46°05'	-37'	126°	45°30'	-38'	127°	44°54'	-39'	127°	44°17'	-39'	128°	43°39'	-40'	129°	11
12	46°39'	-35'	125°	46°04'	-36'	126°	45°28'	-37'	127°	44°52'	-38'	128°	44°15'	-39'	128°	43°37'	-40'	129°	42°59'	-41'	130°	12
13	46°03'	-36'	126°	45°27'	-37'	127°	44°51'	-38'	128°	44°14'	-39'	129°	43°36'	-40'	129°	42°57'	-41'	130°	42°18'	-41'	131°	13
14	45°27'	-37'	127°	44°50'	-38'	128°	44°13'	-39'	129°	43°35'	-39'	130°	42°56'	-40'	131°	42°17'	-41'	131°	41°37'	-42'	132°	14
15	44°50'	-37'	129°	44°13'	-38'	129°	43°34'	-39'	130°	42°55'	-40'	131°	42°16'	-41'	132°	41°36'	-42'	132°	40°55'	-42'	133°	15
16	44°13'	-38'	130°	43°34'	-39'	130°	42°55'	-40'	131°	42°15'	-41'	132°	41°35'	-41'	133°	40°54'	-42'	133°	40°13'	-43'	134°	16
17	43°35'	-39'	131°	42°55'	-40'	131°	42°15'	-40'	132°	41°35'	-41'	133°	40°54'	-42'	133°	40°12'	-42'	134°	39°30'	-43'	135°	17
18	42°56'	-39'	132°	42°16'	-40'	133°	41°35'	-41'	133°	40°54'	-42'	134°	40°12'	-42'	134°	39°30'	-43'	135°	38°47'	-44'	136°	18
19	42°17'	-40'	133°	41°36'	-41'	134°	40°54'	-41'	134°	40°12'	-42'	135°	39°30'	-43'	135°	38°47'	-43'	136°	38°03'	-44'	136°	19
20	41°37'	-40'	134°	40°55'	-41'	134°	40°13'	-42'	135°	39°30'	-42'	136°	38°47'	-43'	136°	38°03'	-44'	137°	37°20'	-44'	137°	20
21	40°57'	-41'	135°	40°14'	-42'	135°	39°31'	-42'	136°	38°48'	-43'	137°	38°04'	-43'	137°	37°20'	-44'	138°	36°35'	-45'	138°	21
22	40°16'	-41'	136°	39°33'	-42'	136°	38°49'	-43'	137°	38°05'	-43'	137°	37°21'	-44'	138°	36°36'	-44'	139°	35°51'	-45'	139°	22
23	39°35'	-42'	137°	38°51'	-42'	137°	38°06'	-43'	138°	37°22'	-44'	138°	36°37'	-44'	139°	35°51'	-45'	139°	35°06'	-45'	140°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°

35° 325° LHA

Latitude CONTRARY to DECLINATION

35° 325° LHA

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

34° 326° LHA

Latitude CONTRARY to Declination

34° 326° LHA

Table with 11 columns (Dec°, 14, 15, 16, 17, 18, 19, 20, Dec°) and 24 rows. Each column from 14 to 20 contains three sub-columns (Hc°, d', Z°). Values range from 53°33' to 40°14'.

34° 326° LHA

Latitude CONTRARY to DECLINATION

34° 326° LHA

33° 327° LHA

Latitude CONTRARY to Declination

33° 327° LHA

Table with 11 columns (Dec°, 14, 15, 16, 17, 18, 19, 20, Dec°) and 24 rows. Each column from 14 to 20 contains three sub-columns (Hc°, d', Z°). Values range from 54°28' to 40°08'.

33° 327° LHA

Latitude CONTRARY to DECLINATION

33° 327° LHA

32° 328° LHA

Latitude CONTRARY to Declination

32° 328° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	55°22'	-26'	111°	55°00'	-28'	112°	54°36'	-29'	114°	54°12'	-31'	115°	53°46'	-32'	116°	53°18'	-33'	118°	52°50'	-34'	119°	0
1	54°56'	-27'	113°	54°32'	-29'	114°	54°07'	-30'	115°	53°41'	-32'	117°	53°14'	-33'	118°	52°45'	-34'	119°	52°16'	-35'	120°	1
2	54°29'	-29'	114°	54°04'	-30'	116°	53°37'	-31'	117°	53°09'	-33'	118°	52°41'	-34'	119°	52°11'	-35'	120°	51°40'	-36'	121°	2
3	54°00'	-30'	116°	53°34'	-31'	117°	53°06'	-32'	118°	52°37'	-34'	119°	52°07'	-35'	120°	51°36'	-36'	122°	51°04'	-37'	123°	3
4	53°31'	-31'	117°	53°03'	-32'	118°	52°34'	-33'	120°	52°03'	-34'	121°	51°32'	-36'	122°	51°00'	-37'	123°	50°27'	-38'	124°	4
5	53°00'	-32'	119°	52°31'	-33'	120°	52°00'	-34'	121°	51°29'	-35'	122°	50°57'	-36'	123°	50°23'	-37'	124°	49°49'	-39'	125°	5
6	52°28'	-33'	120°	51°58'	-34'	121°	51°26'	-35'	122°	50°54'	-36'	123°	50°20'	-37'	124°	49°46'	-38'	125°	49°11'	-39'	126°	6
7	51°56'	-34'	121°	51°24'	-35'	123°	50°51'	-36'	124°	50°18'	-37'	125°	49°43'	-38'	126°	49°08'	-39'	127°	48°32'	-40'	127°	7
8	51°22'	-34'	123°	50°49'	-36'	124°	50°15'	-37'	125°	49°41'	-38'	126°	49°05'	-39'	127°	48°29'	-40'	128°	47°52'	-41'	129°	8
9	50°48'	-35'	124°	50°14'	-36'	125°	49°39'	-37'	126°	49°03'	-38'	127°	48°26'	-39'	128°	47°49'	-40'	129°	47°11'	-41'	130°	9
10	50°12'	-36'	125°	49°37'	-37'	126°	49°01'	-38'	127°	48°25'	-39'	128°	47°47'	-40'	129°	47°09'	-41'	130°	46°30'	-42'	131°	10
11	49°36'	-37'	127°	49°00'	-38'	128°	48°23'	-39'	128°	47°45'	-40'	129°	47°07'	-41'	130°	46°28'	-41'	131°	45°48'	-42'	132°	11
12	48°59'	-38'	128°	48°22'	-39'	129°	47°44'	-40'	130°	47°06'	-40'	130°	46°26'	-41'	131°	45°47'	-42'	132°	45°06'	-43'	133°	12
13	48°22'	-38'	129°	47°44'	-39'	130°	47°05'	-40'	131°	46°25'	-41'	131°	45°45'	-42'	132°	45°05'	-43'	133°	44°23'	-43'	134°	13
14	47°43'	-39'	130°	47°04'	-40'	131°	46°25'	-41'	132°	45°44'	-42'	133°	45°03'	-42'	133°	44°22'	-43'	134°	43°40'	-44'	135°	14
15	47°04'	-40'	131°	46°24'	-41'	132°	45°44'	-41'	133°	45°03'	-42'	134°	44°21'	-43'	134°	43°39'	-44'	135°	42°56'	-44'	136°	15
16	46°25'	-40'	132°	45°44'	-41'	133°	45°03'	-42'	134°	44°21'	-43'	135°	43°38'	-43'	135°	42°56'	-44'	136°	42°12'	-45'	137°	16
17	45°44'	-41'	133°	45°03'	-42'	134°	44°21'	-42'	135°	43°38'	-43'	136°	42°55'	-44'	136°	42°12'	-44'	137°	41°28'	-45'	137°	17
18	45°03'	-41'	134°	44°21'	-42'	135°	43°38'	-43'	136°	42°55'	-44'	137°	42°11'	-44'	137°	41°27'	-45'	138°	40°43'	-45'	138°	18
19	44°22'	-42'	136°	43°39'	-43'	136°	42°56'	-43'	137°	42°12'	-44'	137°	41°27'	-45'	138°	40°42'	-45'	139°	39°57'	-46'	139°	19
20	43°40'	-42'	136°	42°56'	-43'	137°	42°12'	-44'	138°	41°28'	-44'	138°	40°43'	-45'	139°	39°57'	-46'	139°	39°11'	-46'	140°	20
21	42°58'	-43'	137°	42°13'	-44'	138°	41°28'	-44'	139°	40°43'	-45'	139°	39°57'	-45'	140°	39°11'	-46'	140°	38°25'	-46'	141°	21
22	42°15'	-43'	138°	41°30'	-44'	139°	40°44'	-45'	140°	39°58'	-45'	140°	39°12'	-46'	141°	38°26'	-46'	141°	37°39'	-47'	142°	22
23	41°31'	-44'	139°	40°46'	-44'	140°	40°00'	-45'	140°	39°13'	-46'	141°	38°26'	-46'	141°	37°39'	-47'	142°	36°52'	-47'	142°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

32° 328° LHA

Latitude CONTRARY to DECLINATION

32° 328° LHA

31° 329° LHA

Latitude CONTRARY to Declination

31° 329° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	56°16'	-27'	112°	55°53'	-28'	113°	55°29'	-30'	115°	55°03'	-31'	116°	54°37'	-33'	117°	54°08'	-34'	118°	53°39'	-35'	120°	0
1	55°50'	-28'	114°	55°25'	-29'	115°	54°59'	-31'	116°	54°32'	-32'	117°	54°04'	-34'	119°	53°35'	-35'	120°	53°04'	-36'	121°	1
2	55°22'	-29'	115°	54°56'	-31'	116°	54°28'	-32'	118°	54°00'	-33'	119°	53°30'	-35'	120°	53°00'	-36'	121°	52°28'	-37'	122°	2
3	54°53'	-30'	117°	54°25'	-32'	118°	53°56'	-33'	119°	53°27'	-34'	120°	52°56'	-35'	121°	52°24'	-37'	123°	51°51'	-38'	124°	3
4	54°22'	-31'	118°	53°53'	-33'	119°	53°23'	-34'	121°	52°53'	-35'	122°	52°21'	-36'	123°	51°48'	-37'	124°	51°14'	-38'	125°	4
5	53°51'	-32'	120°	53°21'	-34'	121°	52°50'	-35'	122°	52°17'	-36'	123°	51°44'	-37'	124°	51°10'	-38'	125°	50°35'	-39'	126°	5
6	53°18'	-33'	121°	52°47'	-35'	122°	52°15'	-36'	123°	51°41'	-37'	124°	51°07'	-38'	125°	50°32'	-39'	126°	49°56'	-40'	127°	6
7	52°45'	-34'	122°	52°13'	-35'	123°	51°39'	-37'	125°	51°05'	-38'	126°	50°29'	-39'	127°	49°53'	-40'	127°	49°16'	-41'	128°	7
8	52°11'	-35'	124°	51°37'	-36'	125°	51°02'	-37'	126°	50°27'	-38'	127°	49°51'	-39'	128°	49°13'	-40'	129°	48°36'	-41'	130°	8
9	51°36'	-36'	125°	51°01'	-37'	126°	50°25'	-38'	127°	49°48'	-39'	128°	49°11'	-40'	129°	48°33'	-41'	130°	47°54'	-42'	131°	9
10	51°00'	-37'	126°	50°24'	-38'	127°	49°47'	-39'	128°	49°09'	-40'	129°	48°31'	-41'	130°	47°52'	-42'	131°	47°13'	-42'	132°	10
11	50°23'	-38'	128°	49°46'	-39'	128°	49°08'	-40'	129°	48°30'	-40'	130°	47°50'	-41'	131°	47°11'	-42'	132°	46°30'	-43'	133°	11
12	49°45'	-38'	129°	49°07'	-39'	130°	48°28'	-40'	131°	47°49'	-41'	131°	47°09'	-42'	132°	46°28'	-43'	133°	45°47'	-43'	134°	12
13	49°07'	-39'	130°	48°28'	-40'	131°	47°48'	-41'	132°	47°08'	-42'	132°	46°27'	-42'	133°	45°46'	-43'	134°	45°04'	-44'	135°	13
14	48°28'	-40'	131°	47°48'	-41'	132°	47°07'	-41'	133°	46°26'	-42'	134°	45°45'	-43'	134°	45°03'	-44'	135°	44°20'	-44'	136°	14
15	47°48'	-40'	132°	47°07'	-41'	133°	46°26'	-42'	134°	45°44'	-43'	135°	45°02'	-43'	135°	44°19'	-44'	136°	43°35'	-45'	137°	15
16	47°07'	-41'	133°	46°26'	-42'	134°	45°44'	-43'	135°	45°01'	-43'	136°	44°18'	-44'	136°	43°35'	-45'	137°	42°51'	-45'	138°	16
17	46°26'	-42'	134°	45°44'	-42'	135°	45°01'	-43'	136°	44°18'	-44'	137°	43°34'	-44'	137°	42°50'	-45'	138°	42°05'	-46'	138°	17
18	45°45'	-42'	135°	45°02'	-43'	136°	44°18'	-44'	137°	43°34'	-44'	137°	42°50'	-45'	138°	42°05'	-45'	139°	41°20'	-46'	139°	18
19	45°03'	-43'	136°	44°19'	-43'	137°	43°35'	-44'	138°	42°50'	-45'	138°	42°05'	-45'	139°	41°19'	-46'	140°	40°34'	-46'	140°	19
20	44°20'	-43'	137°	43°35'	-44'	138°	42°51'	-44'	139°	42°05'	-45'	139°	41°20'	-46'	140°	40°34'	-46'	140°	39°47'	-47'	141°	20
21	43°37'	-44'	138°	42°52'	-44'	139°	42°06'	-45'	140°	41°20'	-45'	140°	40°34'	-46'	141°	39°47'	-47'	141°	39°00'	-47'	142°	21
22	42°53'	-44'	139°	42°07'	-45'	140°	41°21'	-45'	140°	40°35'	-46'	141°	39°48'	-46'	142°	39°01'	-47'	142°	38°13'	-47'	143°	22
23	42°09'	-45'	140°	41°23'	-45'	141°	40°36'	-46'	141°	39°49'	-46'	142°	39°02'	-47'	142°	38°14'	-47'	143°	37°26'	-48'	143°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

31° 329° LHA

Latitude CONTRARY to DECLINATION

31° 329° LHA

30° 330° LHA

Latitude CONTRARY to Declination

30° 330° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	57°10'	-27'	113°	56°46'	-29'	114°	56°21'	-30'	116°	55°55'	-32'	117°	55°27'	-33'	118°	54°58'	-35'	119°	54°28'	-36'	121°	0
1	56°43'	-29'	114°	56°17'	-30'	116°	55°51'	-32'	117°	55°23'	-33'	118°	54°54'	-34'	120°	54°24'	-35'	121°	53°52'	-37'	122°	1
2	56°14'	-30'	116°	55°47'	-31'	117°	55°19'	-33'	119°	54°50'	-34'	120°	54°20'	-35'	121°	53°48'	-36'	122°	53°16'	-38'	123°	2
3	55°44'	-31'	118°	55°16'	-32'	119°	54°47'	-34'	120°	54°16'	-35'	121°	53°44'	-36'	122°	53°12'	-37'	124°	52°38'	-38'	125°	3
4	55°13'	-32'	119°	54°44'	-33'	120°	54°13'	-35'	121°	53°41'	-36'	123°	53°08'	-37'	124°	52°34'	-38'	125°	52°00'	-39'	126°	4
5	54°41'	-33'	120°	54°10'	-34'	122°	53°38'	-36'	123°	53°05'	-37'	124°	52°31'	-38'	125°	51°56'	-39'	126°	51°21'	-40'	127°	5
6	54°08'	-34'	122°	53°36'	-35'	123°	53°03'	-36'	124°	52°28'	-38'	125°	51°53'	-39'	126°	51°17'	-40'	127°	50°41'	-41'	128°	6
7	53°34'	-35'	123°	53°01'	-36'	124°	52°26'	-37'	126°	51°51'	-38'	127°	51°15'	-39'	128°	50°38'	-40'	129°	50°00'	-41'	129°	7
8	52°59'	-36'	125°	52°24'	-37'	126°	51°49'	-38'	127°	51°13'	-39'	128°	50°35'	-40'	129°	49°57'	-41'	130°	49°19'	-42'	131°	8
9	52°23'	-37'	126°	51°47'	-38'	127°	51°11'	-39'	128°	50°33'	-40'	129°	49°55'	-41'	130°	49°16'	-42'	131°	48°37'	-43'	132°	9
10	51°46'	-38'	127°	51°09'	-39'	128°	50°32'	-40'	129°	49°54'	-41'	130°	49°14'	-41'	131°	48°35'	-42'	132°	47°54'	-43'	133°	10
11	51°09'	-38'	129°	50°31'	-39'	129°	49°52'	-40'	130°	49°13'	-41'	131°	48°33'	-42'	132°	47°52'	-43'	133°	47°11'	-44'	134°	11
12	50°30'	-39'	130°	49°51'	-40'	131°	49°12'	-41'	132°	48°32'	-42'	132°	47°51'	-43'	133°	47°10'	-43'	134°	46°28'	-44'	135°	12
13	49°51'	-40'	131°	49°11'	-41'	132°	48°31'	-42'	133°	47°50'	-42'	133°	47°08'	-43'	134°	46°26'	-44'	135°	45°44'	-45'	136°	13
14	49°11'	-41'	132°	48°31'	-41'	133°	47°49'	-42'	134°	47°08'	-43'	135°	46°25'	-44'	135°	45°42'	-44'	136°	44°59'	-45'	137°	14
15	48°31'	-41'	133°	47°49'	-42'	134°	47°07'	-43'	135°	46°25'	-43'	136°	45°42'	-44'	136°	44°58'	-45'	137°	44°14'	-46'	138°	15
16	47°49'	-42'	134°	47°07'	-43'	135°	46°24'	-43'	136°	45°41'	-44'	137°	44°57'	-45'	137°	44°13'	-45'	138°	43°28'	-46'	139°	16
17	47°08'	-42'	135°	46°25'	-43'	136°	45°41'	-44'	137°	44°57'	-44'	137°	44°13'	-45'	138°	43°28'	-46'	139°	42°42'	-46'	139°	17
18	46°25'	-43'	136°	45°42'	-44'	137°	44°57'	-44'	138°	44°13'	-45'	138°	43°28'	-46'	139°	42°42'	-46'	140°	41°56'	-47'	140°	18
19	45°42'	-43'	137°	44°58'	-44'	138°	44°13'	-45'	139°	43°28'	-45'	139°	42°42'	-46'	140°	41°56'	-47'	141°	41°09'	-47'	141°	19
20	44°59'	-44'	138°	44°14'	-45'	139°	43°28'	-45'	140°	42°42'	-46'	140°	41°56'	-46'	141°	41°09'	-47'	141°	40°22'	-47'	142°	20
21	44°15'	-44'	139°	43°29'	-45'	140°	42°43'	-46'	141°	41°57'	-46'	141°	41°10'	-47'	142°	40°22'	-47'	142°	39°35'	-48'	143°	21
22	43°31'	-45'	140°	42°44'	-45'	141°	41°58'	-46'	141°	41°10'	-47'	142°	40°23'	-47'	143°	39°35'	-48'	143°	38°47'	-48'	144°	22
23	<u>42°46'</u>	<u>-45'</u>	<u>141°</u>	<u>41°59'</u>	<u>-46'</u>	<u>142°</u>	<u>41°12'</u>	<u>-46'</u>	<u>142°</u>	<u>40°24'</u>	<u>-47'</u>	<u>143°</u>	<u>39°36'</u>	<u>-47'</u>	<u>143°</u>	<u>38°48'</u>	<u>-48'</u>	<u>144°</u>	<u>37°59'</u>	<u>-48'</u>	<u>144°</u>	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

30° 330° LHA

Latitude CONTRARY to DECLINATION

30° 330° LHA

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

29° 331° LHA

Latitude CONTRARY to Declination

29° 331° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	58°04'	-28'	114°	57°39'	-30'	115°	57°13'	-31'	116°	56°46'	-33'	118°	56°17'	-34'	119°	55°47'	-35'	120°	55°16'	-36'	122°	0
1	57°36'	-29'	115°	57°09'	-31'	117°	56°42'	-32'	118°	56°13'	-34'	119°	55°43'	-35'	121°	55°12'	-36'	122°	54°40'	-37'	123°	1
2	57°06'	-31'	117°	56°39'	-32'	118°	56°10'	-33'	120°	55°40'	-35'	121°	55°08'	-36'	122°	54°36'	-37'	123°	54°02'	-38'	124°	2
3	56°36'	-32'	118°	56°07'	-33'	120°	55°36'	-34'	121°	55°05'	-36'	122°	54°32'	-37'	123°	53°59'	-38'	125°	53°24'	-39'	126°	3
4	56°04'	-33'	120°	55°34'	-34'	121°	55°02'	-35'	122°	54°29'	-37'	124°	53°55'	-38'	125°	53°21'	-39'	126°	52°45'	-40'	127°	4
5	55°31'	-34'	121°	54°59'	-35'	123°	54°26'	-36'	124°	53°53'	-37'	125°	53°18'	-39'	126°	52°42'	-40'	127°	52°05'	-41'	128°	5
6	54°57'	-35'	123°	54°24'	-36'	124°	53°50'	-37'	125°	53°15'	-38'	126°	52°39'	-39'	127°	52°02'	-40'	128°	51°25'	-41'	129°	6
7	54°22'	-36'	124°	53°48'	-37'	125°	53°13'	-38'	127°	52°37'	-39'	128°	52°00'	-40'	129°	51°22'	-41'	130°	50°43'	-42'	131°	7
8	53°47'	-37'	126°	53°11'	-38'	127°	52°35'	-39'	128°	51°58'	-40'	129°	51°20'	-41'	130°	50°41'	-42'	131°	50°01'	-43'	132°	8
9	53°10'	-38'	127°	52°33'	-39'	128°	51°56'	-40'	129°	51°18'	-41'	130°	50°39'	-42'	131°	49°59'	-42'	132°	49°19'	-43'	133°	9
10	52°32'	-38'	128°	51°55'	-39'	129°	51°16'	-40'	130°	50°37'	-41'	131°	49°57'	-42'	132°	49°17'	-43'	133°	48°35'	-44'	134°	10
11	51°54'	-39'	130°	51°15'	-40'	131°	50°36'	-41'	131°	49°56'	-42'	132°	49°15'	-43'	133°	48°34'	-44'	134°	47°52'	-44'	135°	11
12	51°15'	-40'	131°	50°35'	-41'	132°	49°55'	-42'	133°	49°14'	-43'	133°	48°32'	-43'	134°	47°50'	-44'	135°	47°07'	-45'	136°	12
13	50°35'	-41'	132°	49°54'	-42'	133°	49°13'	-42'	134°	48°31'	-43'	135°	47°49'	-44'	135°	47°06'	-45'	136°	46°23'	-45'	137°	13
14	49°54'	-41'	133°	49°13'	-42'	134°	48°31'	-43'	135°	47°48'	-44'	136°	47°05'	-44'	136°	46°21'	-45'	137°	45°37'	-46'	138°	14
15	49°13'	-42'	134°	48°30'	-43'	135°	47°48'	-43'	136°	47°04'	-44'	137°	46°21'	-45'	137°	45°36'	-46'	138°	44°51'	-46'	139°	15
16	48°31'	-43'	135°	47°48'	-43'	136°	47°04'	-44'	137°	46°20'	-45'	138°	45°36'	-45'	138°	44°51'	-46'	139°	44°05'	-47'	140°	16
17	47°48'	-43'	136°	47°04'	-44'	137°	46°20'	-45'	138°	45°36'	-45'	139°	44°50'	-46'	139°	44°05'	-46'	140°	43°19'	-47'	140°	17
18	47°05'	-44'	137°	46°21'	-44'	138°	45°36'	-45'	139°	44°50'	-46'	139°	44°05'	-46'	140°	43°18'	-47'	141°	42°32'	-47'	141°	18
19	46°21'	-44'	138°	45°36'	-45'	139°	44°51'	-45'	140°	44°05'	-46'	140°	43°18'	-47'	141°	42°32'	-47'	142°	41°44'	-48'	142°	19
20	45°37'	-45'	139°	44°51'	-45'	140°	44°05'	-46'	141°	43°19'	-46'	141°	42°32'	-47'	142°	41°44'	-48'	142°	40°57'	-48'	143°	20
21	44°53'	-45'	140°	44°06'	-46'	141°	43°19'	-46'	142°	42°32'	-47'	142°	41°45'	-47'	143°	40°57'	-48'	143°	40°09'	-48'	144°	21
22	44°07'	-46'	141°	43°20'	-46'	142°	42°33'	-47'	142°	41°45'	-47'	143°	40°57'	-48'	143°	40°09'	-48'	144°	39°20'	-49'	144°	22
23	<u>43°22'</u>	<u>-46'</u>	<u>142°</u>	<u>42°34'</u>	<u>-46'</u>	<u>143°</u>	<u>41°46'</u>	<u>-47'</u>	<u>143°</u>	<u>40°58'</u>	<u>-48'</u>	<u>144°</u>	<u>40°10'</u>	<u>-48'</u>	<u>144°</u>	<u>39°21'</u>	<u>-48'</u>	<u>145°</u>	<u>38°32'</u>	<u>-49'</u>	<u>145°</u>	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

29° 331° LHA

Latitude CONTRARY to 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

28° 332° LHA

Latitude CONTRARY to Declination

28° 332° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	58°57'	-29'	114°	58°31'	-30'	116°	58°05'	-32'	117°	57°36'	-33'	119°	57°07'	-35'	120°	56°36'	-36'	121°	56°04'	-37'	123°	0
1	58°28'	-30'	116°	58°01'	-32'	118°	57°33'	-33'	119°	57°03'	-34'	120°	56°32'	-36'	122°	56°00'	-37'	123°	55°27'	-38'	124°	1
2	57°58'	-31'	118°	57°29'	-33'	119°	57°00'	-34'	121°	56°29'	-35'	122°	55°56'	-37'	123°	55°23'	-38'	124°	54°49'	-39'	125°	2
3	57°27'	-33'	119°	56°57'	-34'	121°	56°25'	-35'	122°	55°53'	-36'	123°	55°20'	-38'	125°	54°45'	-39'	126°	54°10'	-40'	127°	3
4	56°54'	-34'	121°	56°23'	-35'	122°	55°50'	-36'	123°	55°17'	-37'	125°	54°42'	-39'	126°	54°06'	-40'	127°	53°30'	-41'	128°	4
5	56°21'	-35'	122°	55°48'	-36'	124°	55°14'	-37'	125°	54°39'	-38'	126°	54°03'	-39'	127°	53°27'	-40'	128°	52°49'	-41'	129°	5
6	55°46'	-36'	124°	55°12'	-37'	125°	54°37'	-38'	126°	54°01'	-39'	127°	53°24'	-40'	128°	52°46'	-41'	129°	52°08'	-42'	130°	6
7	55°10'	-37'	125°	54°35'	-38'	126°	53°59'	-39'	128°	53°22'	-40'	129°	52°44'	-41'	130°	52°05'	-42'	131°	51°26'	-43'	132°	7
8	54°34'	-38'	127°	53°57'	-39'	128°	53°20'	-40'	129°	52°42'	-41'	130°	52°03'	-42'	131°	51°23'	-42'	132°	50°43'	-43'	133°	8
9	53°56'	-38'	128°	53°19'	-39'	129°	52°40'	-40'	130°	52°01'	-41'	131°	51°21'	-42'	132°	50°41'	-43'	133°	50°00'	-44'	134°	9
10	53°18'	-39'	129°	52°39'	-40'	130°	52°00'	-41'	131°	51°20'	-42'	132°	50°39'	-43'	133°	49°58'	-44'	134°	49°16'	-44'	135°	10
11	52°38'	-40'	131°	51°59'	-41'	132°	51°19'	-42'	133°	50°38'	-43'	133°	49°56'	-44'	134°	49°14'	-44'	135°	48°31'	-45'	136°	11
12	51°58'	-41'	132°	51°18'	-42'	133°	50°37'	-42'	134°	49°55'	-43'	135°	49°13'	-44'	135°	48°30'	-45'	136°	47°46'	-46'	137°	12
13	51°18'	-41'	133°	50°36'	-42'	134°	49°54'	-43'	135°	49°12'	-44'	136°	48°29'	-45'	136°	47°45'	-45'	137°	47°01'	-46'	138°	13
14	50°36'	-42'	134°	49°54'	-43'	135°	49°11'	-44'	136°	48°28'	-44'	137°	47°44'	-45'	137°	47°00'	-46'	138°	46°15'	-46'	139°	14
15	49°54'	-43'	135°	49°11'	-43'	136°	48°28'	-44'	137°	47°43'	-45'	138°	46°59'	-46'	138°	46°14'	-46'	139°	45°28'	-47'	140°	15
16	49°11'	-43'	136°	48°28'	-44'	137°	47°43'	-45'	138°	46°59'	-45'	139°	46°13'	-46'	139°	45°28'	-47'	140°	44°41'	-47'	141°	16
17	48°28'	-44'	137°	47°43'	-45'	138°	46°59'	-45'	139°	46°13'	-46'	140°	45°27'	-46'	140°	44°41'	-47'	141°	43°54'	-48'	141°	17
18	47°44'	-44'	138°	46°59'	-45'	139°	46°13'	-46'	140°	45°27'	-46'	140°	44°41'	-47'	141°	43°54'	-47'	142°	43°07'	-48'	142°	18
19	47°00'	-45'	139°	46°14'	-46'	140°	45°28'	-46'	141°	44°41'	-47'	141°	43°54'	-47'	142°	43°06'	-48'	143°	42°19'	-48'	143°	19
20	46°15'	-45'	140°	45°28'	-46'	141°	44°41'	-47'	142°	43°54'	-47'	142°	43°07'	-48'	143°	42°19'	-48'	143°	41°30'	-49'	144°	20
21	45°29'	-46'	141°	44°42'	-46'	142°	43°55'	-47'	143°	43°07'	-47'	143°	42°19'	-48'	144°	41°30'	-48'	144°	40°42'	-49'	145°	21
22	44°44'	-46'	142°	43°56'	-47'	143°	43°08'	-47'	143°	42°20'	-48'	144°	41°31'	-48'	144°	40°42'	-49'	145°	39°53'	-49'	145°	22
23	<u>43°57'</u>	<u>-47'</u>	<u>143°</u>	<u>43°09'</u>	<u>-47'</u>	<u>144°</u>	<u>42°21'</u>	<u>-48'</u>	<u>144°</u>	<u>41°32'</u>	<u>-48'</u>	<u>145°</u>	<u>40°43'</u>	<u>-49'</u>	<u>145°</u>	<u>39°53'</u>	<u>-49'</u>	<u>146°</u>	<u>39°03'</u>	<u>-50'</u>	<u>146°</u>	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	59°50'	-30'	115°	59°23'	-31'	117°	58°55'	-33'	118°	58°26'	-34'	120°	57°56'	-35'	121°	57°24'	-37'	123°	56°51'	-38'	124°	0
1	59°20'	-31'	117°	58°52'	-32'	119°	58°23'	-34'	120°	57°52'	-35'	121°	57°20'	-37'	123°	56°47'	-38'	124°	56°13'	-39'	125°	1
2	58°49'	-32'	119°	58°20'	-34'	120°	57°49'	-35'	122°	57°17'	-36'	123°	56°44'	-37'	124°	56°10'	-39'	125°	55°34'	-40'	127°	2
3	58°17'	-33'	120°	57°46'	-35'	122°	57°14'	-36'	123°	56°41'	-37'	124°	56°06'	-38'	126°	55°31'	-40'	127°	54°54'	-41'	128°	3
4	57°44'	-34'	122°	57°12'	-36'	123°	56°38'	-37'	125°	56°03'	-38'	126°	55°28'	-39'	127°	54°51'	-40'	128°	54°14'	-41'	129°	4
5	57°09'	-36'	123°	56°36'	-37'	125°	56°01'	-38'	126°	55°25'	-39'	127°	54°49'	-40'	128°	54°11'	-41'	129°	53°32'	-42'	130°	5
6	56°34'	-37'	125°	55°59'	-38'	126°	55°23'	-39'	127°	54°46'	-40'	128°	54°08'	-41'	130°	53°30'	-42'	131°	52°50'	-43'	132°	6
7	55°57'	-37'	126°	55°21'	-39'	128°	54°44'	-40'	129°	54°06'	-41'	130°	53°27'	-42'	131°	52°48'	-43'	132°	52°07'	-43'	133°	7
8	55°20'	-38'	128°	54°43'	-39'	129°	54°05'	-40'	130°	53°26'	-41'	131°	52°46'	-42'	132°	52°05'	-43'	133°	51°24'	-44'	134°	8
9	54°41'	-39'	129°	54°03'	-40'	130°	53°24'	-41'	131°	52°44'	-42'	132°	52°03'	-43'	133°	51°22'	-44'	134°	50°40'	-45'	135°	9
10	54°02'	-40'	130°	53°23'	-41'	131°	52°43'	-42'	132°	52°02'	-43'	133°	51°20'	-44'	134°	50°38'	-44'	135°	49°55'	-45'	136°	10
11	53°22'	-41'	132°	52°42'	-42'	133°	52°01'	-43'	134°	51°19'	-43'	135°	50°37'	-44'	135°	49°54'	-45'	136°	49°10'	-46'	137°	11
12	52°41'	-42'	133°	52°00'	-42'	134°	51°18'	-43'	135°	50°36'	-44'	136°	49°52'	-45'	136°	49°09'	-46'	137°	48°24'	-46'	138°	12
13	52°00'	-42'	134°	51°18'	-43'	135°	50°35'	-44'	136°	49°52'	-45'	137°	49°08'	-45'	137°	48°23'	-46'	138°	47°38'	-47'	139°	13
14	51°17'	-43'	135°	50°35'	-44'	136°	49°51'	-44'	137°	49°07'	-45'	138°	48°22'	-46'	138°	47°37'	-46'	139°	46°51'	-47'	140°	14
15	50°35'	-44'	136°	49°51'	-44'	137°	49°07'	-45'	138°	48°22'	-46'	139°	47°36'	-46'	139°	46°51'	-47'	140°	46°04'	-48'	141°	15
16	49°51'	-44'	137°	49°07'	-45'	138°	48°22'	-45'	139°	47°36'	-46'	140°	46°50'	-47'	140°	46°04'	-47'	141°	45°17'	-48'	142°	16
17	49°07'	-45'	138°	48°22'	-45'	139°	47°36'	-46'	140°	46°50'	-47'	141°	46°03'	-47'	141°	45°16'	-48'	142°	44°29'	-48'	143°	17
18	48°22'	-45'	139°	47°36'	-46'	140°	46°50'	-46'	141°	46°03'	-47'	142°	45°16'	-48'	142°	44°29'	-48'	143°	43°41'	-49'	143°	18
19	47°37'	-46'	140°	46°51'	-46'	141°	46°04'	-47'	142°	45°16'	-47'	142°	44°29'	-48'	143°	43°41'	-48'	144°	42°52'	-49'	144°	19
20	46°51'	-46'	141°	46°04'	-47'	142°	45°17'	-47'	143°	44°29'	-48'	143°	43°41'	-48'	144°	42°52'	-49'	144°	42°03'	-49'	145°	20
21	46°05'	-47'	142°	45°18'	-47'	143°	44°30'	-48'	144°	43°41'	-48'	144°	42°52'	-49'	145°	42°03'	-49'	145°	41°14'	-50'	146°	21
22	45°19'	-47'	143°	44°31'	-48'	144°	43°42'	-48'	144°	42°53'	-49'	145°	42°04'	-49'	145°	41°14'	-49'	146°	40°24'	-50'	146°	22
23	<u>44°32'</u>	<u>-47'</u>	<u>144°</u>	<u>43°43'</u>	<u>-48'</u>	<u>145°</u>	<u>42°54'</u>	<u>-48'</u>	<u>145°</u>	<u>42°04'</u>	<u>-49'</u>	<u>146°</u>	<u>41°15'</u>	<u>-49'</u>	<u>146°</u>	<u>40°25'</u>	<u>-50'</u>	<u>147°</u>	<u>39°34'</u>	<u>-50'</u>	<u>147°</u>	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

27° 333° LHA

Latitude CONTRARY to DECLINATION

27° 333° LHA

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

26° 334° LHA

Latitude CONTRARY to Declination

26° 334° LHA

Table with columns for Dec°, 14, 15, 16, 17, 18, 19, 20, and Dec°. Each column contains three sub-columns (Hc°, d', Z°) and rows for declination from 0 to 23. Underlines are present on the last row (Dec 23) for all data cells.

26° 334° LHA

Latitude CONTRARY to DECLINATION

26° 334° LHA

25° 335° LHA

Latitude CONTRARY to Declination

25° 335° LHA

Table with columns for Dec°, 14, 15, 16, 17, 18, 19, 20, and Dec°. Each column contains three sub-columns (Hc°, d', Z°) and rows for declination from 0 to 23. Underlines are present on the last row (Dec 23) for all data cells.

25° 335° LHA

Latitude CONTRARY to DECLINATION

25° 335° LHA

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

24° 336° LHA

Latitude CONTRARY to Declination

24° 336° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	62°26'	-32'	119°	61°56'	-34'	120°	61°25'	-35'	122°	60°53'	-37'	123°	60°19'	-38'	125°	59°45'	-39'	126°	59°09'	-40'	128°	0
1	61°53'	-33'	120°	61°22'	-35'	122°	60°50'	-36'	123°	60°16'	-38'	125°	59°41'	-39'	126°	59°05'	-40'	128°	58°28'	-41'	129°	1
2	61°20'	-35'	122°	60°47'	-36'	124°	60°14'	-38'	125°	59°39'	-39'	126°	59°02'	-40'	128°	58°25'	-41'	129°	57°47'	-42'	130°	2
3	60°45'	-36'	124°	60°11'	-37'	125°	59°36'	-39'	127°	59°00'	-40'	128°	58°22'	-41'	129°	57°44'	-42'	130°	57°04'	-43'	132°	3
4	60°09'	-37'	125°	59°34'	-38'	127°	58°57'	-40'	128°	58°20'	-41'	129°	57°41'	-42'	131°	57°02'	-43'	132°	56°21'	-44'	133°	4
5	59°32'	-38'	127°	58°56'	-39'	128°	58°18'	-41'	130°	57°39'	-42'	131°	57°00'	-43'	132°	56°19'	-44'	133°	55°38'	-45'	134°	5
6	58°54'	-39'	128°	58°16'	-40'	130°	57°37'	-41'	131°	56°58'	-42'	132°	56°17'	-43'	133°	55°35'	-44'	134°	54°53'	-45'	135°	6
7	58°15'	-40'	130°	57°36'	-41'	131°	56°56'	-42'	132°	56°15'	-43'	133°	55°33'	-44'	134°	54°51'	-45'	135°	54°08'	-46'	136°	7
8	57°35'	-41'	131°	56°55'	-42'	132°	56°14'	-43'	134°	55°32'	-44'	135°	54°49'	-45'	136°	54°06'	-46'	137°	53°22'	-46'	138°	8
9	56°54'	-42'	133°	56°12'	-43'	134°	55°31'	-44'	135°	54°48'	-45'	136°	54°05'	-45'	137°	53°20'	-46'	138°	52°36'	-47'	139°	9
10	56°12'	-43'	134°	55°30'	-44'	135°	54°47'	-44'	136°	54°03'	-45'	137°	53°19'	-46'	138°	52°34'	-47'	139°	51°49'	-47'	140°	10
11	55°29'	-43'	135°	54°46'	-44'	136°	54°02'	-45'	137°	53°18'	-46'	138°	52°33'	-47'	139°	51°48'	-47'	140°	51°01'	-48'	141°	11
12	54°46'	-44'	136°	54°02'	-45'	137°	53°17'	-46'	138°	52°32'	-46'	139°	51°47'	-47'	140°	51°00'	-48'	141°	50°14'	-48'	142°	12
13	54°01'	-45'	138°	53°17'	-46'	138°	52°32'	-46'	139°	51°46'	-47'	140°	50°59'	-48'	141°	50°13'	-48'	142°	49°25'	-49'	142°	13
14	53°17'	-45'	139°	52°31'	-46'	140°	51°45'	-47'	140°	50°59'	-47'	141°	50°12'	-48'	142°	49°24'	-49'	143°	48°37'	-49'	143°	14
15	52°31'	-46'	140°	51°45'	-47'	141°	50°59'	-47'	141°	50°11'	-48'	142°	49°24'	-48'	143°	48°36'	-49'	144°	47°47'	-50'	144°	15
16	51°45'	-46'	141°	50°59'	-47'	142°	50°11'	-48'	142°	49°24'	-48'	143°	48°35'	-49'	144°	47°47'	-49'	144°	46°58'	-50'	145°	16
17	50°59'	-47'	142°	50°11'	-48'	143°	49°24'	-48'	143°	48°35'	-49'	144°	47°47'	-49'	145°	46°57'	-50'	145°	46°08'	-50'	146°	17
18	50°12'	-47'	143°	49°24'	-48'	144°	48°35'	-49'	144°	47°47'	-49'	145°	46°57'	-50'	145°	46°08'	-50'	146°	45°18'	-51'	147°	18
19	49°24'	-48'	144°	48°36'	-48'	144°	47°47'	-49'	145°	46°57'	-49'	146°	46°08'	-50'	146°	45°18'	-50'	147°	44°27'	-51'	147°	19
20	48°37'	-48'	145°	47°47'	-49'	145°	46°58'	-49'	146°	46°08'	-50'	147°	45°18'	-50'	147°	44°27'	-51'	148°	43°36'	-51'	148°	20
21	47°48'	-49'	146°	46°58'	-49'	146°	46°08'	-50'	147°	45°18'	-50'	147°	44°27'	-51'	148°	43°37'	-51'	148°	42°45'	-51'	149°	21
22	46°59'	-49'	146°	46°09'	-50'	147°	45°19'	-50'	148°	44°28'	-50'	148°	43°37'	-51'	149°	42°46'	-51'	149°	41°54'	-52'	150°	22
23	46°10'	-49'	147°	45°20'	-50'	148°	44°29'	-50'	148°	43°38'	-51'	149°	42°46'	-51'	149°	41°54'	-51'	150°	41°02'	-52'	150°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	63°16'	-33'	120°	62°46'	-35'	121°	62°14'	-36'	123°	61°41'	-38'	125°	61°06'	-39'	126°	60°30'	-40'	127°	59°53'	-41'	129°	0
1	62°43'	-34'	122°	62°11'	-36'	123°	61°38'	-37'	125°	61°03'	-39'	126°	60°27'	-40'	128°	59°50'	-41'	129°	59°12'	-42'	130°	1
2	62°09'	-36'	123°	61°35'	-37'	125°	61°00'	-38'	126°	60°24'	-40'	128°	59°47'	-41'	129°	59°09'	-42'	130°	58°29'	-43'	132°	2
3	61°33'	-37'	125°	60°58'	-38'	126°	60°22'	-40'	128°	59°45'	-41'	129°	59°06'	-42'	131°	58°27'	-43'	132°	57°46'	-44'	133°	3
4	60°56'	-38'	127°	60°20'	-39'	128°	59°42'	-41'	129°	59°04'	-42'	131°	58°24'	-43'	132°	57°44'	-44'	133°	57°02'	-45'	134°	4
5	60°18'	-39'	128°	59°41'	-40'	130°	59°02'	-41'	131°	58°22'	-43'	132°	57°42'	-44'	133°	57°00'	-44'	134°	56°18'	-45'	135°	5
6	59°39'	-40'	130°	59°00'	-41'	131°	58°20'	-42'	132°	57°40'	-43'	133°	56°58'	-44'	135°	56°16'	-45'	136°	55°32'	-46'	137°	6
7	58°59'	-41'	131°	58°19'	-42'	132°	57°38'	-43'	134°	56°56'	-44'	135°	56°14'	-45'	136°	55°30'	-46'	137°	54°46'	-47'	138°	7
8	58°18'	-42'	133°	57°37'	-43'	134°	56°55'	-44'	135°	56°12'	-45'	136°	55°29'	-46'	137°	54°45'	-46'	138°	54°00'	-47'	139°	8
9	57°36'	-43'	134°	56°54'	-44'	135°	56°11'	-45'	136°	55°27'	-45'	137°	54°43'	-46'	138°	53°58'	-47'	139°	53°13'	-48'	140°	9
10	56°53'	-44'	135°	56°10'	-44'	136°	55°26'	-45'	137°	54°42'	-46'	138°	53°57'	-47'	139°	53°11'	-47'	140°	52°25'	-48'	141°	10
11	56°10'	-44'	136°	55°26'	-45'	137°	54°41'	-46'	138°	53°56'	-47'	139°	53°10'	-47'	140°	52°24'	-48'	141°	51°37'	-49'	142°	11
12	55°25'	-45'	138°	54°41'	-46'	139°	53°55'	-46'	140°	53°09'	-47'	140°	52°23'	-48'	141°	51°36'	-48'	142°	50°48'	-49'	143°	12
13	54°40'	-46'	139°	53°55'	-46'	140°	53°09'	-47'	141°	52°22'	-48'	141°	51°35'	-48'	142°	50°47'	-49'	143°	49°59'	-49'	144°	13
14	53°55'	-46'	140°	53°08'	-47'	141°	52°22'	-48'	142°	51°34'	-48'	142°	50°47'	-49'	143°	49°58'	-49'	144°	49°10'	-50'	145°	14
15	53°08'	-47'	141°	52°22'	-47'	142°	51°34'	-48'	143°	50°46'	-49'	143°	49°58'	-49'	144°	49°09'	-50'	145°	48°20'	-50'	145°	15
16	52°22'	-47'	142°	51°34'	-48'	143°	50°46'	-48'	144°	49°58'	-49'	144°	49°09'	-50'	145°	48°19'	-50'	146°	47°30'	-51'	146°	16
17	51°34'	-48'	143°	50°46'	-48'	144°	49°58'	-49'	144°	49°09'	-49'	145°	48°19'	-50'	146°	47°29'	-50'	146°	46°39'	-51'	147°	17
18	50°47'	-48'	144°	49°58'	-49'	145°	49°09'	-49'	145°	48°19'	-50'	146°	47°29'	-50'	147°	46°39'	-51'	147°	45°48'	-51'	148°	18
19	49°58'	-49'	145°	49°09'	-49'	146°	48°19'	-50'	146°	47°29'	-50'	147°	46°39'	-51'	147°	45°48'	-51'	148°	44°57'	-51'	149°	19
20	49°10'	-49'	146°	48°20'	-50'	146°	47°30'	-50'	147°	46°39'	-50'	148°	45°48'	-51'	148°	44°57'	-51'	149°	44°06'	-52'	149°	20
21	48°21'	-49'	147°	47°30'	-50'	147°	46°40'	-50'	148°	45°49'	-51'	148°	44°57'	-51'	149°	44°06'	-52'	149°	43°14'	-52'	150°	21
22	47°31'	-50'	148°	46°40'	-50'	148°	45°49'	-51'	149°	44°58'	-51'	149°	44°06'	-51'	150°	43°14'	-52'	150°	42°22'	-52'	151°	22
23	46°41'	-50'	148°	45°50'	-51'	149°	44°59'	-51'	149°	44°07'	-51'	150°	43°15'	-52'	150°	42°22'	-52'	151°	41°30'	-52'	151°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

23° 337° LHA

Latitude CONTRARY to DECLINATION

23° 337° LHA

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

22° 338° LHA

Latitude CONTRARY to Declination

22° 338° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	64°07'	-34'	121°	63°35'	-36'	123°	63°02'	-37'	124°	62°27'	-39'	126°	61°52'	-40'	127°	61°15'	-41'	129°	60°36'	-42'	130°	0
1	63°33'	-35'	123°	62°59'	-37'	124°	62°25'	-38'	126°	61°49'	-40'	128°	61°12'	-41'	129°	60°33'	-42'	130°	59°54'	-43'	132°	1
2	62°57'	-37'	125°	62°23'	-38'	126°	61°47'	-39'	128°	61°09'	-41'	129°	60°31'	-42'	130°	59°51'	-43'	132°	59°11'	-44'	133°	2
3	62°21'	-38'	126°	61°44'	-39'	128°	61°07'	-41'	129°	60°29'	-42'	131°	59°49'	-43'	132°	59°08'	-44'	133°	58°27'	-45'	134°	3
4	61°43'	-39'	128°	61°05'	-40'	129°	60°27'	-41'	131°	59°47'	-43'	132°	59°06'	-44'	133°	58°25'	-45'	134°	57°42'	-45'	136°	4
5	61°04'	-40'	130°	60°25'	-41'	131°	59°45'	-42'	132°	59°04'	-43'	133°	58°23'	-44'	135°	57°40'	-45'	136°	56°57'	-46'	137°	5
6	60°24'	-41'	131°	59°44'	-42'	132°	59°03'	-43'	134°	58°21'	-44'	135°	57°38'	-45'	136°	56°55'	-46'	137°	56°11'	-47'	138°	6
7	59°42'	-42'	133°	59°01'	-43'	134°	58°19'	-44'	135°	57°37'	-45'	136°	56°53'	-46'	137°	56°09'	-47'	138°	55°24'	-47'	139°	7
8	59°00'	-43'	134°	58°18'	-44'	135°	57°35'	-45'	136°	56°52'	-46'	137°	56°07'	-46'	138°	55°22'	-47'	139°	54°36'	-48'	140°	8
9	58°17'	-44'	135°	57°34'	-45'	136°	56°51'	-46'	137°	56°06'	-46'	138°	55°21'	-47'	139°	54°35'	-48'	140°	53°48'	-48'	141°	9
10	57°34'	-44'	137°	56°50'	-45'	138°	56°05'	-46'	139°	55°20'	-47'	140°	54°34'	-48'	140°	53°47'	-48'	141°	53°00'	-49'	142°	10
11	56°49'	-45'	138°	56°04'	-46'	139°	55°19'	-47'	140°	54°33'	-47'	141°	53°46'	-48'	142°	52°59'	-49'	142°	52°11'	-49'	143°	11
12	56°04'	-46'	139°	55°18'	-47'	140°	54°32'	-47'	141°	53°45'	-48'	142°	52°58'	-49'	143°	52°10'	-49'	143°	51°22'	-50'	144°	12
13	55°18'	-46'	140°	54°32'	-47'	141°	53°45'	-48'	142°	52°57'	-48'	143°	52°09'	-49'	143°	51°21'	-50'	144°	50°32'	-50'	145°	13
14	54°32'	-47'	141°	53°45'	-48'	142°	52°57'	-48'	143°	52°09'	-49'	144°	51°20'	-49'	144°	50°31'	-50'	145°	49°42'	-51'	146°	14
15	53°45'	-48'	142°	52°57'	-48'	143°	52°09'	-49'	144°	51°20'	-49'	145°	50°31'	-50'	145°	49°41'	-50'	146°	48°51'	-51'	147°	15
16	52°57'	-48'	143°	52°09'	-49'	144°	51°20'	-49'	145°	50°31'	-50'	146°	49°41'	-50'	146°	48°51'	-51'	147°	48°01'	-51'	147°	16
17	52°09'	-49'	144°	51°20'	-49'	145°	50°31'	-50'	146°	49°41'	-50'	146°	48°51'	-51'	147°	48°00'	-51'	148°	47°09'	-51'	148°	17
18	51°20'	-49'	145°	50°31'	-50'	146°	49°41'	-50'	147°	48°51'	-51'	147°	48°00'	-51'	148°	47°09'	-51'	148°	46°18'	-52'	149°	18
19	50°31'	-49'	146°	49°41'	-50'	147°	48°51'	-50'	147°	48°00'	-51'	148°	47°09'	-51'	149°	46°18'	-52'	149°	45°26'	-52'	150°	19
20	49°42'	-50'	147°	48°51'	-50'	148°	48°01'	-51'	148°	47°09'	-51'	149°	46°18'	-52'	149°	45°26'	-52'	150°	44°34'	-52'	150°	20
21	48°52'	-50'	148°	48°01'	-51'	148°	47°10'	-51'	149°	46°18'	-51'	150°	45°26'	-52'	150°	44°34'	-52'	151°	43°42'	-53'	151°	21
22	48°02'	-51'	149°	47°10'	-51'	149°	46°19'	-51'	150°	45°27'	-52'	150°	44°34'	-52'	151°	43°42'	-52'	151°	42°49'	-53'	152°	22
23	47°11'	-51'	150°	46°19'	-51'	150°	45°27'	-52'	151°	44°35'	-52'	151°	43°42'	-52'	152°	42°50'	-53'	152°	41°56'	-53'	152°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

22° 338° LHA

Latitude CONTRARY to DECLINATION

22° 338° LHA

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

21° 339° LHA

Latitude CONTRARY to Declination

21° 339° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	64°56'	-35'	122°	64°23'	-37'	124°	63°49'	-38'	126°	63°14'	-40'	127°	62°37'	-41'	129°	61°58'	-42'	130°	61°19'	-43'	132°	0
1	64°21'	-36'	124°	63°47'	-38'	126°	63°11'	-39'	127°	62°34'	-41'	129°	61°56'	-42'	130°	61°16'	-43'	132°	60°36'	-44'	133°	1
2	63°45'	-38'	126°	63°09'	-39'	128°	62°32'	-40'	129°	61°53'	-42'	131°	61°14'	-43'	132°	60°33'	-44'	133°	59°52'	-45'	134°	2
3	63°07'	-39'	128°	62°30'	-40'	129°	61°51'	-41'	131°	61°12'	-43'	132°	60°31'	-44'	133°	59°49'	-45'	135°	59°07'	-46'	136°	3
4	62°28'	-40'	129°	61°50'	-41'	131°	61°10'	-42'	132°	60°29'	-44'	133°	59°47'	-45'	135°	59°05'	-45'	136°	58°21'	-46'	137°	4
5	61°48'	-41'	131°	61°08'	-42'	132°	60°27'	-43'	134°	59°45'	-44'	135°	59°03'	-45'	136°	58°19'	-46'	137°	57°35'	-47'	138°	5
6	61°07'	-42'	132°	60°26'	-43'	134°	59°44'	-44'	135°	59°01'	-45'	136°	58°17'	-46'	137°	57°33'	-47'	138°	56°48'	-48'	139°	6
7	60°25'	-43'	134°	59°43'	-44'	135°	59°00'	-45'	136°	58°16'	-46'	137°	57°31'	-47'	139°	56°46'	-47'	140°	56°00'	-48'	140°	7
8	59°42'	-44'	135°	58°59'	-45'	136°	58°15'	-46'	138°	57°30'	-47'	139°	56°45'	-47'	140°	55°59'	-48'	141°	55°12'	-49'	142°	8
9	58°58'	-45'	137°	58°14'	-46'	138°	57°29'	-46'	139°	56°44'	-47'	140°	55°57'	-48'	141°	55°11'	-49'	142°	54°23'	-49'	143°	9
10	58°13'	-45'	138°	57°28'	-46'	139°	56°43'	-47'	140°	55°56'	-48'	141°	55°10'	-48'	142°	54°22'	-49'	143°	53°34'	-50'	144°	10
11	57°28'	-46'	139°	56°42'	-47'	140°	55°56'	-48'	141°	55°09'	-48'	142°	54°21'	-49'	143°	53°33'	-50'	144°	52°44'	-50'	144°	11
12	56°42'	-47'	140°	55°55'	-47'	141°	55°08'	-48'	142°	54°20'	-49'	143°	53°32'	-49'	144°	52°44'	-50'	145°	51°54'	-50'	145°	12
13	55°55'	-47'	141°	55°08'	-48'	142°	54°20'	-49'	143°	53°32'	-49'	144°	52°43'	-50'	145°	51°54'	-50'	146°	51°04'	-51'	146°	13
14	55°08'	-48'	143°	54°20'	-49'	143°	53°31'	-49'	144°	52°42'	-50'	145°	51°53'	-50'	146°	51°03'	-51'	146°	50°13'	-51'	147°	14
15	54°20'	-48'	144°	53°31'	-49'	144°	52°42'	-50'	145°	51°53'	-50'	146°	51°03'	-51'	147°	50°12'	-51'	147°	49°22'	-52'	148°	15
16	53°31'	-49'	145°	52°42'	-49'	145°	51°53'	-50'	146°	51°03'	-50'	147°	50°12'	-51'	147°	49°21'	-51'	148°	48°30'	-52'	149°	16
17	52°42'	-49'	146°	51°53'	-50'	146°	51°03'	-50'	147°	50°12'	-51'	148°	49°21'	-51'	148°	48°30'	-52'	149°	47°39'	-52'	149°	17
18	51°53'	-50'	146°	51°03'	-50'	147°	50°12'	-51'	148°	49°21'	-51'	148°	48°30'	-52'	149°	47°38'	-52'	150°	46°46'	-52'	150°	18
19	51°03'	-50'	147°	50°12'	-51'	148°	49°21'	-51'	149°	48°30'	-52'	149°	47°38'	-52'	150°	46°46'	-52'	150°	45°54'	-53'	151°	19
20	50°13'	-51'	148°	49°22'	-51'	149°	48°30'	-51'	149°	47°39'	-52'	150°	46°46'	-52'	151°	45°54'	-53'	151°	45°01'	-53'	152°	20
21	49°22'	-51'	149°	48°31'	-51'	150°	47°39'	-52'	150°	46°47'	-52'	151°	45°54'	-52'	151°	45°01'	-53'	152°	44°09'	-53'	152°	21
22	48°32'	-51'	150°	47°40'	-52'	150°	46°47'	-52'	151°	45°55'	-52'	151°	45°02'	-53'	152°	44°09'	-53'	152°	43°15'	-53'	153°	22
23	47°40'	-52'	151°	46°48'	-52'	151°	45°55'	-52'	152°	45°02'	-53'	152°	44°09'	-53'	153°	43°16'	-53'	153°	42°22'	-54'	153°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

21° 339° LHA

Latitude CONTRARY to 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

20° 340° LHA

Latitude CONTRARY to Declination

20° 340° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	65°45'	-36'	124°	65°11'	-38'	125°	64°36'	-39'	127°	63°59'	-41'	129°	63°21'	-42'	130°	62°41'	-43'	132°	62°01'	-44'	133°	0
1	65°09'	-37'	126°	64°33'	-39'	127°	63°56'	-40'	129°	63°18'	-42'	130°	62°39'	-43'	132°	61°58'	-44'	133°	61°16'	-45'	135°	1
2	64°32'	-39'	127°	63°54'	-40'	129°	63°16'	-41'	131°	62°36'	-43'	132°	61°56'	-44'	133°	61°14'	-45'	135°	60°31'	-46'	136°	2
3	63°53'	-40'	129°	63°14'	-41'	131°	62°35'	-43'	132°	61°54'	-44'	134°	61°12'	-45'	135°	60°29'	-46'	136°	59°46'	-47'	137°	3
4	63°13'	-41'	131°	62°33'	-42'	132°	61°52'	-43'	134°	61°10'	-45'	135°	60°27'	-45'	136°	59°44'	-46'	137°	58°59'	-47'	139°	4
5	62°32'	-42'	132°	61°51'	-43'	134°	61°09'	-44'	135°	60°26'	-45'	136°	59°42'	-46'	138°	58°57'	-47'	139°	58°12'	-48'	140°	5
6	61°49'	-43'	134°	61°07'	-44'	135°	60°24'	-45'	136°	59°40'	-46'	138°	58°56'	-47'	139°	58°10'	-48'	140°	57°24'	-48'	141°	6
7	61°06'	-44'	135°	60°23'	-45'	137°	59°39'	-46'	138°	58°54'	-47'	139°	58°09'	-48'	140°	57°22'	-48'	141°	56°35'	-49'	142°	7
8	60°22'	-45'	137°	59°38'	-46'	138°	58°53'	-47'	139°	58°07'	-47'	140°	57°21'	-48'	141°	56°34'	-49'	142°	55°46'	-49'	143°	8
9	59°37'	-46'	138°	58°52'	-46'	139°	58°07'	-47'	140°	57°20'	-48'	141°	56°33'	-49'	142°	55°45'	-49'	143°	54°57'	-50'	144°	9
10	58°52'	-46'	139°	58°06'	-47'	140°	57°19'	-48'	141°	56°32'	-49'	142°	55°44'	-49'	143°	54°56'	-50'	144°	54°07'	-50'	145°	10
11	58°05'	-47'	141°	57°19'	-48'	142°	56°31'	-48'	143°	55°43'	-49'	143°	54°55'	-50'	144°	54°06'	-50'	145°	53°17'	-51'	146°	11
12	57°18'	-48'	142°	56°31'	-48'	143°	55°43'	-49'	144°	54°54'	-50'	144°	54°05'	-50'	145°	53°16'	-51'	146°	52°26'	-51'	147°	12
13	56°31'	-48'	143°	55°43'	-49'	144°	54°54'	-49'	145°	54°05'	-50'	145°	53°15'	-51'	146°	52°25'	-51'	147°	51°35'	-52'	148°	13
14	55°42'	-49'	144°	54°54'	-49'	145°	54°04'	-50'	146°	53°15'	-50'	146°	52°25'	-51'	147°	51°34'	-51'	148°	50°43'	-52'	148°	14
15	54°54'	-49'	145°	54°04'	-50'	146°	53°15'	-50'	146°	52°24'	-51'	147°	51°34'	-51'	148°	50°43'	-52'	149°	49°51'	-52'	149°	15
16	54°04'	-50'	146°	53°15'	-50'	147°	52°24'	-51'	147°	51°33'	-51'	148°	50°42'	-52'	149°	49°51'	-52'	149°	48°59'	-52'	150°	16
17	53°15'	-50'	147°	52°24'	-51'	148°	51°33'	-51'	148°	50°42'	-52'	149°	49°51'	-52'	150°	48°59'	-52'	150°	48°07'	-53'	151°	17
18	52°25'	-51'	148°	51°34'	-51'	148°	50°42'	-51'	149°	49°51'	-52'	150°	48°59'	-52'	150°	48°06'	-53'	151°	47°14'	-53'	151°	18
19	51°34'	-51'	149°	50°43'	-51'	149°	49°51'	-52'	150°	48°59'	-52'	150°	48°06'	-53'	151°	47°14'	-53'	152°	46°21'	-53'	152°	19
20	50°43'	-51'	149°	49°51'	-52'	150°	48°59'	-52'	151°	48°07'	-52'	151°	47°14'	-53'	152°	46°21'	-53'	152°	45°28'	-53'	153°	20
21	49°52'	-52'	150°	49°00'	-52'	151°	48°07'	-52'	151°	47°14'	-53'	152°	46°21'	-53'	152°	45°28'	-53'	153°	44°34'	-54'	153°	21
22	49°00'	-52'	151°	48°08'	-52'	152°	47°15'	-53'	152°	46°22'	-53'	153°	45°28'	-53'	153°	44°34'	-54'	154°	43°41'	-54'	154°	22
23	48°08'	-52'	152°	47°15'	-53'	152°	46°22'	-53'	153°	45°29'	-53'	153°	44°35'	-53'	154°	43°41'	-54'	154°	42°47'	-54'	155°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			Dec°

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	66°33'	-37'	125°	65°58'	-39'	127°	65°21'	-40'	129°	64°43'	-42'	130°	64°04'	-43'	132°	63°23'	-44'	133°	62°41'	-45'	135°	0
1	65°56'	-39'	127°	65°19'	-40'	129°	64°41'	-41'	130°	64°01'	-43'	132°	63°21'	-44'	133°	62°39'	-45'	135°	61°56'	-46'	136°	1
2	65°17'	-40'	129°	64°39'	-41'	131°	63°59'	-43'	132°	63°19'	-44'	134°	62°37'	-45'	135°	61°54'	-46'	136°	61°10'	-47'	138°	2
3	64°37'	-41'	131°	63°58'	-42'	132°	63°17'	-44'	134°	62°35'	-45'	135°	61°52'	-46'	136°	61°08'	-47'	138°	60°23'	-47'	139°	3
4	63°56'	-42'	132°	63°15'	-43'	134°	62°33'	-45'	135°	61°50'	-46'	137°	61°06'	-46'	138°	60°21'	-47'	139°	59°36'	-48'	140°	4
5	63°14'	-43'	134°	62°32'	-44'	135°	61°49'	-45'	137°	61°05'	-46'	138°	60°20'	-47'	139°	59°34'	-48'	140°	58°48'	-49'	141°	5
6	62°31'	-44'	135°	61°48'	-45'	137°	61°03'	-46'	138°	60°18'	-47'	139°	59°33'	-48'	140°	58°46'	-49'	141°	57°59'	-49'	142°	6
7	61°47'	-45'	137°	61°02'	-46'	138°	60°17'	-47'	139°	59°31'	-48'	140°	58°45'	-48'	141°	57°58'	-49'	142°	57°10'	-50'	143°	7
8	61°02'	-46'	138°	60°16'	-47'	139°	59°30'	-48'	141°	58°44'	-48'	142°	57°56'	-49'	143°	57°08'	-50'	144°	56°20'	-50'	144°	8
9	60°16'	-47'	140°	59°30'	-47'	141°	58°43'	-48'	142°	57°55'	-49'	143°	57°07'	-50'	144°	56°19'	-50'	145°	55°30'	-51'	145°	9
10	59°29'	-47'	141°	58°42'	-48'	142°	57°55'	-49'	143°	57°06'	-49'	144°	56°18'	-50'	145°	55°29'	-51'	146°	54°39'	-51'	146°	10
11	58°42'	-48'	142°	57°54'	-49'	143°	57°06'	-49'	144°	56°17'	-50'	145°	55°28'	-50'	146°	54°38'	-51'	146°	53°48'	-52'	147°	11
12	57°54'	-49'	143°	57°05'	-49'	144°	56°17'	-50'	145°	55°27'	-50'	146°	54°37'	-51'	147°	53°47'	-51'	147°	52°56'	-52'	148°	12
13	57°05'	-49'	144°	56°16'	-50'	145°	55°27'	-50'	146°	54°37'	-51'	147°	53°46'	-51'	148°	52°56'	-52'	148°	52°04'	-52'	149°	13
14	56°16'	-50'	145°	55°27'	-50'	146°	54°36'	-51'	147°	53°46'	-51'	148°	52°55'	-52'	148°	52°04'	-52'	149°	51°12'	-53'	150°	14
15	55°27'	-50'	146°	54°36'	-51'	147°	53°46'	-51'	148°	52°55'	-52'	149°	52°03'	-52'	149°	51°12'	-52'	150°	50°20'	-53'	150°	15
16	54°36'	-51'	147°	53°46'	-51'	148°	52°55'	-51'	149°	52°03'	-52'	149°	51°11'	-52'	150°	50°19'	-53'	151°	49°27'	-53'	151°	16
17	53°46'	-51'	148°	52°55'	-51'	149°	52°03'	-52'	150°	51°11'	-52'	150°	50°19'	-53'	151°	49°27'	-53'	151°	48°34'	-53'	152°	17
18	52°55'	-51'	149°	52°03'	-52'	150°	51°11'	-52'	150°	50°19'	-53'	151°	49°26'	-53'	152°	48°34'	-53'	152°	47°40'	-54'	153°	18
19	52°04'	-52'	150°	51°12'	-52'	151°	50°19'	-52'	151°	49°27'	-53'	152°	48°34'	-53'	152°	47°40'	-53'	153°	46°47'	-54'	153°	19
20	51°12'	-52'	151°	50°20'	-52'	151°	49°27'	-53'	152°	48°34'	-53'	152°	47°40'	-53'	153°	46°47'	-54'	153°	45°53'	-54'	154°	20
21	50°20'	-52'	152°	49°27'	-53'	152°	48°34'	-53'	153°	47°41'	-53'	153°	46°47'	-54'	154°	45°53'	-54'	154°	44°59'	-54'	155°	21
22	49°28'	-53'	152°	48°35'	-53'	153°	47°41'	-53'	153°	46°47'	-54'	154°	45°53'	-54'	154°	44°59'	-54'	155°	44°05'	-54'	155°	22
23	48°35'	-53'	153°	47°42'	-53'	154°	46°48'	-53'	154°	45°54'	-54'	154°	45°00'	-54'	155°	44°05'	-54'	155°	43°10'	-55'	156°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			Dec°

19° 341° LHA

Latitude CONTRARY to 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

18° 342° LHA

Latitude CONTRARY to Declination

18° 342° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	67°20'	-38'	127°	66°44'	-40'	129°	66°06'	-41'	130°	65°26'	-43'	132°	64°45'	-44'	134°	64°04'	-45'	135°	63°21'	-46'	136°	0
1	66°42'	-40'	129°	66°04'	-41'	130°	65°24'	-43'	132°	64°43'	-44'	134°	64°01'	-45'	135°	63°18'	-46'	137°	62°34'	-47'	138°	1
2	66°02'	-41'	131°	65°23'	-42'	132°	64°42'	-44'	134°	64°00'	-45'	135°	63°16'	-46'	137°	62°32'	-47'	138°	61°47'	-48'	139°	2
3	65°21'	-42'	132°	64°40'	-44'	134°	63°58'	-45'	135°	63°15'	-46'	137°	62°31'	-47'	138°	61°46'	-48'	139°	61°00'	-48'	140°	3
4	64°39'	-43'	134°	63°57'	-45'	135°	63°13'	-46'	137°	62°29'	-47'	138°	61°44'	-47'	139°	60°58'	-48'	141°	60°11'	-49'	142°	4
5	63°55'	-44'	136°	63°12'	-45'	137°	62°28'	-46'	138°	61°43'	-47'	139°	60°57'	-48'	141°	60°10'	-49'	142°	59°22'	-50'	143°	5
6	63°11'	-45'	137°	62°27'	-46'	138°	61°41'	-47'	140°	60°55'	-48'	141°	60°08'	-49'	142°	59°21'	-49'	143°	58°33'	-50'	144°	6
7	62°26'	-46'	138°	61°40'	-47'	140°	60°54'	-48'	141°	60°07'	-49'	142°	59°20'	-49'	143°	58°31'	-50'	144°	57°43'	-51'	145°	7
8	61°40'	-47'	140°	60°53'	-48'	141°	60°06'	-48'	142°	59°19'	-49'	143°	58°30'	-50'	144°	57°41'	-50'	145°	56°52'	-51'	146°	8
9	60°53'	-48'	141°	60°06'	-48'	142°	59°18'	-49'	143°	58°30'	-50'	144°	57°41'	-50'	145°	56°51'	-51'	146°	56°01'	-51'	147°	9
10	60°05'	-48'	142°	59°17'	-49'	143°	58°29'	-50'	144°	57°40'	-50'	145°	56°50'	-51'	146°	56°00'	-51'	147°	55°09'	-52'	148°	10
11	59°17'	-49'	144°	58°28'	-50'	145°	57°39'	-50'	145°	56°49'	-51'	146°	55°59'	-51'	147°	55°09'	-52'	148°	54°18'	-52'	149°	11
12	58°28'	-49'	145°	57°39'	-50'	146°	56°49'	-51'	146°	55°59'	-51'	147°	55°08'	-52'	148°	54°17'	-52'	149°	53°25'	-53'	150°	12
13	57°39'	-50'	146°	56°49'	-51'	147°	55°58'	-51'	147°	55°08'	-52'	148°	54°16'	-52'	149°	53°25'	-52'	150°	52°33'	-53'	150°	13
14	56°49'	-50'	147°	55°58'	-51'	148°	55°07'	-51'	148°	54°16'	-52'	149°	53°24'	-52'	150°	52°32'	-53'	150°	51°40'	-53'	151°	14
15	55°58'	-51'	148°	55°07'	-51'	149°	54°16'	-52'	149°	53°24'	-52'	150°	52°32'	-53'	151°	51°40'	-53'	151°	50°47'	-53'	152°	15
16	55°07'	-51'	149°	54°16'	-52'	149°	53°24'	-52'	150°	52°32'	-53'	151°	51°39'	-53'	151°	50°46'	-53'	152°	49°53'	-54'	153°	16
17	54°16'	-52'	150°	53°24'	-52'	150°	52°32'	-53'	151°	51°39'	-53'	152°	50°46'	-53'	152°	49°53'	-54'	153°	49°00'	-54'	153°	17
18	53°24'	-52'	150°	52°32'	-52'	151°	51°39'	-53'	152°	50°46'	-53'	152°	49°53'	-54'	153°	49°00'	-54'	153°	48°06'	-54'	154°	18
19	52°32'	-52'	151°	51°40'	-53'	152°	50°46'	-53'	152°	49°53'	-53'	153°	49°00'	-54'	154°	48°06'	-54'	154°	47°12'	-54'	155°	19
20	51°40'	-53'	152°	50°47'	-53'	153°	49°53'	-53'	153°	49°00'	-54'	154°	48°06'	-54'	154°	47°12'	-54'	155°	46°17'	-55'	155°	20
21	50°47'	-53'	153°	49°54'	-53'	153°	49°00'	-54'	154°	48°06'	-54'	154°	47°12'	-54'	155°	46°17'	-54'	155°	45°23'	-55'	156°	21
22	49°54'	-53'	154°	49°00'	-54'	154°	48°06'	-54'	155°	47°12'	-54'	155°	46°18'	-54'	156°	45°23'	-55'	156°	44°28'	-55'	156°	22
23	49°01'	-53'	154°	48°07'	-54'	155°	47°13'	-54'	155°	46°18'	-54'	156°	45°23'	-55'	156°	44°28'	-55'	157°	43°33'	-55'	157°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	68°07'	-40'	128°	67°29'	-41'	130°	66°49'	-43'	132°	66°08'	-44'	134°	65°26'	-45'	135°	64°43'	-46'	137°	63°59'	-47'	138°	0
1	67°27'	-41'	130°	66°47'	-42'	132°	66°06'	-44'	134°	65°24'	-45'	135°	64°41'	-46'	137°	63°57'	-47'	138°	63°12'	-48'	140°	1
2	66°46'	-42'	132°	66°05'	-44'	134°	65°23'	-45'	135°	64°39'	-46'	137°	63°55'	-47'	138°	63°10'	-48'	140°	62°24'	-49'	141°	2
3	66°04'	-43'	134°	65°21'	-45'	136°	64°38'	-46'	137°	63°54'	-47'	138°	63°08'	-48'	140°	62°22'	-49'	141°	61°35'	-49'	142°	3
4	65°20'	-45'	136°	64°37'	-46'	137°	63°52'	-47'	139°	63°07'	-48'	140°	62°20'	-48'	141°	61°33'	-49'	142°	60°46'	-50'	143°	4
5	64°36'	-45'	137°	63°51'	-46'	139°	63°06'	-47'	140°	62°19'	-48'	141°	61°32'	-49'	142°	60°44'	-50'	143°	59°56'	-50'	144°	5
6	63°50'	-46'	139°	63°05'	-47'	140°	62°18'	-48'	141°	61°31'	-49'	142°	60°43'	-50'	144°	59°54'	-50'	145°	59°05'	-51'	146°	6
7	63°04'	-47'	140°	62°17'	-48'	141°	61°30'	-49'	143°	60°42'	-50'	144°	59°53'	-50'	145°	59°04'	-51'	146°	58°14'	-51'	147°	7
8	62°17'	-48'	142°	61°29'	-49'	143°	60°41'	-49'	144°	59°52'	-50'	145°	59°03'	-51'	146°	58°13'	-51'	147°	57°23'	-52'	148°	8
9	61°29'	-49'	143°	60°41'	-49'	144°	59°52'	-50'	145°	59°02'	-51'	146°	58°12'	-51'	147°	57°22'	-52'	148°	56°31'	-52'	148°	9
10	60°40'	-49'	144°	59°51'	-50'	145°	59°02'	-51'	146°	58°12'	-51'	147°	57°21'	-52'	148°	56°30'	-52'	149°	55°39'	-53'	149°	10
11	59°51'	-50'	145°	59°01'	-50'	146°	58°11'	-51'	147°	57°21'	-52'	148°	56°30'	-52'	149°	55°38'	-52'	149°	54°46'	-53'	150°	11
12	59°01'	-50'	146°	58°11'	-51'	147°	57°20'	-51'	148°	56°29'	-52'	149°	55°38'	-52'	150°	54°46'	-53'	150°	53°53'	-53'	151°	12
13	58°11'	-51'	147°	57°20'	-51'	148°	56°29'	-52'	149°	55°37'	-52'	150°	54°45'	-53'	150°	53°53'	-53'	151°	53°00'	-54'	152°	13
14	57°20'	-51'	148°	56°29'	-52'	149°	55°37'	-52'	150°	54°45'	-53'	151°	53°52'	-53'	151°	53°00'	-53'	152°	52°07'	-54'	152°	14
15	56°29'	-52'	149°	55°37'	-52'	150°	54°45'	-53'	151°	53°52'	-53'	151°	52°59'	-53'	152°	52°06'	-54'	153°	51°13'	-54'	153°	15
16	55°37'	-52'	150°	54°45'	-53'	151°	53°52'	-53'	152°	52°59'	-53'	152°	52°06'	-54'	153°	51°13'	-54'	153°	50°19'	-54'	154°	16
17	54°45'	-52'	151°	53°52'	-53'	152°	52°59'	-53'	152°	52°06'	-54'	153°	51°12'	-54'	153°	50°19'	-54'	154°	49°25'	-54'	155°	17
18	53°52'	-53'	152°	52°59'	-53'	152°	52°06'	-53'	153°	51°12'	-54'	154°	50°19'	-54'	154°	49°24'	-54'	155°	48°30'	-55'	155°	18
19	53°00'	-53'	153°	52°06'	-53'	153°	51°13'	-54'	154°	50°19'	-54'	154°	49°24'	-54'	155°	48°30'	-55'	155°	47°35'	-55'	156°	19
20	52°07'	-53'	153°	51°13'	-54'	154°	50°19'	-54'	155°	49°25'	-54'	155°	48°30'	-55'	156°	47°35'	-55'	156°	46°40'	-55'	156°	20
21	51°13'	-54'	154°	50°19'	-54'	155°	49°25'	-54'	155°	48°30'	-54'	156°	47°35'	-55'	156°	46°41'	-55'	157°	45°45'	-55'	157°	21
22	50°20'	-54'	155°	49°25'	-54'	155°	48°31'	-54'	156°	47°36'	-55'	156°	46°41'	-55'	157°	45°45'	-55'	157°	44°50'	-55'	158°	22
23	49°26'	-54'	156°	48°31'	-54'	156°	47°36'	-55'	156°	46°41'	-55'	157°	45°46'	-55'	157°	44°50'	-55'	158°	43°55'	-56'	158°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

17° 343° LHA

Latitude CONTRARY to DECLINATION

17° 343° 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 CONTRARY to Declination

16° 344° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	68°52'	-41'	130°	68°12'	-42'	132°	67°31'	-44'	134°	66°49'	-45'	136°	66°06'	-46'	137°	65°21'	-47'	139°	64°36'	-48'	140°	0
1	68°11'	-42'	132°	67°30'	-44'	134°	66°47'	-45'	136°	66°04'	-46'	137°	65°19'	-47'	139°	64°34'	-48'	140°	63°47'	-49'	141°	1
2	67°28'	-44'	134°	66°46'	-45'	136°	66°03'	-46'	137°	65°18'	-47'	139°	64°32'	-48'	140°	63°46'	-49'	141°	62°58'	-50'	143°	2
3	66°45'	-45'	136°	66°01'	-46'	137°	65°17'	-47'	139°	64°31'	-48'	140°	63°44'	-49'	142°	62°57'	-49'	143°	62°09'	-50'	144°	3
4	66°00'	-46'	137°	65°15'	-47'	139°	64°30'	-48'	140°	63°43'	-49'	142°	62°56'	-49'	143°	62°07'	-50'	144°	61°19'	-51'	145°	4
5	65°14'	-47'	139°	64°29'	-48'	140°	63°42'	-48'	142°	62°55'	-49'	143°	62°06'	-50'	144°	61°17'	-51'	145°	60°28'	-51'	146°	5
6	64°28'	-47'	141°	63°41'	-48'	142°	62°54'	-49'	143°	62°05'	-50'	144°	61°16'	-51'	145°	60°27'	-51'	146°	59°37'	-52'	147°	6
7	63°40'	-48'	142°	62°53'	-49'	143°	62°04'	-50'	144°	61°15'	-50'	145°	60°26'	-51'	146°	59°35'	-52'	147°	58°45'	-52'	148°	7
8	62°52'	-49'	143°	62°04'	-50'	144°	61°15'	-50'	145°	60°25'	-51'	146°	59°35'	-52'	147°	58°44'	-52'	148°	57°53'	-53'	149°	8
9	62°03'	-50'	144°	61°14'	-50'	146°	60°24'	-51'	147°	59°34'	-51'	147°	58°43'	-52'	148°	57°52'	-53'	149°	57°00'	-53'	150°	9
10	61°14'	-50'	146°	60°24'	-51'	147°	59°33'	-51'	148°	58°42'	-52'	148°	57°51'	-52'	149°	56°59'	-53'	150°	56°07'	-53'	151°	10
11	60°23'	-51'	147°	59°33'	-51'	148°	58°42'	-52'	149°	57°51'	-52'	149°	56°59'	-53'	150°	56°06'	-53'	151°	55°14'	-54'	152°	11
12	59°33'	-51'	148°	58°42'	-52'	149°	57°50'	-52'	150°	56°58'	-53'	150°	56°06'	-53'	151°	55°13'	-54'	152°	54°20'	-54'	152°	12
13	58°41'	-52'	149°	57°50'	-52'	150°	56°58'	-53'	150°	56°05'	-53'	151°	55°13'	-53'	152°	54°20'	-54'	153°	53°26'	-54'	153°	13
14	57°50'	-52'	150°	56°58'	-53'	151°	56°05'	-53'	151°	55°12'	-53'	152°	54°19'	-54'	153°	53°26'	-54'	153°	52°32'	-54'	154°	14
15	56°58'	-52'	151°	56°05'	-53'	151°	55°12'	-53'	152°	54°19'	-54'	153°	53°26'	-54'	153°	52°32'	-54'	154°	51°38'	-55'	155°	15
16	56°05'	-53'	152°	55°12'	-53'	152°	54°19'	-54'	153°	53°25'	-54'	154°	52°32'	-54'	154°	51°37'	-55'	155°	50°43'	-55'	155°	16
17	55°12'	-53'	152°	54°19'	-54'	153°	53°25'	-54'	154°	52°31'	-54'	154°	51°37'	-55'	155°	50°43'	-55'	155°	49°48'	-55'	156°	17
18	54°19'	-53'	153°	53°26'	-54'	154°	52°32'	-54'	154°	51°37'	-54'	155°	50°43'	-55'	156°	49°48'	-55'	156°	48°53'	-55'	157°	18
19	53°26'	-54'	154°	52°32'	-54'	155°	51°37'	-54'	155°	50°43'	-55'	156°	49°48'	-55'	156°	48°53'	-55'	157°	47°58'	-55'	157°	19
20	52°32'	-54'	155°	51°38'	-54'	155°	50°43'	-55'	156°	49°48'	-55'	156°	48°53'	-55'	157°	47°58'	-55'	157°	47°02'	-56'	158°	20
21	51°38'	-54'	156°	50°43'	-55'	156°	49°48'	-55'	157°	48°53'	-55'	157°	47°58'	-55'	157°	47°02'	-56'	158°	46°07'	-56'	158°	21
22	50°44'	-54'	156°	49°49'	-55'	157°	48°54'	-55'	157°	47°58'	-55'	158°	47°03'	-55'	158°	46°07'	-56'	158°	45°11'	-56'	159°	22
23	<u>49°49'</u>	<u>-55'</u>	<u>157°</u>	<u>48°54'</u>	<u>-55'</u>	<u>157°</u>	<u>47°59'</u>	<u>-55'</u>	<u>158°</u>	<u>47°03'</u>	<u>-55'</u>	<u>158°</u>	<u>46°07'</u>	<u>-56'</u>	<u>159°</u>	<u>45°11'</u>	<u>-56'</u>	<u>159°</u>	<u>44°15'</u>	<u>-56'</u>	<u>159°</u>	23

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	69°36'	-42'	132°	68°55'	-44'	134°	68°12'	-45'	136°	67°29'	-46'	137°	66°44'	-47'	139°	65°58'	-48'	141°	65°11'	-49'	142°	0
1	68°53'	-44'	134°	68°11'	-45'	136°	67°27'	-46'	138°	66°42'	-47'	139°	65°56'	-48'	141°	65°10'	-49'	142°	64°22'	-50'	143°	1
2	68°10'	-45'	136°	67°26'	-46'	138°	66°41'	-47'	139°	65°55'	-48'	141°	65°08'	-49'	142°	64°20'	-50'	143°	63°32'	-51'	145°	2
3	67°25'	-46'	138°	66°40'	-47'	139°	65°54'	-48'	141°	65°07'	-49'	142°	64°19'	-50'	143°	63°31'	-50'	145°	62°41'	-51'	146°	3
4	66°39'	-47'	139°	65°53'	-48'	141°	65°06'	-49'	142°	64°18'	-50'	143°	63°29'	-50'	145°	62°40'	-51'	146°	61°50'	-52'	147°	4
5	65°52'	-48'	141°	65°05'	-49'	142°	64°17'	-50'	144°	63°28'	-50'	145°	62°39'	-51'	146°	61°49'	-52'	147°	60°59'	-52'	148°	5
6	65°04'	-49'	142°	64°16'	-49'	144°	63°27'	-50'	145°	62°38'	-51'	146°	61°48'	-51'	147°	60°57'	-52'	148°	60°06'	-53'	149°	6
7	64°16'	-49'	144°	63°27'	-50'	145°	62°37'	-51'	146°	61°47'	-51'	147°	60°57'	-52'	148°	60°05'	-52'	149°	59°14'	-53'	150°	7
8	63°26'	-50'	145°	62°37'	-51'	146°	61°47'	-51'	147°	60°56'	-52'	148°	60°05'	-52'	149°	59°13'	-53'	150°	58°21'	-53'	151°	8
9	62°36'	-51'	146°	61°46'	-51'	147°	60°55'	-52'	148°	60°04'	-52'	149°	59°12'	-53'	150°	58°20'	-53'	151°	57°27'	-54'	152°	9
10	61°46'	-51'	147°	60°55'	-52'	148°	60°04'	-52'	149°	59°12'	-53'	150°	58°19'	-53'	151°	57°27'	-54'	152°	56°34'	-54'	152°	10
11	60°55'	-52'	148°	60°03'	-52'	149°	59°11'	-53'	150°	58°19'	-53'	151°	57°26'	-54'	152°	56°33'	-54'	153°	55°40'	-54'	153°	11
12	60°03'	-52'	150°	59°11'	-53'	150°	58°19'	-53'	151°	57°26'	-53'	152°	56°33'	-54'	153°	55°39'	-54'	153°	54°46'	-55'	154°	12
13	59°11'	-53'	151°	58°18'	-53'	151°	57°26'	-53'	152°	56°32'	-54'	153°	55°39'	-54'	153°	54°45'	-54'	154°	53°51'	-55'	155°	13
14	58°18'	-53'	151°	57°25'	-53'	152°	56°32'	-54'	153°	55°39'	-54'	154°	54°45'	-54'	154°	53°51'	-55'	155°	52°56'	-55'	155°	14
15	57°25'	-53'	152°	56°32'	-54'	153°	55°39'	-54'	154°	54°45'	-54'	154°	53°50'	-55'	155°	52°56'	-55'	155°	52°01'	-55'	156°	15
16	56°32'	-54'	153°	55°39'	-54'	154°	54°45'	-54'	154°	53°50'	-55'	155°	52°56'	-55'	156°	52°01'	-55'	156°	51°06'	-55'	157°	16
17	55°39'	-54'	154°	54°45'	-54'	155°	53°50'	-55'	155°	52°56'	-55'	156°	52°01'	-55'	156°	51°06'	-55'	157°	50°11'	-56'	157°	17
18	54°45'	-54'	155°	53°50'	-54'	155°	52°56'	-55'	156°	52°01'	-55'	156°	51°06'	-55'	157°	50°10'	-56'	157°	49°15'	-56'	158°	18
19	53°51'	-54'	155°	52°56'	-55'	156°	52°01'	-55'	157°	51°06'	-55'	157°	50°10'	-55'	158°	49°15'	-56'	158°	48°19'	-56'	158°	19
20	52°56'	-55'	156°	52°01'	-55'	157°	51°06'	-55'	157°	50°11'	-55'	158°	49°15'	-56'	158°	48°19'	-56'	159°	47°23'	-56'	159°	20
21	52°02'	-55'	157°	51°06'	-55'	157°	50°11'	-55'	158°	49°15'	-56'	158°	48°19'	-56'	159°	47°23'	-56'	159°	46°27'	-56'	159°	21
22	51°07'	-55'	158°	50°11'	-55'	158°	49°15'	-56'	158°	48°20'	-56'	159°	47°23'	-56'	159°	46°27'	-56'	160°	45°31'	-56'	160°	22
23	<u>50°12'</u>	<u>-55'</u>	<u>158°</u>	<u>49°16'</u>	<u>-56'</u>	<u>159°</u>	<u>48°20'</u>	<u>-56'</u>	<u>159°</u>	<u>47°24'</u>	<u>-56'</u>	<u>159°</u>	<u>46°28'</u>	<u>-56'</u>	<u>160°</u>	<u>45°31'</u>	<u>-56'</u>	<u>160°</u>	<u>44°35'</u>	<u>-56'</u>	<u>160°</u>	23

15° 345° LHA

Latitude CONTRARY to DECLINATION

15° 345° LHA

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

14° 346° LHA

Latitude CONTRARY to Declination

14° 346° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	70°18'	-44'	134°	69°36'	-45'	136°	68°52'	-46'	138°	68°07'	-48'	140°	67°20'	-49'	141°	66°33'	-49'	143°	65°45'	-50'	144°	0
1	69°34'	-45'	136°	68°50'	-46'	138°	68°05'	-47'	140°	67°19'	-48'	141°	66°32'	-49'	143°	65°44'	-50'	144°	64°55'	-51'	145°	1
2	68°49'	-46'	138°	68°04'	-47'	140°	67°18'	-48'	141°	66°31'	-49'	143°	65°42'	-50'	144°	64°54'	-51'	145°	64°04'	-52'	146°	2
3	68°03'	-47'	140°	67°17'	-48'	141°	66°30'	-49'	143°	65°41'	-50'	144°	64°52'	-51'	145°	64°03'	-51'	146°	63°12'	-52'	148°	3
4	67°16'	-48'	141°	66°29'	-49'	143°	65°40'	-50'	144°	64°51'	-51'	145°	64°02'	-51'	147°	63°11'	-52'	148°	62°20'	-53'	149°	4
5	66°28'	-49'	143°	65°40'	-50'	144°	64°50'	-51'	145°	64°01'	-51'	147°	63°10'	-52'	148°	62°19'	-52'	149°	61°28'	-53'	150°	5
6	65°39'	-50'	144°	64°50'	-50'	146°	64°00'	-51'	147°	63°09'	-52'	148°	62°18'	-52'	149°	61°27'	-53'	150°	60°35'	-53'	151°	6
7	64°49'	-50'	146°	63°59'	-51'	147°	63°09'	-52'	148°	62°18'	-52'	149°	61°26'	-53'	150°	60°34'	-53'	151°	59°41'	-54'	152°	7
8	63°59'	-51'	147°	63°08'	-52'	148°	62°17'	-52'	149°	61°25'	-53'	150°	60°33'	-53'	151°	59°41'	-54'	152°	58°48'	-54'	152°	8
9	63°08'	-52'	148°	62°17'	-52'	149°	61°25'	-53'	150°	60°33'	-53'	151°	59°40'	-54'	152°	58°47'	-54'	153°	57°54'	-54'	153°	9
10	62°16'	-52'	149°	61°24'	-53'	150°	60°32'	-53'	151°	59°40'	-54'	152°	58°46'	-54'	153°	57°53'	-54'	153°	56°59'	-55'	154°	10
11	61°24'	-53'	150°	60°32'	-53'	151°	59°39'	-53'	152°	58°46'	-54'	153°	57°52'	-54'	153°	56°59'	-55'	154°	56°04'	-55'	155°	11
12	60°32'	-53'	151°	59°39'	-53'	152°	58°46'	-54'	153°	57°52'	-54'	154°	56°58'	-55'	154°	56°04'	-55'	155°	55°10'	-55'	156°	12
13	59°39'	-53'	152°	58°46'	-54'	153°	57°52'	-54'	154°	56°58'	-54'	154°	56°04'	-55'	155°	55°09'	-55'	156°	54°14'	-55'	156°	13
14	58°45'	-54'	153°	57°52'	-54'	154°	56°58'	-54'	154°	56°03'	-55'	155°	55°09'	-55'	156°	54°14'	-55'	156°	53°19'	-56'	157°	14
15	57°52'	-54'	154°	56°58'	-54'	155°	56°03'	-55'	155°	55°09'	-55'	156°	54°14'	-55'	156°	53°19'	-56'	157°	52°23'	-56'	157°	15
16	56°58'	-54'	155°	56°03'	-55'	155°	55°09'	-55'	156°	54°14'	-55'	157°	53°19'	-55'	157°	52°23'	-56'	158°	51°28'	-56'	158°	16
17	56°03'	-55'	156°	55°09'	-55'	156°	54°14'	-55'	157°	53°19'	-55'	157°	52°23'	-56'	158°	51°28'	-56'	158°	50°32'	-56'	159°	17
18	55°09'	-55'	156°	54°14'	-55'	157°	53°19'	-55'	157°	52°23'	-56'	158°	51°27'	-56'	158°	50°32'	-56'	159°	49°36'	-56'	159°	18
19	54°14'	-55'	157°	53°19'	-55'	157°	52°23'	-56'	158°	51°28'	-56'	158°	50°32'	-56'	159°	49°36'	-56'	159°	48°39'	-56'	160°	19
20	53°19'	-55'	158°	52°23'	-56'	158°	51°28'	-56'	159°	50°32'	-56'	159°	49°36'	-56'	160°	48°39'	-56'	160°	47°43'	-57'	160°	20
21	52°24'	-55'	158°	51°28'	-56'	159°	50°32'	-56'	159°	49°36'	-56'	160°	48°39'	-56'	160°	47°43'	-56'	160°	46°46'	-57'	161°	21
22	51°28'	-56'	159°	50°32'	-56'	159°	49°36'	-56'	160°	48°40'	-56'	160°	47°43'	-56'	161°	46°46'	-57'	161°	45°50'	-57'	161°	22
23	<u>50°33'</u>	<u>-56'</u>	<u>159°</u>	<u>49°36'</u>	<u>-56'</u>	<u>160°</u>	<u>48°40'</u>	<u>-56'</u>	<u>160°</u>	<u>47°43'</u>	<u>-56'</u>	<u>161°</u>	<u>46°47'</u>	<u>-57'</u>	<u>161°</u>	<u>45°50'</u>	<u>-57'</u>	<u>161°</u>	<u>44°53'</u>	<u>-57'</u>	<u>162°</u>	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

14° 346° LHA

Latitude CONTRARY to DECLINATION

14° 346° LHA

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

13° 347° LHA

Latitude CONTRARY to Declination

13° 347° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	70°59'	-45'	136°	70°15'	-47'	138°	69°30'	-48'	140°	68°43'	-49'	142°	67°55'	-50'	143°	67°07'	-51'	145°	66°18'	-51'	146°	0
1	70°14'	-46'	138°	69°28'	-48'	140°	68°42'	-49'	142°	67°54'	-50'	143°	67°06'	-50'	145°	66°16'	-51'	146°	65°26'	-52'	147°	1
2	69°27'	-48'	140°	68°41'	-49'	142°	67°53'	-50'	143°	67°05'	-50'	145°	66°15'	-51'	146°	65°25'	-52'	147°	64°34'	-52'	148°	2
3	68°40'	-48'	142°	67°52'	-49'	143°	67°04'	-50'	145°	66°14'	-51'	146°	65°24'	-52'	147°	64°33'	-52'	148°	63°42'	-53'	150°	3
4	67°51'	-49'	143°	67°03'	-50'	145°	66°13'	-51'	146°	65°23'	-52'	147°	64°32'	-52'	149°	63°41'	-53'	150°	62°49'	-53'	151°	4
5	67°02'	-50'	145°	66°13'	-51'	146°	65°22'	-52'	147°	64°31'	-52'	149°	63°40'	-53'	150°	62°48'	-53'	151°	61°55'	-54'	152°	5
6	66°12'	-51'	146°	65°22'	-52'	148°	64°31'	-52'	149°	63°39'	-53'	150°	62°47'	-53'	151°	61°55'	-54'	152°	61°02'	-54'	152°	6
7	65°21'	-51'	148°	64°30'	-52'	149°	63°39'	-53'	150°	62°47'	-53'	151°	61°54'	-54'	152°	61°01'	-54'	153°	60°07'	-54'	153°	7
8	64°30'	-52'	149°	63°38'	-53'	150°	62°46'	-53'	151°	61°53'	-54'	152°	61°00'	-54'	153°	60°07'	-54'	153°	59°13'	-55'	154°	8
9	63°38'	-53'	150°	62°46'	-53'	151°	61°53'	-54'	152°	61°00'	-54'	153°	60°06'	-54'	154°	59°12'	-55'	154°	58°18'	-55'	155°	9
10	62°45'	-53'	151°	61°53'	-53'	152°	60°59'	-54'	153°	60°06'	-54'	154°	59°12'	-55'	154°	58°18'	-55'	155°	57°23'	-55'	156°	10
11	61°52'	-53'	152°	60°59'	-54'	153°	60°05'	-54'	154°	59°12'	-55'	154°	58°17'	-55'	155°	57°23'	-55'	156°	56°28'	-56'	156°	11
12	60°59'	-54'	153°	60°05'	-54'	154°	59°11'	-55'	155°	58°17'	-55'	155°	57°22'	-55'	156°	56°27'	-55'	157°	55°32'	-56'	157°	12
13	60°05'	-54'	154°	59°11'	-54'	155°	58°17'	-55'	155°	57°22'	-55'	156°	56°27'	-55'	157°	55°32'	-56'	157°	54°36'	-56'	158°	13
14	59°11'	-54'	155°	58°17'	-55'	155°	57°22'	-55'	156°	56°27'	-55'	157°	55°32'	-56'	157°	54°36'	-56'	158°	53°40'	-56'	158°	14
15	58°17'	-55'	156°	57°22'	-55'	156°	56°27'	-55'	157°	55°31'	-56'	157°	54°36'	-56'	158°	53°40'	-56'	158°	52°44'	-56'	159°	15
16	57°22'	-55'	156°	56°27'	-55'	157°	55°31'	-56'	158°	54°36'	-56'	158°	53°40'	-56'	159°	52°44'	-56'	159°	51°48'	-56'	160°	16
17	56°27'	-55'	157°	55°31'	-56'	158°	54°36'	-56'	158°	53°40'	-56'	159°	52°44'	-56'	159°	51°48'	-56'	160°	50°52'	-57'	160°	17
18	55°32'	-55'	158°	54°36'	-56'	158°	53°40'	-56'	159°	52°44'	-56'	159°	51°48'	-56'	160°	50°52'	-57'	160°	49°55'	-57'	161°	18
19	54°36'	-56'	158°	53°40'	-56'	159°	52°44'	-56'	159°	51°48'	-56'	160°	50°52'	-57'	160°	49°55'	-57'	161°	48°58'	-57'	161°	19
20	53°40'	-56'	159°	52°44'	-56'	160°	51°48'	-56'	160°	50°52'	-56'	160°	49°55'	-57'	161°	48°58'	-57'	161°	48°01'	-57'	162°	20
21	52°45'	-56'	160°	51°48'	-56'	160°	50°52'	-56'	161°	49°55'	-57'	161°	48°58'	-57'	161°	48°01'	-57'	162°	47°04'	-57'	162°	21
22	51°49'	-56'	160°	50°52'	-56'	161°	49°55'	-57'	161°	48°58'	-57'	161°	48°02'	-57'	162°	47°04'	-57'	162°	46°07'	-57'	162°	22
23	<u>50°52'</u>	<u>-56'</u>	<u>161°</u>	<u>49°56'</u>	<u>-57'</u>	<u>161°</u>	<u>48°59'</u>	<u>-57'</u>	<u>162°</u>	<u>48°02'</u>	<u>-57'</u>	<u>162°</u>	<u>47°05'</u>	<u>-57'</u>	<u>162°</u>	<u>46°07'</u>	<u>-57'</u>	<u>163°</u>	<u>45°10'</u>	<u>-57'</u>	<u>163°</u>	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

13° 347° LHA

Latitude CONTRARY to DECLINATION

13° 347° LHA

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

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

12° 348° LHA

Latitude CONTRARY to Declination

12° 348° LHA

Table with 12 columns (Dec°, 14, 15, 16, 17, 18, 19, 20, Dec°) and 24 rows. Each column from 14 to 20 contains three sub-columns: Hc°, d', Z°. The last column contains Dec° values from 0 to 23.

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

Table with 12 columns (Dec°, 14, 15, 16, 17, 18, 19, 20, Dec°) and 24 rows. Each column from 14 to 20 contains three sub-columns: Hc°, d', Z°. The last column contains Dec° values from 0 to 23.

11° 349° LHA

Latitude CONTRARY to DECLINATION

11° 349° LHA

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

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

10° 350° LHA

Latitude CONTRARY to Declination

10° 350° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	72°51'	-50'	144°	72°02'	-51'	146°	71°12'	-52'	147°	70°21'	-53'	149°	69°29'	-53'	150°	68°37'	-54'	152°	67°44'	-54'	153°	0
1	72°01'	-51'	146°	71°11'	-52'	147°	70°20'	-52'	149°	69°29'	-53'	150°	68°36'	-54'	152°	67°43'	-54'	153°	66°49'	-55'	154°	1
2	71°11'	-52'	147°	70°20'	-52'	149°	69°28'	-53'	150°	68°35'	-54'	152°	67°42'	-54'	153°	66°49'	-55'	154°	65°55'	-55'	155°	2
3	70°19'	-52'	149°	69°27'	-53'	150°	68°35'	-54'	152°	67°42'	-54'	153°	66°48'	-55'	154°	65°54'	-55'	155°	65°00'	-56'	156°	3
4	69°27'	-53'	150°	68°34'	-54'	152°	67°41'	-54'	153°	66°48'	-55'	154°	65°53'	-55'	155°	64°59'	-55'	156°	64°04'	-56'	157°	4
5	68°34'	-54'	152°	67°41'	-54'	153°	66°47'	-55'	154°	65°53'	-55'	155°	64°58'	-55'	156°	64°03'	-56'	157°	63°08'	-56'	157°	5
6	67°40'	-54'	153°	66°47'	-55'	154°	65°53'	-55'	155°	64°58'	-55'	156°	64°03'	-56'	157°	63°08'	-56'	158°	62°12'	-56'	158°	6
7	66°46'	-54'	154°	65°52'	-55'	155°	64°58'	-55'	156°	64°03'	-56'	157°	63°07'	-56'	158°	62°12'	-56'	158°	61°16'	-57'	159°	7
8	65°52'	-55'	155°	64°57'	-55'	156°	64°02'	-56'	157°	63°07'	-56'	158°	62°11'	-56'	158°	61°15'	-57'	159°	60°19'	-57'	160°	8
9	64°57'	-55'	156°	64°02'	-56'	157°	63°07'	-56'	158°	62°11'	-56'	158°	61°15'	-56'	159°	60°19'	-57'	160°	59°22'	-57'	160°	9
10	64°02'	-56'	157°	63°06'	-56'	158°	62°11'	-56'	159°	61°15'	-56'	159°	60°19'	-57'	160°	59°22'	-57'	160°	58°26'	-57'	161°	10
11	63°06'	-56'	158°	62°11'	-56'	159°	61°15'	-56'	159°	60°18'	-57'	160°	59°22'	-57'	160°	58°25'	-57'	161°	57°28'	-57'	162°	11
12	62°10'	-56'	159°	61°14'	-56'	159°	60°18'	-57'	160°	59°22'	-57'	161°	58°25'	-57'	161°	57°28'	-57'	162°	56°31'	-57'	162°	12
13	61°14'	-56'	159°	60°18'	-57'	160°	59°22'	-57'	161°	58°25'	-57'	161°	57°28'	-57'	162°	56°31'	-57'	162°	55°34'	-58'	163°	13
14	60°18'	-57'	160°	59°22'	-57'	161°	58°25'	-57'	161°	57°28'	-57'	162°	56°31'	-57'	162°	55°34'	-57'	163°	54°36'	-58'	163°	14
15	59°22'	-57'	161°	58°25'	-57'	161°	57°28'	-57'	162°	56°31'	-57'	162°	55°34'	-57'	163°	54°36'	-58'	163°	53°39'	-58'	164°	15
16	58°25'	-57'	161°	57°28'	-57'	162°	56°31'	-57'	162°	55°34'	-57'	163°	54°36'	-58'	163°	53°39'	-58'	164°	52°41'	-58'	164°	16
17	57°28'	-57'	162°	56°31'	-57'	162°	55°34'	-57'	163°	54°36'	-58'	163°	53°39'	-58'	164°	52°41'	-58'	164°	51°43'	-58'	164°	17
18	56°31'	-57'	163°	55°34'	-57'	163°	54°36'	-58'	163°	53°39'	-58'	164°	52°41'	-58'	164°	51°43'	-58'	165°	50°45'	-58'	165°	18
19	55°34'	-57'	163°	54°36'	-57'	164°	53°39'	-58'	164°	52°41'	-58'	164°	51°43'	-58'	165°	50°45'	-58'	165°	49°47'	-58'	165°	19
20	54°36'	-57'	164°	53°39'	-58'	164°	52°41'	-58'	164°	51°43'	-58'	165°	50°45'	-58'	165°	49°47'	-58'	165°	48°49'	-58'	166°	20
21	53°39'	-58'	164°	52°41'	-58'	164°	51°43'	-58'	165°	50°45'	-58'	165°	49°47'	-58'	165°	48°49'	-58'	166°	47°51'	-58'	166°	21
22	52°41'	-58'	165°	51°43'	-58'	165°	50°45'	-58'	165°	49°47'	-58'	166°	48°49'	-58'	166°	47°51'	-58'	166°	46°53'	-58'	166°	22
23	<u>51°44'</u>	<u>-58'</u>	<u>165°</u>	<u>50°46'</u>	<u>-58'</u>	<u>165°</u>	<u>49°48'</u>	<u>-58'</u>	<u>166°</u>	<u>48°49'</u>	<u>-58'</u>	<u>166°</u>	<u>47°51'</u>	<u>-58'</u>	<u>166°</u>	<u>46°53'</u>	<u>-58'</u>	<u>166°</u>	<u>45°54'</u>	<u>-58'</u>	<u>167°</u>	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	73°24'	-51'	147°	72°34'	-52'	149°	71°42'	-53'	150°	70°50'	-54'	152°	69°57'	-54'	153°	69°03'	-55'	154°	68°09'	-55'	155°	0
1	72°33'	-52'	149°	71°41'	-53'	150°	70°49'	-54'	152°	69°56'	-54'	153°	69°02'	-55'	154°	68°08'	-55'	155°	67°13'	-56'	156°	1
2	71°41'	-53'	150°	70°48'	-54'	152°	69°55'	-54'	153°	69°02'	-55'	154°	68°07'	-55'	155°	67°13'	-56'	156°	66°18'	-56'	157°	2
3	70°48'	-54'	152°	69°55'	-54'	153°	69°01'	-55'	154°	68°07'	-55'	155°	67°12'	-56'	156°	66°17'	-56'	157°	65°22'	-56'	158°	3
4	69°54'	-54'	153°	69°01'	-55'	154°	68°06'	-55'	155°	67°12'	-56'	156°	66°17'	-56'	157°	65°21'	-56'	158°	64°25'	-57'	159°	4
5	69°00'	-55'	154°	68°06'	-55'	155°	67°11'	-55'	156°	66°16'	-56'	157°	65°21'	-56'	158°	64°25'	-56'	159°	63°29'	-57'	160°	5
6	68°06'	-55'	155°	67°11'	-55'	156°	66°16'	-56'	157°	65°20'	-56'	158°	64°25'	-56'	159°	63°28'	-57'	160°	62°32'	-57'	160°	6
7	67°11'	-55'	156°	66°16'	-56'	157°	65°20'	-56'	158°	64°24'	-56'	159°	63°28'	-57'	160°	62°32'	-57'	160°	61°35'	-57'	161°	7
8	66°15'	-56'	157°	65°20'	-56'	158°	64°24'	-56'	159°	63°28'	-57'	160°	62°31'	-57'	161°	61°35'	-57'	161°	60°38'	-57'	162°	8
9	65°20'	-56'	158°	64°24'	-56'	159°	63°28'	-57'	160°	62°31'	-57'	160°	61°35'	-57'	161°	60°38'	-57'	162°	59°41'	-57'	162°	9
10	64°24'	-56'	159°	63°27'	-57'	160°	62°31'	-57'	160°	61°34'	-57'	161°	60°37'	-57'	162°	59°40'	-57'	162°	58°43'	-58'	163°	10
11	63°27'	-57'	160°	62°31'	-57'	161°	61°34'	-57'	161°	60°37'	-57'	162°	59°40'	-57'	162°	58°43'	-58'	163°	57°46'	-58'	163°	11
12	62°31'	-57'	161°	61°34'	-57'	161°	60°37'	-57'	162°	59°40'	-57'	162°	58°43'	-58'	163°	57°45'	-58'	163°	56°48'	-58'	164°	12
13	61°34'	-57'	161°	60°37'	-57'	162°	59°40'	-57'	162°	58°43'	-58'	163°	57°45'	-58'	163°	56°48'	-58'	164°	55°50'	-58'	164°	13
14	60°37'	-57'	162°	59°40'	-57'	163°	58°43'	-58'	163°	57°45'	-58'	163°	56°48'	-58'	164°	55°50'	-58'	164°	54°52'	-58'	165°	14
15	59°40'	-57'	163°	58°43'	-57'	163°	57°45'	-58'	164°	56°47'	-58'	164°	55°50'	-58'	164°	54°52'	-58'	165°	53°54'	-58'	165°	15
16	58°43'	-57'	163°	57°45'	-58'	164°	56°47'	-58'	164°	55°50'	-58'	164°	54°52'	-58'	165°	53°54'	-58'	165°	52°56'	-58'	166°	16
17	57°45'	-58'	164°	56°47'	-58'	164°	55°50'	-58'	165°	54°52'	-58'	165°	53°54'	-58'	165°	52°56'	-58'	166°	51°58'	-58'	166°	17
18	56°48'	-58'	164°	55°50'	-58'	165°	54°52'	-58'	165°	53°54'	-58'	165°	52°56'	-58'	166°	51°58'	-58'	166°	50°59'	-58'	166°	18
19	55°50'	-58'	165°	54°52'	-58'	165°	53°54'	-58'	165°	52°56'	-58'	166°	51°58'	-58'	166°	50°59'	-58'	166°	50°01'	-58'	167°	19
20	54°52'	-58'	165°	53°54'	-58'	166°	52°56'	-58'	166°	51°58'	-58'	166°	50°59'	-58'	166°	50°01'	-58'	167°	49°02'	-59'	167°	20
21	53°54'	-58'	166°	52°56'	-58'	166°	51°58'	-58'	166°	50°59'	-58'	167°	50°01'	-58'	167°	49°02'	-58'	167°	48°04'	-59'	167°	21
22	52°56'	-58'	166°	51°58'	-58'	166°	50°59'	-58'	167°	50°01'	-58'	167°	49°03'	-58'	167°	48°04'	-59'	167°	47°05'	-59'	168°	22
23	<u>51°58'</u>	<u>-58'</u>	<u>166°</u>	<u>51°00'</u>	<u>-58'</u>	<u>167°</u>	<u>50°01'</u>	<u>-58'</u>	<u>167°</u>	<u>49°03'</u>	<u>-58'</u>	<u>167°</u>	<u>48°04'</u>	<u>-59'</u>	<u>168°</u>	<u>47°05'</u>	<u>-59'</u>	<u>168°</u>	<u>46°07'</u>	<u>-59'</u>	<u>168°</u>	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

9° 351° LHA

Latitude CONTRARY to DECLINATION

9° 351° LHA

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

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

8° 352° LHA

Latitude CONTRARY to Declination

8° 352° LHA

Dec°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	73°55'	-53'	150°	73°03'	-54'	151°	72°09'	-54'	153°	71°16'	-55'	154°	70°21'	-55'	156°	69°27'	-56'	157°	68°31'	-56'	158°	0
1	73°02'	-54'	152°	72°09'	-54'	153°	71°15'	-55'	154°	70°21'	-55'	156°	69°26'	-56'	157°	68°31'	-56'	158°	67°35'	-57'	159°	1
2	72°09'	-54'	153°	71°15'	-55'	154°	70°20'	-55'	156°	69°26'	-56'	157°	68°30'	-56'	158°	67°35'	-56'	159°	66°39'	-57'	159°	2
3	71°14'	-55'	154°	70°20'	-55'	156°	69°25'	-56'	157°	68°30'	-56'	158°	67°34'	-56'	159°	66°38'	-57'	159°	65°42'	-57'	160°	3
4	70°20'	-55'	156°	69°25'	-56'	157°	68°29'	-56'	158°	67°34'	-56'	159°	66°38'	-57'	160°	65°41'	-57'	160°	64°45'	-57'	161°	4
5	69°25'	-56'	157°	68°29'	-56'	158°	67°33'	-56'	159°	66°37'	-57'	160°	65°41'	-57'	160°	64°44'	-57'	161°	63°48'	-57'	162°	5
6	68°29'	-56'	158°	67°33'	-56'	159°	66°37'	-57'	160°	65°41'	-57'	160°	64°44'	-57'	161°	63°47'	-57'	162°	62°50'	-58'	162°	6
7	67°33'	-56'	159°	66°37'	-57'	160°	65°40'	-57'	160°	64°44'	-57'	161°	63°47'	-57'	162°	62°50'	-58'	162°	61°53'	-58'	163°	7
8	66°37'	-57'	160°	65°40'	-57'	160°	64°44'	-57'	161°	63°47'	-57'	162°	62°50'	-58'	162°	61°52'	-58'	163°	60°55'	-58'	164°	8
9	65°40'	-57'	161°	64°43'	-57'	161°	63°47'	-57'	162°	62°49'	-57'	162°	61°52'	-58'	163°	60°55'	-58'	164°	59°57'	-58'	164°	9
10	64°43'	-57'	161°	63°46'	-57'	162°	62°49'	-57'	163°	61°52'	-58'	163°	60°54'	-58'	164°	59°57'	-58'	164°	58°59'	-58'	165°	10
11	63°46'	-57'	162°	62°49'	-57'	163°	61°52'	-58'	163°	60°54'	-58'	164°	59°57'	-58'	164°	58°59'	-58'	165°	58°01'	-58'	165°	11
12	62°49'	-57'	163°	61°52'	-58'	163°	60°54'	-58'	164°	59°57'	-58'	164°	58°59'	-58'	165°	58°01'	-58'	165°	57°03'	-58'	166°	12
13	61°52'	-58'	163°	60°54'	-58'	164°	59°56'	-58'	164°	58°59'	-58'	165°	58°01'	-58'	165°	57°03'	-58'	166°	56°04'	-58'	166°	13
14	60°54'	-58'	164°	59°56'	-58'	164°	58°59'	-58'	165°	58°01'	-58'	165°	57°03'	-58'	166°	56°04'	-58'	166°	55°06'	-58'	166°	14
15	59°56'	-58'	164°	58°59'	-58'	165°	58°01'	-58'	165°	57°02'	-58'	166°	56°04'	-58'	166°	55°06'	-58'	166°	54°08'	-59'	167°	15
16	58°59'	-58'	165°	58°01'	-58'	165°	57°02'	-58'	166°	56°04'	-58'	166°	55°06'	-58'	166°	54°08'	-59'	167°	53°09'	-59'	167°	16
17	58°01'	-58'	165°	57°02'	-58'	166°	56°04'	-58'	166°	55°06'	-58'	167°	54°08'	-58'	167°	53°09'	-59'	167°	52°11'	-59'	167°	17
18	57°03'	-58'	166°	56°04'	-58'	166°	55°06'	-58'	167°	54°08'	-58'	167°	53°09'	-59'	167°	52°10'	-59'	168°	51°12'	-59'	168°	18
19	56°04'	-58'	166°	55°06'	-58'	167°	54°08'	-58'	167°	53°09'	-59'	167°	52°10'	-59'	168°	51°12'	-59'	168°	50°13'	-59'	168°	19
20	55°06'	-58'	167°	54°08'	-58'	167°	53°09'	-59'	167°	52°11'	-59'	168°	51°12'	-59'	168°	50°13'	-59'	168°	49°14'	-59'	168°	20
21	54°08'	-58'	167°	53°09'	-59'	167°	52°11'	-59'	168°	51°12'	-59'	168°	50°13'	-59'	168°	49°14'	-59'	169°	48°16'	-59'	169°	21
22	53°09'	-58'	168°	52°11'	-59'	168°	51°12'	-59'	168°	50°13'	-59'	168°	49°14'	-59'	169°	48°16'	-59'	169°	47°17'	-59'	169°	22
23	<u>52°11'</u>	<u>-59'</u>	<u>168°</u>	<u>51°12'</u>	<u>-59'</u>	<u>168°</u>	<u>50°13'</u>	<u>-59'</u>	<u>168°</u>	<u>49°15'</u>	<u>-59'</u>	<u>169°</u>	<u>48°16'</u>	<u>-59'</u>	<u>169°</u>	<u>47°17'</u>	<u>-59'</u>	<u>169°</u>	<u>46°18'</u>	<u>-59'</u>	<u>169°</u>	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

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°	14			15			16			17			18			19			20			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	74°23'	-54'	153°	73°29'	-55'	155°	72°34'	-55'	156°	71°39'	-56'	157°	70°44'	-56'	158°	69°48'	-57'	159°	68°51'	-57'	160°	0
1	73°28'	-55'	155°	72°34'	-55'	156°	71°39'	-56'	157°	70°43'	-56'	158°	69°47'	-57'	159°	68°51'	-57'	160°	67°54'	-57'	161°	1
2	72°34'	-55'	156°	71°39'	-56'	157°	70°43'	-56'	158°	69°47'	-57'	159°	68°51'	-57'	160°	67°54'	-57'	161°	66°57'	-57'	162°	2
3	71°38'	-56'	157°	70°43'	-56'	158°	69°47'	-57'	159°	68°50'	-57'	160°	67°54'	-57'	161°	66°57'	-57'	162°	66°00'	-58'	163°	3
4	70°42'	-56'	158°	69°46'	-57'	159°	68°50'	-57'	160°	67°53'	-57'	161°	66°57'	-57'	162°	65°59'	-58'	163°	65°02'	-58'	163°	4
5	69°46'	-57'	159°	68°50'	-57'	160°	67°53'	-57'	161°	66°56'	-57'	162°	65°59'	-58'	163°	65°02'	-58'	163°	64°04'	-58'	164°	5
6	68°50'	-57'	160°	67°53'	-57'	161°	66°56'	-57'	162°	65°59'	-58'	163°	65°02'	-58'	163°	64°04'	-58'	164°	63°06'	-58'	164°	6
7	67°53'	-57'	161°	66°56'	-57'	162°	65°59'	-58'	163°	65°01'	-58'	163°	64°04'	-58'	164°	63°06'	-58'	164°	62°08'	-58'	165°	7
8	66°56'	-57'	162°	65°59'	-58'	163°	65°01'	-58'	163°	64°04'	-58'	164°	63°06'	-58'	165°	62°08'	-58'	165°	61°10'	-58'	166°	8
9	65°58'	-58'	163°	65°01'	-58'	163°	64°03'	-58'	164°	63°06'	-58'	165°	62°08'	-58'	165°	61°10'	-58'	166°	60°12'	-58'	166°	9
10	65°01'	-58'	163°	64°03'	-58'	164°	63°06'	-58'	165°	62°08'	-58'	165°	61°10'	-58'	166°	60°11'	-58'	166°	59°13'	-59'	166°	10
11	64°03'	-58'	164°	63°05'	-58'	165°	62°08'	-58'	165°	61°09'	-58'	166°	60°11'	-58'	166°	59°13'	-59'	166°	58°15'	-59'	167°	11
12	63°05'	-58'	165°	62°07'	-58'	165°	61°09'	-58'	166°	60°11'	-58'	166°	59°13'	-58'	167°	58°14'	-59'	167°	57°16'	-59'	167°	12
13	62°07'	-58'	165°	61°09'	-58'	166°	60°11'	-58'	166°	59°13'	-58'	167°	58°14'	-59'	167°	57°16'	-59'	167°	56°17'	-59'	168°	13
14	61°09'	-58'	166°	60°11'	-58'	166°	59°13'	-58'	167°	58°14'	-59'	167°	57°16'	-59'	167°	56°17'	-59'	168°	55°19'	-59'	168°	14
15	60°11'	-58'	166°	59°13'	-58'	167°	58°14'	-59'	167°	57°16'	-59'	167°	56°17'	-59'	168°	55°19'	-59'	168°	54°20'	-59'	168°	15
16	59°13'	-58'	167°	58°14'	-59'	167°	57°16'	-59'	167°	56°17'	-59'	168°	55°18'	-59'	168°	54°20'	-59'	168°	53°21'	-59'	169°	16
17	58°14'	-59'	167°	57°16'	-59'	168°	56°17'	-59'	168°	55°18'	-59'	168°	54°20'	-59'	168°	53°21'	-59'	169°	52°22'	-59'	169°	17
18	57°16'	-59'	168°	56°17'	-59'	168°	55°18'	-59'	168°	54°20'	-59'	169°	53°21'	-59'	169°	52°22'	-59'	169°	51°23'	-59'	169°	18
19	56°17'	-59'	168°	55°19'	-59'	168°	54°20'	-59'	169°	53°21'	-59'	169°	52°22'	-59'	169°	51°23'	-59'	169°	50°24'	-59'	170°	19
20	55°19'	-59'	168°	54°20'	-59'	169°	53°21'	-59'	169°	52°22'	-59'	169°	51°23'	-59'	169°	50°24'	-59'	170°	49°25'	-59'	170°	20
21	54°20'	-59'	169°	53°21'	-59'	169°	52°22'	-59'	169°	51°23'	-59'	169°	50°24'	-59'	170°	49°25'	-59'	170°	48°26'	-59'	170°	21
22	53°21'	-59'	169°	52°22'	-59'	169°	51°23'	-59'	170°	50°24'	-59'	170°	49°25'	-59'	170°	48°26'	-59'	170°	47°27'	-59'	170°	22
23	<u>52°22'</u>	<u>-59'</u>	<u>169°</u>	<u>51°23'</u>	<u>-59'</u>	<u>170°</u>	<u>50°24'</u>	<u>-59'</u>	<u>170°</u>	<u>49°25'</u>	<u>-59'</u>	<u>170°</u>	<u>48°26'</u>	<u>-59'</u>	<u>170°</u>	<u>47°27'</u>	<u>-59'</u>	<u>170°</u>	<u>46°28'</u>	<u>-59'</u>	<u>171°</u>	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

7° 353° LHA

Latitude CONTRARY to DECLINATION

7° 353° LHA

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

4° 356° LHA

Latitude CONTRARY to Declination

4° 356° LHA

Table with 24 rows (Dec 0-23) and 10 columns (14-20). Each cell contains three values (Hc, d, Z) for a specific declination and LHA. The table is structured with a header row for each declination and a sub-header for each LHA column.

4° 356° LHA

Latitude CONTRARY to DECLINATION

4° 356° LHA

3° 357° LHA

Latitude CONTRARY to Declination

3° 357° LHA

Table with 24 rows (Dec 0-23) and 10 columns (14-20). Each cell contains three values (Hc, d, Z) for a specific declination and LHA. The table is structured with a header row for each declination and a sub-header for each LHA column.

3° 357° LHA

Latitude CONTRARY to DECLINATION

3° 357° LHA

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

0° 360° LHA

Latitude CONTRARY to Declination

0° 360° LHA

Dec°	14			15			16			17			18			19			20			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'	-60'	180°	75°00'	-60'	180°	74°00'	-60'	180°	73°00'	-60'	180°	72°00'	-60'	180°	71°00'	-60'	180°	70°00'	-60'	180°	0
1	75°00'	-60'	180°	74°00'	-60'	180°	73°00'	-60'	180°	72°00'	-60'	180°	71°00'	-60'	180°	70°00'	-60'	180°	69°00'	-60'	180°	1
2	74°00'	-60'	180°	73°00'	-60'	180°	72°00'	-60'	180°	71°00'	-60'	180°	70°00'	-60'	180°	69°00'	-60'	180°	68°00'	-60'	180°	2
3	73°00'	-60'	180°	72°00'	-60'	180°	71°00'	-60'	180°	70°00'	-60'	180°	69°00'	-60'	180°	68°00'	-60'	180°	67°00'	-60'	180°	3
4	72°00'	-60'	180°	71°00'	-60'	180°	70°00'	-60'	180°	69°00'	-60'	180°	68°00'	-60'	180°	67°00'	-60'	180°	66°00'	-60'	180°	4
5	71°00'	-60'	180°	70°00'	-60'	180°	69°00'	-60'	180°	68°00'	-60'	180°	67°00'	-60'	180°	66°00'	-60'	180°	65°00'	-60'	180°	5
6	70°00'	-60'	180°	69°00'	-60'	180°	68°00'	-60'	180°	67°00'	-60'	180°	66°00'	-60'	180°	65°00'	-60'	180°	64°00'	-60'	180°	6
7	69°00'	-60'	180°	68°00'	-60'	180°	67°00'	-60'	180°	66°00'	-60'	180°	65°00'	-60'	180°	64°00'	-60'	180°	63°00'	-60'	180°	7
8	68°00'	-60'	180°	67°00'	-60'	180°	66°00'	-60'	180°	65°00'	-60'	180°	64°00'	-60'	180°	63°00'	-60'	180°	62°00'	-60'	180°	8
9	67°00'	-60'	180°	66°00'	-60'	180°	65°00'	-60'	180°	64°00'	-60'	180°	63°00'	-60'	180°	62°00'	-60'	180°	61°00'	-60'	180°	9
10	66°00'	-60'	180°	65°00'	-60'	180°	64°00'	-60'	180°	63°00'	-60'	180°	62°00'	-60'	180°	61°00'	-60'	180°	60°00'	-60'	180°	10
11	65°00'	-60'	180°	64°00'	-60'	180°	63°00'	-60'	180°	62°00'	-60'	180°	61°00'	-60'	180°	60°00'	-60'	180°	59°00'	-60'	180°	11
12	64°00'	-60'	180°	63°00'	-60'	180°	62°00'	-60'	180°	61°00'	-60'	180°	60°00'	-60'	180°	59°00'	-60'	180°	58°00'	-60'	180°	12
13	63°00'	-60'	180°	62°00'	-60'	180°	61°00'	-60'	180°	60°00'	-60'	180°	59°00'	-60'	180°	58°00'	-60'	180°	57°00'	-60'	180°	13
14	62°00'	-60'	180°	61°00'	-60'	180°	60°00'	-60'	180°	59°00'	-60'	180°	58°00'	-60'	180°	57°00'	-60'	180°	56°00'	-60'	180°	14
15	61°00'	-60'	180°	60°00'	-60'	180°	59°00'	-60'	180°	58°00'	-60'	180°	57°00'	-60'	180°	56°00'	-60'	180°	55°00'	-60'	180°	15
16	60°00'	-60'	180°	59°00'	-60'	180°	58°00'	-60'	180°	57°00'	-60'	180°	56°00'	-60'	180°	55°00'	-60'	180°	54°00'	-60'	180°	16
17	59°00'	-60'	180°	58°00'	-60'	180°	57°00'	-60'	180°	56°00'	-60'	180°	55°00'	-60'	180°	54°00'	-60'	180°	53°00'	-60'	180°	17
18	58°00'	-60'	180°	57°00'	-60'	180°	56°00'	-60'	180°	55°00'	-60'	180°	54°00'	-60'	180°	53°00'	-60'	180°	52°00'	-60'	180°	18
19	57°00'	-60'	180°	56°00'	-60'	180°	55°00'	-60'	180°	54°00'	-60'	180°	53°00'	-60'	180°	52°00'	-60'	180°	51°00'	-60'	180°	19
20	56°00'	-60'	180°	55°00'	-60'	180°	54°00'	-60'	180°	53°00'	-60'	180°	52°00'	-60'	180°	51°00'	-60'	180°	50°00'	-60'	180°	20
21	55°00'	-60'	180°	54°00'	-60'	180°	53°00'	-60'	180°	52°00'	-60'	180°	51°00'	-60'	180°	50°00'	-60'	180°	49°00'	-60'	180°	21
22	54°00'	-60'	180°	53°00'	-60'	180°	52°00'	-60'	180°	51°00'	-60'	180°	50°00'	-60'	180°	49°00'	-60'	180°	48°00'	-60'	180°	22
23	53°00'	-60'	180°	52°00'	-60'	180°	51°00'	-60'	180°	50°00'	-60'	180°	49°00'	-60'	180°	48°00'	-60'	180°	47°00'	-60'	180°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	14			15			16			17			18			19			20			

0° 360° LHA

Latitude CONTRARY to DECLINATION

0° 360° LHA

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

