

Integer

Sight Reduction Tables

Latitude  $0^\circ$  to  $6^\circ$

## 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.





4° 356° LHA

Latitude SAME as Declination

4° 356° LHA

Table with 13 rows and 10 columns. Header row 1: Dec°, 0, 1, 2, 3, 4, 5, 6, Dec°. Header row 2: Hc°, d', Z°. Rows 0-23 contain data for declinations 0 to 23. Row 24 is a duplicate header.

4° 356° LHA

Latitude SAME as Declination

4° 356° LHA

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

5° 355° LHA

Latitude SAME as Declination

5° 355° LHA

Table with 13 rows and 10 columns. Header row 1: Dec°, 0, 1, 2, 3, 4, 5, 6, Dec°. Header row 2: Hc°, d', Z°. Rows 0-23 contain data for declinations 0 to 23. Row 24 is a duplicate header.

5° 355° LHA

Latitude SAME as Declination

5° 355° LHA

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









12° 348° LHA

Latitude SAME as Declination

12° 348° LHA

Table with columns for Dec° (0-23), 0-6, and Dec°. Each cell contains three values (Hc°, d', Z°). The table includes data for North Lat. LHA > 180° and LHA < 180°.

12° 348° LHA

Latitude SAME as Declination

12° 348° LHA

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

13° 347° LHA

Latitude SAME as Declination

13° 347° LHA

Table with columns for Dec° (0-23), 0-6, and Dec°. Each cell contains three values (Hc°, d', Z°). The table includes data for North Lat. LHA > 180° and LHA < 180°.

13° 347° LHA

Latitude SAME as Declination

13° 347° LHA

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

14° 346° LHA

Latitude SAME as Declination

14° 346° LHA

Table with 12 columns (Dec°, 0-6, Dec°) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is a grid of celestial data for a specific declination.

14° 346° LHA

Latitude SAME as Declination

14° 346° LHA

15° 345° LHA

Latitude SAME as Declination

15° 345° LHA

Table with 12 columns (Dec°, 0-6, Dec°) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°. This table is similar to the one above but for a different declination and includes both North and South latitude headers.

15° 345° LHA

Latitude SAME as Declination

15° 345° LHA



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

18° 342° LHA

Latitude SAME as Declination

18° 342° LHA

Table with 12 columns (Dec°, 0-6, Dec°) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is structured with a header row for each column, followed by rows 0-23, and a final header row for each column.

18° 342° LHA

Latitude SAME as Declination

18° 342° LHA

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

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

19° 341° LHA

Latitude SAME as Declination

19° 341° LHA

Table with 12 columns (Dec°, 0-6, Dec°) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is structured with a header row for each column, followed by rows 0-23, and a final header row for each column.

19° 341° LHA

Latitude SAME as Declination

19° 341° LHA

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























40° 320° LHA

Latitude SAME as Declination

40° 320° LHA

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

40° 320° LHA

Latitude SAME as Declination

40° 320° LHA

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

41° 319° LHA

Latitude SAME as Declination

41° 319° LHA

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

41° 319° LHA

Latitude SAME as Declination

41° 319° LHA

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





44° 316° LHA

Latitude SAME as Declination

44° 316° LHA

Table with 12 columns (0-6) and 24 rows (0-23) for 44° 316° LHA. Headers include Dec°, Hc°, d', Z° for each column. Rows show values for each degree of declination.

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

Table with 12 columns (0-6) and 24 rows (0-23) for 45° 315° LHA. Headers include Dec°, Hc°, d', Z° for each column. Rows show values for each degree of declination.

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

52° 308° LHA

Latitude SAME as Declination

52° 308° LHA

Table with 12 columns (Dec°, 0-6, Dec°) and 23 rows of celestial coordinates (Hc°, d', Z°).

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

Table with 12 columns (Dec°, 0-6, Dec°) and 23 rows of celestial coordinates (Hc°, d', Z°).

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

62° 298° LHA

Latitude SAME as Declination

62° 298° LHA

Table with columns for Dec°, Hc°, d', Z° and rows for 0-23. It provides celestial coordinates for a specific LHA.

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

Table with columns for Dec°, Hc°, d', Z° and rows for 0-23. It provides celestial coordinates for a specific LHA.

63° 297° LHA

Latitude SAME as 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

72° 288° LHA

Latitude SAME as Declination

72° 288° LHA

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

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

73° 287° LHA

Latitude SAME as Declination

73° 287° LHA

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

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

74° 286° LHA

Latitude SAME as Declination

74° 286° LHA

Table with 24 rows (Dec° 0 to 23) and 8 columns. Each row contains 8 columns of three sub-columns (Hc°, d', Z°) for indices 0 through 6. The values represent astronomical data for various declinations.

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

Table with 24 rows (Dec° 0 to 23) and 8 columns. Each row contains 8 columns of three sub-columns (Hc°, d', Z°) for indices 0 through 6. The values represent astronomical data for various declinations.

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

88° 272° LHA

Latitude SAME as Declination

88° 272° LHA

Table with 10 columns for LHA values (0-6) and 10 rows for Dec values (0-23). Each cell contains Hc, d, and Z values for different latitudes.

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

Table with 10 columns for LHA values (0-6) and 10 rows for Dec values (0-23). Each cell contains Hc, d, and Z values for different latitudes.

89° 271° LHA

Latitude SAME as Declination

89° 271° LHA

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











82° 278° LHA

Latitude CONTRARY to Declination

82° 278° LHA

Table with columns for Dec° and LHA (0-6) and rows for Z (0-23). Contains celestial coordinate values in Hc°, d', and Z°.

82° 278° LHA

Latitude CONTRARY to DECLINATION

82° 278° LHA

81° 279° LHA

Latitude CONTRARY to Declination

81° 279° LHA

Table with columns for Dec° and LHA (0-6) and rows for Z (0-23). Contains celestial coordinate values in Hc°, d', and Z°.

81° 279° LHA

Latitude CONTRARY to DECLINATION

81° 279° LHA

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

80° 280° LHA

Latitude CONTRARY to Declination

80° 280° LHA

Table with 8 columns (0-6) and 24 rows (Dec 0-23). Each cell contains three values (Hc°, d', Z°) representing celestial coordinates. The table is bordered and includes a 'Dec°' column on the far right.

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

Table with 8 columns (0-6) and 24 rows (Dec 0-23). Each cell contains three values (Hc°, d', Z°) representing celestial coordinates. The table is bordered and includes a 'Dec°' column on the far right.

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

72° 288° LHA

Latitude CONTRARY to Declination

72° 288° LHA

Table with 7 columns (0-6) and 24 rows (0-23) of astronomical data. Each cell contains three values: Hc°, d', Z°. The table is bordered and includes a 'Dec°' column on the far right.

72° 288° LHA

Latitude CONTRARY to DECLINATION

72° 288° LHA

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

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

71° 289° LHA

Latitude CONTRARY to Declination

71° 289° LHA

Table with 7 columns (0-6) and 24 rows (0-23) of astronomical data. Each cell contains three values: Hc°, d', Z°. The table is bordered and includes a 'Dec°' column on the far right.

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

70° 290° LHA

Latitude CONTRARY to DECLINATION

70° 290° LHA

South Lat. LHA &gt; 180° . . Zn = 180-Z    LHA &lt; 180° . . Zn = 180+Z

69° 291° LHA

Latitude CONTRARY to Declination

69° 291° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	21°00'	00'	90°	21°00'	-01'	90°	20°59'	-02'	91°	20°58'	-04'	91°	20°57'	-05'	92°	20°55'	-06'	92°	20°53'	-07'	92°	0
1	21°00'	-01'	91°	20°58'	-02'	91°	20°57'	-03'	92°	20°55'	-04'	92°	20°52'	-05'	93°	20°49'	-06'	93°	20°46'	-07'	93°	1
2	20°59'	-01'	92°	20°57'	-02'	93°	20°54'	-03'	93°	20°51'	-04'	93°	20°47'	-05'	94°	20°43'	-07'	94°	20°39'	-08'	94°	2
3	20°58'	-01'	93°	20°55'	-03'	94°	20°51'	-04'	94°	20°46'	-05'	94°	20°42'	-06'	95°	20°36'	-07'	95°	20°31'	-08'	95°	3
4	20°57'	-02'	94°	20°52'	-03'	95°	20°47'	-04'	95°	20°42'	-05'	95°	20°36'	-06'	96°	20°29'	-07'	96°	20°23'	-08'	97°	4
5	20°55'	-02'	95°	20°49'	-03'	96°	20°43'	-04'	96°	20°36'	-06'	96°	20°29'	-07'	97°	20°22'	-08'	97°	20°14'	-09'	98°	5
6	20°53'	-03'	96°	20°46'	-04'	97°	20°39'	-05'	97°	20°31'	-06'	98°	20°23'	-07'	98°	20°14'	-08'	98°	20°06'	-09'	99°	6
7	20°50'	-03'	97°	20°42'	-04'	98°	20°34'	-05'	98°	20°25'	-06'	99°	20°16'	-07'	99°	20°06'	-08'	99°	19°56'	-10'	100°	7
8	20°47'	-03'	99°	20°38'	-05'	99°	20°29'	-06'	99°	20°19'	-07'	100°	20°08'	-08'	100°	19°58'	-09'	100°	19°47'	-10'	101°	8
9	20°44'	-04'	100°	20°34'	-05'	100°	20°23'	-06'	100°	20°12'	-07'	101°	20°01'	-08'	101°	19°49'	-09'	101°	19°37'	-10'	102°	9
10	20°40'	-04'	101°	20°29'	-05'	101°	20°17'	-06'	101°	20°05'	-07'	102°	19°52'	-09'	102°	19°40'	-10'	102°	19°26'	-11'	103°	10
11	20°36'	-05'	102°	20°23'	-06'	102°	20°11'	-07'	102°	19°57'	-08'	103°	19°44'	-09'	103°	19°30'	-10'	104°	19°16'	-11'	104°	11
12	20°31'	-05'	103°	20°18'	-06'	103°	20°04'	-07'	104°	19°50'	-08'	104°	19°35'	-09'	104°	19°20'	-10'	105°	19°05'	-11'	105°	12
13	20°26'	-05'	104°	20°12'	-06'	104°	19°57'	-07'	105°	19°41'	-09'	105°	19°26'	-10'	105°	19°10'	-11'	106°	18°53'	-12'	106°	13
14	20°21'	-06'	105°	20°05'	-07'	105°	19°49'	-08'	106°	19°33'	-09'	106°	19°16'	-10'	106°	18°59'	-11'	107°	18°42'	-12'	107°	14
15	20°15'	-06'	106°	19°58'	-07'	106°	19°41'	-08'	107°	19°24'	-09'	107°	19°06'	-10'	107°	18°48'	-11'	108°	18°30'	-12'	108°	15
16	20°09'	-07'	107°	19°51'	-08'	107°	19°33'	-09'	108°	19°15'	-10'	108°	18°56'	-11'	108°	18°37'	-12'	109°	18°17'	-13'	109°	16
17	20°03'	-07'	108°	19°44'	-08'	108°	19°24'	-09'	109°	19°05'	-10'	109°	18°45'	-11'	109°	18°25'	-12'	110°	18°05'	-13'	110°	17
18	19°56'	-07'	109°	19°36'	-08'	110°	19°16'	-09'	110°	18°55'	-10'	110°	18°34'	-11'	111°	18°13'	-12'	111°	17°51'	-13'	111°	18
19	19°48'	-08'	110°	19°27'	-09'	111°	19°06'	-10'	111°	18°45'	-11'	111°	18°23'	-12'	112°	18°01'	-13'	112°	17°38'	-14'	112°	19
20	19°41'	-08'	111°	19°19'	-09'	112°	18°57'	-10'	112°	18°34'	-11'	112°	18°11'	-12'	113°	17°48'	-13'	113°	17°24'	-14'	113°	20
21	19°33'	-08'	112°	19°10'	-09'	113°	18°47'	-10'	113°	18°23'	-11'	113°	17°59'	-12'	114°	17°35'	-13'	114°	17°10'	-14'	114°	21
22	19°24'	-09'	113°	19°00'	-10'	114°	18°36'	-11'	114°	18°12'	-12'	114°	17°47'	-13'	115°	17°22'	-14'	115°	16°56'	-15'	115°	22
23	<u>19°16'</u>	<u>-09'</u>	<u>114°</u>	<u>18°51'</u>	<u>-10'</u>	<u>115°</u>	<u>18°25'</u>	<u>-11'</u>	<u>115°</u>	<u>18°00'</u>	<u>-12'</u>	<u>115°</u>	<u>17°34'</u>	<u>-13'</u>	<u>116°</u>	<u>17°08'</u>	<u>-14'</u>	<u>116°</u>	<u>16°42'</u>	<u>-15'</u>	<u>116°</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°
	0			1			2			3			4			5			6			

69° 291° LHA

Latitude CONTRARY to DECLINATION

69° 291° LHA

South Lat. LHA &gt; 180° . . Zn = 180-Z    LHA &lt; 180° . . Zn = 180+Z

68° 292° LHA

**Latitude CONTRARY to Declination**

68° 292° LHA

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

68° 292° LHA

**Latitude CONTRARY to DECLINATION**

68° 292° LHA

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

67° 293° LHA

**Latitude CONTRARY to Declination**

67° 293° LHA

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

67° 293° LHA

**Latitude CONTRARY to 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

66° 294° LHA

Latitude CONTRARY to Declination

66° 294° LHA

Table with columns: Dec°, 0, 1, 2, 3, 4, 5, 6, Dec°. Each column contains three sub-columns for Hc°, d', and Z°. The table lists values for declination from 0 to 23 degrees. The last row (Dec° 23) has underlined values: 21°59' -10' 115°, 21°34' -11' 115°, 21°08' -12' 116°, 20°42' -13' 116°, 20°15' -14' 116°, 19°49' -15' 117°, 19°22' -16' 117°.

66° 294° LHA

Latitude CONTRARY to DECLINATION

66° 294° LHA

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

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

65° 295° LHA

Latitude CONTRARY to Declination

65° 295° LHA

Table with columns: Dec°, 0, 1, 2, 3, 4, 5, 6, Dec°. Each column contains three sub-columns for Hc°, d', and Z°. The table lists values for declination from 0 to 23 degrees. The last row (Dec° 23) has underlined values: 22°54' -11' 115°, 22°28' -12' 115°, 22°02' -13' 116°, 21°36' -14' 116°, 21°09' -15' 117°, 20°42' -16' 117°, 20°15' -17' 117°.

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

Table with 12 columns (Dec°, 0-6, Dec°) and 24 rows (0-23). Columns 0-6 contain three sub-columns (Hc°, d', Z°) for each degree. Values range from 26°00' to 23°48'.

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

Table with 12 columns (Dec°, 0-6, Dec°) and 24 rows (0-23). Columns 0-6 contain three sub-columns (Hc°, d', Z°) for each degree. Values range from 27°00' to 24°42'.

63° 297° LHA

Latitude CONTRARY to DECLINATION

63° 297° LHA

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

62° 298° LHA

Latitude CONTRARY to Declination

62° 298° LHA

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

62° 298° LHA

Latitude CONTRARY to DECLINATION

62° 298° LHA

South Lat. LHA &gt; 180° .. Zn = 180-Z      LHA &lt; 180° .. Zn= 180+Z

North Lat. LHA &gt; 180° .. Zn = Z      LHA &lt; 180° .. Zn= 360-Z

61° 299° LHA

Latitude CONTRARY to Declination

61° 299° LHA

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

61° 299° LHA

Latitude CONTRARY to DECLINATION

61° 299° LHA

South Lat. LHA &gt; 180° .. Zn = 180-Z      LHA &lt; 180° .. Zn= 180+Z

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

**60° 300° LHA**

**Latitude CONTRARY to Declination**

**60° 300° LHA**

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

**60° 300° LHA**

**Latitude CONTRARY to DECLINATION**

**60° 300° LHA**

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

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

**59° 301° LHA**

**Latitude CONTRARY to Declination**

**59° 301° LHA**

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

**59° 301° LHA**

**Latitude CONTRARY to DECLINATION**

**59° 301° 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

Table with columns for Dec°, 0-6, and Dec°. Rows 0-23. Each cell contains Hc°, d', Z° values.

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

Table with columns for Dec°, 0-6, and Dec°. Rows 0-23. Each cell contains Hc°, d', Z° values.

57° 303° LHA

Latitude CONTRARY to DECLINATION

57° 303° LHA

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



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

56° 304° LHA

**Latitude CONTRARY to Declination**

56° 304° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	34°00'	00'	90°	34°00'	-02'	91°	33°59'	-03'	91°	33°57'	-04'	92°	33°54'	-05'	93°	33°51'	-07'	93°	33°47'	-08'	94°	0
1	34°00'	-01'	91°	33°58'	-02'	92°	33°56'	-04'	93°	33°53'	-05'	93°	33°49'	-06'	94°	33°45'	-07'	95°	33°39'	-09'	95°	1
2	33°59'	-02'	92°	33°56'	-03'	93°	33°52'	-04'	94°	33°48'	-06'	94°	33°43'	-07'	95°	33°37'	-08'	96°	33°31'	-09'	96°	2
3	33°57'	-02'	94°	33°53'	-04'	94°	33°48'	-05'	95°	33°42'	-06'	96°	33°36'	-07'	96°	33°29'	-09'	97°	33°22'	-10'	98°	3
4	33°54'	-03'	95°	33°49'	-04'	95°	33°43'	-06'	96°	33°36'	-07'	97°	33°29'	-08'	97°	33°20'	-09'	98°	33°12'	-11'	99°	4
5	33°51'	-04'	96°	33°45'	-05'	97°	33°37'	-06'	97°	33°29'	-08'	98°	33°20'	-09'	99°	33°11'	-10'	99°	33°01'	-11'	100°	5
6	33°47'	-05'	97°	33°39'	-06'	98°	33°31'	-07'	99°	33°22'	-08'	99°	33°12'	-09'	100°	33°01'	-11'	100°	32°50'	-12'	101°	6
7	33°43'	-05'	98°	33°34'	-06'	99°	33°24'	-08'	100°	33°13'	-09'	100°	33°02'	-10'	101°	32°50'	-11'	102°	32°38'	-13'	102°	7
8	33°37'	-06'	100°	33°27'	-07'	100°	33°16'	-08'	101°	33°04'	-10'	102°	32°52'	-11'	102°	32°39'	-12'	103°	32°25'	-13'	103°	8
9	33°32'	-07'	101°	33°20'	-08'	101°	33°08'	-09'	102°	32°55'	-10'	103°	32°41'	-11'	103°	32°27'	-13'	104°	32°12'	-14'	105°	9
10	33°25'	-07'	102°	33°12'	-09'	103°	32°59'	-10'	103°	32°45'	-11'	104°	32°30'	-12'	105°	32°14'	-13'	105°	31°58'	-14'	106°	10
11	33°18'	-08'	103°	33°04'	-09'	104°	32°49'	-10'	104°	32°34'	-12'	105°	32°18'	-13'	106°	32°01'	-14'	106°	31°44'	-15'	107°	11
12	33°10'	-09'	104°	32°54'	-10'	105°	32°39'	-11'	106°	32°22'	-12'	106°	32°05'	-13'	107°	31°47'	-14'	107°	31°29'	-16'	108°	12
13	33°01'	-09'	106°	32°44'	-11'	106°	32°27'	-12'	107°	32°10'	-13'	107°	31°52'	-14'	108°	31°33'	-15'	109°	31°13'	-16'	109°	13
14	32°52'	-10'	107°	32°34'	-11'	107°	32°16'	-12'	108°	31°57'	-13'	109°	31°38'	-15'	109°	31°18'	-16'	110°	30°57'	-17'	110°	14
15	32°42'	-11'	108°	32°23'	-12'	109°	32°03'	-13'	109°	31°44'	-14'	110°	31°23'	-15'	110°	31°02'	-16'	111°	30°40'	-17'	111°	15
16	32°31'	-11'	109°	32°11'	-12'	110°	31°51'	-14'	110°	31°29'	-15'	111°	31°08'	-16'	111°	30°46'	-17'	112°	30°23'	-18'	113°	16
17	32°20'	-12'	110°	31°59'	-13'	111°	31°37'	-14'	111°	31°15'	-15'	112°	30°52'	-16'	113°	30°29'	-17'	113°	30°05'	-18'	114°	17
18	32°08'	-13'	111°	31°46'	-14'	112°	31°23'	-15'	113°	31°00'	-16'	113°	30°36'	-17'	114°	30°11'	-18'	114°	29°47'	-19'	115°	18
19	31°55'	-13'	113°	31°32'	-14'	113°	31°08'	-15'	114°	30°44'	-16'	114°	30°19'	-17'	115°	29°53'	-19'	115°	29°28'	-20'	116°	19
20	31°42'	-14'	114°	31°18'	-15'	114°	30°53'	-16'	115°	30°27'	-17'	115°	30°01'	-18'	116°	29°35'	-19'	116°	29°08'	-20'	117°	20
21	31°28'	-14'	115°	31°03'	-15'	115°	30°37'	-17'	116°	30°10'	-18'	116°	29°43'	-19'	117°	29°16'	-20'	117°	28°48'	-21'	118°	21
22	31°14'	-15'	116°	30°47'	-16'	117°	30°20'	-17'	117°	29°53'	-18'	118°	29°25'	-19'	118°	28°56'	-20'	119°	28°27'	-21'	119°	22
23	30°59'	-16'	117°	30°31'	-17'	118°	30°03'	-18'	118°	29°35'	-19'	119°	29°06'	-20'	119°	28°36'	-21'	120°	28°06'	-22'	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°

56° 304° LHA

**Latitude CONTRARY to DECLINATION**

56° 304° LHA

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

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

55° 305° LHA

**Latitude CONTRARY to Declination**

55° 305° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	35°00'	00'	90°	35°00'	-02'	91°	34°59'	-03'	91°	34°57'	-04'	92°	34°54'	-05'	93°	34°51'	-07'	93°	34°47'	-08'	94°	0
1	35°00'	-01'	91°	34°58'	-02'	92°	34°56'	-04'	93°	34°53'	-05'	93°	34°49'	-06'	94°	34°44'	-07'	95°	34°39'	-09'	95°	1
2	34°59'	-02'	92°	34°56'	-03'	93°	34°52'	-04'	94°	34°48'	-06'	95°	34°42'	-07'	95°	34°37'	-08'	96°	34°30'	-09'	97°	2
3	34°57'	-03'	94°	34°53'	-04'	94°	34°48'	-05'	95°	34°42'	-06'	96°	34°36'	-08'	96°	34°29'	-09'	97°	34°21'	-10'	98°	3
4	34°54'	-03'	95°	34°49'	-05'	96°	34°42'	-06'	96°	34°36'	-07'	97°	34°28'	-08'	98°	34°20'	-10'	98°	34°11'	-11'	99°	4
5	34°51'	-04'	96°	34°44'	-05'	97°	34°37'	-07'	97°	34°29'	-08'	98°	34°20'	-09'	99°	34°10'	-10'	100°	34°00'	-11'	100°	5
6	34°47'	-05'	97°	34°39'	-06'	98°	34°30'	-07'	99°	34°21'	-08'	99°	34°11'	-10'	100°	34°00'	-11'	101°	33°48'	-12'	101°	6
7	34°42'	-05'	99°	34°33'	-07'	99°	34°23'	-08'	100°	34°12'	-09'	101°	34°01'	-10'	101°	33°49'	-12'	102°	33°36'	-13'	103°	7
8	34°37'	-06'	100°	34°26'	-07'	100°	34°15'	-09'	101°	34°03'	-10'	102°	33°51'	-11'	102°	33°37'	-12'	103°	33°23'	-13'	104°	8
9	34°30'	-07'	101°	34°19'	-08'	102°	34°06'	-09'	102°	33°53'	-11'	103°	33°39'	-12'	104°	33°25'	-13'	104°	33°10'	-14'	105°	9
10	34°24'	-08'	102°	34°11'	-09'	103°	33°57'	-10'	103°	33°43'	-11'	104°	33°28'	-12'	105°	33°12'	-14'	105°	32°56'	-15'	106°	10
11	34°16'	-08'	103°	34°02'	-10'	104°	33°47'	-11'	105°	33°31'	-12'	105°	33°15'	-13'	106°	32°58'	-14'	107°	32°41'	-15'	107°	11
12	34°08'	-09'	105°	33°52'	-10'	105°	33°36'	-11'	106°	33°20'	-13'	106°	33°02'	-14'	107°	32°44'	-15'	108°	32°26'	-16'	108°	12
13	33°59'	-10'	106°	33°42'	-11'	106°	33°25'	-12'	107°	33°07'	-13'	108°	32°48'	-14'	108°	32°29'	-15'	109°	32°10'	-17'	109°	13
14	33°49'	-10'	107°	33°31'	-12'	108°	33°13'	-13'	108°	32°54'	-14'	109°	32°34'	-15'	109°	32°14'	-16'	110°	31°53'	-17'	111°	14
15	33°39'	-11'	108°	33°20'	-12'	109°	33°00'	-13'	109°	32°40'	-14'	110°	32°19'	-16'	111°	31°58'	-17'	111°	31°36'	-18'	112°	15
16	33°28'	-12'	109°	33°07'	-13'	110°	32°47'	-14'	111°	32°25'	-15'	111°	32°04'	-16'	112°	31°41'	-17'	112°	31°18'	-18'	113°	16
17	33°16'	-12'	110°	32°55'	-13'	111°	32°33'	-15'	112°	32°10'	-16'	112°	31°47'	-17'	113°	31°24'	-18'	113°	31°00'	-19'	114°	17
18	33°04'	-13'	112°	32°41'	-14'	112°	32°18'	-15'	113°	31°55'	-16'	113°	31°30'	-17'	114°	31°06'	-18'	115°	30°41'	-20'	115°	18
19	32°51'	-14'	113°	32°27'	-15'	113°	32°03'	-16'	114°	31°38'	-17'	115°	31°13'	-18'	115°	30°47'	-19'	116°	30°21'	-20'	116°	19
20	32°37'	-14'	114°	32°12'	-15'	115°	31°47'	-16'	115°	31°21'	-18'	116°	30°55'	-19'	116°	30°28'	-20'	117°	30°01'	-21'	117°	20
21	32°23'	-15'	115°	31°57'	-16'	116°	31°31'	-17'	116°	31°04'	-18'	117°	30°37'	-19'	117°	30°09'	-20'	118°	29°41'	-21'	118°	21
22	32°08'	-16'	116°	31°41'	-17'	117°	31°14'	-18'	117°	30°46'	-19'	118°	30°17'	-20'	118°	29°49'	-21'	119°	29°19'	-22'	119°	22
23	31°52'	-16'	117°	31°24'	-17'	118°	30°56'	-18'	118°	30°27'	-19'	119°	29°58'	-20'	119°	29°28'	-21'	120°	28°58'	-22'	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°

55° 305° LHA

**Latitude CONTRARY to DECLINATION**

55° 305° LHA

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

54° 306° LHA

Latitude CONTRARY to Declination

54° 306° LHA

Dec°	0			1			2			3			4			5			6			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	36°00'	00'	90°	36°00'	-02'	91°	35°58'	-03'	91°	35°57'	-04'	92°	35°54'	-06'	93°	35°51'	-07'	94°	35°46'	-08'	94°	0			
1	36°00'	-01'	91°	35°58'	-02'	92°	35°56'	-04'	93°	35°52'	-05'	93°	35°48'	-06'	94°	35°44'	-08'	95°	35°38'	-09'	96°	1			
2	35°58'	-02'	92°	35°56'	-03'	93°	35°52'	-04'	94°	35°47'	-06'	95°	35°42'	-07'	95°	35°36'	-08'	96°	35°29'	-10'	97°	2			
3	35°57'	-03'	94°	35°52'	-04'	94°	35°47'	-05'	95°	35°42'	-07'	96°	35°35'	-08'	97°	35°28'	-09'	97°	35°20'	-10'	98°	3			
4	35°54'	-03'	95°	35°48'	-05'	96°	35°42'	-06'	96°	35°35'	-07'	97°	35°27'	-09'	98°	35°19'	-10'	98°	35°10'	-11'	99°	4			
5	35°51'	-04'	96°	35°44'	-05'	97°	35°36'	-07'	98°	35°28'	-08'	98°	35°19'	-09'	99°	35°09'	-10'	100°	34°59'	-12'	100°	5			
6	35°46'	-05'	97°	35°38'	-06'	98°	35°29'	-07'	99°	35°20'	-09'	100°	35°10'	-10'	100°	34°59'	-11'	101°	34°47'	-12'	102°	6			
7	35°41'	-06'	99°	35°32'	-07'	99°	35°22'	-08'	100°	35°11'	-09'	101°	35°00'	-11'	101°	34°47'	-12'	102°	34°34'	-13'	103°	7			
8	35°36'	-06'	100°	35°25'	-08'	101°	35°14'	-09'	101°	35°02'	-10'	102°	34°49'	-11'	103°	34°35'	-13'	103°	34°21'	-14'	104°	8			
9	35°29'	-07'	101°	35°17'	-08'	102°	35°05'	-10'	102°	34°52'	-11'	103°	34°38'	-12'	104°	34°23'	-13'	104°	34°08'	-14'	105°	9			
10	35°22'	-08'	102°	35°09'	-09'	103°	34°55'	-10'	104°	34°41'	-12'	104°	34°26'	-13'	105°	34°10'	-14'	106°	33°53'	-15'	106°	10			
11	35°14'	-09'	104°	35°00'	-10'	104°	34°45'	-11'	105°	34°29'	-12'	106°	34°13'	-13'	106°	33°56'	-15'	107°	33°38'	-16'	107°	11			
12	35°06'	-09'	105°	34°50'	-11'	105°	34°34'	-12'	106°	34°17'	-13'	107°	33°59'	-14'	107°	33°41'	-15'	108°	33°22'	-16'	109°	12			
13	34°56'	-10'	106°	34°40'	-11'	107°	34°22'	-12'	107°	34°04'	-14'	108°	33°45'	-15'	109°	33°26'	-16'	109°	33°06'	-17'	110°	13			
14	34°46'	-11'	107°	34°28'	-12'	108°	34°10'	-13'	108°	33°50'	-14'	109°	33°31'	-15'	110°	33°10'	-17'	110°	32°49'	-18'	111°	14			
15	34°36'	-11'	108°	34°16'	-13'	109°	33°57'	-14'	110°	33°36'	-15'	110°	33°15'	-16'	111°	32°53'	-17'	111°	32°31'	-18'	112°	15			
16	34°24'	-12'	110°	34°04'	-13'	110°	33°43'	-14'	111°	33°21'	-16'	111°	32°59'	-17'	112°	32°36'	-18'	113°	32°13'	-19'	113°	16			
17	34°12'	-13'	111°	33°51'	-14'	111°	33°28'	-15'	112°	33°06'	-16'	113°	32°42'	-17'	113°	32°19'	-18'	114°	31°54'	-19'	114°	17			
18	33°59'	-13'	112°	33°37'	-15'	113°	33°13'	-16'	113°	32°50'	-17'	114°	32°25'	-18'	114°	32°00'	-19'	115°	31°35'	-20'	115°	18			
19	33°46'	-14'	113°	33°22'	-15'	114°	32°58'	-16'	114°	32°33'	-17'	115°	32°07'	-18'	115°	31°41'	-20'	116°	31°15'	-21'	117°	19			
20	33°32'	-15'	114°	33°07'	-16'	115°	32°41'	-17'	115°	32°15'	-18'	116°	31°49'	-19'	117°	31°22'	-20'	117°	30°54'	-21'	118°	20			
21	33°17'	-15'	115°	32°51'	-17'	116°	32°24'	-18'	117°	31°57'	-19'	117°	31°30'	-20'	118°	31°02'	-21'	118°	30°33'	-22'	119°	21			
22	33°01'	-16'	117°	32°34'	-17'	117°	32°07'	-18'	118°	31°39'	-19'	118°	31°10'	-20'	119°	30°41'	-21'	119°	30°11'	-22'	120°	22			
23	32°45'	-17'	118°	32°17'	-18'	118°	31°49'	-19'	119°	31°19'	-20'	119°	30°50'	-21'	120°	30°20'	-22'	120°	29°49'	-23'	121°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6						

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°	0			1			2			3			4			5			6			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	37°00'	00'	90°	37°00'	-02'	91°	36°58'	-03'	92°	36°56'	-04'	92°	36°54'	-06'	93°	36°50'	-07'	94°	36°46'	-08'	95°	0			
1	37°00'	-01'	91°	36°58'	-02'	92°	36°55'	-04'	93°	36°52'	-05'	94°	36°48'	-06'	94°	36°43'	-08'	95°	36°38'	-09'	96°	1			
2	36°58'	-02'	93°	36°55'	-03'	93°	36°52'	-05'	94°	36°47'	-06'	95°	36°42'	-07'	95°	36°36'	-08'	96°	36°29'	-10'	97°	2			
3	36°56'	-03'	94°	36°52'	-04'	95°	36°47'	-05'	95°	36°41'	-07'	96°	36°35'	-08'	97°	36°27'	-09'	97°	36°19'	-10'	98°	3			
4	36°54'	-04'	95°	36°48'	-05'	96°	36°42'	-06'	96°	36°35'	-07'	97°	36°27'	-09'	98°	36°18'	-10'	99°	36°08'	-11'	99°	4			
5	36°50'	-04'	96°	36°43'	-06'	97°	36°36'	-07'	98°	36°27'	-08'	98°	36°18'	-09'	99°	36°08'	-11'	100°	35°57'	-12'	101°	5			
6	36°46'	-05'	97°	36°38'	-06'	98°	36°29'	-08'	99°	36°19'	-09'	100°	36°08'	-10'	100°	35°57'	-11'	101°	35°45'	-13'	102°	6			
7	36°41'	-06'	99°	36°31'	-07'	99°	36°21'	-08'	100°	36°10'	-10'	101°	35°58'	-11'	102°	35°46'	-12'	102°	35°33'	-13'	103°	7			
8	36°35'	-07'	100°	36°24'	-08'	101°	36°13'	-09'	101°	36°00'	-10'	102°	35°47'	-12'	103°	35°34'	-13'	104°	35°19'	-14'	104°	8			
9	36°28'	-07'	101°	36°16'	-09'	102°	36°03'	-10'	103°	35°50'	-11'	103°	35°36'	-12'	104°	35°21'	-14'	105°	35°05'	-15'	105°	9			
10	36°21'	-08'	102°	36°08'	-09'	103°	35°53'	-11'	104°	35°39'	-12'	105°	35°23'	-13'	105°	35°07'	-14'	106°	34°50'	-15'	107°	10			
11	36°13'	-09'	104°	35°58'	-10'	104°	35°43'	-11'	105°	35°27'	-13'	106°	35°10'	-14'	106°	34°53'	-15'	107°	34°35'	-16'	108°	11			
12	36°04'	-10'	105°	35°48'	-11'	106°	35°31'	-12'	106°	35°14'	-13'	107°	34°56'	-14'	108°	34°38'	-16'	108°	34°19'	-17'	109°	12			
13	35°54'	-10'	106°	35°37'	-12'	107°	35°19'	-13'	107°	35°01'	-14'	108°	34°42'	-15'	109°	34°22'	-16'	109°	34°02'	-17'	110°	13			
14	35°44'	-11'	107°	35°25'	-12'	108°	35°07'	-14'	109°	34°47'	-15'	109°	34°27'	-16'	110°	34°06'	-17'	111°	33°45'	-18'	111°	14			
15	35°33'	-12'	109°	35°13'	-13'	109°	34°53'	-14'	110°	34°32'	-15'	111°	34°11'	-16'	111°	33°49'	-18'	112°	33°26'	-19'	112°	15			
16	35°21'	-13'	110°	35°00'	-14'	110°	34°39'	-15'	111°	34°17'	-16'	112°	33°54'	-17'	112°	33°31'	-18'	113°	33°08'	-19'	114°	16			
17	35°08'	-13'	111°	34°46'	-14'	112°	34°24'	-16'	112°	34°01'	-17'	113°	33°37'	-18'	113°	33°13'	-19'	114°	32°48'	-20'	115°	17			
18	34°55'	-14'	112°	34°32'	-15'	113°	34°08'	-16'	113°	33°44'	-17'	114°	33°20'	-18'	115°	32°54'	-19'	115°	32°28'	-21'	116°	18			
19	34°41'	-15'	113°	34°17'	-16'	114°	33°52'	-17'	115°	33°27'	-18'	115°	33°01'	-19'	116°	32°35'	-20'	116°	32°08'	-21'	117°	19			
20	34°26'	-15'	115°	34°01'	-16'	115°	33°35'	-17'	116°	33°09'	-19'	116°	32°42'	-20'	117°	32°15'	-21'	117°	31°47'	-22'	118°	20			
21	34°11'	-16'	116°	33°45'	-17'	116°	33°18'	-18'	117°	32°50'	-19'	117°	32°23'	-20'	118°	31°54'	-21'	119°	31°25'	-22'	119°	21			
22	33°55'	-17'	117°	33°28'	-18'	117°	33°00'	-19'	118°	32°31'	-20'	119°	32°02'	-21'	119°	31°33'	-22'	120°	31°03'	-23'	120°	22			
23	33°38'	-17'	118°	33°10'	-18'	119°	32°41'	-19'	119°	32°12'	-20'	120°	31°42'	-21'	120°	31°11'	-22'	121°	30°40'	-23'	121°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6						

53° 307° LHA

Latitude CONTRARY to 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

52° 308° LHA

**Latitude CONTRARY to Declination**

52° 308° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	38°00'	00'	90°	38°00'	-02'	91°	37°58'	-03'	92°	37°56'	-04'	92°	37°53'	-06'	93°	37°50'	-07'	94°	37°45'	-08'	95°	0
1	38°00'	-01'	91°	37°58'	-03'	92°	37°55'	-04'	93°	37°52'	-05'	94°	37°48'	-07'	94°	37°43'	-08'	95°	37°37'	-09'	96°	1
2	37°58'	-02'	93°	37°55'	-03'	93°	37°51'	-05'	94°	37°47'	-06'	95°	37°41'	-07'	96°	37°35'	-09'	96°	37°28'	-10'	97°	2
3	37°56'	-03'	94°	37°52'	-04'	95°	37°47'	-05'	95°	37°41'	-07'	96°	37°34'	-08'	97°	37°26'	-09'	98°	37°18'	-11'	98°	3
4	37°53'	-04'	95°	37°48'	-05'	96°	37°41'	-06'	97°	37°34'	-08'	97°	37°26'	-09'	98°	37°17'	-10'	99°	37°07'	-11'	100°	4
5	37°50'	-04'	96°	37°43'	-06'	97°	37°35'	-07'	98°	37°26'	-08'	99°	37°17'	-10'	99°	37°07'	-11'	100°	36°56'	-12'	101°	5
6	37°45'	-05'	98°	37°37'	-07'	98°	37°28'	-08'	99°	37°18'	-09'	100°	37°07'	-10'	101°	36°56'	-12'	101°	36°44'	-13'	102°	6
7	37°40'	-06'	99°	37°30'	-07'	100°	37°20'	-09'	100°	37°09'	-10'	101°	36°57'	-11'	102°	36°44'	-12'	103°	36°31'	-14'	103°	7
8	37°34'	-07'	100°	37°23'	-08'	101°	37°11'	-09'	102°	36°59'	-11'	102°	36°46'	-12'	103°	36°32'	-13'	104°	36°17'	-14'	105°	8
9	37°27'	-08'	101°	37°15'	-09'	102°	37°02'	-10'	103°	36°48'	-11'	104°	36°34'	-13'	104°	36°19'	-14'	105°	36°03'	-15'	106°	9
10	37°19'	-08'	103°	37°06'	-10'	103°	36°52'	-11'	104°	36°37'	-12'	105°	36°21'	-13'	106°	36°05'	-15'	106°	35°47'	-16'	107°	10
11	37°11'	-09'	104°	36°56'	-10'	105°	36°41'	-12'	105°	36°24'	-13'	106°	36°08'	-14'	107°	35°50'	-15'	107°	35°32'	-17'	108°	11
12	37°02'	-10'	105°	36°46'	-11'	106°	36°29'	-12'	107°	36°12'	-14'	107°	35°53'	-15'	108°	35°35'	-16'	109°	35°15'	-17'	109°	12
13	36°52'	-11'	106°	36°34'	-12'	107°	36°17'	-13'	108°	35°58'	-14'	108°	35°39'	-16'	109°	35°19'	-17'	110°	34°58'	-18'	110°	13
14	36°41'	-12'	108°	36°22'	-13'	108°	36°03'	-14'	109°	35°43'	-15'	110°	35°23'	-16'	110°	35°02'	-17'	111°	34°40'	-19'	112°	14
15	36°29'	-12'	109°	36°10'	-13'	109°	35°49'	-15'	110°	35°28'	-16'	111°	35°07'	-17'	111°	34°44'	-18'	112°	34°22'	-19'	113°	15
16	36°17'	-13'	110°	35°56'	-14'	111°	35°35'	-15'	111°	35°13'	-16'	112°	34°50'	-18'	113°	34°26'	-19'	113°	34°02'	-20'	114°	16
17	36°04'	-14'	111°	35°42'	-15'	112°	35°19'	-16'	113°	34°56'	-17'	113°	34°32'	-18'	114°	34°08'	-19'	114°	33°43'	-20'	115°	17
18	35°50'	-14'	112°	35°27'	-16'	113°	35°03'	-17'	114°	34°39'	-18'	114°	34°14'	-19'	115°	33°48'	-20'	116°	33°22'	-21'	116°	18
19	35°36'	-15'	114°	35°12'	-16'	114°	34°47'	-17'	115°	34°21'	-18'	116°	33°55'	-20'	116°	33°28'	-21'	117°	33°01'	-22'	117°	19
20	35°21'	-16'	115°	34°55'	-17'	115°	34°29'	-18'	116°	34°03'	-19'	117°	33°35'	-20'	117°	33°08'	-21'	118°	32°39'	-22'	118°	20
21	35°05'	-17'	116°	34°38'	-18'	117°	34°11'	-19'	117°	33°44'	-20'	118°	33°15'	-21'	118°	32°47'	-22'	119°	32°17'	-23'	120°	21
22	34°48'	-17'	117°	34°21'	-18'	118°	33°53'	-19'	118°	33°24'	-20'	119°	32°55'	-21'	120°	32°25'	-22'	120°	31°54'	-23'	121°	22
23	34°31'	-18'	118°	34°03'	-19'	119°	33°33'	-20'	119°	33°04'	-21'	120°	32°33'	-22'	121°	32°02'	-23'	121°	31°31'	-24'	122°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	<b>0</b>			<b>1</b>			<b>2</b>			<b>3</b>			<b>4</b>			<b>5</b>			<b>6</b>			

52° 308° LHA

**Latitude CONTRARY to DECLINATION**

52° 308° LHA

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

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

51° 309° LHA

**Latitude CONTRARY to Declination**

51° 309° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	39°00'	00'	90°	39°00'	-02'	91°	38°58'	-03'	92°	38°56'	-04'	92°	38°53'	-06'	93°	38°49'	-07'	94°	38°45'	-08'	95°	0
1	39°00'	-01'	91°	38°58'	-03'	92°	38°55'	-04'	93°	38°52'	-05'	94°	38°47'	-07'	95°	38°42'	-08'	95°	38°36'	-09'	96°	1
2	38°58'	-02'	93°	38°55'	-03'	93°	38°51'	-05'	94°	38°46'	-06'	95°	38°41'	-07'	96°	38°34'	-09'	97°	38°27'	-10'	97°	2
3	38°56'	-03'	94°	38°52'	-04'	95°	38°46'	-06'	95°	38°40'	-07'	96°	38°33'	-08'	97°	38°26'	-10'	98°	38°17'	-11'	99°	3
4	38°53'	-04'	95°	38°47'	-05'	96°	38°41'	-06'	97°	38°33'	-08'	98°	38°25'	-09'	98°	38°16'	-10'	99°	38°06'	-12'	100°	4
5	38°49'	-05'	96°	38°42'	-06'	97°	38°34'	-07'	98°	38°26'	-09'	99°	38°16'	-10'	100°	38°06'	-11'	100°	37°54'	-12'	101°	5
6	38°45'	-05'	98°	38°36'	-07'	98°	38°27'	-08'	99°	38°17'	-09'	100°	38°06'	-11'	101°	37°54'	-12'	102°	37°42'	-13'	102°	6
7	38°39'	-06'	99°	38°30'	-08'	100°	38°19'	-09'	101°	38°08'	-10'	101°	37°55'	-11'	102°	37°42'	-13'	103°	37°29'	-14'	104°	7
8	38°33'	-07'	100°	38°22'	-08'	101°	38°10'	-10'	102°	37°57'	-11'	103°	37°44'	-12'	103°	37°30'	-14'	104°	37°15'	-15'	105°	8
9	38°26'	-08'	102°	38°13'	-09'	102°	38°00'	-11'	103°	37°46'	-12'	104°	37°32'	-13'	105°	37°16'	-14'	105°	37°00'	-15'	106°	9
10	38°18'	-09'	103°	38°04'	-10'	104°	37°50'	-11'	104°	37°35'	-13'	105°	37°19'	-14'	106°	37°02'	-15'	107°	36°45'	-16'	107°	10
11	38°09'	-10'	104°	37°54'	-11'	105°	37°39'	-12'	106°	37°22'	-13'	106°	37°05'	-15'	107°	36°47'	-16'	108°	36°28'	-17'	108°	11
12	38°00'	-10'	105°	37°43'	-12'	106°	37°26'	-13'	107°	37°09'	-14'	108°	36°50'	-15'	108°	36°31'	-16'	109°	36°11'	-18'	110°	12
13	37°49'	-11'	107°	37°32'	-12'	107°	37°14'	-14'	108°	36°55'	-15'	109°	36°35'	-16'	109°	36°15'	-17'	110°	35°54'	-18'	111°	13
14	37°38'	-12'	108°	37°19'	-13'	109°	37°00'	-14'	109°	36°40'	-16'	110°	36°19'	-17'	111°	35°58'	-18'	111°	35°35'	-19'	112°	14
15	37°26'	-13'	109°	37°06'	-14'	110°	36°46'	-15'	110°	36°24'	-16'	111°	36°02'	-17'	112°	35°40'	-19'	112°	35°16'	-20'	113°	15
16	37°13'	-13'	110°	36°52'	-15'	111°	36°31'	-16'	112°	36°08'	-17'	112°	35°45'	-18'	113°	35°21'	-19'	114°	34°57'	-20'	114°	16
17	37°00'	-14'	111°	36°38'	-15'	112°	36°15'	-17'	113°	35°51'	-18'	114°	35°27'	-19'	114°	35°02'	-20'	115°	34°37'	-21'	115°	17
18	36°46'	-15'	113°	36°22'	-16'	113°	35°58'	-17'	114°	35°33'	-18'	115°	35°08'	-19'	115°	34°42'	-21'	116°	34°16'	-22'	117°	18
19	36°31'	-16'	114°	36°06'	-17'	115°	35°41'	-18'	115°	35°15'	-19'	116°	34°49'	-20'	116°	34°22'	-21'	117°	33°54'	-22'	118°	19
20	36°15'	-16'	115°	35°49'	-17'	116°	35°23'	-19'	116°	34°56'	-20'	117°	34°29'	-21'	118°	34°00'	-22'	118°	33°32'	-23'	119°	20
21	35°59'	-17'	116°	35°32'	-18'	117°	35°05'	-19'	118°	34°36'	-20'	118°	34°08'	-21'	119°	33°39'	-22'	119°	33°09'	-23'	120°	21
22	35°42'	-18'	117°	35°14'	-19'	118°	34°45'	-20'	119°	34°16'	-21'	119°	33°47'	-22'	120°	33°16'	-23'	120°	32°46'	-24'	121°	22
23	35°24'	-18'	119°	34°55'	-19'	119°	34°25'	-21'	120°	33°55'	-22'	120°	33°25'	-23'	121°	32°53'	-24'	122°	32°22'	-24'	122°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	<b>0</b>			<b>1</b>			<b>2</b>			<b>3</b>			<b>4</b>			<b>5</b>			<b>6</b>			

51° 309° LHA

**Latitude CONTRARY to DECLINATION**

51° 309° LHA

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

50° 310° LHA		Latitude CONTRARY to Declination						50° 310° LHA														
Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	40°00'	00'	90°	40°00'	-02'	91°	39°58'	-03'	92°	39°56'	-05'	93°	39°53'	-06'	93°	39°49'	-07'	94°	39°44'	-09'	95°	0
1	40°00'	-01'	91°	39°58'	-03'	92°	39°55'	-04'	93°	39°52'	-05'	94°	39°47'	-07'	95°	39°42'	-08'	95°	39°36'	-09'	96°	1
2	39°58'	-02'	93°	39°55'	-04'	93°	39°51'	-05'	94°	39°46'	-06'	95°	39°40'	-08'	96°	39°34'	-09'	97°	39°26'	-10'	98°	2
3	39°56'	-03'	94°	39°52'	-04'	95°	39°46'	-06'	96°	39°40'	-07'	96°	39°33'	-08'	97°	39°25'	-10'	98°	39°16'	-11'	99°	3
4	39°53'	-04'	95°	39°47'	-05'	96°	39°40'	-07'	97°	39°33'	-08'	98°	39°24'	-09'	99°	39°15'	-11'	99°	39°05'	-12'	100°	4
5	39°49'	-05'	97°	39°42'	-06'	97°	39°34'	-07'	98°	39°25'	-09'	99°	39°15'	-10'	100°	39°04'	-11'	101°	38°53'	-13'	101°	5
6	39°44'	-06'	98°	39°36'	-07'	99°	39°26'	-08'	99°	39°16'	-10'	100°	39°05'	-11'	101°	38°53'	-12'	102°	38°40'	-14'	103°	6
7	39°39'	-07'	99°	39°29'	-08'	100°	39°18'	-09'	101°	39°06'	-10'	102°	38°54'	-12'	102°	38°41'	-13'	103°	38°27'	-14'	104°	7
8	39°32'	-07'	100°	39°21'	-09'	101°	39°09'	-10'	102°	38°56'	-11'	103°	38°42'	-13'	104°	38°28'	-14'	104°	38°12'	-15'	105°	8
9	39°25'	-08'	102°	39°12'	-10'	102°	38°59'	-11'	103°	38°45'	-12'	104°	38°30'	-13'	105°	38°14'	-15'	106°	37°57'	-16'	106°	9
10	39°16'	-09'	103°	39°03'	-10'	104°	38°48'	-12'	105°	38°32'	-13'	105°	38°16'	-14'	106°	37°59'	-15'	107°	37°41'	-17'	108°	10
11	39°07'	-10'	104°	38°52'	-11'	105°	38°36'	-12'	106°	38°20'	-14'	107°	38°02'	-15'	107°	37°44'	-16'	108°	37°25'	-17'	109°	11
12	38°57'	-11'	106°	38°41'	-12'	106°	38°24'	-13'	107°	38°06'	-14'	108°	37°47'	-16'	109°	37°28'	-17'	109°	37°08'	-18'	110°	12
13	38°47'	-12'	107°	38°29'	-13'	108°	38°11'	-14'	108°	37°51'	-15'	109°	37°31'	-16'	110°	37°11'	-18'	110°	36°49'	-19'	111°	13
14	38°35'	-12'	108°	38°16'	-14'	109°	37°57'	-15'	110°	37°36'	-16'	110°	37°15'	-17'	111°	36°53'	-18'	112°	36°31'	-19'	112°	14
15	38°23'	-13'	109°	38°03'	-14'	110°	37°42'	-16'	111°	37°20'	-17'	111°	36°58'	-18'	112°	36°35'	-19'	113°	36°11'	-20'	114°	15
16	38°10'	-14'	111°	37°48'	-15'	111°	37°26'	-16'	112°	37°03'	-17'	113°	36°40'	-19'	113°	36°16'	-20'	114°	35°51'	-21'	115°	16
17	37°56'	-15'	112°	37°33'	-16'	112°	37°10'	-17'	113°	36°46'	-18'	114°	36°21'	-19'	115°	35°56'	-20'	115°	35°30'	-21'	116°	17
18	37°41'	-15'	113°	37°17'	-17'	114°	36°53'	-18'	114°	36°28'	-19'	115°	36°02'	-20'	116°	35°36'	-21'	116°	35°09'	-22'	117°	18
19	37°26'	-16'	114°	37°01'	-17'	115°	36°35'	-18'	116°	36°09'	-20'	116°	35°42'	-21'	117°	35°15'	-22'	118°	34°47'	-23'	118°	19
20	37°10'	-17'	115°	36°43'	-18'	116°	36°17'	-19'	117°	35°49'	-20'	117°	35°22'	-21'	118°	34°53'	-22'	119°	34°24'	-23'	119°	20
21	36°53'	-18'	117°	36°25'	-19'	117°	35°58'	-20'	118°	35°29'	-21'	119°	35°00'	-22'	119°	34°31'	-23'	120°	34°01'	-24'	120°	21
22	36°35'	-18'	118°	36°07'	-19'	118°	35°38'	-20'	119°	35°08'	-22'	120°	34°38'	-23'	120°	34°08'	-24'	121°	33°37'	-25'	121°	22
23	<u>36°17'</u>	<u>-19'</u>	<u>119°</u>	<u>35°47'</u>	<u>-20'</u>	<u>120°</u>	<u>35°17'</u>	<u>-21'</u>	<u>120°</u>	<u>34°47'</u>	<u>-22'</u>	<u>121°</u>	<u>34°16'</u>	<u>-23'</u>	<u>121°</u>	<u>33°44'</u>	<u>-24'</u>	<u>122°</u>	<u>33°12'</u>	<u>-25'</u>	<u>123°</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°
	0			1			2			3			4			5			6			

50° 310° LHA

Latitude CONTRARY to DECLINATION

50° 310° LHA

South Lat. LHA &gt; 180° .. Zn = 180-Z LHA &lt; 180° .. Zn= 180+Z

49° 311° LHA		Latitude CONTRARY to Declination						49° 311° LHA														
Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	41°00'	00'	90°	41°00'	-02'	91°	40°58'	-03'	92°	40°56'	-05'	93°	40°53'	-06'	93°	40°49'	-07'	94°	40°44'	-09'	95°	0
1	41°00'	-01'	91°	40°58'	-03'	92°	40°55'	-04'	93°	40°51'	-06'	94°	40°47'	-07'	95°	40°41'	-08'	96°	40°35'	-10'	96°	1
2	40°58'	-02'	93°	40°55'	-04'	94°	40°51'	-05'	94°	40°46'	-06'	95°	40°40'	-08'	96°	40°33'	-09'	97°	40°25'	-10'	98°	2
3	40°56'	-03'	94°	40°51'	-05'	95°	40°46'	-06'	96°	40°39'	-07'	97°	40°32'	-09'	97°	40°24'	-10'	98°	40°15'	-11'	99°	3
4	40°53'	-04'	95°	40°47'	-05'	96°	40°40'	-07'	97°	40°32'	-08'	98°	40°23'	-10'	99°	40°14'	-11'	100°	40°04'	-12'	100°	4
5	40°49'	-05'	97°	40°41'	-06'	97°	40°33'	-08'	98°	40°24'	-09'	99°	40°14'	-10'	100°	40°03'	-12'	101°	39°51'	-13'	102°	5
6	40°44'	-06'	98°	40°35'	-07'	99°	40°25'	-09'	100°	40°15'	-10'	100°	40°04'	-11'	101°	39°51'	-13'	102°	39°38'	-14'	103°	6
7	40°38'	-07'	99°	40°28'	-08'	100°	40°17'	-09'	101°	40°05'	-11'	102°	39°52'	-12'	103°	39°39'	-13'	103°	39°25'	-15'	104°	7
8	40°31'	-08'	101°	40°20'	-09'	101°	40°07'	-10'	102°	39°54'	-12'	103°	39°40'	-13'	104°	39°26'	-14'	105°	39°10'	-15'	105°	8
9	40°23'	-09'	102°	40°11'	-10'	103°	39°57'	-11'	103°	39°43'	-12'	104°	39°27'	-14'	105°	39°11'	-15'	106°	38°55'	-16'	107°	9
10	40°15'	-09'	103°	40°01'	-11'	104°	39°46'	-12'	105°	39°30'	-13'	106°	39°14'	-15'	106°	38°56'	-16'	107°	38°38'	-17'	108°	10
11	40°05'	-10'	104°	39°50'	-12'	105°	39°34'	-13'	106°	39°17'	-14'	107°	38°59'	-15'	108°	38°41'	-17'	108°	38°21'	-18'	109°	11
12	39°55'	-11'	106°	39°39'	-12'	107°	39°21'	-14'	107°	39°03'	-15'	108°	38°44'	-16'	109°	38°24'	-17'	110°	38°04'	-18'	110°	12
13	39°44'	-12'	107°	39°26'	-13'	108°	39°07'	-14'	109°	38°48'	-16'	109°	38°28'	-17'	110°	38°07'	-18'	111°	37°45'	-19'	112°	13
14	39°32'	-13'	108°	39°13'	-14'	109°	38°53'	-15'	110°	38°32'	-16'	111°	38°11'	-18'	111°	37°49'	-19'	112°	37°26'	-20'	113°	14
15	39°19'	-14'	110°	38°59'	-15'	110°	38°38'	-16'	111°	38°16'	-17'	112°	37°53'	-18'	113°	37°30'	-20'	113°	37°06'	-21'	114°	15
16	39°06'	-14'	111°	38°44'	-16'	112°	38°22'	-17'	112°	37°59'	-18'	113°	37°35'	-19'	114°	37°10'	-20'	114°	36°45'	-21'	115°	16
17	38°51'	-15'	112°	38°29'	-16'	113°	38°05'	-18'	114°	37°41'	-19'	114°	37°16'	-20'	115°	36°50'	-21'	116°	36°24'	-22'	116°	17
18	38°36'	-16'	113°	38°12'	-17'	114°	37°47'	-18'	115°	37°22'	-19'	115°	36°56'	-21'	116°	36°29'	-22'	117°	36°02'	-23'	117°	18
19	38°20'	-17'	115°	37°55'	-18'	115°	37°29'	-19'	116°	37°03'	-20'	117°	36°35'	-21'	117°	36°08'	-22'	118°	35°39'	-23'	119°	19
20	38°04'	-17'	116°	37°37'	-19'	116°	37°10'	-20'	117°	36°43'	-21'	118°	36°14'	-22'	118°	35°45'	-23'	119°	35°16'	-24'	120°	20
21	37°46'	-18'	117°	37°19'	-19'	118°	36°50'	-20'	118°	36°22'	-21'	119°	35°52'	-23'	120°	35°22'	-24'	120°	34°52'	-25'	121°	21
22	37°28'	-19'	118°	36°59'	-20'	119°	36°30'	-21'	119°	36°00'	-22'	120°	35°30'	-23'	121°	34°59'	-24'	121°	34°27'	-25'	122°	22
23	<u>37°09'</u>	<u>-20'</u>	<u>119°</u>	<u>36°39'</u>	<u>-21'</u>	<u>120°</u>	<u>36°09'</u>	<u>-22'</u>	<u>121°</u>	<u>35°38'</u>	<u>-23'</u>	<u>121°</u>	<u>35°07'</u>	<u>-24'</u>	<u>122°</u>	<u>34°35'</u>	<u>-25'</u>	<u>122°</u>	<u>34°02'</u>	<u>-26'</u>	<u>123°</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°
	0			1			2			3			4			5			6			

49° 311° LHA

Latitude CONTRARY to DECLINATION

49° 311° LHA

South Lat. LHA &gt; 180° .. Zn = 180-Z LHA &lt; 180° .. Zn= 180+Z

**48° 312° LHA**

**Latitude CONTRARY to Declination**

**48° 312° LHA**

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	42°00'	00'	90°	42°00'	-02'	91°	41°58'	-03'	92°	41°56'	-05'	93°	41°52'	-06'	94°	41°48'	-07'	94°	41°43'	-09'	95°	0
1	42°00'	-01'	91°	41°58'	-03'	92°	41°55'	-04'	93°	41°51'	-06'	94°	41°46'	-07'	95°	41°41'	-08'	96°	41°34'	-10'	97°	1
2	41°58'	-02'	93°	41°55'	-04'	94°	41°51'	-05'	94°	41°45'	-07'	95°	41°39'	-08'	96°	41°32'	-09'	97°	41°24'	-11'	98°	2
3	41°56'	-03'	94°	41°51'	-05'	95°	41°45'	-06'	96°	41°39'	-07'	97°	41°31'	-09'	98°	41°23'	-10'	98°	41°14'	-12'	99°	3
4	41°52'	-04'	95°	41°46'	-06'	96°	41°39'	-07'	97°	41°31'	-08'	98°	41°23'	-10'	99°	41°13'	-11'	100°	41°02'	-12'	101°	4
5	41°48'	-05'	97°	41°41'	-07'	98°	41°32'	-08'	98°	41°23'	-09'	99°	41°13'	-11'	100°	41°02'	-12'	101°	40°50'	-13'	102°	5
6	41°43'	-06'	98°	41°34'	-07'	99°	41°24'	-09'	100°	41°14'	-10'	101°	41°02'	-12'	102°	40°50'	-13'	102°	40°37'	-14'	103°	6
7	41°37'	-07'	99°	41°27'	-08'	100°	41°16'	-10'	101°	41°04'	-11'	102°	40°51'	-12'	103°	40°37'	-14'	104°	40°22'	-15'	104°	7
8	41°30'	-08'	101°	41°18'	-09'	102°	41°06'	-11'	102°	40°53'	-12'	103°	40°38'	-13'	104°	40°23'	-15'	105°	40°07'	-16'	106°	8
9	41°22'	-09'	102°	41°09'	-10'	103°	40°55'	-11'	104°	40°41'	-13'	105°	40°25'	-14'	105°	40°09'	-15'	106°	39°52'	-17'	107°	9
10	41°13'	-10'	103°	40°59'	-11'	104°	40°44'	-12'	105°	40°28'	-14'	106°	40°11'	-15'	107°	39°53'	-16'	107°	39°35'	-17'	108°	10
11	41°04'	-11'	105°	40°48'	-12'	105°	40°31'	-13'	106°	40°14'	-14'	107°	39°56'	-16'	108°	39°37'	-17'	109°	39°18'	-18'	110°	11
12	40°53'	-11'	106°	40°36'	-13'	107°	40°18'	-14'	108°	40°00'	-15'	108°	39°40'	-17'	109°	39°20'	-18'	110°	38°59'	-19'	111°	12
13	40°41'	-12'	107°	40°23'	-14'	108°	40°04'	-15'	109°	39°44'	-16'	110°	39°24'	-17'	110°	39°03'	-19'	111°	38°40'	-20'	112°	13
14	40°29'	-13'	109°	40°10'	-14'	109°	39°49'	-16'	110°	39°28'	-17'	111°	39°07'	-18'	112°	38°44'	-19'	112°	38°21'	-20'	113°	14
15	40°16'	-14'	110°	39°55'	-15'	111°	39°34'	-16'	111°	39°11'	-18'	112°	38°48'	-19'	113°	38°25'	-20'	114°	38°00'	-21'	114°	15
16	40°02'	-15'	111°	39°40'	-16'	112°	39°17'	-17'	113°	38°54'	-18'	113°	38°30'	-20'	114°	38°05'	-21'	115°	37°39'	-22'	116°	16
17	39°47'	-16'	112°	39°24'	-17'	113°	39°00'	-18'	114°	38°35'	-19'	115°	38°10'	-20'	115°	37°44'	-21'	116°	37°17'	-23'	117°	17
18	39°31'	-16'	114°	39°07'	-18'	114°	38°42'	-19'	115°	38°16'	-20'	116°	37°50'	-21'	117°	37°22'	-22'	117°	36°55'	-23'	118°	18
19	39°15'	-17'	115°	38°49'	-18'	116°	38°23'	-20'	116°	37°56'	-21'	117°	37°29'	-22'	118°	37°00'	-23'	118°	36°32'	-24'	119°	19
20	38°58'	-18'	116°	38°31'	-19'	117°	38°03'	-20'	118°	37°35'	-21'	118°	37°07'	-22'	119°	36°38'	-23'	120°	36°08'	-25'	120°	20
21	38°40'	-19'	117°	38°12'	-20'	118°	37°43'	-21'	119°	37°14'	-22'	119°	36°44'	-23'	120°	36°14'	-24'	121°	35°43'	-25'	121°	21
22	38°21'	-20'	119°	37°52'	-21'	119°	37°22'	-22'	120°	36°52'	-23'	121°	36°21'	-24'	121°	35°50'	-25'	122°	35°18'	-26'	122°	22
23	<u>38°01'</u>	<u>-20'</u>	<u>120°</u>	<u>37°31'</u>	<u>-21'</u>	<u>120°</u>	<u>37°00'</u>	<u>-22'</u>	<u>121°</u>	<u>36°29'</u>	<u>-23'</u>	<u>122°</u>	<u>35°57'</u>	<u>-24'</u>	<u>122°</u>	<u>35°25'</u>	<u>-25'</u>	<u>123°</u>	<u>34°52'</u>	<u>-26'</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°
	<b>0</b>			<b>1</b>			<b>2</b>			<b>3</b>			<b>4</b>			<b>5</b>			<b>6</b>			

**48° 312° LHA**

**Latitude CONTRARY to DECLINATION**

**48° 312° LHA**

**47° 313° LHA**

**Latitude CONTRARY to Declination**

**47° 313° LHA**

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	43°00'	00'	90°	43°00'	-02'	91°	42°58'	-03'	92°	42°56'	-05'	93°	42°52'	-06'	94°	42°48'	-08'	95°	42°42'	-09'	96°	0
1	43°00'	-01'	91°	42°58'	-03'	92°	42°55'	-04'	93°	42°51'	-06'	94°	42°46'	-07'	95°	42°40'	-09'	96°	42°33'	-10'	97°	1
2	42°58'	-02'	93°	42°55'	-04'	94°	42°50'	-05'	95°	42°45'	-07'	96°	42°39'	-08'	96°	42°32'	-09'	97°	42°24'	-11'	98°	2
3	42°56'	-03'	94°	42°51'	-05'	95°	42°45'	-06'	96°	42°38'	-08'	97°	42°31'	-09'	98°	42°22'	-10'	99°	42°13'	-12'	100°	3
4	42°52'	-04'	95°	42°46'	-06'	96°	42°39'	-07'	97°	42°31'	-09'	98°	42°22'	-10'	99°	42°12'	-11'	100°	42°01'	-13'	101°	4
5	42°48'	-05'	97°	42°40'	-07'	98°	42°32'	-08'	99°	42°22'	-10'	100°	42°12'	-11'	100°	42°00'	-12'	101°	41°48'	-14'	102°	5
6	42°42'	-06'	98°	42°33'	-08'	99°	42°24'	-09'	100°	42°13'	-10'	101°	42°01'	-12'	102°	41°48'	-13'	103°	41°35'	-14'	104°	6
7	42°36'	-07'	100°	42°26'	-09'	100°	42°14'	-10'	101°	42°02'	-11'	102°	41°49'	-13'	103°	41°35'	-14'	104°	41°20'	-15'	105°	7
8	42°29'	-08'	101°	42°17'	-10'	102°	42°04'	-11'	103°	41°51'	-12'	104°	41°36'	-14'	104°	41°21'	-15'	105°	41°05'	-16'	106°	8
9	42°21'	-09'	102°	42°08'	-10'	103°	41°54'	-12'	104°	41°39'	-13'	105°	41°23'	-14'	106°	41°06'	-16'	107°	40°49'	-17'	107°	9
10	42°12'	-10'	104°	41°57'	-11'	104°	41°42'	-13'	105°	41°25'	-14'	106°	41°08'	-15'	107°	40°50'	-17'	108°	40°32'	-18'	109°	10
11	42°02'	-11'	105°	41°46'	-12'	106°	41°29'	-14'	107°	41°11'	-15'	107°	40°53'	-16'	108°	40°34'	-17'	109°	40°14'	-19'	110°	11
12	41°51'	-12'	106°	41°33'	-13'	107°	41°15'	-14'	108°	40°57'	-16'	109°	40°37'	-17'	110°	40°16'	-18'	110°	39°55'	-19'	111°	12
13	41°39'	-13'	108°	41°20'	-14'	108°	41°01'	-15'	109°	40°41'	-17'	110°	40°20'	-18'	111°	39°58'	-19'	112°	39°36'	-20'	112°	13
14	41°26'	-14'	109°	41°06'	-15'	110°	40°46'	-16'	110°	40°24'	-17'	111°	40°02'	-19'	112°	39°39'	-20'	113°	39°16'	-21'	114°	14
15	41°12'	-15'	110°	40°51'	-16'	111°	40°29'	-17'	112°	40°07'	-18'	113°	39°43'	-19'	113°	39°19'	-21'	114°	38°55'	-22'	115°	15
16	40°58'	-15'	111°	40°36'	-17'	112°	40°12'	-18'	113°	39°49'	-19'	114°	39°24'	-20'	115°	38°59'	-21'	115°	38°33'	-22'	116°	16
17	40°42'	-16'	113°	40°19'	-17'	113°	39°55'	-19'	114°	39°30'	-20'	115°	39°04'	-21'	116°	38°38'	-22'	116°	38°10'	-23'	117°	17
18	40°26'	-17'	114°	40°02'	-18'	115°	39°36'	-19'	115°	39°10'	-21'	116°	38°43'	-22'	117°	38°16'	-23'	118°	37°47'	-24'	118°	18
19	40°09'	-18'	115°	39°43'	-19'	116°	39°17'	-20'	117°	38°49'	-21'	117°	38°21'	-22'	118°	37°53'	-23'	119°	37°24'	-24'	119°	19
20	39°51'	-19'	116°	39°24'	-20'	117°	38°57'	-21'	118°	38°28'	-22'	119°	37°59'	-23'	119°	37°29'	-24'	120°	36°59'	-25'	121°	20
21	39°33'	-19'	118°	39°05'	-21'	118°	38°36'	-22'	119°	38°06'	-23'	120°	37°36'	-24'	120°	37°05'	-25'	121°	36°34'	-26'	122°	21
22	39°13'	-20'	119°	38°44'	-21'	120°	38°14'	-22'	120°	37°43'	-23'	121°	37°12'	-24'	122°	36°41'	-25'	122°	36°08'	-26'	123°	22
23	<u>38°53'</u>	<u>-21'</u>	<u>120°</u>	<u>38°23'</u>	<u>-22'</u>	<u>121°</u>	<u>37°52'</u>	<u>-23'</u>	<u>121°</u>	<u>37°20'</u>	<u>-24'</u>	<u>122°</u>	<u>36°48'</u>	<u>-25'</u>	<u>123°</u>	<u>36°15'</u>	<u>-26'</u>	<u>123°</u>	<u>35°42'</u>	<u>-27'</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°
	<b>0</b>			<b>1</b>			<b>2</b>			<b>3</b>			<b>4</b>			<b>5</b>			<b>6</b>			

**47° 313° LHA**

**Latitude CONTRARY to DECLINATION**

**47° 313° LHA**

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

46° 314° LHA

**Latitude CONTRARY to Declination**

46° 314° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	44°00'	-01'	90°	43°59'	-02'	91°	43°58'	-03'	92°	43°55'	-05'	93°	43°52'	-06'	94°	43°47'	-08'	95°	43°42'	-09'	96°	0
1	43°59'	-02'	91°	43°58'	-03'	92°	43°55'	-04'	93°	43°51'	-06'	94°	43°46'	-07'	95°	43°40'	-09'	96°	43°33'	-10'	97°	1
2	43°58'	-03'	93°	43°55'	-04'	94°	43°50'	-05'	95°	43°45'	-07'	96°	43°38'	-08'	97°	43°31'	-10'	98°	43°23'	-11'	98°	2
3	43°55'	-04'	94°	43°51'	-05'	95°	43°45'	-06'	96°	43°38'	-08'	97°	43°30'	-09'	98°	43°21'	-11'	99°	43°11'	-12'	100°	3
4	43°52'	-05'	96°	43°46'	-06'	97°	43°38'	-07'	97°	43°30'	-09'	98°	43°21'	-10'	99°	43°11'	-12'	100°	42°59'	-13'	101°	4
5	43°47'	-06'	97°	43°40'	-07'	98°	43°31'	-08'	99°	43°21'	-10'	100°	43°11'	-11'	101°	42°59'	-13'	102°	42°46'	-14'	103°	5
6	43°42'	-07'	98°	43°33'	-08'	99°	43°23'	-09'	100°	43°11'	-11'	101°	42°59'	-12'	102°	42°46'	-13'	103°	42°33'	-15'	104°	6
7	43°35'	-08'	100°	43°25'	-09'	101°	43°13'	-10'	102°	43°01'	-12'	102°	42°47'	-13'	103°	42°33'	-14'	104°	42°18'	-16'	105°	7
8	43°28'	-08'	101°	43°16'	-10'	102°	43°03'	-11'	103°	42°49'	-13'	104°	42°34'	-14'	105°	42°19'	-15'	106°	42°02'	-17'	106°	8
9	43°19'	-09'	102°	43°06'	-11'	103°	42°52'	-12'	104°	42°36'	-14'	105°	42°20'	-15'	106°	42°03'	-16'	107°	41°46'	-17'	108°	9
10	43°10'	-10'	104°	42°55'	-12'	105°	42°40'	-13'	106°	42°23'	-14'	106°	42°06'	-16'	107°	41°47'	-17'	108°	41°28'	-18'	109°	10
11	43°00'	-11'	105°	42°43'	-13'	106°	42°26'	-14'	107°	42°09'	-15'	108°	41°50'	-17'	109°	41°30'	-18'	109°	41°10'	-19'	110°	11
12	42°48'	-12'	106°	42°31'	-14'	107°	42°12'	-15'	108°	41°53'	-16'	109°	41°33'	-17'	110°	41°12'	-19'	111°	40°51'	-20'	112°	12
13	42°36'	-13'	108°	42°17'	-14'	109°	41°58'	-16'	110°	41°37'	-17'	110°	41°16'	-18'	111°	40°54'	-20'	112°	40°31'	-21'	113°	13
14	42°23'	-14'	109°	42°03'	-15'	110°	41°42'	-17'	111°	41°20'	-18'	112°	40°57'	-19'	112°	40°34'	-20'	113°	40°10'	-21'	114°	14
15	42°09'	-15'	110°	41°47'	-16'	111°	41°25'	-17'	112°	41°02'	-19'	113°	40°38'	-20'	114°	40°14'	-21'	114°	39°49'	-22'	115°	15
16	41°54'	-16'	112°	41°31'	-17'	113°	41°08'	-18'	113°	40°43'	-20'	114°	40°18'	-21'	115°	39°53'	-22'	116°	39°26'	-23'	116°	16
17	41°38'	-17'	113°	41°14'	-18'	114°	40°49'	-19'	115°	40°24'	-20'	115°	39°58'	-21'	116°	39°31'	-23'	117°	39°03'	-24'	118°	17
18	41°21'	-18'	114°	40°56'	-19'	115°	40°30'	-20'	116°	40°04'	-21'	117°	39°36'	-22'	117°	39°08'	-23'	118°	38°40'	-24'	119°	18
19	41°03'	-18'	116°	40°37'	-20'	116°	40°10'	-21'	117°	39°42'	-22'	118°	39°14'	-23'	119°	38°45'	-24'	119°	38°15'	-25'	120°	19
20	40°45'	-19'	117°	40°18'	-20'	118°	39°49'	-21'	118°	39°21'	-23'	119°	38°51'	-24'	120°	38°21'	-25'	120°	37°50'	-26'	121°	20
21	40°26'	-20'	118°	39°57'	-21'	119°	39°28'	-22'	120°	38°58'	-23'	120°	38°27'	-24'	121°	37°56'	-25'	122°	37°25'	-26'	122°	21
22	40°06'	-21'	119°	39°36'	-22'	120°	39°06'	-23'	121°	38°35'	-24'	121°	38°03'	-25'	122°	37°31'	-26'	123°	36°58'	-27'	123°	22
23	39°45'	-22'	121°	39°14'	-23'	121°	38°43'	-24'	122°	38°11'	-25'	123°	37°38'	-26'	123°	37°05'	-27'	124°	36°31'	-28'	125°	23
Dec°	0			1			2			3			4			5			6			Dec°

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

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	45°00'	-01'	90°	44°59'	-02'	91°	44°58'	-03'	92°	44°55'	-05'	93°	44°52'	-06'	94°	44°47'	-08'	95°	44°41'	-09'	96°	0
1	44°59'	-02'	91°	44°57'	-03'	92°	44°54'	-05'	93°	44°50'	-06'	94°	44°45'	-07'	95°	44°39'	-09'	96°	44°32'	-10'	97°	1
2	44°58'	-03'	93°	44°54'	-04'	94°	44°50'	-06'	95°	44°44'	-07'	96°	44°38'	-08'	97°	44°30'	-10'	98°	44°22'	-11'	99°	2
3	44°55'	-04'	94°	44°50'	-05'	95°	44°44'	-07'	96°	44°37'	-08'	97°	44°29'	-09'	98°	44°20'	-11'	99°	44°10'	-12'	100°	3
4	44°52'	-05'	96°	44°45'	-06'	97°	44°38'	-08'	98°	44°29'	-09'	99°	44°20'	-10'	100°	44°09'	-12'	101°	43°58'	-13'	101°	4
5	44°47'	-06'	97°	44°39'	-07'	98°	44°30'	-09'	99°	44°20'	-10'	100°	44°09'	-11'	101°	43°58'	-13'	102°	43°45'	-14'	103°	5
6	44°41'	-07'	98°	44°32'	-08'	99°	44°22'	-10'	100°	44°10'	-11'	101°	43°58'	-12'	102°	43°45'	-14'	103°	43°30'	-15'	104°	6
7	44°34'	-08'	100°	44°24'	-09'	101°	44°12'	-11'	102°	43°59'	-12'	103°	43°46'	-13'	104°	43°31'	-15'	105°	43°15'	-16'	105°	7
8	44°27'	-09'	101°	44°15'	-10'	102°	44°01'	-12'	103°	43°47'	-13'	104°	43°32'	-14'	105°	43°16'	-16'	106°	42°59'	-17'	107°	8
9	44°18'	-10'	103°	44°04'	-11'	104°	43°50'	-13'	105°	43°34'	-14'	105°	43°18'	-15'	106°	43°01'	-17'	107°	42°42'	-18'	108°	9
10	44°08'	-11'	104°	43°53'	-12'	105°	43°37'	-13'	106°	43°20'	-15'	107°	43°03'	-16'	108°	42°44'	-17'	109°	42°24'	-19'	109°	10
11	43°57'	-12'	105°	43°41'	-13'	106°	43°24'	-14'	107°	43°06'	-16'	108°	42°46'	-17'	109°	42°27'	-18'	110°	42°06'	-20'	111°	11
12	43°46'	-13'	107°	43°28'	-14'	108°	43°09'	-15'	109°	42°50'	-17'	109°	42°29'	-18'	110°	42°08'	-19'	111°	41°46'	-20'	112°	12
13	43°33'	-14'	108°	43°14'	-15'	109°	42°54'	-16'	110°	42°33'	-18'	111°	42°12'	-19'	112°	41°49'	-20'	112°	41°26'	-21'	113°	13
14	43°19'	-15'	109°	42°59'	-16'	110°	42°38'	-17'	111°	42°16'	-18'	112°	41°53'	-20'	113°	41°29'	-21'	114°	41°05'	-22'	114°	14
15	43°05'	-15'	111°	42°43'	-17'	112°	42°21'	-18'	112°	41°57'	-19'	113°	41°33'	-20'	114°	41°08'	-22'	115°	40°43'	-23'	116°	15
16	42°49'	-16'	112°	42°26'	-18'	113°	42°03'	-19'	114°	41°38'	-20'	115°	41°13'	-21'	115°	40°47'	-22'	116°	40°20'	-24'	117°	16
17	42°33'	-17'	113°	42°09'	-19'	114°	41°44'	-20'	115°	41°18'	-21'	116°	40°51'	-22'	117°	40°24'	-23'	117°	39°56'	-24'	118°	17
18	42°16'	-18'	115°	41°50'	-19'	115°	41°24'	-21'	116°	40°57'	-22'	117°	40°29'	-23'	118°	40°01'	-24'	119°	39°32'	-25'	119°	18
19	41°57'	-19'	116°	41°31'	-20'	117°	41°03'	-21'	118°	40°35'	-22'	118°	40°07'	-24'	119°	39°37'	-25'	120°	39°07'	-26'	120°	19
20	41°38'	-20'	117°	41°11'	-21'	118°	40°42'	-22'	119°	40°13'	-23'	120°	39°43'	-24'	120°	39°12'	-25'	121°	38°41'	-26'	122°	20
21	41°19'	-21'	118°	40°50'	-22'	119°	40°20'	-23'	120°	39°50'	-24'	121°	39°19'	-25'	121°	38°47'	-26'	122°	38°15'	-27'	123°	21
22	40°58'	-21'	120°	40°28'	-23'	120°	39°57'	-24'	121°	39°26'	-25'	122°	38°54'	-26'	123°	38°21'	-27'	123°	37°48'	-28'	124°	22
23	40°37'	-22'	121°	40°05'	-23'	122°	39°33'	-24'	122°	39°01'	-25'	123°	38°28'	-26'	124°	37°54'	-27'	124°	37°20'	-28'	125°	23
Dec°	0			1			2			3			4			5			6			Dec°

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

Dec°	0			1			2			3			4			5			6			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	46°00'	-01'	90°	45°59'	-02'	91°	45°58'	-04'	92°	45°55'	-05'	93°	45°51'	-07'	94°	45°46'	-08'	95°	45°41'	-09'	96°	0			
1	45°59'	-02'	91°	45°57'	-03'	92°	45°54'	-05'	94°	45°50'	-06'	95°	45°45'	-08'	96°	45°38'	-09'	97°	45°31'	-11'	98°	1			
2	45°58'	-03'	93°	45°54'	-04'	94°	45°50'	-06'	95°	45°44'	-07'	96°	45°37'	-09'	97°	45°29'	-10'	98°	45°21'	-12'	99°	2			
3	45°55'	-04'	94°	45°50'	-05'	95°	45°44'	-07'	96°	45°37'	-08'	97°	45°29'	-10'	98°	45°19'	-11'	99°	45°09'	-13'	100°	3			
4	45°51'	-05'	96°	45°45'	-06'	97°	45°37'	-08'	98°	45°29'	-09'	99°	45°19'	-11'	100°	45°08'	-12'	101°	44°56'	-14'	102°	4			
5	45°46'	-06'	97°	45°38'	-07'	98°	45°29'	-09'	99°	45°19'	-10'	100°	45°08'	-12'	101°	44°56'	-13'	102°	44°43'	-15'	103°	5			
6	45°41'	-07'	99°	45°31'	-08'	100°	45°21'	-10'	101°	45°09'	-11'	102°	44°56'	-13'	103°	44°43'	-14'	104°	44°28'	-16'	105°	6			
7	45°34'	-08'	100°	45°23'	-09'	101°	45°11'	-11'	102°	44°58'	-12'	103°	44°44'	-14'	104°	44°29'	-15'	105°	44°13'	-16'	106°	7			
8	45°26'	-09'	101°	45°13'	-11'	102°	45°00'	-12'	103°	44°45'	-13'	104°	44°30'	-15'	105°	44°14'	-16'	106°	43°56'	-17'	107°	8			
9	45°16'	-10'	103°	45°03'	-12'	104°	44°48'	-13'	105°	44°32'	-14'	106°	44°15'	-16'	107°	43°58'	-17'	108°	43°39'	-18'	109°	9			
10	45°06'	-11'	104°	44°51'	-13'	105°	44°35'	-14'	106°	44°18'	-15'	107°	44°00'	-17'	108°	43°41'	-18'	109°	43°21'	-19'	110°	10			
11	44°55'	-12'	106°	44°39'	-14'	107°	44°21'	-15'	108°	44°02'	-16'	108°	43°43'	-18'	109°	43°23'	-19'	110°	43°01'	-20'	111°	11			
12	44°43'	-13'	107°	44°25'	-14'	108°	44°06'	-16'	109°	43°46'	-17'	110°	43°25'	-18'	111°	43°04'	-20'	112°	42°41'	-21'	112°	12			
13	44°30'	-14'	108°	44°11'	-15'	109°	43°50'	-17'	110°	43°29'	-18'	111°	43°07'	-19'	112°	42°44'	-21'	113°	42°20'	-22'	114°	13			
14	44°16'	-15'	110°	43°55'	-16'	111°	43°34'	-18'	112°	43°11'	-19'	112°	42°48'	-20'	113°	42°24'	-21'	114°	41°59'	-23'	115°	14			
15	44°01'	-16'	111°	43°39'	-17'	112°	43°16'	-19'	113°	42°52'	-20'	114°	42°28'	-21'	115°	42°02'	-22'	115°	41°36'	-23'	116°	15			
16	43°45'	-17'	112°	43°21'	-18'	113°	42°57'	-19'	114°	42°32'	-21'	115°	42°07'	-22'	116°	41°40'	-23'	117°	41°13'	-24'	117°	16			
17	43°28'	-18'	114°	43°03'	-19'	115°	42°38'	-20'	115°	42°12'	-21'	116°	41°45'	-23'	117°	41°17'	-24'	118°	40°49'	-25'	119°	17			
18	43°10'	-19'	115°	42°44'	-20'	116°	42°18'	-21'	117°	41°50'	-22'	118°	41°22'	-23'	118°	40°53'	-25'	119°	40°24'	-26'	120°	18			
19	42°51'	-20'	116°	42°24'	-21'	117°	41°56'	-22'	118°	41°28'	-23'	119°	40°59'	-24'	120°	40°29'	-25'	120°	39°58'	-26'	121°	19			
20	42°32'	-20'	118°	42°03'	-22'	118°	41°35'	-23'	119°	41°05'	-24'	120°	40°35'	-25'	121°	40°04'	-26'	121°	39°32'	-27'	122°	20			
21	42°11'	-21'	119°	41°42'	-22'	120°	41°12'	-24'	120°	40°41'	-25'	121°	40°10'	-26'	122°	39°38'	-27'	123°	39°05'	-28'	123°	21			
22	41°50'	-22'	120°	41°19'	-23'	121°	40°48'	-24'	122°	40°16'	-25'	122°	39°44'	-26'	123°	39°11'	-27'	124°	38°37'	-28'	124°	22			
23	<u>41°28' -23' 121°</u>	<u>40°56' -24' 122°</u>	<u>40°24' -25' 123°</u>	<u>39°51' -26' 124°</u>	<u>39°18' -27' 124°</u>	<u>38°43' -28' 125°</u>	<u>38°09' -29' 126°</u>	<u>37°36' -30' 126°</u>	<u>37°03' -31' 127°</u>	<u>36°30' -32' 127°</u>	<u>35°57' -33' 128°</u>	<u>35°24' -34' 128°</u>	<u>34°51' -35' 129°</u>	<u>34°18' -36' 129°</u>	<u>33°45' -37' 130°</u>	<u>33°12' -38' 130°</u>	<u>32°40' -39' 131°</u>	<u>32°07' -40' 131°</u>	<u>31°34' -41' 132°</u>	<u>31°01' -42' 132°</u>	<u>30°28' -43' 133°</u>	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°
	<b>0</b>			<b>1</b>			<b>2</b>			<b>3</b>			<b>4</b>			<b>5</b>			<b>6</b>					<b>Dec°</b>	

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

Dec°	0			1			2			3			4			5			6			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	47°00'	-01'	90°	46°59'	-02'	91°	46°58'	-04'	92°	46°55'	-05'	93°	46°51'	-07'	94°	46°46'	-08'	95°	46°40'	-10'	96°	0			
1	46°59'	-02'	91°	46°57'	-03'	93°	46°54'	-05'	94°	46°50'	-06'	95°	46°44'	-08'	96°	46°38'	-09'	97°	46°30'	-11'	98°	1			
2	46°58'	-03'	93°	46°54'	-04'	94°	46°49'	-06'	95°	46°44'	-07'	96°	46°37'	-09'	97°	46°29'	-10'	98°	46°19'	-12'	99°	2			
3	46°55'	-04'	94°	46°50'	-05'	95°	46°44'	-07'	97°	46°36'	-08'	98°	46°28'	-10'	99°	46°18'	-11'	100°	46°08'	-13'	101°	3			
4	46°51'	-05'	96°	46°44'	-07'	97°	46°37'	-08'	98°	46°28'	-10'	99°	46°18'	-11'	100°	46°07'	-12'	101°	45°55'	-14'	102°	4			
5	46°46'	-06'	97°	46°38'	-08'	98°	46°29'	-09'	99°	46°18'	-11'	100°	46°07'	-12'	101°	45°54'	-13'	102°	45°41'	-15'	103°	5			
6	46°40'	-07'	99°	46°30'	-09'	100°	46°19'	-10'	101°	46°08'	-12'	102°	45°55'	-13'	103°	45°41'	-14'	104°	45°26'	-16'	105°	6			
7	46°33'	-08'	100°	46°21'	-10'	101°	46°09'	-11'	102°	45°56'	-13'	103°	45°42'	-14'	104°	45°26'	-15'	105°	45°10'	-17'	106°	7			
8	46°24'	-09'	102°	46°12'	-11'	103°	45°58'	-12'	104°	45°43'	-14'	105°	45°28'	-15'	106°	45°11'	-16'	107°	44°53'	-18'	108°	8			
9	46°15'	-10'	103°	46°01'	-12'	104°	45°46'	-13'	105°	45°30'	-15'	106°	45°13'	-16'	107°	44°54'	-17'	108°	44°35'	-19'	109°	9			
10	46°04'	-12'	104°	45°49'	-13'	105°	45°32'	-14'	106°	45°15'	-16'	107°	44°56'	-17'	108°	44°37'	-18'	109°	44°17'	-20'	110°	10			
11	45°53'	-13'	106°	45°36'	-14'	107°	45°18'	-15'	108°	44°59'	-17'	109°	44°39'	-18'	110°	44°19'	-19'	111°	43°57'	-21'	112°	11			
12	45°40'	-14'	107°	45°22'	-15'	108°	45°03'	-16'	109°	44°43'	-18'	110°	44°21'	-19'	111°	43°59'	-20'	112°	43°36'	-21'	113°	12			
13	45°27'	-15'	109°	45°07'	-16'	110°	44°46'	-17'	111°	44°25'	-19'	112°	44°03'	-20'	112°	43°39'	-21'	113°	43°15'	-22'	114°	13			
14	45°12'	-16'	110°	44°51'	-17'	111°	44°29'	-18'	112°	44°06'	-19'	113°	43°43'	-21'	114°	43°18'	-22'	115°	42°53'	-23'	115°	14			
15	44°57'	-17'	111°	44°34'	-18'	112°	44°11'	-19'	113°	43°47'	-20'	114°	43°22'	-22'	115°	42°56'	-23'	116°	42°30'	-24'	117°	15			
16	44°40'	-17'	113°	44°17'	-19'	114°	43°52'	-20'	115°	43°27'	-21'	115°	43°00'	-22'	116°	42°33'	-24'	117°	42°06'	-25'	118°	16			
17	44°23'	-18'	114°	43°58'	-20'	115°	43°32'	-21'	116°	43°05'	-22'	117°	42°38'	-23'	118°	42°10'	-24'	118°	41°41'	-25'	119°	17			
18	44°04'	-19'	115°	43°38'	-21'	116°	43°11'	-22'	117°	42°43'	-23'	118°	42°15'	-24'	119°	41°45'	-25'	120°	41°15'	-26'	120°	18			
19	43°45'	-20'	117°	43°18'	-21'	118°	42°49'	-23'	118°	42°20'	-24'	119°	41°51'	-25'	120°	41°20'	-26'	121°	40°49'	-27'	122°	19			
20	43°25'	-21'	118°	42°56'	-22'	119°	42°27'	-23'	120°	41°57'	-25'	121°	41°26'	-26'	121°	40°54'	-27'	122°	40°22'	-28'	123°	20			
21	43°04'	-22'	119°	42°34'	-23'	120°	42°03'	-24'	121°	41°32'	-25'	122°	41°00'	-26'	122°	40°28'	-27'	123°	39°55'	-28'	124°	21			
22	42°42'	-23'	121°	42°11'	-24'	121°	41°39'	-25'	122°	41°07'	-26'	123°	40°34'	-27'	124°	40°00'	-28'	124°	39°26'	-29'	125°	22			
23	<u>42°19' -24' 122°</u>	<u>41°47' -25' 123°</u>	<u>41°14' -26' 123°</u>	<u>40°41' -27' 124°</u>	<u>40°07' -28' 125°</u>	<u>39°32' -29' 126°</u>	<u>38°57' -30' 126°</u>	<u>38°30' -31' 127°</u>	<u>37°55' -32' 127°</u>	<u>37°30' -33' 128°</u>	<u>37°05' -34' 128°</u>	<u>36°40' -35' 129°</u>	<u>36°15' -36' 129°</u>	<u>35°50' -37' 130°</u>	<u>35°25' -38' 130°</u>	<u>35°00' -39' 131°</u>	<u>34°35' -40' 131°</u>	<u>34°10' -41' 132°</u>	<u>33°45' -42' 132°</u>	<u>33°20' -43' 133°</u>	<u>32°55' -44' 133°</u>	<u>32°30' -45' 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°	Hc°	d'	Z°	Dec°
	<b>0</b>			<b>1</b>			<b>2</b>			<b>3</b>			<b>4</b>			<b>5</b>			<b>6</b>					<b>Dec°</b>	

43° 317° LHA

**Latitude CONTRARY to DECLINATION**

43° 317° LHA

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

42° 318° LHA

**Latitude CONTRARY to Declination**

42° 318° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	48°00'	-01'	90°	47°59'	-02'	91°	47°58'	-04'	92°	47°55'	-05'	93°	47°51'	-07'	94°	47°46'	-08'	96°	47°39'	-10'	97°	0
1	47°59'	-02'	91°	47°57'	-03'	93°	47°54'	-05'	94°	47°50'	-06'	95°	47°44'	-08'	96°	47°37'	-09'	97°	47°29'	-11'	98°	1
2	47°58'	-03'	93°	47°54'	-04'	94°	47°49'	-06'	95°	47°43'	-08'	96°	47°36'	-09'	97°	47°28'	-11'	98°	47°18'	-12'	100°	2
3	47°55'	-04'	94°	47°50'	-06'	96°	47°43'	-07'	97°	47°36'	-09'	98°	47°27'	-10'	99°	47°17'	-12'	100°	47°06'	-13'	101°	3
4	47°51'	-05'	96°	47°44'	-07'	97°	47°36'	-08'	98°	47°27'	-10'	99°	47°17'	-11'	100°	47°05'	-13'	101°	46°53'	-14'	102°	4
5	47°46'	-06'	97°	47°37'	-08'	99°	47°28'	-09'	100°	47°17'	-11'	101°	47°05'	-12'	102°	46°53'	-14'	103°	46°39'	-15'	104°	5
6	47°39'	-07'	99°	47°29'	-09'	100°	47°18'	-10'	101°	47°06'	-12'	102°	46°53'	-13'	103°	46°39'	-15'	104°	46°24'	-16'	105°	6
7	47°32'	-09'	100°	47°20'	-10'	101°	47°08'	-12'	103°	46°54'	-13'	104°	46°40'	-14'	105°	46°24'	-16'	106°	46°07'	-17'	107°	7
8	47°23'	-10'	102°	47°10'	-11'	103°	46°56'	-13'	104°	46°41'	-14'	105°	46°25'	-16'	106°	46°08'	-17'	107°	45°50'	-18'	108°	8
9	47°13'	-11'	103°	46°59'	-12'	104°	46°44'	-14'	105°	46°27'	-15'	106°	46°10'	-17'	107°	45°51'	-18'	108°	45°32'	-19'	109°	9
10	47°03'	-12'	105°	46°47'	-13'	106°	46°30'	-15'	107°	46°12'	-16'	108°	45°53'	-18'	109°	45°33'	-19'	110°	45°13'	-20'	111°	10
11	46°51'	-13'	106°	46°33'	-14'	107°	46°15'	-16'	108°	45°56'	-17'	109°	45°36'	-18'	110°	45°15'	-20'	111°	44°52'	-21'	112°	11
12	46°38'	-14'	108°	46°19'	-15'	109°	45°59'	-17'	110°	45°39'	-18'	111°	45°17'	-19'	112°	44°55'	-21'	112°	44°31'	-22'	113°	12
13	46°24'	-15'	109°	46°04'	-16'	110°	45°43'	-18'	111°	45°21'	-19'	112°	44°58'	-20'	113°	44°34'	-22'	114°	44°09'	-23'	115°	13
14	46°09'	-16'	110°	45°47'	-17'	111°	45°25'	-19'	112°	45°02'	-20'	113°	44°37'	-21'	114°	44°12'	-23'	115°	43°47'	-24'	116°	14
15	45°53'	-17'	112°	45°30'	-18'	113°	45°06'	-20'	114°	44°42'	-21'	115°	44°16'	-22'	115°	43°50'	-23'	116°	43°23'	-25'	117°	15
16	45°35'	-18'	113°	45°11'	-19'	114°	44°46'	-21'	115°	44°21'	-22'	116°	43°54'	-23'	117°	43°26'	-24'	118°	42°58'	-25'	118°	16
17	45°17'	-19'	115°	44°52'	-20'	115°	44°26'	-21'	116°	43°59'	-23'	117°	43°31'	-24'	118°	43°02'	-25'	119°	42°33'	-26'	120°	17
18	44°58'	-20'	116°	44°32'	-21'	117°	44°04'	-22'	118°	43°36'	-24'	119°	43°07'	-25'	119°	42°37'	-26'	120°	42°07'	-27'	121°	18
19	44°38'	-21'	117°	44°11'	-22'	118°	43°42'	-23'	119°	43°13'	-24'	120°	42°42'	-25'	121°	42°11'	-27'	121°	41°40'	-28'	122°	19
20	44°18'	-22'	119°	43°49'	-23'	119°	43°19'	-24'	120°	42°48'	-25'	121°	42°17'	-26'	122°	41°45'	-27'	123°	41°12'	-28'	123°	20
21	43°56'	-23'	120°	43°26'	-24'	121°	42°55'	-25'	121°	42°23'	-26'	122°	41°51'	-27'	123°	41°18'	-28'	124°	40°44'	-29'	124°	21
22	43°33'	-23'	121°	43°02'	-25'	122°	42°30'	-26'	123°	41°57'	-27'	123°	41°24'	-28'	124°	40°50'	-29'	125°	40°15'	-30'	126°	22
23	43°10'	-24'	122°	42°37'	-25'	123°	42°04'	-26'	124°	41°30'	-27'	125°	40°56'	-28'	125°	40°21'	-29'	126°	39°45'	-30'	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°
	0			1			2			3			4			5			6			

42° 318° LHA

**Latitude CONTRARY to DECLINATION**

42° 318° LHA

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

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

41° 319° LHA

**Latitude CONTRARY to Declination**

41° 319° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	49°00'	-01'	90°	48°59'	-02'	91°	48°58'	-04'	92°	48°55'	-05'	93°	48°50'	-07'	95°	48°45'	-09'	96°	48°38'	-10'	97°	0
1	48°59'	-02'	92°	48°57'	-03'	93°	48°54'	-05'	94°	48°49'	-07'	95°	48°43'	-08'	96°	48°36'	-10'	97°	48°28'	-11'	98°	1
2	48°58'	-03'	93°	48°54'	-05'	94°	48°49'	-06'	95°	48°43'	-08'	96°	48°35'	-09'	98°	48°27'	-11'	99°	48°17'	-12'	100°	2
3	48°55'	-04'	95°	48°49'	-06'	96°	48°43'	-07'	97°	48°35'	-09'	98°	48°26'	-10'	99°	48°16'	-12'	100°	48°05'	-13'	101°	3
4	48°50'	-05'	96°	48°43'	-07'	97°	48°35'	-09'	98°	48°26'	-10'	99°	48°16'	-12'	101°	48°04'	-13'	102°	47°51'	-15'	103°	4
5	48°45'	-07'	98°	48°36'	-08'	99°	48°27'	-10'	100°	48°16'	-11'	101°	48°04'	-13'	102°	47°51'	-14'	103°	47°37'	-16'	104°	5
6	48°38'	-08'	99°	48°28'	-09'	100°	48°17'	-11'	101°	48°05'	-12'	102°	47°51'	-14'	103°	47°37'	-15'	105°	47°21'	-17'	106°	6
7	48°31'	-09'	101°	48°19'	-10'	102°	48°06'	-12'	103°	47°52'	-13'	104°	47°38'	-15'	105°	47°22'	-16'	106°	47°04'	-18'	107°	7
8	48°22'	-10'	102°	48°09'	-12'	103°	47°54'	-13'	104°	47°39'	-14'	105°	47°23'	-16'	106°	47°05'	-17'	107°	46°47'	-19'	108°	8
9	48°12'	-11'	104°	47°57'	-13'	105°	47°41'	-14'	106°	47°25'	-16'	107°	47°07'	-17'	108°	46°48'	-18'	109°	46°28'	-20'	110°	9
10	48°01'	-12'	105°	47°44'	-14'	106°	47°27'	-15'	107°	47°09'	-17'	108°	46°50'	-18'	109°	46°30'	-19'	110°	46°08'	-21'	111°	10
11	47°48'	-13'	107°	47°31'	-15'	108°	47°12'	-16'	109°	46°52'	-18'	110°	46°32'	-19'	111°	46°10'	-20'	112°	45°48'	-22'	113°	11
12	47°35'	-14'	108°	47°16'	-16'	109°	46°56'	-17'	110°	46°35'	-19'	111°	46°13'	-20'	112°	45°50'	-21'	113°	45°26'	-23'	114°	12
13	47°20'	-16'	109°	47°00'	-17'	110°	46°38'	-18'	111°	46°16'	-20'	112°	45°53'	-21'	113°	45°29'	-22'	114°	45°03'	-23'	115°	13
14	47°05'	-17'	111°	46°43'	-18'	112°	46°20'	-19'	113°	45°56'	-21'	114°	45°32'	-22'	115°	45°06'	-23'	116°	44°40'	-24'	116°	14
15	46°48'	-18'	112°	46°25'	-19'	113°	46°01'	-20'	114°	45°36'	-22'	115°	45°10'	-23'	116°	44°43'	-24'	117°	44°16'	-25'	118°	15
16	46°30'	-19'	114°	46°06'	-20'	115°	45°41'	-21'	115°	45°14'	-22'	116°	44°47'	-24'	117°	44°19'	-25'	118°	43°51'	-26'	119°	16
17	46°12'	-20'	115°	45°46'	-21'	116°	45°19'	-22'	117°	44°52'	-23'	118°	44°24'	-25'	119°	43°54'	-26'	119°	43°25'	-27'	120°	17
18	45°52'	-21'	116°	45°25'	-22'	117°	44°57'	-23'	118°	44°29'	-24'	119°	43°59'	-25'	120°	43°29'	-26'	121°	42°58'	-28'	121°	18
19	45°32'	-22'	118°	45°03'	-23'	119°	44°34'	-24'	119°	44°04'	-25'	120°	43°34'	-26'	121°	43°02'	-27'	122°	42°30'	-28'	123°	19
20	45°10'	-22'	119°	44°41'	-24'	120°	44°10'	-25'	121°	43°39'	-26'	122°	43°08'	-27'	122°	42°35'	-28'	123°	42°02'	-29'	124°	20
21	44°48'	-23'	120°	44°17'	-24'	121°	43°46'	-26'	122°	43°13'	-27'	123°	42°41'	-28'	124°	42°07'	-29'	124°	41°33'	-30'	125°	21
22	44°24'	-24'	122°	43°53'	-25'	122°	43°20'	-26'	123°	42°47'	-27'	124°	42°13'	-28'	125°	41°38'	-29'	126°	41°03'	-30'	126°	22
23	44°00'	-25'	123°	43°27'	-26'	124°	42°54'	-27'	124°	42°19'	-28'	125°	41°44'	-29'	126°	41°09'	-30'	127°	40°33'	-31'	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°
	0			1			2			3			4			5			6			

41° 319° LHA

**Latitude CONTRARY to 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

**40° 320° LHA**

**Latitude CONTRARY to Declination**

**40° 320° LHA**

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	50°00'	-01'	90°	49°59'	-02'	91°	49°58'	-04'	92°	49°54'	-05'	94°	49°50'	-07'	95°	49°44'	-09'	96°	49°38'	-10'	97°	0
1	49°59'	-02'	92°	49°57'	-03'	93°	49°54'	-05'	94°	49°49'	-07'	95°	49°43'	-08'	96°	49°36'	-10'	97°	49°27'	-11'	99°	1
2	49°58'	-03'	93°	49°54'	-05'	94°	49°49'	-06'	95°	49°42'	-08'	97°	49°35'	-10'	98°	49°26'	-11'	99°	49°16'	-13'	100°	2
3	49°54'	-04'	95°	49°49'	-06'	96°	49°42'	-08'	97°	49°34'	-09'	98°	49°25'	-11'	99°	49°15'	-12'	100°	49°03'	-14'	102°	3
4	49°50'	-06'	96°	49°43'	-07'	97°	49°35'	-09'	99°	49°25'	-10'	100°	49°14'	-12'	101°	49°03'	-13'	102°	48°49'	-15'	103°	4
5	49°44'	-07'	98°	49°36'	-08'	99°	49°26'	-10'	100°	49°15'	-12'	101°	49°03'	-13'	102°	48°49'	-15'	103°	48°35'	-16'	105°	5
6	49°38'	-08'	99°	49°27'	-10'	100°	49°16'	-11'	102°	49°03'	-13'	103°	48°49'	-14'	104°	48°35'	-16'	105°	48°19'	-17'	106°	6
7	49°30'	-09'	101°	49°18'	-11'	102°	49°05'	-12'	103°	48°51'	-14'	104°	48°35'	-15'	105°	48°19'	-17'	106°	48°01'	-18'	107°	7
8	49°20'	-10'	102°	49°07'	-12'	103°	48°52'	-13'	105°	48°37'	-15'	106°	48°20'	-16'	107°	48°02'	-18'	108°	47°43'	-19'	109°	8
9	49°10'	-12'	104°	48°55'	-13'	105°	48°39'	-15'	106°	48°22'	-16'	107°	48°04'	-17'	108°	47°44'	-19'	109°	47°24'	-20'	110°	9
10	48°58'	-13'	105°	48°42'	-14'	106°	48°24'	-16'	108°	48°06'	-17'	109°	47°46'	-19'	110°	47°26'	-20'	111°	47°04'	-21'	112°	10
11	48°46'	-14'	107°	48°28'	-15'	108°	48°09'	-17'	109°	47°49'	-18'	110°	47°28'	-20'	111°	47°06'	-21'	112°	46°43'	-22'	113°	11
12	48°32'	-15'	108°	48°12'	-16'	109°	47°52'	-18'	110°	47°31'	-19'	111°	47°08'	-21'	112°	46°45'	-22'	113°	46°20'	-23'	114°	12
13	48°17'	-16'	110°	47°56'	-17'	111°	47°34'	-19'	112°	47°11'	-20'	113°	46°48'	-22'	114°	46°23'	-23'	115°	45°57'	-24'	116°	13
14	48°01'	-17'	111°	47°39'	-19'	112°	47°15'	-20'	113°	46°51'	-21'	114°	46°26'	-22'	115°	46°00'	-24'	116°	45°33'	-25'	117°	14
15	47°44'	-18'	113°	47°20'	-20'	114°	46°55'	-21'	115°	46°30'	-22'	116°	46°04'	-23'	117°	45°36'	-25'	117°	45°08'	-26'	118°	15
16	47°25'	-19'	114°	47°00'	-21'	115°	46°35'	-22'	116°	46°08'	-23'	117°	45°40'	-24'	118°	45°12'	-25'	119°	44°43'	-27'	120°	16
17	47°06'	-20'	115°	46°40'	-22'	116°	46°13'	-23'	117°	45°45'	-24'	118°	45°16'	-25'	119°	44°46'	-26'	120°	44°16'	-27'	121°	17
18	46°46'	-21'	117°	46°18'	-22'	118°	45°50'	-24'	119°	45°21'	-25'	120°	44°51'	-26'	120°	44°20'	-27'	121°	43°49'	-28'	122°	18
19	46°25'	-22'	118°	45°56'	-23'	119°	45°26'	-25'	120°	44°56'	-26'	121°	44°25'	-27'	122°	43°53'	-28'	123°	43°20'	-29'	123°	19
20	46°03'	-23'	120°	45°33'	-24'	120°	45°02'	-25'	121°	44°30'	-27'	122°	43°58'	-28'	123°	43°25'	-29'	124°	42°51'	-30'	125°	20
21	45°39'	-24'	121°	45°08'	-25'	122°	44°36'	-26'	123°	44°04'	-27'	123°	43°30'	-28'	124°	42°56'	-29'	125°	42°22'	-30'	126°	21
22	45°15'	-25'	122°	44°43'	-26'	123°	44°10'	-27'	124°	43°36'	-28'	125°	43°02'	-29'	125°	42°27'	-30'	126°	41°51'	-31'	127°	22
23	<u>44°50'</u>	<u>-26'</u>	<u>123°</u>	<u>44°17'</u>	<u>-27'</u>	<u>124°</u>	<u>43°43'</u>	<u>-28'</u>	<u>125°</u>	<u>43°08'</u>	<u>-29'</u>	<u>126°</u>	<u>42°33'</u>	<u>-30'</u>	<u>127°</u>	<u>41°57'</u>	<u>-31'</u>	<u>127°</u>	<u>41°20'</u>	<u>-32'</u>	<u>128°</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°
	<b>0</b>			<b>1</b>			<b>2</b>			<b>3</b>			<b>4</b>			<b>5</b>			<b>6</b>			

**40° 320° LHA**

**Latitude CONTRARY to DECLINATION**

**40° 320° LHA**

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

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

**39° 321° LHA**

**Latitude CONTRARY to Declination**

**39° 321° LHA**

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	51°00'	-01'	90°	50°59'	-02'	91°	50°57'	-04'	92°	50°54'	-06'	94°	50°50'	-07'	95°	50°44'	-09'	96°	50°37'	-11'	97°	0
1	50°59'	-02'	92°	50°57'	-04'	93°	50°53'	-05'	94°	50°49'	-07'	95°	50°42'	-09'	96°	50°35'	-10'	98°	50°26'	-12'	99°	1
2	50°57'	-03'	93°	50°53'	-05'	94°	50°48'	-07'	96°	50°42'	-08'	97°	50°34'	-10'	98°	50°25'	-11'	99°	50°15'	-13'	100°	2
3	50°54'	-05'	95°	50°49'	-06'	96°	50°42'	-08'	97°	50°34'	-09'	98°	50°24'	-11'	100°	50°14'	-13'	101°	50°02'	-14'	102°	3
4	50°50'	-06'	96°	50°42'	-07'	98°	50°34'	-09'	99°	50°24'	-11'	100°	50°13'	-12'	101°	50°01'	-14'	102°	49°48'	-15'	103°	4
5	50°44'	-07'	98°	50°35'	-09'	99°	50°25'	-10'	100°	50°14'	-12'	102°	50°01'	-13'	103°	49°47'	-15'	104°	49°32'	-16'	105°	5
6	50°37'	-08'	99°	50°26'	-10'	101°	50°15'	-11'	102°	50°02'	-13'	103°	49°48'	-15'	104°	49°32'	-16'	105°	49°16'	-18'	106°	6
7	50°29'	-10'	101°	50°16'	-11'	102°	50°03'	-13'	103°	49°49'	-14'	105°	49°33'	-16'	106°	49°16'	-17'	107°	48°58'	-19'	108°	7
8	50°19'	-11'	103°	50°05'	-12'	104°	49°50'	-14'	105°	49°34'	-15'	106°	49°17'	-17'	107°	48°59'	-18'	108°	48°40'	-20'	109°	8
9	50°08'	-12'	104°	49°53'	-14'	105°	49°37'	-15'	106°	49°19'	-16'	108°	49°00'	-18'	109°	48°41'	-19'	110°	48°20'	-21'	111°	9
10	49°56'	-13'	106°	49°39'	-15'	107°	49°22'	-16'	108°	49°03'	-18'	109°	48°43'	-19'	110°	48°21'	-20'	111°	47°59'	-22'	112°	10
11	49°43'	-14'	107°	49°25'	-16'	108°	49°05'	-17'	109°	48°45'	-19'	110°	48°23'	-20'	112°	48°01'	-21'	113°	47°37'	-23'	114°	11
12	49°29'	-15'	109°	49°09'	-17'	110°	48°48'	-18'	111°	48°26'	-20'	112°	48°03'	-21'	113°	47°40'	-22'	114°	47°15'	-24'	115°	12
13	49°13'	-17'	110°	48°52'	-18'	111°	48°30'	-19'	112°	48°07'	-21'	113°	47°42'	-22'	114°	47°17'	-23'	115°	46°51'	-25'	116°	13
14	48°57'	-18'	112°	48°34'	-19'	113°	48°10'	-20'	114°	47°46'	-22'	115°	47°20'	-23'	116°	46°54'	-24'	117°	46°26'	-26'	118°	14
15	48°39'	-19'	113°	48°15'	-20'	114°	47°50'	-21'	115°	47°24'	-23'	116°	46°57'	-24'	117°	46°29'	-25'	118°	46°01'	-26'	119°	15
16	48°20'	-20'	114°	47°55'	-21'	116°	47°28'	-22'	116°	47°01'	-24'	117°	46°33'	-25'	118°	46°04'	-26'	119°	45°34'	-27'	120°	16
17	48°00'	-21'	116°	47°34'	-22'	117°	47°06'	-23'	118°	46°37'	-25'	119°	46°08'	-26'	120°	45°38'	-27'	121°	45°07'	-28'	121°	17
18	47°39'	-22'	117°	47°11'	-23'	118°	46°43'	-24'	119°	46°13'	-26'	120°	45°42'	-27'	121°	45°11'	-28'	122°	44°39'	-29'	123°	18
19	47°17'	-23'	119°	46°48'	-24'	120°	46°18'	-25'	121°	45°47'	-26'	121°	45°16'	-28'	122°	44°43'	-29'	123°	44°10'	-30'	124°	19
20	46°55'	-24'	120°	46°24'	-25'	121°	45°53'	-26'	122°	45°21'	-27'	123°	44°48'	-28'	124°	44°15'	-29'	124°	43°40'	-30'	125°	20
21	46°31'	-25'	121°	45°59'	-26'	122°	45°27'	-27'	123°	44°54'	-28'	124°	44°20'	-29'	125°	43°45'	-30'	126°	43°10'	-31'	126°	21
22	46°06'	-26'	123°	45°33'	-27'	124°	45°00'	-28'	124°	44°25'	-29'	125°	43°51'	-30'	126°	43°15'	-31'	127°	42°39'	-32'	128°	22
23	<u>45°40'</u>	<u>-27'</u>	<u>124°</u>	<u>45°06'</u>	<u>-28'</u>	<u>125°</u>	<u>44°32'</u>	<u>-29'</u>	<u>126°</u>	<u>43°57'</u>	<u>-30'</u>	<u>126°</u>	<u>43°21'</u>	<u>-31'</u>	<u>127°</u>	<u>42°44'</u>	<u>-32'</u>	<u>128°</u>	<u>42°07'</u>	<u>-33'</u>	<u>129°</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°
	<b>0</b>			<b>1</b>			<b>2</b>			<b>3</b>			<b>4</b>			<b>5</b>			<b>6</b>			

**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°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	52°00'	-01'	90°	51°59'	-02'	91°	51°57'	-04'	93°	51°54'	-06'	94°	51°49'	-07'	95°	51°43'	-09'	96°	51°36'	-11'	98°	0
1	51°59'	-02'	92°	51°57'	-04'	93°	51°53'	-05'	94°	51°48'	-07'	95°	51°42'	-09'	97°	51°34'	-10'	98°	51°25'	-12'	99°	1
2	51°57'	-03'	93°	51°53'	-05'	95°	51°48'	-07'	96°	51°41'	-08'	97°	51°33'	-10'	98°	51°24'	-12'	100°	51°13'	-13'	101°	2
3	51°54'	-05'	95°	51°48'	-06'	96°	51°41'	-08'	97°	51°33'	-10'	99°	51°23'	-11'	100°	51°12'	-13'	101°	51°00'	-14'	102°	3
4	51°49'	-06'	96°	51°42'	-08'	98°	51°33'	-09'	99°	51°23'	-11'	100°	51°12'	-13'	101°	50°59'	-14'	103°	50°46'	-16'	104°	4
5	51°43'	-07'	98°	51°34'	-09'	99°	51°24'	-11'	101°	51°12'	-12'	102°	50°59'	-14'	103°	50°45'	-15'	104°	50°30'	-17'	105°	5
6	51°36'	-09'	100°	51°25'	-10'	101°	51°13'	-12'	102°	51°00'	-13'	103°	50°46'	-15'	105°	50°30'	-17'	106°	50°13'	-18'	107°	6
7	51°27'	-10'	101°	51°15'	-11'	103°	51°01'	-13'	104°	50°47'	-15'	105°	50°31'	-16'	106°	50°13'	-18'	107°	49°55'	-19'	108°	7
8	51°18'	-11'	103°	51°04'	-13'	104°	50°48'	-14'	105°	50°32'	-16'	106°	50°14'	-17'	108°	49°56'	-19'	109°	49°36'	-20'	110°	8
9	51°06'	-12'	104°	50°51'	-14'	106°	50°34'	-15'	107°	50°16'	-17'	108°	49°57'	-18'	109°	49°37'	-20'	110°	49°16'	-21'	111°	9
10	50°54'	-14'	106°	50°37'	-15'	107°	50°19'	-17'	108°	49°59'	-18'	109°	49°39'	-20'	111°	49°17'	-21'	112°	48°54'	-22'	113°	10
11	50°40'	-15'	108°	50°22'	-16'	109°	50°02'	-18'	110°	49°41'	-19'	111°	49°19'	-21'	112°	48°56'	-22'	113°	48°32'	-23'	114°	11
12	50°25'	-16'	109°	50°05'	-17'	110°	49°44'	-19'	111°	49°22'	-20'	112°	48°58'	-22'	113°	48°34'	-23'	114°	48°09'	-24'	116°	12
13	50°09'	-17'	111°	49°48'	-19'	112°	49°25'	-20'	113°	49°01'	-21'	114°	48°37'	-23'	115°	48°11'	-24'	116°	47°44'	-25'	117°	13
14	49°52'	-18'	112°	49°29'	-20'	113°	49°05'	-21'	114°	48°40'	-22'	115°	48°14'	-24'	116°	47°47'	-25'	117°	47°19'	-26'	118°	14
15	49°34'	-19'	114°	49°10'	-21'	115°	48°44'	-22'	116°	48°18'	-23'	117°	47°50'	-25'	118°	47°22'	-26'	119°	46°53'	-27'	120°	15
16	49°15'	-20'	115°	48°49'	-22'	116°	48°22'	-23'	117°	47°54'	-24'	118°	47°26'	-26'	119°	46°56'	-27'	120°	46°26'	-28'	121°	16
17	48°54'	-22'	116°	48°27'	-23'	117°	47°59'	-24'	118°	47°30'	-25'	119°	47°00'	-27'	120°	46°29'	-28'	121°	45°58'	-29'	122°	17
18	48°33'	-23'	118°	48°04'	-24'	119°	47°35'	-25'	120°	47°04'	-26'	121°	46°33'	-27'	122°	46°02'	-29'	123°	45°29'	-30'	123°	18
19	48°10'	-24'	119°	47°40'	-25'	120°	47°10'	-26'	121°	46°38'	-27'	122°	46°06'	-28'	123°	45°33'	-29'	124°	44°59'	-30'	125°	19
20	47°46'	-25'	121°	47°15'	-26'	122°	46°44'	-27'	122°	46°11'	-28'	123°	45°38'	-29'	124°	45°04'	-30'	125°	44°29'	-31'	126°	20
21	47°22'	-25'	122°	46°50'	-27'	123°	46°17'	-28'	124°	45°43'	-29'	125°	45°09'	-30'	125°	44°34'	-31'	126°	43°58'	-32'	127°	21
22	46°56'	-26'	123°	46°23'	-28'	124°	45°49'	-29'	125°	45°14'	-30'	126°	44°39'	-31'	127°	44°03'	-32'	127°	43°26'	-33'	128°	22
23	<u>46°30'</u>	<u>-27'</u>	<u>125°</u>	<u>45°56'</u>	<u>-28'</u>	<u>125°</u>	<u>45°20'</u>	<u>-29'</u>	<u>126°</u>	<u>44°45'</u>	<u>-30'</u>	<u>127°</u>	<u>44°08'</u>	<u>-31'</u>	<u>128°</u>	<u>43°31'</u>	<u>-32'</u>	<u>129°</u>	<u>42°53'</u>	<u>-33'</u>	<u>129°</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°
	0			1			2			3			4			5			6			

38° 322° LHA

**Latitude CONTRARY to DECLINATION**

38° 322° LHA

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

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

37° 323° LHA

**Latitude CONTRARY to Declination**

37° 323° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	53°00'	-01'	90°	52°59'	-02'	91°	52°57'	-04'	93°	52°54'	-06'	94°	52°49'	-08'	95°	52°43'	-09'	97°	52°35'	-11'	98°	0
1	52°59'	-02'	92°	52°57'	-04'	93°	52°53'	-06'	94°	52°48'	-07'	96°	52°41'	-09'	97°	52°33'	-11'	98°	52°24'	-12'	100°	1
2	52°57'	-03'	93°	52°53'	-05'	95°	52°48'	-07'	96°	52°41'	-09'	97°	52°32'	-10'	99°	52°23'	-12'	100°	52°12'	-14'	101°	2
3	52°54'	-05'	95°	52°48'	-07'	96°	52°41'	-08'	98°	52°32'	-10'	99°	52°22'	-12'	100°	52°11'	-13'	101°	51°58'	-15'	103°	3
4	52°49'	-06'	97°	52°41'	-08'	98°	52°32'	-10'	99°	52°22'	-11'	101°	52°10'	-13'	102°	51°58'	-14'	103°	51°43'	-16'	104°	4
5	52°43'	-08'	98°	52°33'	-09'	100°	52°23'	-11'	101°	52°11'	-13'	102°	51°58'	-14'	103°	51°43'	-16'	105°	51°27'	-17'	106°	5
6	52°35'	-09'	100°	52°24'	-11'	101°	52°12'	-12'	102°	51°58'	-14'	104°	51°43'	-15'	105°	51°27'	-17'	106°	51°10'	-18'	107°	6
7	52°26'	-10'	102°	52°14'	-12'	103°	52°00'	-13'	104°	51°44'	-15'	105°	51°28'	-17'	106°	51°10'	-18'	108°	50°52'	-20'	109°	7
8	52°16'	-12'	103°	52°02'	-13'	104°	51°46'	-15'	106°	51°29'	-16'	107°	51°11'	-18'	108°	50°52'	-19'	109°	50°32'	-21'	110°	8
9	52°04'	-13'	105°	51°49'	-14'	106°	51°31'	-16'	107°	51°13'	-17'	108°	50°54'	-19'	110°	50°33'	-20'	111°	50°11'	-22'	112°	9
10	51°52'	-14'	106°	51°34'	-16'	108°	51°15'	-17'	109°	50°56'	-19'	110°	50°35'	-20'	111°	50°12'	-22'	112°	49°49'	-23'	113°	10
11	51°37'	-15'	108°	51°18'	-17'	109°	50°58'	-18'	110°	50°37'	-20'	111°	50°14'	-21'	113°	49°51'	-23'	114°	49°26'	-24'	115°	11
12	51°22'	-17'	109°	51°02'	-18'	111°	50°40'	-20'	112°	50°17'	-21'	113°	49°53'	-22'	114°	49°28'	-24'	115°	49°02'	-25'	116°	12
13	51°06'	-18'	111°	50°44'	-19'	112°	50°20'	-21'	113°	49°56'	-22'	114°	49°31'	-23'	115°	49°05'	-25'	116°	48°37'	-26'	117°	13
14	50°48'	-19'	113°	50°24'	-20'	114°	50°00'	-22'	115°	49°34'	-23'	116°	49°08'	-24'	117°	48°40'	-26'	118°	48°12'	-27'	119°	14
15	50°29'	-20'	114°	50°04'	-21'	115°	49°38'	-23'	116°	49°11'	-24'	117°	48°43'	-25'	118°	48°14'	-27'	119°	47°45'	-28'	120°	15
16	50°09'	-21'	115°	49°43'	-23'	117°	49°15'	-24'	118°	48°47'	-25'	119°	48°18'	-26'	120°	47°48'	-28'	121°	47°17'	-29'	121°	16
17	49°48'	-22'	117°	49°20'	-24'	118°	48°51'	-25'	119°	48°22'	-26'	120°	47°51'	-27'	121°	47°20'	-28'	122°	46°48'	-30'	123°	17
18	49°25'	-23'	118°	48°56'	-25'	119°	48°27'	-26'	120°	47°56'	-27'	121°	47°24'	-28'	122°	46°52'	-29'	123°	46°19'	-30'	124°	18
19	49°02'	-24'	120°	48°32'	-26'	121°	48°01'	-27'	122°	47°29'	-28'	123°	46°56'	-29'	124°	46°23'	-30'	124°	45°48'	-31'	125°	19
20	48°38'	-25'	121°	48°06'	-26'	122°	47°34'	-28'	123°	47°01'	-29'	124°	46°27'	-30'	125°	45°52'	-31'	126°	45°17'	-32'	127°	20
21	48°13'	-26'	123°	47°40'	-27'	123°	47°06'	-29'	124°	46°32'	-30'	125°	45°57'	-31'	126°	45°22'	-32'	127°	44°45'	-33'	128°	21
22	47°46'	-27'	124°	47°13'	-28'	125°	46°38'	-29'	126°	46°03'	-30'	126°	45°27'	-31'	127°	44°50'	-32'	128°	44°12'	-33'	129°	22
23	<u>47°19'</u>	<u>-28'</u>	<u>125°</u>	<u>46°44'</u>	<u>-29'</u>	<u>126°</u>	<u>46°09'</u>	<u>-30'</u>	<u>127°</u>	<u>45°32'</u>	<u>-31'</u>	<u>128°</u>	<u>44°55'</u>	<u>-32'</u>	<u>129°</u>	<u>44°17'</u>	<u>-33'</u>	<u>129°</u>	<u>43°39'</u>	<u>-34'</u>	<u>130°</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°
	0			1			2			3			4			5			6			

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°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	54°00'	-01'	90°	53°59'	-02'	91°	53°57'	-04'	93°	53°54'	-06'	94°	53°49'	-08'	95°	53°42'	-10'	97°	53°34'	-11'	98°	0
1	53°59'	-02'	92°	53°57'	-04'	93°	53°53'	-06'	94°	53°47'	-07'	96°	53°41'	-09'	97°	53°33'	-11'	99°	53°23'	-13'	100°	1
2	53°57'	-04'	93°	53°53'	-05'	95°	53°47'	-07'	96°	53°40'	-09'	97°	53°32'	-11'	99°	53°22'	-12'	100°	53°10'	-14'	101°	2
3	53°54'	-05'	95°	53°47'	-07'	96°	53°40'	-09'	98°	53°31'	-10'	99°	53°21'	-12'	100°	53°09'	-14'	102°	52°56'	-15'	103°	3
4	53°49'	-06'	97°	53°41'	-08'	98°	53°32'	-10'	99°	53°21'	-12'	101°	53°09'	-13'	102°	52°56'	-15'	103°	52°41'	-17'	105°	4
5	53°42'	-08'	98°	53°33'	-10'	100°	53°22'	-11'	101°	53°09'	-13'	102°	52°56'	-15'	104°	52°41'	-16'	105°	52°25'	-18'	106°	5
6	53°34'	-09'	100°	53°23'	-11'	101°	53°10'	-13'	103°	52°56'	-14'	104°	52°41'	-16'	105°	52°25'	-17'	107°	52°07'	-19'	108°	6
7	53°25'	-11'	102°	53°12'	-12'	103°	52°58'	-14'	104°	52°42'	-16'	106°	52°25'	-17'	107°	52°07'	-19'	108°	51°48'	-20'	109°	7
8	53°14'	-12'	103°	53°00'	-14'	105°	52°44'	-15'	106°	52°27'	-17'	107°	52°08'	-18'	108°	51°49'	-20'	110°	51°28'	-21'	111°	8
9	53°02'	-13'	105°	52°46'	-15'	106°	52°29'	-16'	108°	52°10'	-18'	109°	51°50'	-20'	110°	51°29'	-21'	111°	51°06'	-22'	112°	9
10	52°49'	-15'	107°	52°31'	-16'	108°	52°12'	-18'	109°	51°52'	-19'	110°	51°30'	-21'	112°	51°08'	-22'	113°	50°44'	-24'	114°	10
11	52°35'	-16'	108°	52°15'	-17'	110°	51°54'	-19'	111°	51°33'	-20'	112°	51°10'	-22'	113°	50°46'	-23'	114°	50°20'	-25'	115°	11
12	52°19'	-17'	110°	51°58'	-19'	111°	51°35'	-20'	112°	51°12'	-22'	113°	50°48'	-23'	115°	50°22'	-24'	116°	49°56'	-26'	117°	12
13	52°02'	-18'	111°	51°39'	-20'	113°	51°15'	-21'	114°	50°51'	-23'	115°	50°25'	-24'	116°	49°58'	-25'	117°	49°30'	-27'	118°	13
14	51°43'	-20'	113°	51°19'	-21'	114°	50°54'	-22'	115°	50°28'	-24'	116°	50°01'	-25'	117°	49°33'	-26'	118°	49°04'	-28'	119°	14
15	51°24'	-21'	115°	50°58'	-22'	116°	50°32'	-23'	117°	50°04'	-25'	118°	49°36'	-26'	119°	49°06'	-27'	120°	48°36'	-29'	121°	15
16	51°03'	-22'	116°	50°36'	-23'	117°	50°08'	-25'	118°	49°39'	-26'	119°	49°10'	-27'	120°	48°39'	-28'	121°	48°08'	-29'	122°	16
17	50°41'	-23'	117°	50°13'	-24'	119°	49°44'	-26'	120°	49°14'	-27'	121°	48°43'	-28'	122°	48°11'	-29'	123°	47°38'	-30'	123°	17
18	50°18'	-24'	119°	49°49'	-25'	120°	49°18'	-27'	121°	48°47'	-28'	122°	48°15'	-29'	123°	47°42'	-30'	124°	47°08'	-31'	125°	18
19	49°54'	-25'	120°	49°23'	-26'	121°	48°52'	-27'	122°	48°19'	-29'	123°	47°46'	-30'	124°	47°12'	-31'	125°	46°37'	-32'	126°	19
20	49°29'	-26'	122°	48°57'	-27'	123°	48°24'	-28'	124°	47°50'	-30'	125°	47°16'	-31'	126°	46°41'	-32'	126°	46°05'	-33'	127°	20
21	49°03'	-27'	123°	48°30'	-28'	124°	47°56'	-29'	125°	47°21'	-30'	126°	46°45'	-31'	127°	46°09'	-32'	128°	45°32'	-33'	128°	21
22	48°36'	-28'	125°	48°02'	-29'	125°	47°26'	-30'	126°	46°51'	-31'	127°	46°14'	-32'	128°	45°37'	-33'	129°	44°59'	-34'	130°	22
23	48°08'	-29'	126°	47°33'	-30'	127°	46°56'	-31'	128°	46°19'	-32'	128°	45°42'	-33'	129°	45°03'	-34'	130°	44°25'	-35'	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°
	0			1			2			3			4			5			6			

36° 324° LHA

**Latitude CONTRARY to DECLINATION**

36° 324° LHA

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

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

35° 325° LHA

**Latitude CONTRARY to Declination**

35° 325° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	55°00'	-01'	90°	54°59'	-03'	91°	54°57'	-04'	93°	54°53'	-06'	94°	54°48'	-08'	96°	54°41'	-10'	97°	54°33'	-12'	98°	0
1	54°59'	-02'	92°	54°57'	-04'	93°	54°53'	-06'	95°	54°47'	-08'	96°	54°40'	-09'	97°	54°32'	-11'	99°	54°22'	-13'	100°	1
2	54°57'	-04'	93°	54°53'	-06'	95°	54°47'	-07'	96°	54°39'	-09'	98°	54°31'	-11'	99°	54°20'	-13'	100°	54°09'	-14'	102°	2
3	54°53'	-05'	95°	54°47'	-07'	97°	54°39'	-09'	98°	54°30'	-11'	99°	54°20'	-12'	101°	54°08'	-14'	102°	53°55'	-16'	104°	3
4	54°48'	-07'	97°	54°40'	-08'	98°	54°31'	-10'	100°	54°20'	-12'	101°	54°08'	-14'	102°	53°54'	-15'	104°	53°39'	-17'	105°	4
5	54°41'	-08'	99°	54°32'	-10'	100°	54°20'	-12'	101°	54°08'	-13'	103°	53°54'	-15'	104°	53°39'	-17'	105°	53°22'	-18'	107°	5
6	54°33'	-10'	100°	54°22'	-11'	102°	54°09'	-13'	103°	53°55'	-15'	104°	53°39'	-16'	106°	53°22'	-18'	107°	53°04'	-20'	108°	6
7	54°24'	-11'	102°	54°10'	-13'	103°	53°56'	-14'	105°	53°40'	-16'	106°	53°23'	-18'	107°	53°04'	-19'	109°	52°44'	-21'	110°	7
8	54°13'	-12'	104°	53°58'	-14'	105°	53°41'	-16'	106°	53°24'	-17'	108°	53°05'	-19'	109°	52°45'	-20'	110°	52°23'	-22'	111°	8
9	54°00'	-14'	105°	53°44'	-15'	107°	53°26'	-17'	108°	53°06'	-19'	109°	52°46'	-20'	111°	52°24'	-22'	112°	52°02'	-23'	113°	9
10	53°47'	-15'	107°	53°28'	-17'	108°	53°09'	-18'	110°	52°48'	-20'	111°	52°26'	-21'	112°	52°03'	-23'	113°	51°38'	-24'	114°	10
11	53°31'	-16'	109°	53°12'	-18'	110°	52°50'	-20'	111°	52°28'	-21'	112°	52°05'	-22'	114°	51°40'	-24'	115°	51°14'	-25'	116°	11
12	53°15'	-18'	110°	52°54'	-19'	112°	52°31'	-21'	113°	52°07'	-22'	114°	51°42'	-24'	115°	51°16'	-25'	116°	50°49'	-26'	117°	12
13	52°57'	-19'	112°	52°34'	-20'	113°	52°10'	-22'	114°	51°45'	-23'	115°	51°18'	-25'	117°	50°51'	-26'	118°	50°23'	-27'	119°	13
14	52°38'	-20'	113°	52°14'	-22'	115°	51°48'	-23'	116°	51°22'	-24'	117°	50°54'	-26'	118°	50°25'	-27'	119°	49°55'	-28'	120°	14
15	52°18'	-21'	115°	51°52'	-23'	116°	51°25'	-24'	117°	50°57'	-26'	118°	50°28'	-27'	119°	49°58'	-28'	121°	49°27'	-29'	122°	15
16	51°57'	-23'	117°	51°29'	-24'	118°	51°01'	-25'	119°	50°32'	-27'	120°	50°01'	-28'	121°	49°30'	-29'	122°	48°58'	-30'	123°	16
17	51°34'	-24'	118°	51°05'	-25'	119°	50°36'	-26'	120°	50°05'	-28'	121°	49°33'	-29'	122°	49°01'	-30'	123°	48°28'	-31'	124°	17
18	51°10'	-25'	120°	50°40'	-26'	121°	50°09'	-27'	122°	49°37'	-28'	123°	49°05'	-30'	124°	48°31'	-31'	125°	47°57'	-32'	125°	18
19	50°46'	-26'	121°	50°14'	-27'	122°	49°42'	-28'	123°	49°09'	-29'	124°	48°35'	-31'	125°	48°00'	-32'	126°	47°25'	-33'	127°	19
20	50°20'	-27'	122°	49°47'	-28'	123°	49°14'	-29'	124°	48°40'	-30'	125°	48°04'	-31'	126°	47°29'	-32'	127°	46°52'	-33'	128°	20
21	49°53'	-28'	124°	49°19'	-29'	125°	48°45'	-30'	126°	48°09'	-31'	127°	47°33'	-32'	127°	46°56'	-33'	128°	46°19'	-34'	129°	21
22	49°25'	-29'	125°	48°50'	-30'	126°	48°15'	-31'	127°	47°38'	-32'	128°	47°01'	-33'	129°	46°23'	-34'	130°	45°44'	-35'	130°	22
23	48°56'	-30'	127°	48°20'	-31'	127°	47°44'	-32'	128°	47°06'	-33'	129°	46°28'	-34'	130°	45°49'	-35'	131°	45°10'	-36'	132°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

35° 325° LHA

**Latitude CONTRARY to 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

34° 326° LHA

Latitude CONTRARY to Declination

34° 326° LHA

Dec°	0			1			2			3			4			5			6			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	56°00'	-01'	90°	55°59'	-03'	91°	55°57'	-05'	93°	55°53'	-06'	94°	55°48'	-08'	96°	55°41'	-10'	97°	55°32'	-12'	99°	0			
1	55°59'	-02'	92°	55°57'	-04'	93°	55°52'	-06'	95°	55°47'	-08'	96°	55°39'	-10'	98°	55°31'	-11'	99°	55°20'	-13'	101°	1			
2	55°57'	-04'	94°	55°52'	-06'	95°	55°46'	-08'	97°	55°39'	-09'	98°	55°30'	-11'	99°	55°19'	-13'	101°	55°07'	-15'	102°	2			
3	55°53'	-05'	95°	55°47'	-07'	97°	55°39'	-09'	98°	55°29'	-11'	100°	55°19'	-13'	101°	55°06'	-14'	103°	54°52'	-16'	104°	3			
4	55°48'	-07'	97°	55°39'	-09'	99°	55°30'	-11'	100°	55°19'	-12'	101°	55°06'	-14'	103°	54°52'	-16'	104°	54°36'	-17'	106°	4			
5	55°41'	-08'	99°	55°31'	-10'	100°	55°19'	-12'	102°	55°06'	-14'	103°	54°52'	-15'	105°	54°36'	-17'	106°	54°19'	-19'	107°	5			
6	55°32'	-10'	101°	55°20'	-12'	102°	55°07'	-13'	103°	54°52'	-15'	105°	54°36'	-17'	106°	54°19'	-18'	108°	54°00'	-20'	109°	6			
7	55°22'	-11'	102°	55°09'	-13'	104°	54°54'	-15'	105°	54°37'	-17'	107°	54°20'	-18'	108°	54°01'	-20'	109°	53°40'	-21'	110°	7			
8	55°11'	-13'	104°	54°56'	-15'	105°	54°39'	-16'	107°	54°21'	-18'	108°	54°01'	-19'	110°	53°41'	-21'	111°	53°19'	-23'	112°	8			
9	54°58'	-14'	106°	54°41'	-16'	107°	54°23'	-18'	109°	54°03'	-19'	110°	53°42'	-21'	111°	53°20'	-22'	112°	52°56'	-24'	114°	9			
10	54°44'	-16'	108°	54°25'	-17'	109°	54°05'	-19'	110°	53°44'	-20'	111°	53°21'	-22'	113°	52°58'	-23'	114°	52°33'	-25'	115°	10			
11	54°28'	-17'	109°	54°08'	-19'	110°	53°46'	-20'	112°	53°23'	-22'	113°	52°59'	-23'	114°	52°34'	-25'	115°	52°08'	-26'	117°	11			
12	54°11'	-18'	111°	53°49'	-20'	112°	53°26'	-21'	113°	53°02'	-23'	115°	52°36'	-24'	116°	52°10'	-26'	117°	51°42'	-27'	118°	12			
13	53°53'	-20'	112°	53°29'	-21'	114°	53°05'	-23'	115°	52°39'	-24'	116°	52°12'	-25'	117°	51°44'	-27'	118°	51°15'	-28'	119°	13			
14	53°33'	-21'	114°	53°08'	-22'	115°	52°42'	-24'	116°	52°15'	-25'	118°	51°46'	-26'	119°	51°17'	-28'	120°	50°47'	-29'	121°	14			
15	53°12'	-22'	116°	52°46'	-24'	117°	52°18'	-25'	118°	51°50'	-26'	119°	51°20'	-28'	120°	50°49'	-29'	121°	50°18'	-30'	122°	15			
16	52°50'	-23'	117°	52°22'	-25'	118°	51°53'	-26'	119°	51°23'	-27'	121°	50°52'	-29'	122°	50°21'	-30'	123°	49°48'	-31'	124°	16			
17	52°27'	-24'	119°	51°58'	-26'	120°	51°27'	-27'	121°	50°56'	-28'	122°	50°24'	-30'	123°	49°51'	-31'	124°	49°17'	-32'	125°	17			
18	52°03'	-26'	120°	51°32'	-27'	121°	51°00'	-28'	122°	50°28'	-29'	123°	49°54'	-30'	124°	49°20'	-32'	125°	48°45'	-33'	126°	18			
19	51°37'	-27'	122°	51°05'	-28'	123°	50°32'	-29'	124°	49°58'	-30'	125°	49°24'	-31'	126°	48°49'	-32'	127°	48°12'	-33'	128°	19			
20	51°10'	-28'	123°	50°37'	-29'	124°	50°03'	-30'	125°	49°28'	-31'	126°	48°53'	-32'	127°	48°16'	-33'	128°	47°39'	-34'	129°	20			
21	50°43'	-29'	124°	50°08'	-30'	125°	49°33'	-31'	126°	48°57'	-32'	127°	48°20'	-33'	128°	47°43'	-34'	129°	47°05'	-35'	130°	21			
22	50°14'	-30'	126°	49°39'	-31'	127°	49°02'	-32'	128°	48°25'	-33'	129°	47°47'	-34'	129°	47°09'	-35'	130°	46°30'	-36'	131°	22			
23	49°44'	-31'	127°	49°08'	-32'	128°	48°30'	-33'	129°	47°52'	-34'	130°	47°13'	-35'	131°	46°34'	-36'	132°	45°54'	-36'	132°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6						

34° 326° LHA

Latitude CONTRARY to DECLINATION

34° 326° LHA

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

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

33° 327° LHA

Latitude CONTRARY to Declination

33° 327° LHA

Dec°	0			1			2			3			4			5			6			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	57°00'	-01'	90°	56°59'	-03'	92°	56°57'	-05'	93°	56°53'	-07'	95°	56°47'	-08'	96°	56°40'	-10'	98°	56°31'	-12'	99°	0			
1	56°59'	-02'	92°	56°56'	-04'	93°	56°52'	-06'	95°	56°46'	-08'	96°	56°39'	-10'	98°	56°30'	-12'	99°	56°19'	-14'	101°	1			
2	56°57'	-04'	94°	56°52'	-06'	95°	56°46'	-08'	97°	56°38'	-10'	98°	56°29'	-12'	100°	56°18'	-13'	101°	56°05'	-15'	103°	2			
3	56°53'	-06'	95°	56°46'	-07'	97°	56°38'	-09'	99°	56°28'	-11'	100°	56°17'	-13'	101°	56°05'	-15'	103°	55°50'	-17'	104°	3			
4	56°47'	-07'	97°	56°39'	-09'	99°	56°29'	-11'	100°	56°17'	-13'	102°	56°04'	-14'	103°	55°50'	-16'	105°	55°34'	-18'	106°	4			
5	56°40'	-09'	99°	56°30'	-11'	101°	56°18'	-12'	102°	56°05'	-14'	104°	55°50'	-16'	105°	55°34'	-17'	107°	55°16'	-19'	108°	5			
6	56°31'	-10'	101°	56°19'	-12'	102°	56°05'	-14'	104°	55°50'	-16'	105°	55°34'	-17'	107°	55°16'	-19'	108°	54°57'	-21'	109°	6			
7	56°21'	-12'	103°	56°07'	-14'	104°	55°52'	-15'	106°	55°35'	-17'	107°	55°16'	-19'	108°	54°57'	-20'	110°	54°36'	-22'	111°	7			
8	56°09'	-13'	104°	55°53'	-15'	106°	55°36'	-17'	107°	55°18'	-18'	109°	54°58'	-20'	110°	54°37'	-22'	111°	54°14'	-23'	113°	8			
9	55°56'	-15'	106°	55°38'	-16'	108°	55°19'	-18'	109°	54°59'	-20'	110°	54°38'	-21'	112°	54°15'	-23'	113°	53°51'	-24'	114°	9			
10	55°41'	-16'	108°	55°22'	-18'	109°	55°01'	-19'	111°	54°39'	-21'	112°	54°16'	-23'	113°	53°52'	-24'	115°	53°27'	-26'	116°	10			
11	55°25'	-18'	110°	55°04'	-19'	111°	54°42'	-21'	112°	54°18'	-22'	114°	53°54'	-24'	115°	53°28'	-25'	116°	53°01'	-27'	117°	11			
12	55°07'	-19'	111°	54°45'	-21'	113°	54°21'	-22'	114°	53°56'	-24'	115°	53°30'	-25'	116°	53°03'	-26'	118°	52°34'	-28'	119°	12			
13	54°48'	-20'	113°	54°24'	-22'	114°	53°59'	-23'	116°	53°32'	-25'	117°	53°05'	-26'	118°	52°36'	-27'	119°	52°07'	-29'	120°	13			
14	54°28'	-22'	115°	54°02'	-23'	116°	53°36'	-25'	117°	53°08'	-26'	118°	52°39'	-27'	119°	52°09'	-29'	121°	51°38'	-30'	122°	14			
15	54°06'	-23'	116°	53°39'	-24'	117°	53°11'	-26'	119°	52°42'	-27'	120°	52°12'	-28'	121°	51°40'	-30'	122°	51°08'	-31'	123°	15			
16	53°43'	-24'	118°	53°15'	-25'	119°	52°45'	-27'	120°	52°15'	-28'	121°	51°43'	-29'	122°	51°11'	-31'	123°	50°37'	-32'	124°	16			
17	53°19'	-25'	119°	52°50'	-27'	120°	52°19'	-28'	122°	51°47'	-29'	123°	51°14'	-30'	124°	50°40'	-31'	125°	50°05'	-33'	126°	17			
18	52°54'	-26'	121°	52°23'	-28'	122°	51°51'	-29'	123°	51°18'	-30'	124°	50°44'	-31'	125°	50°09'	-32'	126°	49°33'	-33'	127°	18			
19	52°28'	-27'	122°	51°55'	-29'	123°	51°22'	-30'	124°	50°48'	-31'	125°	50°12'	-32'	126°	49°36'	-33'	127°	48°59'	-34'	128°	19			
20	52°00'	-28'	124°	51°27'	-30'	125°	50°52'	-31'	126°	50°16'	-32'	127°	49°40'	-33'	128°	49°03'	-34'	129°	48°25'	-35'	130°	20			
21	51°32'	-29'	125°	50°57'	-31'	126°	50°21'	-32'	127°	49°44'	-33'	128°	49°07'	-34'	129°	48°29'	-35'	130°	47°50'	-36'	131°	21			
22	51°02'	-30'	127°	50°26'	-32'	128°	49°49'	-33'	128°	49°12'	-34'	129°	48°33'	-35'	130°	47°54'	-36'	131°	47°14'	-37'	132°	22			
23	50°32'	-31'	128°	49°55'	-32'	129°	49°17'	-33'	130°	48°38'	-34'	131°	47°59'	-35'	132°	47°18'	-36'	132°	46°38'	-37'	133°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6						

33° 327° LHA

Latitude CONTRARY to DECLINATION

33° 327° LHA

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

32° 328° LHA

Latitude CONTRARY to Declination

32° 328° LHA

Table with 13 columns (Dec°, 0-6, Dec°) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is symmetric about the center row (Dec 12).

32° 328° LHA

Latitude CONTRARY to DECLINATION

32° 328° LHA

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

31° 329° LHA

Latitude CONTRARY to Declination

31° 329° LHA

Table with 13 columns (Dec°, 0-6, Dec°) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is symmetric about the center row (Dec 12).

31° 329° LHA

Latitude CONTRARY to DECLINATION

31° 329° LHA

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

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

30° 330° LHA

**Latitude CONTRARY to Declination**

30° 330° LHA

Dec°	0			1			2			3			4			5			6			Dec°		
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°			
0	60°00'	-01'	90°	59°59'	-03'	92°	59°56'	-05'	93°	59°52'	-07'	95°	59°46'	-09'	97°	59°37'	-11'	99°	59°28'	-13'	100°	0		
1	59°59'	-03'	92°	59°56'	-05'	94°	59°51'	-07'	95°	59°45'	-09'	97°	59°36'	-11'	99°	59°26'	-13'	101°	59°14'	-15'	102°	1		
2	59°56'	-05'	94°	59°51'	-07'	96°	59°44'	-09'	97°	59°36'	-11'	99°	59°25'	-13'	101°	59°13'	-15'	102°	59°00'	-16'	104°	2		
3	59°52'	-06'	96°	59°45'	-08'	98°	59°36'	-10'	99°	59°25'	-12'	101°	59°13'	-14'	103°	58°59'	-16'	104°	58°43'	-18'	106°	3		
4	59°46'	-08'	98°	59°36'	-10'	100°	59°25'	-12'	101°	59°13'	-14'	103°	58°59'	-16'	105°	58°43'	-18'	106°	58°25'	-20'	108°	4		
5	59°37'	-10'	100°	59°26'	-12'	102°	59°13'	-14'	103°	58°59'	-16'	105°	58°43'	-18'	106°	58°25'	-19'	108°	58°05'	-21'	110°	5		
6	59°28'	-12'	102°	59°14'	-13'	104°	59°00'	-15'	105°	58°43'	-17'	107°	58°25'	-19'	108°	58°05'	-21'	110°	57°44'	-23'	111°	6		
7	59°16'	-13'	104°	59°01'	-15'	105°	58°44'	-17'	107°	58°26'	-19'	109°	58°06'	-21'	110°	57°45'	-22'	112°	57°22'	-24'	113°	7		
8	59°03'	-15'	106°	58°46'	-17'	107°	58°27'	-19'	109°	58°07'	-20'	110°	57°45'	-22'	112°	57°22'	-24'	113°	56°58'	-25'	115°	8		
9	58°48'	-16'	108°	58°29'	-18'	109°	58°09'	-20'	111°	57°47'	-22'	112°	57°23'	-23'	114°	56°59'	-25'	115°	56°33'	-27'	116°	9		
10	58°32'	-18'	109°	58°11'	-20'	111°	57°49'	-22'	112°	57°25'	-23'	114°	57°00'	-25'	115°	56°34'	-26'	117°	56°06'	-28'	118°	10		
11	58°13'	-20'	111°	57°51'	-21'	113°	57°27'	-23'	114°	57°02'	-25'	116°	56°35'	-26'	117°	56°07'	-28'	118°	55°38'	-29'	120°	11		
12	57°54'	-21'	113°	57°30'	-23'	114°	57°04'	-24'	116°	56°37'	-26'	117°	56°09'	-27'	119°	55°40'	-29'	120°	55°09'	-30'	121°	12		
13	57°33'	-22'	115°	57°07'	-24'	116°	56°40'	-26'	118°	56°11'	-27'	119°	55°42'	-29'	120°	55°11'	-30'	121°	54°39'	-31'	123°	13		
14	57°10'	-24'	117°	56°43'	-25'	118°	56°14'	-27'	119°	55°44'	-28'	120°	55°13'	-30'	122°	54°41'	-31'	123°	54°08'	-32'	124°	14		
15	56°46'	-25'	118°	56°17'	-27'	120°	55°47'	-28'	121°	55°16'	-29'	122°	54°44'	-31'	123°	54°10'	-32'	124°	53°36'	-33'	126°	15		
16	56°21'	-26'	120°	55°51'	-28'	121°	55°19'	-29'	122°	54°47'	-31'	124°	54°13'	-32'	125°	53°38'	-33'	126°	53°03'	-34'	127°	16		
17	55°55'	-28'	121°	55°23'	-29'	123°	54°50'	-30'	124°	54°16'	-32'	125°	53°41'	-33'	126°	53°05'	-34'	127°	52°28'	-35'	128°	17		
18	55°27'	-29'	123°	54°54'	-30'	124°	54°20'	-31'	125°	53°44'	-33'	126°	53°08'	-34'	128°	52°31'	-35'	129°	51°53'	-36'	130°	18		
19	54°58'	-30'	125°	54°24'	-31'	126°	53°48'	-32'	127°	53°12'	-34'	128°	52°34'	-35'	129°	51°56'	-36'	130°	51°17'	-37'	131°	19		
20	54°28'	-31'	126°	53°52'	-32'	127°	53°16'	-33'	128°	52°38'	-35'	129°	52°00'	-36'	130°	51°21'	-37'	131°	50°41'	-38'	132°	20		
21	53°57'	-32'	128°	53°20'	-33'	129°	52°42'	-34'	130°	52°04'	-35'	131°	51°24'	-36'	132°	50°44'	-37'	132°	50°03'	-38'	133°	21		
22	53°25'	-33'	129°	52°47'	-34'	130°	52°08'	-35'	131°	51°28'	-36'	132°	50°48'	-37'	133°	50°07'	-38'	134°	49°25'	-39'	135°	22		
23	<u>52°52'</u>	<u>-34'</u>	<u>130°</u>	<u>52°12'</u>	<u>-35'</u>	<u>131°</u>	<u>51°32'</u>	<u>-36'</u>	<u>132°</u>	<u>50°52'</u>	<u>-37'</u>	<u>133°</u>	<u>50°10'</u>	<u>-38'</u>	<u>134°</u>	<u>49°28'</u>	<u>-39'</u>	<u>135°</u>	<u>48°46'</u>	<u>-40'</u>	<u>136°</u>	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°
	0			1			2			3			4			5			6					

30° 330° LHA

**Latitude CONTRARY to DECLINATION**

30° 330° LHA

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

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

29° 331° LHA

**Latitude CONTRARY to Declination**

29° 331° LHA

Dec°	0			1			2			3			4			5			6			Dec°		
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°			
0	61°00'	-01'	90°	60°59'	-03'	92°	60°56'	-05'	94°	60°52'	-07'	95°	60°45'	-09'	97°	60°37'	-12'	99°	60°26'	-14'	101°	0		
1	60°59'	-03'	92°	60°56'	-05'	94°	60°51'	-07'	96°	60°44'	-09'	97°	60°35'	-11'	99°	60°25'	-13'	101°	60°13'	-15'	103°	1		
2	60°56'	-05'	94°	60°51'	-07'	96°	60°44'	-09'	98°	60°35'	-11'	99°	60°24'	-13'	101°	60°12'	-15'	103°	59°57'	-17'	105°	2		
3	60°52'	-07'	96°	60°44'	-09'	98°	60°35'	-11'	100°	60°24'	-13'	101°	60°11'	-15'	103°	59°57'	-17'	105°	59°40'	-19'	106°	3		
4	60°45'	-08'	98°	60°35'	-10'	100°	60°24'	-13'	102°	60°11'	-15'	103°	59°56'	-16'	105°	59°40'	-18'	107°	59°22'	-20'	108°	4		
5	60°37'	-10'	100°	60°25'	-12'	102°	60°12'	-14'	104°	59°57'	-16'	105°	59°40'	-18'	107°	59°22'	-20'	109°	59°02'	-22'	110°	5		
6	60°26'	-12'	102°	60°13'	-14'	104°	59°57'	-16'	106°	59°40'	-18'	107°	59°22'	-20'	109°	59°02'	-21'	110°	58°40'	-23'	112°	6		
7	60°14'	-14'	104°	59°59'	-16'	106°	59°41'	-18'	108°	59°23'	-19'	109°	59°02'	-21'	111°	58°40'	-23'	112°	58°17'	-25'	114°	7		
8	60°01'	-15'	106°	59°43'	-17'	108°	59°24'	-19'	109°	59°03'	-21'	111°	58°41'	-23'	113°	58°17'	-24'	114°	57°52'	-26'	115°	8		
9	59°45'	-17'	108°	59°26'	-19'	110°	59°05'	-21'	111°	58°42'	-22'	113°	58°18'	-24'	114°	57°53'	-26'	116°	57°26'	-27'	117°	9		
10	59°28'	-19'	110°	59°07'	-21'	112°	58°44'	-22'	113°	58°20'	-24'	115°	57°54'	-26'	116°	57°27'	-27'	117°	56°59'	-29'	119°	10		
11	59°09'	-20'	112°	58°46'	-22'	113°	58°22'	-24'	115°	57°56'	-25'	116°	57°28'	-27'	118°	57°00'	-28'	119°	56°30'	-30'	120°	11		
12	58°49'	-22'	114°	58°24'	-23'	115°	57°58'	-25'	117°	57°30'	-27'	118°	57°02'	-28'	119°	56°32'	-30'	121°	56°00'	-31'	122°	12		
13	58°27'	-23'	115°	58°01'	-25'	117°	57°33'	-26'	118°	57°04'	-28'	120°	56°33'	-29'	121°	56°02'	-31'	122°	55°29'	-32'	124°	13		
14	58°04'	-25'	117°	57°36'	-26'	119°	57°06'	-28'	120°	56°36'	-29'	121°	56°04'	-31'	123°	55°31'	-32'	124°	54°57'	-33'	125°	14		
15	57°39'	-26'	119°	57°09'	-28'	120°	56°39'	-29'	122°	56°07'	-30'	123°	55°34'	-32'	124°	54°59'	-33'	125°	54°24'	-34'	126°	15		
16	57°13'	-27'	121°	56°42'	-29'	122°	56°10'	-30'	123°	55°36'	-31'	124°	55°02'	-33'	126°	54°26'	-34'	127°	53°50'	-35'	128°	16		
17	56°46'	-29'	122°	56°13'	-30'	124°	55°40'	-31'	125°	55°05'	-33'	126°	54°29'	-34'	127°	53°53'	-35'	128°	53°15'	-36'	129°	17		
18	56°17'	-30'	124°	55°43'	-31'	125°	55°08'	-32'	126°	54°32'	-34'	127°	53°55'	-35'	128°	53°18'	-36'	130°	52°39'	-37'	131°	18		
19	55°47'	-31'	125°	55°12'	-32'	127°	54°36'	-33'	128°	53°59'	-35'	129°	53°21'	-36'	130°	52°42'	-37'	131°	52°02'	-38'	132°	19		
20	55°16'	-32'	127°	54°40'	-33'	128°	54°02'	-34'	129°	53°24'	-35'	130°	52°45'	-37'	131°	52°05'	-38'	132°	51°25'	-38'	133°	20		
21	54°44'	-33'	128°	54°07'	-34'	129°	53°28'	-35'	131°	52°49'	-36'	132°	52°09'	-37'	132°	51°28'	-38'	133°	50°46'	-39'	134°	21		
22	54°11'	-34'	130°	53°32'	-35'	131°	52°53'	-36'	132°	52°12'	-37'	133°	51°31'	-38'	134°	50°49'	-39'	135°	50°07'	-40'	135°	22		
23	<u>53°37'</u>	<u>-35'</u>	<u>131°</u>	<u>52°57'</u>	<u>-36'</u>	<u>132°</u>	<u>52°17'</u>	<u>-37'</u>	<u>133°</u>	<u>51°35'</u>	<u>-38'</u>	<u>134°</u>	<u>50°53'</u>	<u>-39'</u>	<u>135°</u>	<u>50°10'</u>	<u>-40'</u>	<u>136°</u>	<u>49°27'</u>	<u>-41'</u>	<u>137°</u>	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°
	0			1			2			3			4			5			6					

29° 331° LHA

**Latitude CONTRARY to DECLINATION**

29° 331° LHA

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

28° 332° LHA

Latitude CONTRARY to Declination

28° 332° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	62°00'	-01'	90°	61°59'	-03'	92°	61°56'	-05'	94°	61°51'	-08'	96°	61°44'	-10'	97°	61°36'	-12'	99°	61°25'	-14'	101°	0
1	61°59'	-03'	92°	61°56'	-05'	94°	61°51'	-07'	96°	61°44'	-10'	98°	61°35'	-12'	100°	61°24'	-14'	101°	61°11'	-16'	103°	1
2	61°56'	-05'	94°	61°51'	-07'	96°	61°43'	-09'	98°	61°34'	-11'	100°	61°23'	-13'	102°	61°10'	-16'	103°	60°55'	-18'	105°	2
3	61°51'	-07'	96°	61°44'	-09'	98°	61°34'	-11'	100°	61°23'	-13'	102°	61°09'	-15'	104°	60°54'	-17'	105°	60°38'	-19'	107°	3
4	61°44'	-09'	98°	61°35'	-11'	100°	61°23'	-13'	102°	61°09'	-15'	104°	60°54'	-17'	106°	60°37'	-19'	107°	60°18'	-21'	109°	4
5	61°36'	-11'	101°	61°24'	-13'	102°	61°10'	-15'	104°	60°54'	-17'	106°	60°37'	-19'	108°	60°18'	-21'	109°	59°57'	-22'	111°	5
6	61°25'	-12'	103°	61°11'	-15'	104°	60°55'	-17'	106°	60°38'	-18'	108°	60°18'	-20'	110°	59°57'	-22'	111°	59°35'	-24'	113°	6
7	61°12'	-14'	105°	60°56'	-16'	106°	60°39'	-18'	108°	60°19'	-20'	110°	59°58'	-22'	111°	59°35'	-24'	113°	59°11'	-25'	115°	7
8	60°58'	-16'	107°	60°40'	-18'	108°	60°20'	-20'	110°	59°59'	-22'	112°	59°36'	-23'	113°	59°12'	-25'	115°	58°46'	-27'	116°	8
9	60°42'	-18'	109°	60°22'	-20'	110°	60°00'	-21'	112°	59°37'	-23'	114°	59°13'	-25'	115°	58°46'	-27'	117°	58°19'	-28'	118°	9
10	60°24'	-19'	111°	60°02'	-21'	112°	59°39'	-23'	114°	59°14'	-25'	115°	58°48'	-26'	117°	58°20'	-28'	118°	57°51'	-29'	120°	10
11	60°05'	-21'	112°	59°41'	-23'	114°	59°16'	-25'	116°	58°49'	-26'	117°	58°21'	-28'	119°	57°52'	-29'	120°	57°21'	-31'	121°	11
12	59°44'	-23'	114°	59°18'	-24'	116°	58°51'	-26'	117°	58°23'	-28'	119°	57°54'	-29'	120°	57°23'	-30'	122°	56°51'	-32'	123°	12
13	59°21'	-24'	116°	58°54'	-26'	118°	58°25'	-27'	119°	57°56'	-29'	121°	57°24'	-30'	122°	56°52'	-32'	123°	56°19'	-33'	124°	13
14	58°57'	-26'	118°	58°28'	-27'	119°	57°58'	-29'	121°	57°27'	-30'	122°	56°54'	-31'	123°	56°21'	-33'	125°	55°46'	-34'	126°	14
15	58°31'	-27'	120°	58°01'	-28'	121°	57°29'	-30'	122°	56°57'	-31'	124°	56°23'	-33'	125°	55°48'	-34'	126°	55°12'	-35'	127°	15
16	58°05'	-28'	121°	57°33'	-30'	123°	57°00'	-31'	124°	56°25'	-32'	125°	55°50'	-34'	127°	55°14'	-35'	128°	54°37'	-36'	129°	16
17	57°36'	-30'	123°	57°03'	-31'	124°	56°29'	-32'	126°	55°53'	-33'	127°	55°17'	-35'	128°	54°39'	-36'	129°	54°01'	-37'	130°	17
18	57°07'	-31'	125°	56°32'	-32'	126°	55°56'	-33'	127°	55°20'	-34'	128°	54°42'	-36'	129°	54°03'	-37'	130°	53°24'	-38'	132°	18
19	56°36'	-32'	126°	56°00'	-33'	127°	55°23'	-34'	129°	54°45'	-35'	130°	54°06'	-37'	131°	53°27'	-38'	132°	52°46'	-39'	133°	19
20	56°04'	-33'	128°	55°27'	-34'	129°	54°49'	-35'	130°	54°10'	-36'	131°	53°30'	-37'	132°	52°49'	-38'	133°	52°08'	-39'	134°	20
21	55°31'	-34'	129°	54°53'	-35'	130°	54°13'	-36'	131°	53°33'	-37'	132°	52°52'	-38'	133°	52°11'	-39'	134°	51°28'	-40'	135°	21
22	54°57'	-35'	131°	54°17'	-36'	132°	53°37'	-37'	133°	52°56'	-38'	134°	52°14'	-39'	135°	51°32'	-40'	136°	50°48'	-41'	136°	22
23	54°22'	-36'	132°	53°41'	-37'	133°	53°00'	-38'	134°	52°18'	-39'	135°	51°35'	-40'	136°	50°52'	-41'	137°	50°08'	-41'	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°
	<b>0</b>			<b>1</b>			<b>2</b>			<b>3</b>			<b>4</b>			<b>5</b>			<b>6</b>			

28° 332° LHA

Latitude CONTRARY to DECLINATION

28° 332° LHA

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

27° 333° LHA

Latitude CONTRARY to Declination

27° 333° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	63°00'	-01'	90°	62°59'	-03'	92°	62°56'	-06'	94°	62°51'	-08'	96°	62°44'	-10'	98°	62°35'	-12'	100°	62°23'	-14'	102°	0
1	62°59'	-03'	92°	62°56'	-05'	94°	62°50'	-08'	96°	62°43'	-10'	98°	62°34'	-12'	100°	62°22'	-14'	102°	62°09'	-16'	104°	1
2	62°56'	-05'	94°	62°50'	-07'	96°	62°43'	-10'	98°	62°33'	-12'	100°	62°21'	-14'	102°	62°08'	-16'	104°	61°53'	-18'	106°	2
3	62°51'	-07'	97°	62°43'	-09'	99°	62°33'	-12'	100°	62°21'	-14'	102°	62°07'	-16'	104°	61°52'	-18'	106°	61°34'	-20'	108°	3
4	62°44'	-09'	99°	62°34'	-11'	101°	62°21'	-13'	103°	62°07'	-16'	104°	61°52'	-18'	106°	61°34'	-20'	108°	61°15'	-22'	110°	4
5	62°35'	-11'	101°	62°22'	-13'	103°	62°08'	-15'	105°	61°52'	-17'	106°	61°34'	-19'	108°	61°14'	-21'	110°	60°53'	-23'	112°	5
6	62°23'	-13'	103°	62°09'	-15'	105°	61°53'	-17'	107°	61°34'	-19'	108°	61°15'	-21'	110°	60°53'	-23'	112°	60°30'	-25'	114°	6
7	62°10'	-15'	105°	61°54'	-17'	107°	61°35'	-19'	109°	61°15'	-21'	110°	60°54'	-23'	112°	60°30'	-24'	114°	60°05'	-26'	115°	7
8	61°56'	-17'	107°	61°37'	-19'	109°	61°17'	-21'	111°	60°54'	-22'	112°	60°31'	-24'	114°	60°06'	-26'	116°	59°39'	-28'	117°	8
9	61°39'	-18'	109°	61°18'	-20'	111°	60°56'	-22'	113°	60°32'	-24'	114°	60°07'	-26'	116°	59°40'	-27'	117°	59°11'	-29'	119°	9
10	61°20'	-20'	111°	60°58'	-22'	113°	60°34'	-24'	115°	60°08'	-26'	116°	59°41'	-27'	118°	59°12'	-29'	119°	58°42'	-30'	121°	10
11	61°00'	-22'	113°	60°36'	-24'	115°	60°10'	-25'	116°	59°42'	-27'	118°	59°14'	-29'	119°	58°43'	-30'	121°	58°12'	-32'	122°	11
12	60°38'	-23'	115°	60°12'	-25'	117°	59°44'	-27'	118°	59°15'	-28'	120°	58°45'	-30'	121°	58°13'	-31'	123°	57°41'	-33'	124°	12
13	60°15'	-25'	117°	59°47'	-27'	118°	59°18'	-28'	120°	58°47'	-30'	121°	58°15'	-31'	123°	57°42'	-33'	124°	57°08'	-34'	125°	13
14	59°50'	-26'	119°	59°20'	-28'	120°	58°49'	-30'	122°	58°17'	-31'	123°	57°44'	-32'	124°	57°09'	-34'	126°	56°34'	-35'	127°	14
15	59°23'	-28'	121°	58°52'	-29'	122°	58°20'	-31'	123°	57°46'	-32'	125°	57°12'	-33'	126°	56°36'	-35'	127°	55°59'	-36'	128°	15
16	58°55'	-29'	122°	58°23'	-31'	124°	57°49'	-32'	125°	57°14'	-33'	126°	56°38'	-35'	127°	56°01'	-36'	129°	55°23'	-37'	130°	16
17	58°26'	-30'	124°	57°52'	-32'	125°	57°17'	-33'	127°	56°41'	-34'	128°	56°03'	-36'	129°	55°25'	-37'	130°	54°46'	-38'	131°	17
18	57°56'	-32'	126°	57°20'	-33'	127°	56°44'	-34'	128°	56°06'	-35'	129°	55°28'	-37'	130°	54°49'	-38'	131°	54°08'	-39'	133°	18
19	57°24'	-33'	127°	56°47'	-34'	128°	56°10'	-35'	130°	55°31'	-36'	131°	54°51'	-37'	132°	54°11'	-39'	133°	53°30'	-39'	134°	19
20	56°51'	-34'	129°	56°13'	-35'	130°	55°34'	-36'	131°	54°54'	-37'	132°	54°14'	-38'	133°	53°32'	-39'	134°	52°50'	-40'	135°	20
21	56°17'	-35'	130°	55°38'	-36'	131°	54°58'	-37'	132°	54°17'	-38'	133°	53°35'	-39'	134°	52°53'	-40'	135°	52°10'	-41'	136°	21
22	55°42'	-36'	132°	55°02'	-37'	133°	54°21'	-38'	134°	53°39'	-39'	135°	52°56'	-40'	136°	52°13'	-41'	137°	51°29'	-42'	137°	22
23	55°06'	-37'	133°	54°25'	-38'	134°	53°43'	-39'	135°	53°00'	-40'	136°	52°16'	-41'	137°	51°32'	-42'	138°	50°47'	-42'	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°
	<b>0</b>			<b>1</b>			<b>2</b>			<b>3</b>			<b>4</b>			<b>5</b>			<b>6</b>			

27° 333° LHA

Latitude CONTRARY to 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

26° 334° LHA

**Latitude CONTRARY to Declination**

26° 334° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	64°00'	-01'	90°	63°59'	-03'	92°	63°56'	-06'	94°	63°50'	-08'	96°	63°43'	-10'	98°	63°33'	-13'	100°	63°22'	-15'	102°	0
1	63°59'	-03'	92°	63°55'	-06'	94°	63°50'	-08'	96°	63°42'	-10'	98°	63°32'	-13'	100°	63°21'	-15'	102°	63°07'	-17'	104°	1
2	63°56'	-05'	95°	63°50'	-08'	97°	63°42'	-10'	99°	63°32'	-12'	101°	63°20'	-14'	103°	63°06'	-17'	104°	62°50'	-19'	106°	2
3	63°50'	-07'	97°	63°42'	-10'	99°	63°32'	-12'	101°	63°20'	-14'	103°	63°05'	-16'	105°	62°49'	-19'	107°	62°31'	-21'	108°	3
4	63°43'	-10'	99°	63°32'	-12'	101°	63°20'	-14'	103°	63°05'	-16'	105°	62°49'	-18'	107°	62°31'	-20'	109°	62°11'	-22'	110°	4
5	63°33'	-12'	101°	63°21'	-14'	103°	63°06'	-16'	105°	62°49'	-18'	107°	62°31'	-20'	109°	62°10'	-22'	111°	61°48'	-24'	112°	5
6	63°22'	-14'	103°	63°07'	-16'	105°	62°50'	-18'	107°	62°31'	-20'	109°	62°11'	-22'	111°	61°48'	-24'	113°	61°24'	-26'	114°	6
7	63°08'	-16'	106°	62°51'	-18'	108°	62°32'	-20'	109°	62°11'	-22'	111°	61°49'	-24'	113°	61°25'	-25'	115°	60°59'	-27'	116°	7
8	62°53'	-17'	108°	62°34'	-19'	110°	62°12'	-21'	111°	61°50'	-23'	113°	61°25'	-25'	115°	60°59'	-27'	116°	60°32'	-29'	118°	8
9	62°35'	-19'	110°	62°14'	-21'	112°	61°51'	-23'	113°	61°26'	-25'	115°	61°00'	-27'	117°	60°33'	-28'	118°	60°03'	-30'	120°	9
10	62°16'	-21'	112°	61°53'	-23'	114°	61°28'	-25'	115°	61°02'	-26'	117°	60°34'	-28'	119°	60°04'	-30'	120°	59°33'	-31'	122°	10
11	61°55'	-23'	114°	61°30'	-25'	116°	61°03'	-26'	117°	60°35'	-28'	119°	60°05'	-30'	120°	59°35'	-31'	122°	59°02'	-32'	123°	11
12	61°32'	-24'	116°	61°05'	-26'	118°	60°37'	-28'	119°	60°07'	-29'	121°	59°36'	-31'	122°	59°03'	-32'	123°	58°30'	-34'	125°	12
13	61°08'	-26'	118°	60°39'	-28'	119°	60°09'	-29'	121°	59°38'	-31'	122°	59°05'	-32'	124°	58°31'	-33'	125°	57°56'	-35'	126°	13
14	60°42'	-27'	120°	60°12'	-29'	121°	59°40'	-31'	123°	59°07'	-32'	124°	58°33'	-33'	125°	57°58'	-35'	127°	57°21'	-36'	128°	14
15	60°15'	-29'	121°	59°43'	-30'	123°	59°10'	-32'	124°	58°35'	-33'	126°	58°00'	-34'	127°	57°23'	-36'	128°	56°45'	-37'	129°	15
16	59°46'	-30'	123°	59°12'	-32'	125°	58°38'	-33'	126°	58°02'	-34'	127°	57°25'	-36'	129°	56°47'	-37'	130°	56°09'	-38'	131°	16
17	59°16'	-31'	125°	58°41'	-33'	126°	58°05'	-34'	128°	57°28'	-35'	129°	56°50'	-37'	130°	56°11'	-38'	131°	55°31'	-39'	132°	17
18	58°44'	-33'	127°	58°08'	-34'	128°	57°31'	-35'	129°	56°52'	-36'	130°	56°13'	-38'	131°	55°33'	-39'	133°	54°52'	-40'	134°	18
19	58°12'	-34'	128°	57°34'	-35'	129°	56°55'	-36'	131°	56°16'	-37'	132°	55°36'	-38'	133°	54°54'	-39'	134°	54°12'	-40'	135°	19
20	57°38'	-35'	130°	56°59'	-36'	131°	56°19'	-37'	132°	55°39'	-38'	133°	54°57'	-39'	134°	54°15'	-40'	135°	53°32'	-41'	136°	20
21	57°03'	-36'	131°	56°23'	-37'	132°	55°42'	-38'	133°	55°00'	-39'	134°	54°18'	-40'	135°	53°35'	-41'	136°	52°51'	-42'	137°	21
22	56°27'	-37'	133°	55°46'	-38'	134°	55°04'	-39'	135°	54°21'	-40'	136°	53°38'	-41'	137°	52°54'	-42'	138°	52°09'	-43'	139°	22
23	55°50'	-38'	134°	55°07'	-39'	135°	54°25'	-40'	136°	53°41'	-41'	137°	52°57'	-42'	138°	52°12'	-42'	139°	51°26'	-43'	140°	23

26° 334° LHA

**Latitude CONTRARY to DECLINATION**

26° 334° LHA

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

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

25° 335° LHA

**Latitude CONTRARY to Declination**

25° 335° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	65°00'	-01'	90°	64°59'	-04'	92°	64°56'	-06'	94°	64°50'	-08'	96°	64°42'	-11'	99°	64°32'	-13'	101°	64°20'	-15'	103°	0
1	64°59'	-03'	92°	64°55'	-06'	95°	64°49'	-08'	97°	64°41'	-11'	99°	64°31'	-13'	101°	64°19'	-15'	103°	64°05'	-17'	105°	1
2	64°56'	-06'	95°	64°49'	-08'	97°	64°41'	-10'	99°	64°31'	-13'	101°	64°18'	-15'	103°	64°04'	-17'	105°	63°47'	-19'	107°	2
3	64°50'	-08'	97°	64°41'	-10'	99°	64°31'	-13'	101°	64°18'	-15'	103°	64°03'	-17'	105°	63°46'	-19'	107°	63°28'	-21'	109°	3
4	64°42'	-10'	99°	64°31'	-12'	101°	64°18'	-15'	104°	64°03'	-17'	106°	63°46'	-19'	107°	63°27'	-21'	109°	63°06'	-23'	111°	4
5	64°32'	-12'	102°	64°19'	-14'	104°	64°04'	-17'	106°	63°46'	-19'	108°	63°27'	-21'	110°	63°06'	-23'	111°	62°43'	-25'	113°	5
6	64°20'	-14'	104°	64°05'	-16'	106°	63°47'	-19'	108°	63°28'	-21'	110°	63°06'	-23'	112°	62°43'	-25'	113°	62°19'	-26'	115°	6
7	64°06'	-16'	106°	63°48'	-18'	108°	63°29'	-20'	110°	63°07'	-22'	112°	62°44'	-24'	114°	62°19'	-26'	115°	61°52'	-28'	117°	7
8	63°50'	-18'	108°	63°30'	-20'	110°	63°08'	-22'	112°	62°45'	-24'	114°	62°19'	-26'	116°	61°53'	-28'	117°	61°24'	-29'	119°	8
9	63°32'	-20'	111°	63°10'	-22'	112°	62°46'	-24'	114°	62°21'	-26'	116°	61°53'	-28'	118°	61°25'	-29'	119°	60°55'	-31'	121°	9
10	63°12'	-22'	113°	62°48'	-24'	114°	62°22'	-26'	116°	61°55'	-27'	118°	61°26'	-29'	120°	60°56'	-31'	121°	60°24'	-32'	123°	10
11	62°50'	-24'	115°	62°24'	-25'	116°	61°56'	-27'	118°	61°27'	-29'	120°	60°57'	-30'	121°	60°25'	-32'	123°	59°52'	-33'	124°	11
12	62°26'	-25'	117°	61°58'	-27'	118°	61°29'	-29'	120°	60°58'	-30'	122°	60°26'	-32'	123°	59°53'	-33'	125°	59°18'	-35'	126°	12
13	62°01'	-27'	119°	61°31'	-29'	120°	61°01'	-30'	122°	60°28'	-32'	123°	59°55'	-33'	125°	59°20'	-34'	126°	58°44'	-36'	128°	13
14	61°34'	-28'	121°	61°03'	-30'	122°	60°30'	-32'	124°	59°57'	-33'	125°	59°21'	-34'	126°	58°45'	-36'	128°	58°08'	-37'	129°	14
15	61°06'	-30'	122°	60°33'	-31'	124°	59°59'	-33'	125°	59°24'	-34'	127°	58°47'	-35'	128°	58°10'	-37'	129°	57°31'	-38'	131°	15
16	60°36'	-31'	124°	60°02'	-33'	126°	59°26'	-34'	127°	58°49'	-35'	128°	58°12'	-37'	130°	57°33'	-38'	131°	56°53'	-39'	132°	16
17	60°05'	-33'	126°	59°29'	-34'	127°	58°52'	-35'	129°	58°14'	-36'	130°	57°35'	-38'	131°	56°55'	-39'	132°	56°15'	-40'	133°	17
18	59°32'	-34'	128°	58°55'	-35'	129°	58°17'	-36'	130°	57°38'	-37'	131°	56°58'	-39'	133°	56°17'	-40'	134°	55°35'	-41'	135°	18
19	58°58'	-35'	129°	58°20'	-36'	130°	57°41'	-37'	132°	57°00'	-38'	133°	56°19'	-39'	134°	55°37'	-40'	135°	54°54'	-41'	136°	19
20	58°24'	-36'	131°	57°44'	-37'	132°	57°03'	-38'	133°	56°22'	-39'	134°	55°40'	-40'	135°	54°57'	-41'	136°	54°13'	-42'	137°	20
21	57°47'	-37'	132°	57°07'	-38'	133°	56°25'	-39'	134°	55°43'	-40'	136°	54°59'	-41'	137°	54°15'	-42'	138°	53°31'	-43'	138°	21
22	57°10'	-38'	134°	56°29'	-39'	135°	55°46'	-40'	136°	55°02'	-41'	137°	54°18'	-42'	138°	53°34'	-43'	139°	52°48'	-43'	140°	22
23	56°32'	-39'	135°	55°49'	-40'	136°	55°06'	-41'	137°	54°21'	-42'	138°	53°36'	-43'	139°	52°51'	-43'	140°	52°05'	-44'	141°	23

25° 335° LHA

**Latitude CONTRARY to DECLINATION**

25° 335° LHA

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



**24° 336° LHA**

**Latitude CONTRARY to Declination**

**24° 336° LHA**

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	66°00'	-01'	90°	65°59'	-04'	92°	65°55'	-06'	94°	65°49'	-09'	97°	65°41'	-11'	99°	65°31'	-14'	101°	65°18'	-16'	103°	0
1	65°59'	-04'	92°	65°55'	-06'	95°	65°49'	-09'	97°	65°41'	-11'	99°	65°30'	-13'	101°	65°17'	-16'	103°	65°02'	-18'	106°	1
2	65°55'	-06'	95°	65°49'	-08'	97°	65°40'	-11'	99°	65°30'	-13'	101°	65°17'	-16'	104°	65°01'	-18'	106°	64°44'	-20'	108°	2
3	65°49'	-08'	97°	65°41'	-11'	100°	65°30'	-13'	102°	65°16'	-15'	104°	65°01'	-18'	106°	64°43'	-20'	108°	64°24'	-22'	110°	3
4	65°41'	-10'	100°	65°30'	-13'	102°	65°17'	-15'	104°	65°01'	-17'	106°	64°43'	-20'	108°	64°24'	-22'	110°	64°02'	-24'	112°	4
5	65°31'	-13'	102°	65°17'	-15'	104°	65°01'	-17'	106°	64°43'	-19'	108°	64°24'	-22'	110°	64°02'	-24'	112°	63°38'	-26'	114°	5
6	65°18'	-15'	104°	65°02'	-17'	107°	64°44'	-19'	109°	64°24'	-21'	111°	64°02'	-23'	113°	63°38'	-25'	114°	63°12'	-27'	116°	6
7	65°03'	-17'	107°	64°45'	-19'	109°	64°25'	-21'	111°	64°03'	-23'	113°	63°38'	-25'	115°	63°13'	-27'	116°	62°45'	-29'	118°	7
8	64°47'	-19'	109°	64°26'	-21'	111°	64°04'	-23'	113°	63°39'	-25'	115°	63°13'	-27'	117°	62°45'	-29'	118°	62°16'	-30'	120°	8
9	64°28'	-21'	111°	64°05'	-23'	113°	63°40'	-25'	115°	63°14'	-27'	117°	62°46'	-29'	119°	62°17'	-30'	120°	61°46'	-32'	122°	9
10	64°07'	-23'	113°	63°42'	-25'	115°	63°16'	-27'	117°	62°47'	-28'	119°	62°18'	-30'	121°	61°47'	-32'	122°	61°14'	-33'	124°	10
11	63°44'	-25'	116°	63°17'	-26'	117°	62°49'	-28'	119°	62°19'	-30'	121°	61°48'	-31'	122°	61°15'	-33'	124°	60°41'	-34'	125°	11
12	63°20'	-26'	118°	62°51'	-28'	119°	62°21'	-30'	121°	61°49'	-31'	123°	61°16'	-33'	124°	60°42'	-34'	126°	60°06'	-36'	127°	12
13	62°53'	-28'	120°	62°23'	-30'	121°	61°51'	-31'	123°	61°18'	-33'	124°	60°43'	-34'	126°	60°08'	-35'	127°	59°31'	-37'	129°	13
14	62°26'	-29'	122°	61°53'	-31'	123°	61°20'	-33'	125°	60°45'	-34'	126°	60°09'	-35'	128°	59°32'	-37'	129°	58°54'	-38'	130°	14
15	61°56'	-31'	123°	61°22'	-32'	125°	60°47'	-34'	126°	60°11'	-35'	128°	59°34'	-36'	129°	58°56'	-38'	130°	58°16'	-39'	132°	15
16	61°25'	-32'	125°	60°50'	-34'	127°	60°14'	-35'	128°	59°36'	-36'	129°	58°57'	-38'	131°	58°18'	-39'	132°	57°37'	-40'	133°	16
17	60°53'	-34'	127°	60°16'	-35'	128°	59°39'	-36'	130°	59°00'	-37'	131°	58°20'	-39'	132°	57°39'	-40'	133°	56°58'	-41'	134°	17
18	60°19'	-35'	129°	59°41'	-36'	130°	59°02'	-37'	131°	58°22'	-38'	132°	57°41'	-40'	134°	57°00'	-41'	135°	56°17'	-41'	136°	18
19	59°45'	-36'	130°	59°05'	-37'	132°	58°25'	-38'	133°	57°44'	-39'	134°	57°02'	-40'	135°	56°19'	-41'	136°	55°35'	-42'	137°	19
20	59°09'	-37'	132°	58°28'	-38'	133°	57°47'	-39'	134°	57°04'	-40'	135°	56°21'	-41'	136°	55°38'	-42'	137°	54°53'	-43'	138°	20
21	58°32'	-38'	133°	57°50'	-39'	135°	57°07'	-40'	136°	56°24'	-41'	137°	55°40'	-42'	138°	54°55'	-43'	139°	54°10'	-44'	140°	21
22	57°53'	-39'	135°	57°11'	-40'	136°	56°27'	-41'	137°	55°43'	-42'	138°	54°58'	-43'	139°	54°13'	-44'	140°	53°26'	-44'	141°	22
23	57°14'	-40'	136°	56°31'	-41'	137°	55°46'	-42'	138°	55°01'	-43'	139°	54°15'	-44'	140°	53°29'	-44'	141°	52°42'	-45'	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°

**24° 336° LHA**

**Latitude CONTRARY to DECLINATION**

**24° 336° LHA**

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

**23° 337° LHA**

**Latitude CONTRARY to Declination**

**23° 337° LHA**

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	67°00'	-01'	90°	66°59'	-04'	92°	66°55'	-07'	95°	66°49'	-09'	97°	66°40'	-12'	99°	66°29'	-14'	102°	66°16'	-17'	104°	0
1	66°59'	-04'	93°	66°55'	-06'	95°	66°49'	-09'	97°	66°40'	-12'	100°	66°29'	-14'	102°	66°15'	-16'	104°	66°00'	-19'	106°	1
2	66°55'	-06'	95°	66°49'	-09'	97°	66°40'	-11'	100°	66°28'	-14'	102°	66°15'	-16'	104°	65°59'	-19'	106°	65°41'	-21'	109°	2
3	66°49'	-09'	98°	66°40'	-11'	100°	66°28'	-14'	102°	66°14'	-16'	104°	65°58'	-18'	107°	65°40'	-21'	109°	65°20'	-23'	111°	3
4	66°40'	-11'	100°	66°29'	-13'	102°	66°15'	-16'	105°	65°58'	-18'	107°	65°40'	-20'	109°	65°19'	-23'	111°	64°57'	-25'	113°	4
5	66°29'	-13'	103°	66°15'	-16'	105°	65°59'	-18'	107°	65°40'	-20'	109°	65°19'	-22'	111°	64°57'	-25'	113°	64°32'	-27'	115°	5
6	66°16'	-15'	105°	66°00'	-18'	107°	65°41'	-20'	109°	65°20'	-22'	111°	64°57'	-24'	113°	64°32'	-26'	115°	64°06'	-28'	117°	6
7	66°01'	-18'	107°	65°42'	-20'	110°	65°21'	-22'	112°	64°58'	-24'	114°	64°33'	-26'	116°	64°06'	-28'	117°	63°37'	-30'	119°	7
8	65°43'	-20'	110°	65°22'	-22'	112°	64°59'	-24'	114°	64°33'	-26'	116°	64°06'	-28'	118°	63°38'	-30'	119°	63°08'	-31'	121°	8
9	65°23'	-22'	112°	65°00'	-24'	114°	64°35'	-26'	116°	64°07'	-28'	118°	63°39'	-30'	120°	63°08'	-31'	121°	62°36'	-33'	123°	9
10	65°02'	-24'	114°	64°36'	-26'	116°	64°09'	-28'	118°	63°40'	-29'	120°	63°09'	-31'	122°	62°37'	-33'	123°	62°03'	-34'	125°	10
11	64°38'	-26'	116°	64°10'	-27'	118°	63°41'	-29'	120°	63°10'	-31'	122°	62°38'	-33'	123°	62°04'	-34'	125°	61°29'	-35'	127°	11
12	64°13'	-27'	119°	63°43'	-29'	120°	63°12'	-31'	122°	62°39'	-32'	124°	62°05'	-34'	125°	61°30'	-35'	127°	60°54'	-37'	128°	12
13	63°45'	-29'	121°	63°14'	-31'	122°	62°41'	-32'	124°	62°07'	-34'	126°	61°32'	-35'	127°	60°55'	-37'	128°	60°17'	-38'	130°	13
14	63°16'	-30'	123°	62°43'	-32'	124°	62°09'	-34'	126°	61°33'	-35'	127°	60°56'	-36'	129°	60°18'	-38'	130°	59°39'	-39'	131°	14
15	62°46'	-32'	124°	62°11'	-33'	126°	61°35'	-35'	128°	60°58'	-36'	129°	60°20'	-38'	130°	59°41'	-39'	132°	59°00'	-40'	133°	15
16	62°14'	-33'	126°	61°38'	-35'	128°	61°00'	-36'	129°	60°22'	-37'	131°	59°42'	-39'	132°	59°02'	-40'	133°	58°20'	-41'	134°	16
17	61°41'	-35'	128°	61°03'	-36'	129°	60°24'	-37'	131°	59°45'	-38'	132°	59°04'	-40'	133°	58°22'	-41'	135°	57°40'	-42'	136°	17
18	61°06'	-36'	130°	60°27'	-37'	131°	59°47'	-38'	132°	59°06'	-40'	134°	58°24'	-41'	135°	57°42'	-42'	136°	56°58'	-42'	137°	18
19	60°30'	-37'	131°	59°50'	-38'	133°	59°09'	-39'	134°	58°27'	-40'	135°	57°44'	-41'	136°	57°00'	-42'	137°	56°16'	-43'	138°	19
20	59°53'	-38'	133°	59°12'	-39'	134°	58°29'	-40'	135°	57°46'	-41'	136°	57°02'	-42'	138°	56°18'	-43'	139°	55°32'	-44'	140°	20
21	59°15'	-39'	134°	58°32'	-40'	136°	57°49'	-41'	137°	57°05'	-42'	138°	56°20'	-43'	139°	55°34'	-44'	140°	54°48'	-45'	141°	21
22	58°36'	-40'	136°	57°52'	-41'	137°	57°08'	-42'	138°	56°23'	-43'	139°	55°37'	-44'	140°	54°51'	-45'	141°	54°04'	-45'	142°	22
23	57°55'	-41'	137°	57°11'	-42'	138°	56°26'	-43'	139°	55°40'	-44'	140°	54°53'	-44'	141°	54°06'	-45'	142°	53°18'	-46'	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°

**23° 337° LHA**

**Latitude CONTRARY to DECLINATION**

**23° 337° LHA**

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

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

**22° 338° LHA**

**Latitude CONTRARY to Declination**

**22° 338° LHA**

Table with columns for Dec (0-23) and LHA (0-6). Each cell contains three coordinates (Hc, d, Z). Row 23 values are underlined.

**22° 338° LHA**

**Latitude CONTRARY to DECLINATION**

**22° 338° LHA**

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

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

**21° 339° LHA**

**Latitude CONTRARY to Declination**

**21° 339° LHA**

Table with columns for Dec (0-23) and LHA (0-6). Each cell contains three coordinates (Hc, d, Z). Row 23 values are underlined.

**21° 339° LHA**

**Latitude CONTRARY to DECLINATION**

**21° 339° LHA**

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

20° 340° LHA

**Latitude CONTRARY to Declination**

20° 340° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	70°00'	-01'	90°	69°59'	-04'	93°	69°54'	-08'	95°	69°47'	-10'	98°	69°37'	-13'	101°	69°25'	-16'	103°	69°09'	-19'	106°	0
1	69°59'	-04'	93°	69°54'	-07'	96°	69°47'	-10'	98°	69°37'	-13'	101°	69°24'	-16'	104°	69°08'	-19'	106°	68°50'	-21'	109°	1
2	69°54'	-07'	96°	69°47'	-10'	99°	69°36'	-13'	101°	69°23'	-16'	104°	69°08'	-18'	106°	68°50'	-21'	109°	68°29'	-24'	111°	2
3	69°47'	-10'	99°	69°37'	-13'	101°	69°23'	-16'	104°	69°08'	-18'	107°	68°49'	-21'	109°	68°29'	-23'	111°	68°06'	-26'	114°	3
4	69°37'	-13'	102°	69°24'	-15'	104°	69°08'	-18'	107°	68°49'	-21'	109°	68°28'	-23'	112°	68°05'	-26'	114°	67°40'	-28'	116°	4
5	69°25'	-15'	104°	69°08'	-18'	107°	68°50'	-21'	109°	68°29'	-23'	112°	68°05'	-25'	114°	67°40'	-28'	116°	67°12'	-30'	118°	5
6	69°09'	-18'	107°	68°50'	-20'	110°	68°29'	-23'	112°	68°06'	-25'	114°	67°40'	-27'	116°	67°12'	-30'	119°	66°42'	-31'	121°	6
7	68°51'	-20'	110°	68°30'	-23'	112°	68°06'	-25'	114°	67°40'	-27'	117°	67°12'	-29'	119°	66°43'	-31'	121°	66°11'	-33'	123°	7
8	68°31'	-23'	112°	68°07'	-25'	115°	67°41'	-27'	117°	67°13'	-29'	119°	66°43'	-31'	121°	66°11'	-33'	123°	65°38'	-35'	125°	8
9	68°09'	-25'	115°	67°42'	-27'	117°	67°14'	-29'	119°	66°44'	-31'	121°	66°12'	-33'	123°	65°38'	-35'	125°	65°03'	-36'	127°	9
10	67°44'	-27'	117°	67°15'	-29'	119°	66°45'	-31'	121°	66°13'	-33'	123°	65°39'	-34'	125°	65°04'	-36'	127°	64°27'	-38'	129°	10
11	67°17'	-29'	120°	66°46'	-31'	122°	66°14'	-33'	124°	65°40'	-34'	125°	65°05'	-36'	127°	64°28'	-37'	129°	63°49'	-39'	130°	11
12	66°48'	-31'	122°	66°16'	-32'	124°	65°41'	-34'	126°	65°06'	-36'	127°	64°29'	-37'	129°	63°50'	-39'	131°	63°11'	-40'	132°	12
13	66°18'	-32'	124°	65°43'	-34'	126°	65°07'	-36'	128°	64°30'	-37'	129°	63°51'	-39'	131°	63°11'	-40'	132°	62°31'	-41'	134°	13
14	65°45'	-34'	126°	65°09'	-36'	128°	64°32'	-37'	130°	63°53'	-38'	131°	63°13'	-40'	133°	62°32'	-41'	134°	61°49'	-42'	135°	14
15	65°11'	-36'	128°	64°33'	-37'	130°	63°54'	-38'	131°	63°14'	-40'	133°	62°33'	-41'	134°	61°51'	-42'	136°	61°07'	-43'	137°	15
16	64°36'	-37'	130°	63°56'	-38'	132°	63°16'	-40'	133°	62°35'	-41'	134°	61°52'	-42'	136°	61°09'	-43'	137°	60°24'	-44'	138°	16
17	63°59'	-38'	132°	63°18'	-40'	133°	62°36'	-41'	135°	61°54'	-42'	136°	61°10'	-43'	137°	60°26'	-44'	138°	59°40'	-45'	140°	17
18	63°21'	-39'	134°	62°39'	-41'	135°	61°56'	-42'	136°	61°12'	-43'	138°	60°27'	-44'	139°	59°42'	-45'	140°	58°56'	-45'	141°	18
19	62°41'	-41'	135°	61°58'	-42'	137°	61°14'	-43'	138°	60°29'	-44'	139°	59°44'	-45'	140°	58°57'	-45'	141°	58°10'	-46'	142°	19
20	62°01'	-42'	137°	61°16'	-43'	138°	60°31'	-44'	139°	59°46'	-44'	140°	58°59'	-45'	141°	58°12'	-46'	142°	57°24'	-47'	143°	20
21	61°19'	-43'	138°	60°34'	-44'	139°	59°48'	-44'	141°	59°01'	-45'	142°	58°14'	-46'	143°	57°26'	-47'	144°	56°37'	-47'	145°	21
22	60°36'	-43'	140°	59°50'	-44'	141°	59°03'	-45'	142°	58°16'	-46'	143°	57°28'	-47'	144°	56°39'	-47'	145°	55°50'	-48'	146°	22
23	<u>59°53'</u>	<u>-44'</u>	<u>141°</u>	<u>59°06'</u>	<u>-45'</u>	<u>142°</u>	<u>58°18'</u>	<u>-46'</u>	<u>143°</u>	<u>57°30'</u>	<u>-47'</u>	<u>144°</u>	<u>56°41'</u>	<u>-47'</u>	<u>145°</u>	<u>55°51'</u>	<u>-48'</u>	<u>146°</u>	<u>55°02'</u>	<u>-49'</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°
	0			1			2			3			4			5			6			

20° 340° LHA

**Latitude CONTRARY to DECLINATION**

20° 340° LHA

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

19° 341° LHA

**Latitude CONTRARY to Declination**

19° 341° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	71°00'	-02'	90°	70°58'	-05'	93°	70°54'	-08'	96°	70°46'	-11'	99°	70°36'	-14'	101°	70°23'	-17'	104°	70°07'	-20'	107°	0
1	70°58'	-05'	93°	70°54'	-08'	96°	70°46'	-11'	99°	70°35'	-14'	102°	70°22'	-17'	104°	70°06'	-20'	107°	69°47'	-22'	110°	1
2	70°54'	-08'	96°	70°46'	-11'	99°	70°35'	-14'	102°	70°22'	-17'	105°	70°05'	-19'	107°	69°46'	-22'	110°	69°25'	-25'	112°	2
3	70°46'	-10'	99°	70°35'	-13'	102°	70°22'	-16'	105°	70°05'	-19'	107°	69°46'	-22'	110°	69°24'	-24'	112°	69°00'	-27'	115°	3
4	70°36'	-13'	102°	70°22'	-16'	105°	70°05'	-19'	108°	69°46'	-22'	110°	69°24'	-24'	113°	69°00'	-27'	115°	68°33'	-29'	117°	4
5	70°23'	-16'	105°	70°06'	-19'	108°	69°46'	-22'	110°	69°24'	-24'	113°	69°00'	-26'	115°	68°33'	-29'	118°	68°04'	-31'	120°	5
6	70°07'	-19'	108°	69°47'	-21'	110°	69°25'	-24'	113°	69°00'	-26'	115°	68°33'	-29'	118°	68°04'	-31'	120°	67°33'	-33'	122°	6
7	69°48'	-21'	111°	69°25'	-24'	113°	69°01'	-26'	116°	68°34'	-28'	118°	68°05'	-31'	120°	67°34'	-33'	122°	67°01'	-34'	124°	7
8	69°27'	-24'	113°	69°02'	-26'	116°	68°34'	-28'	118°	68°05'	-30'	120°	67°34'	-32'	122°	67°01'	-34'	124°	66°26'	-36'	126°	8
9	69°03'	-26'	116°	68°36'	-28'	118°	68°06'	-30'	120°	67°35'	-32'	123°	67°02'	-34'	125°	66°27'	-36'	126°	65°50'	-37'	128°	9
10	68°37'	-28'	118°	68°07'	-30'	121°	67°36'	-32'	123°	67°03'	-34'	125°	66°28'	-36'	127°	65°51'	-37'	128°	65°13'	-39'	130°	10
11	68°09'	-30'	121°	67°37'	-32'	123°	67°04'	-34'	125°	66°29'	-36'	127°	65°52'	-37'	129°	65°14'	-39'	130°	64°34'	-40'	132°	11
12	67°39'	-32'	123°	67°05'	-34'	125°	66°30'	-35'	127°	65°53'	-37'	129°	65°15'	-39'	130°	64°35'	-40'	132°	63°54'	-41'	134°	12
13	67°07'	-34'	125°	66°31'	-35'	127°	65°54'	-37'	129°	65°16'	-38'	131°	64°36'	-40'	132°	63°55'	-41'	134°	63°13'	-42'	135°	13
14	66°33'	-35'	127°	65°56'	-37'	129°	65°17'	-38'	131°	64°37'	-40'	133°	63°56'	-41'	134°	63°14'	-42'	135°	62°31'	-43'	137°	14
15	65°58'	-37'	129°	65°19'	-38'	131°	64°39'	-40'	133°	63°58'	-41'	134°	63°15'	-42'	136°	62°32'	-43'	137°	61°48'	-44'	138°	15
16	65°21'	-38'	131°	64°41'	-40'	133°	63°59'	-41'	134°	63°17'	-42'	136°	62°33'	-43'	137°	61°49'	-44'	139°	61°03'	-45'	140°	16
17	64°43'	-39'	133°	64°01'	-41'	135°	63°19'	-42'	136°	62°35'	-43'	137°	61°50'	-44'	139°	61°05'	-45'	140°	60°18'	-46'	141°	17
18	64°04'	-41'	135°	63°21'	-42'	136°	62°37'	-43'	138°	61°52'	-44'	139°	61°06'	-45'	140°	60°20'	-46'	141°	59°33'	-47'	142°	18
19	63°23'	-42'	137°	62°39'	-43'	138°	61°54'	-44'	139°	61°08'	-45'	140°	60°21'	-46'	142°	59°34'	-46'	143°	58°46'	-47'	144°	19
20	62°41'	-43'	138°	61°56'	-44'	139°	61°10'	-45'	141°	60°23'	-46'	142°	59°36'	-46'	143°	58°48'	-47'	144°	57°59'	-48'	145°	20
21	61°58'	-44'	140°	61°12'	-45'	141°	60°25'	-46'	142°	59°38'	-46'	143°	58°49'	-47'	144°	58°00'	-48'	145°	57°11'	-48'	146°	21
22	61°15'	-45'	141°	60°28'	-45'	142°	59°40'	-46'	143°	58°51'	-47'	144°	58°02'	-48'	145°	57°13'	-48'	146°	56°23'	-49'	147°	22
23	<u>60°30'</u>	<u>-45'</u>	<u>143°</u>	<u>59°42'</u>	<u>-46'</u>	<u>144°</u>	<u>58°53'</u>	<u>-47'</u>	<u>145°</u>	<u>58°04'</u>	<u>-48'</u>	<u>145°</u>	<u>57°15'</u>	<u>-48'</u>	<u>146°</u>	<u>56°24'</u>	<u>-49'</u>	<u>147°</u>	<u>55°34'</u>	<u>-49'</u>	<u>148°</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°
	0			1			2			3			4			5			6			

19° 341° LHA

**Latitude CONTRARY to DECLINATION**

19° 341° LHA

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

18° 342° LHA

Latitude CONTRARY to Declination

18° 342° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	72°00'	-02'	90°	71°58'	-05'	93°	71°54'	-08'	96°	71°46'	-12'	99°	71°35'	-15'	102°	71°20'	-18'	105°	71°03'	-21'	108°	0
1	71°58'	-05'	93°	71°53'	-08'	96°	71°45'	-11'	99°	71°34'	-15'	102°	71°20'	-18'	105°	71°03'	-20'	108°	70°43'	-23'	111°	1
2	71°54'	-08'	96°	71°45'	-11'	99°	71°34'	-14'	102°	71°19'	-17'	105°	71°02'	-20'	108°	70°42'	-23'	111°	70°20'	-26'	113°	2
3	71°46'	-11'	100°	71°34'	-14'	103°	71°19'	-17'	105°	71°02'	-20'	108°	70°42'	-23'	111°	70°19'	-26'	114°	69°54'	-28'	116°	3
4	71°35'	-14'	103°	71°20'	-17'	106°	71°02'	-20'	108°	70°42'	-23'	111°	70°19'	-25'	114°	69°54'	-28'	116°	69°26'	-30'	119°	4
5	71°20'	-17'	106°	71°03'	-20'	109°	70°42'	-23'	111°	70°19'	-25'	114°	69°54'	-28'	116°	69°26'	-30'	119°	68°56'	-32'	121°	5
6	71°03'	-20'	109°	70°43'	-22'	111°	70°20'	-25'	114°	69°54'	-28'	117°	69°26'	-30'	119°	68°56'	-32'	121°	68°24'	-34'	123°	6
7	70°44'	-22'	112°	70°20'	-25'	114°	69°54'	-27'	117°	69°26'	-30'	119°	68°56'	-32'	121°	68°24'	-34'	124°	67°50'	-36'	126°	7
8	70°21'	-25'	114°	69°55'	-27'	117°	69°27'	-30'	119°	68°57'	-32'	122°	68°24'	-34'	124°	67°50'	-36'	126°	67°14'	-37'	128°	8
9	69°57'	-27'	117°	69°28'	-29'	120°	68°57'	-32'	122°	68°25'	-34'	124°	67°51'	-35'	126°	67°14'	-37'	128°	66°37'	-39'	130°	9
10	69°29'	-29'	120°	68°59'	-31'	122°	68°26'	-33'	124°	67°51'	-35'	126°	67°15'	-37'	128°	66°37'	-39'	130°	65°58'	-40'	132°	10
11	69°00'	-31'	122°	68°27'	-33'	124°	67°52'	-35'	126°	67°16'	-37'	128°	66°38'	-38'	130°	65°59'	-40'	132°	65°18'	-41'	133°	11
12	68°29'	-33'	125°	67°54'	-35'	127°	67°17'	-37'	128°	66°39'	-38'	130°	66°00'	-40'	132°	65°19'	-41'	134°	64°37'	-42'	135°	12
13	67°55'	-35'	127°	67°19'	-37'	129°	66°40'	-38'	130°	66°01'	-40'	132°	65°20'	-41'	134°	64°38'	-42'	135°	63°54'	-43'	137°	13
14	67°20'	-37'	129°	66°42'	-38'	131°	66°02'	-40'	132°	65°21'	-41'	134°	64°39'	-42'	136°	63°55'	-43'	137°	63°11'	-44'	138°	14
15	66°44'	-38'	131°	66°04'	-40'	133°	65°23'	-41'	134°	64°40'	-42'	136°	63°57'	-43'	137°	63°12'	-44'	139°	62°27'	-45'	140°	15
16	66°06'	-39'	133°	65°24'	-41'	134°	64°42'	-42'	136°	63°58'	-43'	137°	63°13'	-44'	139°	62°28'	-45'	140°	61°41'	-46'	141°	16
17	65°26'	-41'	135°	64°43'	-42'	136°	64°00'	-43'	138°	63°15'	-44'	139°	62°29'	-45'	140°	61°43'	-46'	141°	60°55'	-47'	143°	17
18	64°45'	-42'	136°	64°01'	-43'	138°	63°16'	-44'	139°	62°31'	-45'	140°	61°44'	-46'	142°	60°57'	-47'	143°	60°08'	-48'	144°	18
19	64°04'	-43'	138°	63°18'	-44'	139°	62°32'	-45'	141°	61°46'	-46'	142°	60°58'	-47'	143°	60°10'	-47'	144°	59°21'	-48'	145°	19
20	63°21'	-44'	140°	62°34'	-45'	141°	61°47'	-46'	142°	61°00'	-47'	143°	60°11'	-47'	144°	59°22'	-48'	145°	58°33'	-49'	146°	20
21	62°37'	-45'	141°	61°49'	-46'	142°	61°02'	-47'	143°	60°13'	-47'	144°	59°24'	-48'	145°	58°34'	-49'	146°	57°44'	-49'	147°	21
22	61°52'	-46'	143°	61°04'	-47'	144°	60°15'	-47'	145°	59°26'	-48'	146°	58°36'	-49'	147°	57°45'	-49'	148°	56°55'	-50'	148°	22
23	<u>61°06'</u>	<u>-47'</u>	<u>144°</u>	<u>60°17'</u>	<u>-47'</u>	<u>145°</u>	<u>59°28'</u>	<u>-48'</u>	<u>146°</u>	<u>58°38'</u>	<u>-49'</u>	<u>147°</u>	<u>57°47'</u>	<u>-49'</u>	<u>148°</u>	<u>56°56'</u>	<u>-50'</u>	<u>149°</u>	<u>56°05'</u>	<u>-50'</u>	<u>149°</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°
	0			1			2			3			4			5			6			Dec°

18° 342° LHA

Latitude CONTRARY to DECLINATION

18° 342° LHA

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

17° 343° LHA

Latitude CONTRARY to Declination

17° 343° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	73°00'	-02'	90°	72°58'	-05'	93°	72°53'	-09'	97°	72°45'	-12'	100°	72°33'	-16'	103°	72°18'	-19'	106°	72°00'	-22'	109°	0
1	72°58'	-05'	93°	72°53'	-09'	97°	72°44'	-12'	100°	72°32'	-15'	103°	72°17'	-19'	106°	71°59'	-22'	109°	71°38'	-24'	112°	1
2	72°53'	-08'	97°	72°44'	-12'	100°	72°32'	-15'	103°	72°17'	-18'	106°	71°59'	-21'	109°	71°38'	-24'	112°	71°14'	-27'	115°	2
3	72°45'	-12'	100°	72°32'	-15'	103°	72°17'	-18'	106°	71°59'	-21'	109°	71°38'	-24'	112°	71°14'	-27'	115°	70°47'	-29'	117°	3
4	72°33'	-15'	103°	72°17'	-18'	107°	71°59'	-21'	109°	71°38'	-24'	112°	71°13'	-27'	115°	70°47'	-29'	118°	70°18'	-31'	120°	4
5	72°18'	-18'	107°	71°59'	-21'	110°	71°38'	-24'	112°	71°14'	-26'	115°	70°47'	-29'	118°	70°18'	-31'	120°	69°46'	-33'	123°	5
6	72°00'	-21'	110°	71°38'	-24'	113°	71°14'	-26'	115°	70°47'	-29'	118°	70°18'	-31'	120°	69°46'	-33'	123°	69°13'	-35'	125°	6
7	71°39'	-24'	113°	71°15'	-26'	116°	70°48'	-29'	118°	70°18'	-31'	121°	69°47'	-33'	123°	69°13'	-35'	125°	68°38'	-37'	127°	7
8	71°16'	-26'	116°	70°49'	-29'	118°	70°19'	-31'	121°	69°47'	-33'	123°	69°14'	-35'	125°	68°38'	-37'	127°	68°01'	-39'	129°	8
9	70°50'	-28'	118°	70°20'	-31'	121°	69°48'	-33'	123°	69°14'	-35'	125°	68°38'	-37'	128°	68°01'	-38'	130°	67°22'	-40'	131°	9
10	70°21'	-31'	121°	69°49'	-33'	123°	69°15'	-35'	126°	68°39'	-37'	128°	68°02'	-38'	130°	67°23'	-40'	132°	66°42'	-41'	133°	10
11	69°50'	-33'	124°	69°16'	-35'	126°	68°40'	-37'	128°	68°03'	-38'	130°	67°23'	-40'	132°	66°43'	-41'	133°	66°01'	-43'	135°	11
12	69°18'	-35'	126°	68°41'	-36'	128°	68°04'	-38'	130°	67°24'	-40'	132°	66°44'	-41'	134°	66°02'	-42'	135°	65°18'	-44'	137°	12
13	68°43'	-36'	128°	68°05'	-38'	130°	67°25'	-40'	132°	66°45'	-41'	134°	66°02'	-42'	135°	65°19'	-44'	137°	64°35'	-45'	138°	13
14	68°07'	-38'	130°	67°27'	-40'	132°	66°46'	-41'	134°	66°04'	-42'	136°	65°20'	-43'	137°	64°36'	-45'	139°	63°50'	-46'	140°	14
15	67°29'	-39'	133°	66°47'	-41'	134°	66°05'	-42'	136°	65°21'	-43'	137°	64°37'	-44'	139°	63°51'	-45'	140°	63°05'	-46'	141°	15
16	66°49'	-41'	134°	66°06'	-42'	136°	65°23'	-43'	138°	64°38'	-44'	139°	63°52'	-45'	140°	63°06'	-46'	142°	62°18'	-47'	143°	16
17	66°08'	-42'	136°	65°24'	-43'	138°	64°39'	-44'	139°	63°54'	-45'	141°	63°07'	-46'	142°	62°19'	-47'	143°	61°31'	-48'	144°	17
18	65°26'	-43'	138°	64°41'	-44'	139°	63°55'	-45'	141°	63°08'	-46'	142°	62°20'	-47'	143°	61°32'	-48'	144°	60°43'	-49'	145°	18
19	64°43'	-44'	140°	63°57'	-45'	141°	63°10'	-46'	142°	62°22'	-47'	143°	61°33'	-48'	145°	60°44'	-49'	146°	59°54'	-49'	147°	19
20	63°59'	-45'	141°	63°12'	-46'	142°	62°24'	-47'	144°	61°35'	-48'	145°	60°46'	-48'	146°	59°56'	-49'	147°	59°05'	-50'	148°	20
21	63°14'	-46'	143°	62°25'	-47'	144°	61°37'	-48'	145°	60°47'	-48'	146°	59°57'	-49'	147°	59°07'	-50'	148°	58°16'	-50'	149°	21
22	62°27'	-47'	144°	61°39'	-48'	145°	60°49'	-48'	146°	59°59'	-49'	147°	59°08'	-50'	148°	58°17'	-50'	149°	57°25'	-51'	150°	22
23	<u>61°41'</u>	<u>-48'</u>	<u>145°</u>	<u>60°51'</u>	<u>-48'</u>	<u>146°</u>	<u>60°01'</u>	<u>-49'</u>	<u>147°</u>	<u>59°10'</u>	<u>-50'</u>	<u>148°</u>	<u>58°18'</u>	<u>-50'</u>	<u>149°</u>	<u>57°27'</u>	<u>-51'</u>	<u>150°</u>	<u>56°35'</u>	<u>-51'</u>	<u>151°</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°
	0			1			2			3			4			5			6			Dec°

17° 343° LHA

Latitude CONTRARY to DECLINATION

17° 343° LHA

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

**16° 344° LHA**

**Latitude CONTRARY to Declination**

**16° 344° LHA**

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	74°00'	-02'	90°	73°58'	-06'	93°	73°53'	-09'	97°	73°44'	-13'	100°	73°31'	-16'	104°	73°15'	-20'	107°	72°56'	-23'	110°	0
1	73°58'	-05'	94°	73°53'	-09'	97°	73°43'	-13'	100°	73°31'	-16'	104°	73°15'	-20'	107°	72°56'	-23'	110°	72°34'	-26'	113°	1
2	73°53'	-09'	97°	73°43'	-13'	101°	73°31'	-16'	104°	73°15'	-19'	107°	72°55'	-23'	110°	72°33'	-25'	113°	72°08'	-28'	116°	2
3	73°44'	-12'	101°	73°31'	-16'	104°	73°15'	-19'	107°	72°55'	-22'	110°	72°33'	-25'	113°	72°08'	-28'	116°	71°40'	-31'	119°	3
4	73°31'	-16'	104°	73°15'	-19'	107°	72°55'	-22'	111°	72°33'	-25'	114°	72°07'	-28'	116°	71°39'	-30'	119°	71°09'	-33'	122°	4
5	73°15'	-19'	108°	72°56'	-22'	111°	72°33'	-25'	114°	72°08'	-28'	117°	71°39'	-30'	119°	71°09'	-33'	122°	70°36'	-35'	124°	5
6	72°56'	-22'	111°	72°34'	-25'	114°	72°08'	-28'	117°	71°40'	-30'	119°	71°09'	-33'	122°	70°36'	-35'	124°	70°01'	-37'	127°	6
7	72°34'	-25'	114°	72°09'	-28'	117°	71°40'	-30'	120°	71°09'	-32'	122°	70°37'	-35'	125°	70°02'	-37'	127°	69°25'	-38'	129°	7
8	72°09'	-27'	117°	71°41'	-30'	120°	71°10'	-32'	122°	70°37'	-35'	125°	70°02'	-36'	127°	69°25'	-38'	129°	68°46'	-40'	131°	8
9	71°42'	-30'	120°	71°11'	-32'	122°	70°38'	-34'	125°	70°02'	-36'	127°	69°25'	-38'	129°	68°47'	-40'	131°	68°06'	-41'	133°	9
10	71°12'	-32'	123°	70°39'	-34'	125°	70°03'	-36'	127°	69°26'	-38'	129°	68°47'	-40'	131°	68°07'	-41'	133°	67°25'	-43'	135°	10
11	70°40'	-34'	125°	70°04'	-36'	127°	69°27'	-38'	130°	68°48'	-40'	132°	68°07'	-41'	133°	67°26'	-43'	135°	66°42'	-44'	137°	11
12	70°06'	-36'	128°	69°28'	-38'	130°	68°49'	-40'	132°	68°08'	-41'	134°	67°26'	-42'	135°	66°43'	-44'	137°	65°59'	-45'	139°	12
13	69°30'	-38'	130°	68°50'	-40'	132°	68°09'	-41'	134°	67°27'	-42'	136°	66°44'	-44'	137°	65°59'	-45'	139°	65°14'	-46'	140°	13
14	68°52'	-39'	132°	68°11'	-41'	134°	67°28'	-42'	136°	66°45'	-44'	137°	66°00'	-45'	139°	65°14'	-46'	140°	64°28'	-47'	142°	14
15	68°12'	-41'	134°	67°30'	-42'	136°	66°46'	-44'	138°	66°01'	-45'	139°	65°15'	-46'	140°	64°29'	-47'	142°	63°41'	-48'	143°	15
16	67°31'	-42'	136°	66°47'	-43'	138°	66°03'	-45'	139°	65°17'	-46'	141°	64°30'	-47'	142°	63°42'	-47'	143°	62°54'	-48'	144°	16
17	66°49'	-43'	138°	66°04'	-45'	139°	65°18'	-46'	141°	64°31'	-47'	142°	63°43'	-47'	143°	62°55'	-48'	145°	62°05'	-49'	146°	17
18	66°06'	-45'	140°	65°19'	-46'	141°	64°32'	-47'	142°	63°44'	-47'	144°	62°56'	-48'	145°	62°06'	-49'	146°	61°16'	-50'	147°	18
19	65°21'	-46'	141°	64°34'	-46'	143°	63°46'	-47'	144°	62°57'	-48'	145°	62°07'	-49'	146°	61°17'	-50'	147°	60°27'	-50'	148°	19
20	64°36'	-46'	143°	63°47'	-47'	144°	62°58'	-48'	145°	62°09'	-49'	146°	61°19'	-49'	147°	60°28'	-50'	148°	59°37'	-51'	149°	20
21	63°49'	-47'	144°	63°00'	-48'	145°	62°10'	-49'	147°	61°20'	-49'	148°	60°29'	-50'	149°	59°38'	-51'	149°	58°46'	-51'	150°	21
22	63°02'	-48'	146°	62°12'	-49'	147°	61°22'	-49'	148°	60°31'	-50'	149°	59°39'	-51'	150°	58°47'	-51'	150°	57°55'	-52'	151°	22
23	62°14'	-49'	147°	61°23'	-49'	148°	60°32'	-50'	149°	59°41'	-51'	150°	58°48'	-51'	151°	57°56'	-52'	151°	57°03'	-52'	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°
0																						

**16° 344° LHA**

**Latitude CONTRARY to DECLINATION**

**16° 344° LHA**

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

**15° 345° LHA**

**Latitude CONTRARY to Declination**

**15° 345° LHA**

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	75°00'	-02'	90°	74°58'	-06'	94°	74°52'	-10'	97°	74°43'	-14'	101°	74°29'	-17'	105°	74°12'	-21'	108°	73°52'	-24'	111°	0
1	74°58'	-06'	94°	74°52'	-10'	98°	74°42'	-14'	101°	74°29'	-17'	105°	74°12'	-21'	108°	73°52'	-24'	111°	73°28'	-27'	115°	1
2	74°52'	-10'	98°	74°42'	-13'	101°	74°29'	-17'	105°	74°12'	-21'	108°	73°51'	-24'	112°	73°28'	-27'	115°	73°01'	-30'	118°	2
3	74°43'	-13'	101°	74°29'	-17'	105°	74°12'	-20'	108°	73°51'	-24'	112°	73°27'	-27'	115°	73°01'	-30'	118°	72°31'	-32'	121°	3
4	74°29'	-17'	105°	74°12'	-20'	109°	73°51'	-24'	112°	73°27'	-27'	115°	73°01'	-29'	118°	72°31'	-32'	121°	71°59'	-34'	123°	4
5	74°12'	-20'	109°	73°52'	-23'	112°	73°28'	-26'	115°	73°01'	-29'	118°	72°31'	-32'	121°	71°59'	-34'	124°	71°25'	-36'	126°	5
6	73°52'	-23'	112°	73°28'	-26'	115°	73°01'	-29'	118°	72°31'	-32'	121°	71°59'	-34'	124°	71°25'	-36'	126°	70°49'	-38'	128°	6
7	73°29'	-26'	115°	73°02'	-29'	118°	72°32'	-32'	121°	72°00'	-34'	124°	71°25'	-36'	126°	70°49'	-38'	129°	70°11'	-40'	131°	7
8	73°03'	-29'	119°	72°33'	-32'	121°	72°00'	-34'	124°	71°26'	-36'	126°	70°49'	-38'	129°	70°11'	-40'	131°	69°31'	-41'	133°	8
9	72°34'	-31'	121°	72°01'	-34'	124°	71°26'	-36'	127°	70°50'	-38'	129°	70°11'	-40'	131°	69°31'	-41'	133°	68°49'	-43'	135°	9
10	72°02'	-34'	124°	71°27'	-36'	127°	70°50'	-38'	129°	70°12'	-40'	131°	69°31'	-41'	133°	68°50'	-43'	135°	68°06'	-44'	137°	10
11	71°28'	-36'	127°	70°51'	-38'	129°	70°13'	-40'	131°	69°32'	-41'	133°	68°50'	-43'	135°	68°07'	-44'	137°	67°22'	-45'	139°	11
12	70°53'	-38'	129°	70°14'	-39'	132°	69°33'	-41'	134°	68°51'	-43'	135°	68°08'	-44'	137°	67°23'	-45'	139°	66°37'	-46'	140°	12
13	70°15'	-39'	132°	69°34'	-41'	134°	68°52'	-42'	136°	68°08'	-44'	137°	67°24'	-45'	139°	66°38'	-46'	141°	65°51'	-47'	142°	13
14	69°36'	-41'	134°	68°53'	-42'	136°	68°10'	-44'	138°	67°25'	-45'	139°	66°39'	-46'	141°	65°52'	-47'	142°	65°04'	-48'	143°	14
15	68°55'	-42'	136°	68°11'	-44'	138°	67°26'	-45'	139°	66°40'	-46'	141°	65°53'	-47'	142°	65°05'	-48'	144°	64°16'	-49'	145°	15
16	68°12'	-44'	138°	67°27'	-45'	140°	66°41'	-46'	141°	65°54'	-47'	142°	65°06'	-48'	144°	64°17'	-49'	145°	63°27'	-49'	146°	16
17	67°29'	-45'	140°	66°42'	-46'	141°	65°55'	-47'	143°	65°07'	-48'	144°	64°18'	-49'	145°	63°28'	-49'	146°	62°38'	-50'	147°	17
18	66°44'	-46'	141°	65°56'	-47'	143°	65°08'	-48'	144°	64°19'	-49'	145°	63°29'	-49'	147°	62°39'	-50'	148°	61°48'	-51'	149°	18
19	65°58'	-47'	143°	65°10'	-48'	144°	64°20'	-48'	146°	63°31'	-49'	147°	62°40'	-50'	148°	61°49'	-51'	149°	60°57'	-51'	150°	19
20	65°11'	-48'	145°	64°22'	-48'	146°	63°32'	-49'	147°	62°41'	-50'	148°	61°50'	-51'	149°	60°59'	-51'	150°	60°06'	-52'	151°	20
21	64°23'	-48'	146°	63°33'	-49'	147°	62°43'	-50'	148°	61°51'	-50'	149°	61°00'	-51'	150°	60°07'	-52'	151°	59°15'	-52'	152°	21
22	63°35'	-49'	147°	62°44'	-50'	148°	61°53'	-50'	149°	61°01'	-51'	150°	60°09'	-52'	151°	59°16'	-52'	152°	58°23'	-52'	153°	22
23	62°46'	-50'	149°	61°54'	-50'	150°	61°02'	-51'	151°	60°10'	-52'	151°	59°17'	-52'	152°	58°24'	-52'	153°	57°30'	-53'	154°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
0																						

**15° 345° LHA**

**Latitude CONTRARY to 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

14° 346° LHA

Latitude CONTRARY to Declination

14° 346° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	76°00'	-02'	90°	75°58'	-06'	94°	75°52'	-11'	98°	75°41'	-15'	102°	75°27'	-18'	106°	75°09'	-22'	109°	74°48'	-25'	113°	0
1	75°58'	-06'	94°	75°52'	-10'	98°	75°41'	-15'	102°	75°27'	-18'	106°	75°09'	-22'	109°	74°47'	-25'	113°	74°22'	-28'	116°	1
2	75°52'	-10'	98°	75°41'	-14'	102°	75°27'	-18'	106°	75°08'	-22'	109°	74°47'	-25'	113°	74°22'	-28'	116°	73°54'	-31'	119°	2
3	75°41'	-14'	102°	75°27'	-18'	106°	75°08'	-22'	110°	74°46'	-25'	113°	74°21'	-28'	116°	73°53'	-31'	119°	73°22'	-34'	122°	3
4	75°27'	-18'	106°	75°09'	-22'	110°	74°47'	-25'	113°	74°21'	-28'	116°	73°53'	-31'	120°	73°22'	-34'	123°	72°49'	-36'	125°	4
5	75°09'	-22'	110°	74°47'	-25'	113°	74°22'	-28'	117°	73°53'	-31'	120°	73°22'	-33'	123°	72°49'	-36'	125°	72°13'	-38'	128°	5
6	74°48'	-25'	113°	74°22'	-28'	117°	73°54'	-31'	120°	73°22'	-33'	123°	72°49'	-36'	125°	72°13'	-38'	128°	71°35'	-40'	130°	6
7	74°23'	-28'	117°	73°54'	-31'	120°	73°23'	-33'	123°	72°49'	-36'	126°	72°13'	-38'	128°	71°35'	-40'	131°	70°55'	-41'	133°	7
8	73°55'	-31'	120°	73°23'	-33'	123°	72°50'	-36'	126°	72°13'	-38'	128°	71°35'	-40'	131°	70°55'	-41'	133°	70°14'	-43'	135°	8
9	73°24'	-33'	123°	72°50'	-35'	126°	72°14'	-38'	128°	71°36'	-40'	131°	70°56'	-41'	133°	70°14'	-43'	135°	69°31'	-44'	137°	9
10	72°51'	-35'	126°	72°15'	-38'	129°	71°36'	-39'	131°	70°56'	-41'	133°	70°14'	-43'	135°	69°31'	-44'	137°	68°47'	-45'	139°	10
11	72°16'	-37'	129°	71°37'	-39'	131°	70°57'	-41'	133°	70°15'	-43'	135°	69°32'	-44'	137°	68°47'	-45'	139°	68°01'	-46'	141°	11
12	71°38'	-39'	131°	70°58'	-41'	133°	70°16'	-43'	136°	69°32'	-44'	137°	68°48'	-45'	139°	68°02'	-46'	141°	67°15'	-47'	142°	12
13	70°59'	-41'	134°	70°17'	-43'	136°	69°33'	-44'	138°	68°48'	-45'	139°	68°02'	-46'	141°	67°15'	-47'	142°	66°27'	-48'	144°	13
14	70°18'	-43'	136°	69°34'	-44'	138°	68°49'	-45'	139°	68°03'	-46'	141°	67°16'	-47'	143°	66°28'	-48'	144°	65°39'	-49'	145°	14
15	69°36'	-44'	138°	68°50'	-45'	140°	68°04'	-46'	141°	67°17'	-47'	143°	66°29'	-48'	144°	65°40'	-49'	145°	64°50'	-50'	147°	15
16	68°52'	-45'	140°	68°05'	-46'	141°	67°18'	-47'	143°	66°30'	-48'	144°	65°40'	-49'	146°	64°50'	-50'	147°	64°00'	-50'	148°	16
17	68°07'	-46'	142°	67°19'	-47'	143°	66°31'	-48'	145°	65°41'	-49'	146°	64°51'	-50'	147°	64°01'	-50'	148°	63°09'	-51'	149°	17
18	67°20'	-47'	143°	66°32'	-48'	145°	65°42'	-49'	146°	64°52'	-50'	147°	64°02'	-50'	148°	63°10'	-51'	149°	62°18'	-52'	150°	18
19	66°33'	-48'	145°	65°44'	-49'	146°	64°54'	-50'	147°	64°03'	-50'	148°	63°11'	-51'	150°	62°19'	-52'	150°	61°27'	-52'	151°	19
20	65°45'	-49'	146°	64°55'	-50'	148°	64°04'	-50'	149°	63°12'	-51'	150°	62°20'	-52'	151°	61°28'	-52'	152°	60°35'	-53'	152°	20
21	64°56'	-50'	148°	64°05'	-50'	149°	63°14'	-51'	150°	62°21'	-51'	151°	61°29'	-52'	152°	60°36'	-52'	153°	59°42'	-53'	153°	21
22	64°07'	-50'	149°	63°15'	-51'	150°	62°23'	-51'	151°	61°30'	-52'	152°	60°37'	-52'	153°	59°43'	-53'	154°	58°49'	-53'	154°	22
23	<u>63°16'</u>	<u>-51'</u>	<u>150°</u>	<u>62°24'</u>	<u>-51'</u>	<u>151°</u>	<u>61°31'</u>	<u>-52'</u>	<u>152°</u>	<u>60°38'</u>	<u>-52'</u>	<u>153°</u>	<u>59°44'</u>	<u>-53'</u>	<u>154°</u>	<u>58°50'</u>	<u>-53'</u>	<u>155°</u>	<u>57°56'</u>	<u>-54'</u>	<u>155°</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°
	0			1			2			3			4			5			6			

14° 346° LHA

Latitude CONTRARY to DECLINATION

14° 346° LHA

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

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

13° 347° LHA

Latitude CONTRARY to Declination

13° 347° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	77°00'	-02'	90°	76°58'	-07'	94°	76°51'	-11'	99°	76°40'	-16'	103°	76°25'	-20'	107°	76°05'	-24'	111°	75°42'	-27'	114°	0
1	76°58'	-07'	94°	76°51'	-11'	99°	76°40'	-16'	103°	76°24'	-20'	107°	76°05'	-23'	111°	75°42'	-27'	114°	75°15'	-30'	118°	1
2	76°51'	-11'	99°	76°40'	-15'	103°	76°24'	-20'	107°	76°05'	-23'	111°	75°41'	-27'	115°	75°15'	-30'	118°	74°45'	-33'	121°	2
3	76°40'	-15'	103°	76°24'	-19'	107°	76°05'	-23'	111°	75°41'	-27'	115°	75°15'	-30'	118°	74°45'	-33'	121°	74°12'	-35'	124°	3
4	76°25'	-19'	107°	76°05'	-23'	111°	75°41'	-27'	115°	75°15'	-30'	118°	74°45'	-33'	121°	74°12'	-35'	124°	73°37'	-38'	127°	4
5	76°05'	-23'	111°	75°42'	-26'	115°	75°15'	-30'	118°	74°45'	-33'	122°	74°12'	-35'	125°	73°37'	-38'	127°	72°59'	-40'	130°	5
6	75°42'	-26'	115°	75°15'	-30'	118°	74°45'	-32'	122°	74°12'	-35'	125°	73°37'	-37'	128°	72°59'	-40'	130°	72°20'	-41'	133°	6
7	75°16'	-30'	119°	74°46'	-32'	122°	74°13'	-35'	125°	73°37'	-37'	128°	72°59'	-39'	130°	72°20'	-41'	133°	71°38'	-43'	135°	7
8	74°46'	-32'	122°	74°13'	-35'	125°	73°38'	-37'	128°	73°00'	-39'	130°	72°20'	-41'	133°	71°38'	-43'	135°	70°55'	-44'	137°	8
9	74°14'	-35'	125°	73°38'	-37'	128°	73°00'	-39'	131°	72°20'	-41'	133°	71°39'	-43'	135°	70°55'	-44'	137°	70°11'	-46'	139°	9
10	73°39'	-37'	128°	73°01'	-39'	131°	72°21'	-41'	133°	71°39'	-43'	135°	70°56'	-44'	137°	70°11'	-46'	139°	69°25'	-47'	141°	10
11	73°02'	-39'	131°	72°22'	-41'	133°	71°40'	-43'	135°	70°56'	-44'	137°	70°11'	-46'	139°	69°25'	-47'	141°	68°38'	-48'	143°	11
12	72°23'	-41'	133°	71°41'	-43'	136°	70°57'	-44'	138°	70°12'	-46'	139°	69°26'	-47'	141°	68°39'	-48'	143°	67°50'	-49'	144°	12
13	71°42'	-43'	136°	70°58'	-44'	138°	70°13'	-45'	140°	69°27'	-47'	141°	68°39'	-48'	143°	67°51'	-49'	144°	67°02'	-50'	146°	13
14	70°59'	-44'	138°	70°14'	-45'	140°	69°27'	-47'	142°	68°40'	-48'	143°	67°51'	-49'	145°	67°02'	-50'	146°	66°12'	-50'	147°	14
15	70°15'	-45'	140°	69°28'	-47'	142°	68°41'	-48'	143°	67°52'	-49'	145°	67°03'	-49'	146°	66°13'	-50'	147°	65°22'	-51'	149°	15
16	69°30'	-47'	142°	68°42'	-48'	143°	67°53'	-49'	145°	67°04'	-49'	146°	66°13'	-50'	148°	65°22'	-51'	149°	64°31'	-52'	150°	16
17	68°43'	-48'	144°	67°54'	-49'	145°	67°05'	-49'	146°	66°14'	-50'	148°	65°23'	-51'	149°	64°31'	-52'	150°	63°39'	-52'	151°	17
18	67°55'	-49'	145°	67°06'	-49'	147°	66°15'	-50'	148°	65°24'	-51'	149°	64°32'	-51'	150°	63°40'	-52'	151°	62°47'	-53'	152°	18
19	67°07'	-49'	147°	66°16'	-50'	148°	65°25'	-51'	149°	64°33'	-51'	150°	63°41'	-52'	151°	62°48'	-53'	152°	61°55'	-53'	153°	19
20	66°18'	-50'	148°	65°26'	-51'	149°	64°34'	-51'	151°	63°42'	-52'	152°	62°49'	-53'	152°	61°55'	-53'	153°	61°02'	-53'	154°	20
21	65°27'	-51'	150°	64°35'	-51'	151°	63°43'	-52'	152°	62°50'	-52'	153°	61°56'	-53'	153°	61°02'	-53'	154°	60°08'	-54'	155°	21
22	64°37'	-51'	151°	63°44'	-52'	152°	62°51'	-52'	153°	61°57'	-53'	154°	61°03'	-53'	154°	60°09'	-54'	155°	59°14'	-54'	156°	22
23	<u>63°45'</u>	<u>-52'</u>	<u>152°</u>	<u>62°52'</u>	<u>-52'</u>	<u>153°</u>	<u>61°58'</u>	<u>-53'</u>	<u>154°</u>	<u>61°04'</u>	<u>-53'</u>	<u>155°</u>	<u>60°10'</u>	<u>-54'</u>	<u>155°</u>	<u>59°15'</u>	<u>-54'</u>	<u>156°</u>	<u>58°20'</u>	<u>-54'</u>	<u>157°</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°
	0			1			2			3			4			5			6			

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

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	78°00'	-02'	90°	77°58'	-07'	95°	77°50'	-12'	99°	77°38'	-17'	104°	77°22'	-21'	108°	77°01'	-25'	112°	76°36'	-29'	116°	0
1	77°58'	-07'	95°	77°50'	-12'	99°	77°38'	-17'	104°	77°21'	-21'	108°	77°00'	-25'	112°	76°36'	-29'	116°	76°07'	-32'	120°	1
2	77°50'	-12'	100°	77°38'	-17'	104°	77°21'	-21'	108°	77°00'	-25'	112°	76°35'	-29'	116°	76°07'	-32'	120°	75°36'	-35'	123°	2
3	77°38'	-17'	104°	77°21'	-21'	108°	77°00'	-25'	113°	76°35'	-28'	116°	76°07'	-32'	120°	75°35'	-35'	123°	75°01'	-37'	127°	3
4	77°22'	-21'	109°	77°00'	-25'	113°	76°35'	-28'	117°	76°07'	-32'	120°	75°35'	-35'	124°	75°01'	-37'	127°	74°24'	-39'	130°	4
5	77°01'	-25'	113°	76°36'	-28'	117°	76°07'	-32'	120°	75°35'	-34'	124°	75°01'	-37'	127°	74°23'	-39'	130°	73°44'	-41'	132°	5
6	76°36'	-28'	117°	76°07'	-31'	120°	75°36'	-34'	124°	75°01'	-37'	127°	74°24'	-39'	130°	73°44'	-41'	132°	73°03'	-43'	135°	6
7	76°08'	-31'	121°	75°36'	-34'	124°	75°01'	-37'	127°	74°24'	-39'	130°	73°44'	-41'	133°	73°03'	-43'	135°	72°20'	-45'	137°	7
8	75°37'	-34'	124°	75°02'	-37'	127°	74°24'	-39'	130°	73°45'	-41'	133°	73°03'	-43'	135°	72°20'	-45'	137°	71°35'	-46'	139°	8
9	75°02'	-37'	127°	74°25'	-39'	130°	73°45'	-41'	133°	73°03'	-43'	135°	72°20'	-45'	137°	71°35'	-46'	139°	70°49'	-47'	141°	9
10	74°26'	-39'	130°	73°46'	-41'	133°	73°04'	-43'	135°	72°20'	-44'	138°	71°35'	-46'	140°	70°49'	-47'	141°	70°02'	-48'	143°	10
11	73°47'	-41'	133°	73°05'	-43'	135°	72°21'	-44'	138°	71°36'	-46'	140°	70°50'	-47'	142°	70°02'	-48'	143°	69°13'	-49'	145°	11
12	73°06'	-43'	136°	72°22'	-44'	138°	71°37'	-46'	140°	70°51'	-47'	142°	70°03'	-48'	144°	69°14'	-49'	145°	68°24'	-50'	146°	12
13	72°23'	-44'	138°	71°37'	-46'	140°	70°51'	-47'	142°	70°03'	-48'	144°	69°14'	-49'	145°	68°25'	-50'	147°	67°34'	-51'	148°	13
14	71°38'	-46'	140°	70°52'	-47'	142°	70°04'	-48'	144°	69°15'	-49'	145°	68°25'	-50'	147°	67°35'	-51'	148°	66°43'	-51'	149°	14
15	70°53'	-47'	142°	70°05'	-48'	144°	69°16'	-49'	145°	68°26'	-50'	147°	67°35'	-51'	148°	66°44'	-51'	149°	65°52'	-52'	151°	15
16	70°06'	-48'	144°	69°17'	-49'	146°	68°27'	-50'	147°	67°36'	-51'	148°	66°45'	-51'	150°	65°52'	-52'	151°	65°00'	-53'	152°	16
17	69°18'	-49'	146°	68°28'	-50'	147°	67°37'	-51'	149°	66°45'	-51'	150°	65°53'	-52'	151°	65°00'	-53'	152°	64°07'	-53'	153°	17
18	68°29'	-50'	147°	67°38'	-51'	149°	66°46'	-51'	150°	65°54'	-52'	151°	65°01'	-53'	152°	64°08'	-53'	153°	63°14'	-54'	154°	18
19	67°39'	-51'	149°	66°47'	-51'	150°	65°55'	-52'	151°	65°02'	-53'	152°	64°09'	-53'	153°	63°15'	-53'	154°	62°21'	-54'	155°	19
20	66°48'	-51'	150°	65°56'	-52'	151°	65°03'	-52'	152°	64°09'	-53'	153°	63°16'	-53'	154°	62°21'	-54'	155°	61°27'	-54'	156°	20
21	65°57'	-52'	152°	65°04'	-52'	153°	64°10'	-53'	154°	63°16'	-53'	154°	62°22'	-54'	155°	61°28'	-54'	156°	60°33'	-55'	157°	21
22	65°05'	-52'	153°	64°11'	-53'	154°	63°17'	-53'	155°	62°23'	-54'	155°	61°28'	-54'	156°	60°33'	-55'	157°	59°38'	-55'	158°	22
23	64°13'	-53'	154°	63°18'	-53'	155°	62°24'	-54'	156°	61°29'	-54'	156°	60°34'	-55'	157°	59°39'	-55'	158°	58°43'	-55'	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°
	0			1			2			3			4			5			6			Dec°

12° 348° LHA

Latitude CONTRARY to DECLINATION

12° 348° LHA

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

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

11° 349° LHA

Latitude CONTRARY to Declination

11° 349° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	79°00'	-03'	90°	78°57'	-08'	95°	78°49'	-13'	100°	78°36'	-18'	105°	78°18'	-23'	110°	77°56'	-27'	114°	77°29'	-31'	118°	0
1	78°57'	-08'	95°	78°49'	-13'	100°	78°36'	-18'	105°	78°18'	-23'	110°	77°55'	-27'	114°	77°29'	-31'	118°	76°59'	-34'	122°	1
2	78°49'	-13'	100°	78°36'	-18'	105°	78°18'	-23'	110°	77°55'	-27'	114°	77°29'	-30'	118°	76°58'	-34'	122°	76°25'	-37'	126°	2
3	78°36'	-18'	105°	78°18'	-23'	110°	77°55'	-27'	114°	77°28'	-30'	119°	76°58'	-34'	122°	76°24'	-37'	126°	75°48'	-39'	129°	3
4	78°18'	-22'	110°	77°55'	-27'	115°	77°29'	-30'	119°	76°58'	-34'	122°	76°24'	-37'	126°	75°48'	-39'	129°	75°09'	-41'	132°	4
5	77°56'	-27'	115°	77°29'	-30'	119°	76°58'	-34'	123°	76°24'	-36'	126°	75°48'	-39'	129°	75°09'	-41'	132°	74°27'	-43'	135°	5
6	77°29'	-30'	119°	76°59'	-33'	123°	76°25'	-36'	126°	75°48'	-39'	129°	75°09'	-41'	132°	74°27'	-43'	135°	73°44'	-45'	137°	6
7	76°59'	-33'	123°	76°25'	-36'	126°	75°48'	-39'	129°	75°09'	-41'	132°	74°27'	-43'	135°	73°44'	-45'	137°	72°59'	-46'	140°	7
8	76°26'	-36'	126°	75°49'	-39'	130°	75°09'	-41'	132°	74°28'	-43'	135°	73°44'	-45'	138°	72°59'	-46'	140°	72°13'	-48'	142°	8
9	75°49'	-39'	130°	75°10'	-41'	133°	74°28'	-43'	135°	73°45'	-45'	138°	73°00'	-46'	140°	72°13'	-48'	142°	71°25'	-49'	144°	9
10	75°11'	-41'	133°	74°29'	-43'	135°	73°45'	-45'	138°	73°00'	-46'	140°	72°13'	-48'	142°	71°25'	-49'	144°	70°36'	-50'	146°	10
11	74°30'	-43'	136°	73°46'	-45'	138°	73°00'	-46'	140°	72°14'	-47'	142°	71°26'	-49'	144°	70°37'	-50'	146°	69°47'	-51'	147°	11
12	73°47'	-45'	138°	73°01'	-46'	140°	72°14'	-47'	142°	71°26'	-49'	144°	70°37'	-50'	146°	69°47'	-51'	147°	68°56'	-51'	149°	12
13	73°02'	-46'	140°	72°15'	-47'	142°	71°27'	-49'	144°	70°38'	-50'	146°	69°48'	-50'	147°	68°57'	-51'	149°	68°05'	-52'	150°	13
14	72°16'	-47'	143°	71°28'	-49'	144°	70°38'	-50'	146°	69°48'	-50'	148°	68°57'	-51'	149°	68°05'	-52'	150°	67°13'	-53'	151°	14
15	71°28'	-49'	145°	70°39'	-50'	146°	69°49'	-50'	148°	68°58'	-51'	149°	68°06'	-52'	150°	67°13'	-53'	152°	66°20'	-53'	153°	15
16	70°40'	-50'	146°	69°50'	-50'	148°	68°58'	-51'	149°	68°06'	-52'	151°	67°14'	-53'	152°	66°21'	-53'	153°	65°27'	-54'	154°	16
17	69°50'	-50'	148°	68°59'	-51'	149°	68°07'	-52'	151°	67°15'	-53'	152°	66°21'	-53'	153°	65°28'	-54'	154°	64°34'	-54'	155°	17
18	69°00'	-51'	150°	68°08'	-52'	151°	67°15'	-52'	152°	66°22'	-53'	153°	65°28'	-54'	154°	64°34'	-54'	155°	63°40'	-54'	156°	18
19	68°09'	-52'	151°	67°16'	-52'	152°	66°23'	-53'	153°	65°29'	-54'	154°	64°35'	-54'	155°	63°40'	-54'	156°	62°45'	-55'	157°	19
20	67°17'	-52'	152°	66°24'	-53'	153°	65°30'	-54'	154°	64°35'	-54'	155°	63°41'	-54'	156°	62°46'	-55'	157°	61°50'	-55'	158°	20
21	66°25'	-53'	154°	65°31'	-54'	155°	64°36'	-54'	155°	63°41'	-54'	156°	62°46'	-55'	157°	61°51'	-55'	158°	60°55'	-55'	158°	21
22	65°32'	-53'	155°	64°37'	-54'	156°	63°42'	-54'	156°	62°47'	-55'	157°	61°52'	-55'	158°	60°56'	-55'	159°	60°00'	-56'	159°	22
23	64°38'	-54'	156°	63°43'	-54'	157°	62°48'	-55'	157°	61°52'	-55'	158°	60°57'	-55'	159°	60°01'	-56'	159°	59°04'	-56'	160°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			Dec°

11° 349° LHA

Latitude CONTRARY to DECLINATION

11° 349° LHA

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

10° 350° LHA

Latitude CONTRARY to Declination

10° 350° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	80°00'	-03'	90°	79°57'	-09'	96°	79°48'	-15'	101°	79°34'	-20'	107°	79°14'	-25'	112°	78°50'	-29'	116°	78°21'	-33'	121°	0
1	79°57'	-09'	96°	79°48'	-14'	101°	79°34'	-20'	107°	79°14'	-25'	112°	78°50'	-29'	116°	78°21'	-33'	121°	77°48'	-36'	125°	1
2	79°48'	-14'	101°	79°34'	-20'	107°	79°14'	-25'	112°	78°49'	-29'	116°	78°21'	-33'	121°	77°48'	-36'	125°	77°12'	-39'	128°	2
3	79°34'	-20'	107°	79°14'	-24'	112°	78°49'	-29'	117°	78°21'	-33'	121°	77°48'	-36'	125°	77°12'	-39'	128°	76°33'	-41'	132°	3
4	79°14'	-24'	112°	78°50'	-29'	117°	78°21'	-33'	121°	77°48'	-36'	125°	77°12'	-39'	129°	76°33'	-41'	132°	75°52'	-43'	135°	4
5	78°50'	-29'	117°	78°21'	-32'	121°	77°48'	-36'	125°	77°12'	-39'	129°	76°33'	-41'	132°	75°52'	-43'	135°	75°09'	-45'	138°	5
6	78°21'	-32'	121°	77°48'	-36'	125°	77°12'	-39'	129°	76°33'	-41'	132°	75°52'	-43'	135°	75°09'	-45'	138°	74°23'	-47'	140°	6
7	77°49'	-36'	125°	77°13'	-39'	129°	76°34'	-41'	132°	75°52'	-43'	135°	75°09'	-45'	138°	74°24'	-47'	140°	73°37'	-48'	142°	7
8	77°13'	-39'	129°	76°34'	-41'	132°	75°53'	-43'	135°	75°09'	-45'	138°	74°24'	-47'	140°	73°37'	-48'	143°	72°49'	-49'	144°	8
9	76°35'	-41'	132°	75°53'	-43'	135°	75°09'	-45'	138°	74°24'	-47'	140°	73°37'	-48'	143°	72°49'	-49'	145°	71°59'	-50'	146°	9
10	75°54'	-43'	135°	75°10'	-45'	138°	74°24'	-47'	140°	73°37'	-48'	143°	72°49'	-49'	145°	72°00'	-50'	146°	71°09'	-51'	148°	10
11	75°11'	-45'	138°	74°25'	-47'	141°	73°38'	-48'	143°	72°49'	-49'	145°	72°00'	-50'	147°	71°09'	-51'	148°	70°18'	-52'	150°	11
12	74°26'	-47'	141°	73°38'	-48'	143°	72°50'	-49'	145°	72°00'	-50'	147°	71°10'	-51'	148°	70°18'	-52'	150°	69°26'	-53'	151°	12
13	73°39'	-48'	143°	72°51'	-49'	145°	72°01'	-50'	147°	71°10'	-51'	148°	70°19'	-52'	150°	69°26'	-53'	151°	68°34'	-53'	152°	13
14	72°51'	-49'	145°	72°01'	-50'	147°	71°11'	-51'	149°	70°19'	-52'	150°	69°27'	-53'	151°	68°34'	-53'	153°	67°40'	-54'	154°	14
15	72°02'	-50'	147°	71°11'	-51'	149°	70°20'	-52'	150°	69°27'	-52'	151°	68°34'	-53'	153°	67°41'	-54'	154°	66°47'	-54'	155°	15
16	71°12'	-51'	149°	70°20'	-52'	150°	69°28'	-52'	152°	68°35'	-53'	153°	67°41'	-54'	154°	66°47'	-54'	155°	65°53'	-55'	156°	16
17	70°21'	-52'	150°	69°29'	-52'	152°	68°35'	-53'	153°	67°42'	-54'	154°	66°48'	-54'	155°	65°53'	-55'	156°	64°58'	-55'	157°	17
18	69°29'	-52'	152°	68°36'	-53'	153°	67°42'	-54'	154°	66°48'	-54'	155°	65°53'	-55'	156°	64°58'	-55'	157°	64°03'	-55'	158°	18
19	68°37'	-53'	153°	67°43'	-54'	154°	66°49'	-54'	155°	65°54'	-55'	156°	64°59'	-55'	157°	64°03'	-55'	158°	63°08'	-56'	159°	19
20	67°44'	-54'	154°	66°49'	-54'	156°	65°55'	-55'	156°	65°00'	-55'	157°	64°04'	-55'	158°	63°08'	-56'	159°	62°12'	-56'	160°	20
21	66°50'	-54'	156°	65°55'	-54'	157°	65°00'	-55'	157°	64°05'	-55'	158°	63°09'	-56'	159°	62°13'	-56'	160°	61°16'	-56'	160°	21
22	65°56'	-54'	157°	65°01'	-55'	158°	64°05'	-55'	158°	63°09'	-56'	159°	62°13'	-56'	160°	61°17'	-56'	160°	60°20'	-56'	161°	22
23	<u>65°02'</u>	<u>-55'</u>	<u>158°</u>	<u>64°06'</u>	<u>-55'</u>	<u>159°</u>	<u>63°10'</u>	<u>-56'</u>	<u>159°</u>	<u>62°14'</u>	<u>-56'</u>	<u>160°</u>	<u>61°17'</u>	<u>-56'</u>	<u>161°</u>	<u>60°21'</u>	<u>-56'</u>	<u>161°</u>	<u>59°24'</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°
	0			1			2			3			4			5			6			

10° 350° LHA

Latitude CONTRARY to DECLINATION

10° 350° LHA

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

9° 351° LHA

Latitude CONTRARY to Declination

9° 351° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	81°00'	-03'	90°	80°57'	-10'	96°	80°47'	-16'	102°	80°31'	-22'	108°	80°09'	-27'	114°	79°43'	-31'	119°	79°12'	-35'	123°	0
1	80°57'	-10'	96°	80°47'	-16'	103°	80°31'	-22'	108°	80°09'	-27'	114°	79°43'	-31'	119°	79°11'	-35'	123°	78°37'	-38'	128°	1
2	80°47'	-16'	103°	80°31'	-22'	108°	80°09'	-27'	114°	79°42'	-31'	119°	79°11'	-35'	124°	78°36'	-38'	128°	77°58'	-41'	131°	2
3	80°31'	-22'	109°	80°09'	-27'	114°	79°42'	-31'	119°	79°11'	-35'	124°	78°36'	-38'	128°	77°58'	-41'	131°	77°17'	-44'	135°	3
4	80°09'	-27'	114°	79°43'	-31'	119°	79°11'	-35'	124°	78°36'	-38'	128°	77°58'	-41'	132°	77°17'	-43'	135°	76°33'	-46'	138°	4
5	79°43'	-31'	119°	79°11'	-35'	124°	78°36'	-38'	128°	77°58'	-41'	132°	77°17'	-43'	135°	76°33'	-45'	138°	75°48'	-47'	141°	5
6	79°12'	-35'	124°	78°37'	-38'	128°	77°58'	-41'	132°	77°17'	-43'	135°	76°33'	-45'	138°	75°48'	-47'	141°	75°01'	-49'	143°	6
7	78°37'	-38'	128°	77°58'	-41'	132°	77°17'	-43'	135°	76°33'	-45'	138°	75°48'	-47'	141°	75°01'	-49'	143°	74°12'	-50'	145°	7
8	77°59'	-41'	132°	77°17'	-43'	135°	76°34'	-45'	138°	75°48'	-47'	141°	75°01'	-49'	143°	74°12'	-50'	145°	73°22'	-51'	147°	8
9	77°18'	-43'	135°	76°34'	-45'	138°	75°48'	-47'	141°	75°01'	-48'	143°	74°12'	-50'	145°	73°22'	-51'	147°	72°31'	-52'	149°	9
10	76°35'	-45'	138°	75°49'	-47'	141°	75°01'	-48'	143°	74°13'	-50'	146°	73°23'	-51'	147°	72°31'	-52'	149°	71°40'	-53'	151°	10
11	75°49'	-47'	141°	75°02'	-48'	144°	74°13'	-50'	146°	73°23'	-51'	148°	72°32'	-52'	149°	71°40'	-52'	151°	70°47'	-53'	152°	11
12	75°02'	-48'	144°	74°13'	-50'	146°	73°23'	-51'	148°	72°32'	-52'	149°	71°40'	-52'	151°	70°47'	-53'	152°	69°54'	-54'	154°	12
13	74°14'	-50'	146°	73°24'	-51'	148°	72°33'	-52'	149°	71°40'	-52'	151°	70°48'	-53'	152°	69°54'	-54'	154°	69°00'	-54'	155°	13
14	73°24'	-51'	148°	72°33'	-52'	150°	71°41'	-52'	151°	70°48'	-53'	153°	69°54'	-54'	154°	69°00'	-54'	155°	68°06'	-55'	156°	14
15	72°34'	-52'	150°	71°41'	-52'	151°	70°48'	-53'	153°	69°55'	-54'	154°	69°01'	-54'	155°	68°06'	-55'	156°	67°11'	-55'	157°	15
16	71°42'	-52'	151°	70°49'	-53'	153°	69°55'	-54'	154°	69°01'	-54'	155°	68°06'	-55'	156°	67°11'	-55'	157°	66°16'	-56'	158°	16
17	70°50'	-53'	153°	69°56'	-54'	154°	69°02'	-54'	155°	68°07'	-55'	156°	67°12'	-55'	157°	66°16'	-55'	158°	65°20'	-56'	159°	17
18	69°57'	-54'	154°	69°02'	-54'	155°	68°07'	-55'	156°	67°12'	-55'	157°	66°17'	-55'	158°	65°21'	-56'	159°	64°25'	-56'	160°	18
19	69°03'	-54'	156°	68°08'	-55'	157°	67°13'	-55'	158°	66°17'	-55'	158°	65°21'	-56'	159°	64°25'	-56'	160°	63°28'	-56'	161°	19
20	68°09'	-55'	157°	67°13'	-55'	158°	66°18'	-55'	159°	65°22'	-56'	159°	64°25'	-56'	160°	63°29'	-56'	161°	62°32'	-57'	161°	20
21	67°14'	-55'	158°	66°18'	-55'	159°	65°22'	-56'	159°	64°26'	-56'	160°	63°29'	-56'	161°	62°32'	-57'	162°	61°35'	-57'	162°	21
22	66°19'	-55'	159°	65°23'	-56'	160°	64°26'	-56'	160°	63°30'	-56'	161°	62°33'	-57'	162°	61°36'	-57'	162°	60°39'	-57'	163°	22
23	<u>65°23'</u>	<u>-56'</u>	<u>160°</u>	<u>64°27'</u>	<u>-56'</u>	<u>160°</u>	<u>63°30'</u>	<u>-56'</u>	<u>161°</u>	<u>62°33'</u>	<u>-57'</u>	<u>162°</u>	<u>61°36'</u>	<u>-57'</u>	<u>162°</u>	<u>60°39'</u>	<u>-57'</u>	<u>163°</u>	<u>59°42'</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°
	0			1			2			3			4			5			6			

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°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	82°00'	-04'	90°	81°56'	-11'	97°	81°45'	-18'	104°	81°28'	-24'	110°	81°04'	-29'	116°	80°34'	-34'	122°	80°01'	-38'	127°	0
1	81°56'	-11'	97°	81°45'	-18'	104°	81°27'	-24'	110°	81°03'	-29'	116°	80°34'	-34'	122°	80°00'	-38'	127°	79°23'	-41'	131°	1
2	81°45'	-18'	104°	81°27'	-24'	111°	81°03'	-29'	117°	80°34'	-34'	122°	80°00'	-38'	127°	79°23'	-41'	131°	78°42'	-44'	135°	2
3	81°28'	-24'	111°	81°03'	-29'	117°	80°34'	-34'	122°	80°00'	-38'	127°	79°22'	-41'	131°	78°42'	-44'	135°	77°58'	-46'	138°	3
4	81°04'	-29'	117°	80°34'	-34'	122°	80°00'	-38'	127°	79°22'	-41'	131°	78°41'	-44'	135°	77°58'	-46'	138°	77°12'	-48'	141°	4
5	80°34'	-34'	122°	80°00'	-38'	127°	79°23'	-41'	131°	78°42'	-44'	135°	77°58'	-46'	138°	77°12'	-48'	141°	76°24'	-49'	144°	5
6	80°01'	-38'	127°	79°23'	-41'	131°	78°42'	-44'	135°	77°58'	-46'	138°	77°12'	-48'	141°	76°24'	-49'	144°	75°35'	-50'	146°	6
7	79°23'	-41'	131°	78°42'	-43'	135°	77°58'	-46'	138°	77°12'	-48'	141°	76°24'	-49'	144°	75°35'	-50'	146°	74°45'	-52'	148°	7
8	78°42'	-43'	135°	77°58'	-46'	139°	77°12'	-48'	142°	76°25'	-49'	144°	75°35'	-50'	146°	74°45'	-51'	148°	73°53'	-52'	150°	8
9	77°59'	-46'	139°	77°13'	-48'	142°	76°25'	-49'	144°	75°36'	-50'	146°	74°45'	-51'	148°	73°53'	-52'	150°	73°01'	-53'	152°	9
10	77°13'	-47'	142°	76°25'	-49'	144°	75°36'	-50'	147°	74°45'	-51'	149°	73°53'	-52'	150°	73°01'	-53'	152°	72°08'	-54'	153°	10
11	76°26'	-49'	144°	75°36'	-50'	147°	74°45'	-51'	149°	73°54'	-52'	150°	73°01'	-53'	152°	72°08'	-54'	154°	71°14'	-54'	155°	11
12	75°37'	-50'	147°	74°46'	-51'	149°	73°54'	-52'	151°	73°01'	-53'	152°	72°08'	-54'	154°	71°14'	-54'	155°	70°19'	-55'	156°	12
13	74°46'	-51'	149°	73°54'	-52'	151°	73°02'	-53'	152°	72°08'	-54'	154°	71°14'	-54'	155°	70°19'	-55'	156°	69°24'	-55'	157°	13
14	73°55'	-52'	151°	73°02'	-53'	152°	72°09'	-54'	154°	71°14'	-54'	155°	70°20'	-55'	156°	69°25'	-55'	157°	68°29'	-56'	158°	14
15	73°03'	-53'	153°	72°09'	-54'	154°	71°15'	-54'	155°	70°20'	-55'	156°	69°25'	-55'	158°	68°29'	-56'	158°	67°33'	-56'	159°	15
16	72°09'	-54'	154°	71°15'	-54'	155°	70°20'	-55'	157°	69°25'	-55'	158°	68°29'	-56'	159°	67°33'	-56'	159°	66°37'	-56'	160°	16
17	71°16'	-54'	156°	70°21'	-55'	157°	69°26'	-55'	158°	68°30'	-56'	159°	67°34'	-56'	160°	66°37'	-56'	160°	65°41'	-57'	161°	17
18	70°21'	-55'	157°	69°26'	-55'	158°	68°30'	-56'	159°	67°34'	-56'	160°	66°38'	-56'	161°	65°41'	-57'	161°	64°44'	-57'	162°	18
19	69°27'	-55'	158°	68°31'	-56'	159°	67°35'	-56'	160°	66°38'	-56'	161°	65°41'	-57'	161°	64°44'	-57'	162°	63°47'	-57'	163°	19
20	68°31'	-56'	159°	67°35'	-56'	160°	66°39'	-56'	161°	65°42'	-57'	161°	64°45'	-57'	162°	63°48'	-57'	163°	62°50'	-57'	163°	20
21	67°36'	-56'	160°	66°39'	-56'	161°	65°42'	-57'	162°	64°45'	-57'	162°	63°48'	-57'	163°	62°50'	-57'	163°	61°53'	-57'	164°	21
22	66°40'	-56'	161°	65°43'	-57'	162°	64°46'	-57'	162°	63°48'	-57'	163°	62°51'	-57'	164°	61°53'	-57'	164°	60°55'	-58'	165°	22
23	65°43'	-57'	162°	64°46'	-57'	163°	63°49'	-57'	163°	62°51'	-57'	164°	61°54'	-57'	164°	60°56'	-58'	165°	59°58'	-58'	165°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			Dec°

8° 352° LHA

Latitude CONTRARY to DECLINATION

8° 352° LHA

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

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

7° 353° LHA

Latitude CONTRARY to Declination

7° 353° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	83°00'	-04'	90°	82°56'	-13'	98°	82°43'	-20'	106°	82°23'	-27'	113°	81°57'	-32'	120°	81°24'	-37'	125°	80°47'	-41'	130°	0
1	82°56'	-12'	98°	82°43'	-20'	106°	82°23'	-27'	113°	81°56'	-32'	120°	81°24'	-37'	125°	80°47'	-41'	130°	80°06'	-44'	135°	1
2	82°43'	-20'	106°	82°23'	-27'	113°	81°56'	-32'	120°	81°24'	-37'	125°	80°47'	-41'	130°	80°06'	-44'	135°	79°23'	-46'	139°	2
3	82°23'	-27'	113°	81°56'	-32'	120°	81°24'	-37'	126°	80°47'	-41'	131°	80°06'	-44'	135°	79°22'	-46'	139°	78°36'	-48'	142°	3
4	81°57'	-32'	120°	81°24'	-37'	126°	80°47'	-41'	131°	80°06'	-44'	135°	79°22'	-46'	139°	78°36'	-48'	142°	77°48'	-50'	145°	4
5	81°24'	-37'	126°	80°47'	-41'	131°	80°06'	-44'	135°	79°22'	-46'	139°	78°36'	-48'	142°	77°48'	-50'	145°	76°58'	-51'	147°	5
6	80°47'	-41'	131°	80°06'	-44'	135°	79°23'	-46'	139°	78°36'	-48'	142°	77°48'	-50'	145°	76°58'	-51'	147°	76°07'	-52'	150°	6
7	80°07'	-44'	135°	79°23'	-46'	139°	78°36'	-48'	142°	77°48'	-50'	145°	76°58'	-51'	148°	76°07'	-52'	150°	75°15'	-53'	152°	7
8	79°23'	-46'	139°	78°37'	-48'	142°	77°48'	-50'	145°	76°58'	-51'	148°	76°07'	-52'	150°	75°15'	-53'	152°	74°21'	-54'	153°	8
9	78°37'	-48'	142°	77°49'	-50'	145°	76°58'	-51'	148°	76°07'	-52'	150°	75°15'	-53'	152°	74°21'	-54'	153°	73°27'	-55'	155°	9
10	77°49'	-50'	145°	76°59'	-51'	148°	76°07'	-52'	150°	75°15'	-53'	152°	74°22'	-54'	154°	73°28'	-55'	155°	72°33'	-55'	156°	10
11	76°59'	-51'	148°	76°08'	-52'	150°	75°15'	-53'	152°	74°22'	-54'	154°	73°28'	-55'	155°	72°33'	-55'	156°	71°38'	-56'	158°	11
12	76°08'	-52'	150°	75°15'	-53'	152°	74°22'	-54'	154°	73°28'	-55'	155°	72°33'	-55'	157°	71°38'	-56'	158°	70°42'	-56'	159°	12
13	75°16'	-53'	152°	74°22'	-54'	154°	73°28'	-55'	155°	72°33'	-55'	157°	71°38'	-56'	158°	70°42'	-56'	159°	69°46'	-56'	160°	13
14	74°23'	-54'	154°	73°28'	-55'	155°	72°34'	-55'	157°	71°38'	-56'	158°	70°42'	-56'	159°	69°46'	-56'	160°	68°50'	-57'	161°	14
15	73°29'	-55'	156°	72°34'	-55'	157°	71°39'	-56'	158°	70°43'	-56'	159°	69°46'	-56'	160°	68°50'	-57'	161°	67°53'	-57'	162°	15
16	72°34'	-55'	157°	71°39'	-56'	158°	70°43'	-56'	159°	69°47'	-56'	160°	68°50'	-57'	161°	67°53'	-57'	162°	66°56'	-57'	163°	16
17	71°39'	-56'	158°	70°43'	-56'	159°	69°47'	-56'	160°	68°50'	-57'	161°	67°53'	-57'	162°	66°56'	-57'	163°	65°59'	-57'	163°	17
18	70°44'	-56'	159°	69°47'	-56'	160°	68°51'	-57'	161°	67°54'	-57'	162°	66°57'	-57'	163°	65°59'	-57'	163°	65°02'	-58'	164°	18
19	69°48'	-56'	161°	68°51'	-57'	161°	67°54'	-57'	162°	66°57'	-57'	163°	65°59'	-57'	164°	65°02'	-58'	164°	64°04'	-58'	165°	19
20	68°51'	-57'	161°	67°54'	-57'	162°	66°57'	-57'	163°	66°00'	-57'	164°	65°02'	-58'	164°	64°04'	-58'	165°	63°06'	-58'	165°	20
21	67°55'	-57'	162°	66°58'	-57'	163°	66°00'	-57'	164°	65°02'	-58'	164°	64°04'	-58'	165°	63°06'	-58'	165°	62°08'	-58'	166°	21
22	66°58'	-57'	163°	66°00'	-57'	164°	65°03'	-58'	164°	64°05'	-58'	165°	63°07'	-58'	166°	62°09'	-58'	166°	61°10'	-58'	166°	22
23	66°01'	-57'	164°	65°03'	-58'	165°	64°05'	-58'	165°	63°07'	-58'	166°	62°09'	-58'	166°	61°11'	-58'	167°	60°12'	-58'	167°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			Dec°

7° 353° LHA

Latitude CONTRARY to 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

**6° 354° LHA**

**Latitude CONTRARY to Declination**

**6° 354° LHA**

Dec°	0			1			2			3			4			5			6			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	84°00'	-05'	90°	83°55'	-15'	99°	83°41'	-23'	108°	83°18'	-30'	116°	82°48'	-36'	124°	82°12'	-41'	130°	81°31'	-44'	135°	0			
1	83°55'	-14'	99°	83°41'	-23'	108°	83°18'	-30'	117°	82°47'	-36'	124°	82°12'	-41'	130°	81°31'	-44'	135°	80°47'	-47'	139°	1			
2	83°41'	-23'	108°	83°18'	-30'	117°	82°47'	-36'	124°	82°11'	-40'	130°	81°31'	-44'	135°	80°47'	-47'	139°	80°00'	-49'	143°	2			
3	83°18'	-30'	117°	82°47'	-36'	124°	82°11'	-40'	130°	81°31'	-44'	135°	80°47'	-47'	139°	80°00'	-49'	143°	79°11'	-51'	146°	3			
4	82°48'	-36'	124°	82°12'	-40'	130°	81°31'	-44'	135°	80°47'	-47'	139°	80°00'	-49'	143°	79°11'	-51'	146°	78°21'	-52'	149°	4			
5	82°12'	-40'	130°	81°31'	-44'	135°	80°47'	-47'	139°	80°00'	-49'	143°	79°11'	-51'	146°	78°21'	-52'	149°	77°28'	-53'	151°	5			
6	81°31'	-44'	135°	80°47'	-47'	140°	80°00'	-49'	143°	79°11'	-51'	146°	78°21'	-52'	149°	77°28'	-53'	151°	76°35'	-54'	153°	6			
7	80°47'	-47'	140°	80°00'	-49'	143°	79°11'	-51'	146°	78°21'	-52'	149°	77°29'	-53'	151°	76°35'	-54'	153°	75°41'	-55'	155°	7			
8	80°01'	-49'	143°	79°12'	-51'	146°	78°21'	-52'	149°	77°29'	-53'	151°	76°35'	-54'	153°	75°41'	-55'	155°	74°46'	-55'	157°	8			
9	79°12'	-51'	147°	78°21'	-52'	149°	77°29'	-53'	152°	76°36'	-54'	154°	75°42'	-55'	155°	74°47'	-55'	157°	73°51'	-56'	158°	9			
10	78°21'	-52'	149°	77°29'	-53'	152°	76°36'	-54'	154°	75°42'	-55'	155°	74°47'	-55'	157°	73°51'	-56'	158°	72°55'	-56'	159°	10			
11	77°29'	-53'	152°	76°36'	-54'	154°	75°42'	-55'	155°	74°47'	-55'	157°	73°51'	-56'	158°	72°55'	-56'	160°	71°59'	-57'	161°	11			
12	76°36'	-54'	154°	75°42'	-55'	156°	74°47'	-55'	157°	73°52'	-56'	159°	72°56'	-56'	160°	71°59'	-57'	161°	71°02'	-57'	162°	12			
13	75°42'	-55'	156°	74°47'	-55'	157°	73°52'	-56'	159°	72°56'	-56'	160°	71°59'	-57'	161°	71°02'	-57'	162°	70°05'	-57'	163°	13			
14	74°48'	-55'	157°	73°52'	-56'	159°	72°56'	-56'	160°	71°59'	-57'	161°	71°02'	-57'	162°	70°05'	-57'	163°	69°08'	-57'	163°	14			
15	73°52'	-56'	159°	72°56'	-56'	160°	72°00'	-57'	161°	71°03'	-57'	162°	70°06'	-57'	163°	69°08'	-57'	164°	68°10'	-58'	164°	15			
16	72°56'	-56'	160°	72°00'	-57'	161°	71°03'	-57'	162°	70°06'	-57'	163°	69°08'	-57'	164°	68°11'	-58'	164°	67°13'	-58'	165°	16			
17	72°00'	-57'	161°	71°03'	-57'	162°	70°06'	-57'	163°	69°08'	-57'	164°	68°11'	-58'	164°	67°13'	-58'	165°	66°15'	-58'	166°	17			
18	71°03'	-57'	162°	70°06'	-57'	163°	69°09'	-57'	164°	68°11'	-58'	164°	67°13'	-58'	165°	66°15'	-58'	166°	65°17'	-58'	166°	18			
19	70°07'	-57'	163°	69°09'	-57'	164°	68°11'	-58'	165°	67°13'	-58'	165°	66°15'	-58'	166°	65°17'	-58'	166°	64°19'	-58'	167°	19			
20	69°09'	-57'	164°	68°12'	-58'	165°	67°14'	-58'	165°	66°15'	-58'	166°	65°17'	-58'	166°	64°19'	-58'	167°	63°20'	-58'	167°	20			
21	68°12'	-58'	165°	67°14'	-58'	165°	66°16'	-58'	166°	65°17'	-58'	166°	64°19'	-58'	167°	63°21'	-58'	167°	62°22'	-59'	168°	21			
22	67°14'	-58'	165°	66°16'	-58'	166°	65°18'	-58'	167°	64°19'	-58'	167°	63°21'	-58'	168°	62°22'	-59'	168°	61°23'	-59'	168°	22			
23	66°16'	-58'	166°	65°18'	-58'	167°	64°20'	-58'	167°	63°21'	-58'	168°	62°22'	-59'	168°	61°24'	-59'	168°	60°25'	-59'	169°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6						

**6° 354° LHA**

**Latitude CONTRARY to DECLINATION**

**6° 354° LHA**

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

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

**5° 355° LHA**

**Latitude CONTRARY to Declination**

**5° 355° LHA**

Dec°	0			1			2			3			4			5			6			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	85°00'	-06'	90°	84°54'	-17'	101°	84°37'	-27'	112°	84°10'	-34'	121°	83°36'	-40'	129°	82°56'	-44'	135°	82°12'	-48'	140°	0			
1	84°54'	-17'	101°	84°37'	-27'	112°	84°10'	-34'	121°	83°36'	-40'	129°	82°56'	-44'	135°	82°12'	-48'	140°	81°24'	-50'	144°	1			
2	84°37'	-27'	112°	84°10'	-34'	121°	83°36'	-40'	129°	82°56'	-44'	135°	82°12'	-48'	140°	81°24'	-50'	144°	80°34'	-52'	148°	2			
3	84°10'	-34'	121°	83°36'	-40'	129°	82°56'	-44'	135°	82°11'	-47'	140°	81°24'	-50'	144°	80°34'	-52'	148°	79°42'	-53'	151°	3			
4	83°36'	-40'	129°	82°56'	-44'	135°	82°12'	-47'	140°	81°24'	-50'	144°	80°34'	-52'	148°	79°42'	-53'	151°	78°49'	-54'	153°	4			
5	82°56'	-44'	135°	82°12'	-47'	140°	81°24'	-50'	145°	80°34'	-52'	148°	79°42'	-53'	151°	78°49'	-54'	153°	77°55'	-55'	155°	5			
6	82°12'	-47'	140°	81°24'	-50'	145°	80°34'	-52'	148°	79°42'	-53'	151°	78°49'	-54'	153°	77°55'	-55'	156°	77°00'	-56'	157°	6			
7	81°24'	-50'	145°	80°34'	-52'	148°	79°43'	-53'	151°	78°49'	-54'	153°	77°55'	-55'	156°	77°00'	-56'	157°	76°05'	-56'	157°	7			
8	80°34'	-52'	148°	79°43'	-53'	151°	78°50'	-54'	154°	77°55'	-55'	156°	77°00'	-56'	157°	76°05'	-56'	159°	75°08'	-56'	159°	8			
9	79°43'	-53'	151°	78°50'	-54'	154°	77°55'	-55'	156°	77°00'	-56'	157°	76°05'	-56'	159°	75°08'	-57'	160°	74°12'	-57'	162°	9			
10	78°50'	-54'	154°	77°56'	-55'	156°	77°00'	-56'	158°	76°05'	-56'	159°	75°08'	-57'	160°	74°12'	-57'	162°	73°15'	-57'	163°	10			
11	77°56'	-55'	156°	77°01'	-56'	158°	76°05'	-56'	159°	75°09'	-57'	161°	74°12'	-57'	162°	73°15'	-57'	163°	72°17'	-58'	164°	11			
12	77°01'	-56'	158°	76°05'	-56'	159°	75°09'	-57'	161°	74°12'	-57'	162°	73°15'	-57'	163°	72°17'	-58'	164°	71°20'	-58'	165°	12			
13	76°05'	-56'	159°	75°09'	-57'	161°	74°12'	-57'	162°	73°15'	-57'	163°	72°17'	-58'	164°	71°20'	-58'	165°	70°22'	-58'	165°	13			
14	75°09'	-57'	161°	74°12'	-57'	162°	73°15'	-57'	163°	72°18'	-58'	164°	71°20'	-58'	165°	70°22'	-58'	165°	69°24'	-58'	166°	14			
15	74°12'	-57'	162°	73°15'	-57'	163°	72°18'	-58'	164°	71°20'	-58'	165°	70°22'	-58'	165°	69°24'	-58'	166°	68°25'	-58'	167°	15			
16	73°15'	-57'	163°	72°18'	-58'	164°	71°20'	-58'	165°	70°22'	-58'	166°	69°24'	-58'	166°	68°25'	-58'	167°	67°27'	-59'	167°	16			
17	72°18'	-58'	164°	71°20'	-58'	165°	70°22'	-58'	166°	69°24'	-58'	166°	68°26'	-58'	167°	67°27'	-59'	167°	66°28'	-59'	168°	17			
18	71°20'	-58'	165°	70°22'	-58'	166°	69°24'	-58'	166°	68°26'	-58'	167°	67°27'	-58'	168°	66°29'	-59'	168°	65°30'	-59'	168°	18			
19	70°23'	-58'	166°	69°24'	-58'	166°	68°26'	-58'	167°	67°27'	-58'	168°	66°29'	-59'	168°	65°30'	-59'	169°	64°31'	-59'	169°	19			
20	69°25'	-58'	167°	68°26'	-58'	167°	67°28'	-58'	168°	66°29'	-59'	168°	65°30'	-59'	169°	64°31'	-59'	169°	63°32'	-59'	169°	20			
21	68°26'	-58'	167°	67°28'	-58'	168°	66°29'	-59'	168°	65°30'	-59'	169°	64°31'	-59'	169°	63°32'	-59'	169°	62°33'	-59'	170°	21			
22	67°28'	-58'	168°	66°29'	-59'	168°	65°30'	-59'	169°	64°32'	-59'	169°	63°33'	-59'	170°	62°34'	-59'	170°	61°34'	-59'	170°	22			
23	66°29'	-59'	168°	65°31'	-59'	169°	64°32'	-59'	169°	63°33'	-59'	170°	62°34'	-59'	170°	61°35'	-59'	170°	60°35'	-59'	171°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6						

**5° 355° LHA**

**Latitude CONTRARY to 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

4° 356° LHA

Latitude CONTRARY to Declination

4° 356° LHA

Table with columns for Dec°, Hc°, d', Z° and rows for 0 to 23. It contains celestial navigation data for 4° 356° LHA.

4° 356° LHA

Latitude CONTRARY to DECLINATION

4° 356° LHA

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

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

3° 357° LHA

Latitude CONTRARY to Declination

3° 357° LHA

Table with columns for Dec°, Hc°, d', Z° and rows for 0 to 23. It contains celestial navigation data for 3° 357° LHA.

3° 357° LHA

Latitude CONTRARY to 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

0° 360° LHA

Latitude CONTRARY to Declination

0° 360° LHA

Dec°	0			1			2			3			4			5			6			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	90°00'	-60'	90°	89°00'	-60'	180°	88°00'	-60'	180°	87°00'	-60'	180°	86°00'	-60'	180°	85°00'	-60'	180°	84°00'	-60'	180°	0
1	89°00'	-60'	180°	88°00'	-60'	180°	87°00'	-60'	180°	86°00'	-60'	180°	85°00'	-60'	180°	84°00'	-60'	180°	83°00'	-60'	180°	1
2	88°00'	-60'	180°	87°00'	-60'	180°	86°00'	-60'	180°	85°00'	-60'	180°	84°00'	-60'	180°	83°00'	-60'	180°	82°00'	-60'	180°	2
3	87°00'	-60'	180°	86°00'	-60'	180°	85°00'	-60'	180°	84°00'	-60'	180°	83°00'	-60'	180°	82°00'	-60'	180°	81°00'	-60'	180°	3
4	86°00'	-60'	180°	85°00'	-60'	180°	84°00'	-60'	180°	83°00'	-60'	180°	82°00'	-60'	180°	81°00'	-60'	180°	80°00'	-60'	180°	4
5	85°00'	-60'	180°	84°00'	-60'	180°	83°00'	-60'	180°	82°00'	-60'	180°	81°00'	-60'	180°	80°00'	-60'	180°	79°00'	-60'	180°	5
6	84°00'	-60'	180°	83°00'	-60'	180°	82°00'	-60'	180°	81°00'	-60'	180°	80°00'	-60'	180°	79°00'	-60'	180°	78°00'	-60'	180°	6
7	83°00'	-60'	180°	82°00'	-60'	180°	81°00'	-60'	180°	80°00'	-60'	180°	79°00'	-60'	180°	78°00'	-60'	180°	77°00'	-60'	180°	7
8	82°00'	-60'	180°	81°00'	-60'	180°	80°00'	-60'	180°	79°00'	-60'	180°	78°00'	-60'	180°	77°00'	-60'	180°	76°00'	-60'	180°	8
9	81°00'	-60'	180°	80°00'	-60'	180°	79°00'	-60'	180°	78°00'	-60'	180°	77°00'	-60'	180°	76°00'	-60'	180°	75°00'	-60'	180°	9
10	80°00'	-60'	180°	79°00'	-60'	180°	78°00'	-60'	180°	77°00'	-60'	180°	76°00'	-60'	180°	75°00'	-60'	180°	74°00'	-60'	180°	10
11	79°00'	-60'	180°	78°00'	-60'	180°	77°00'	-60'	180°	76°00'	-60'	180°	75°00'	-60'	180°	74°00'	-60'	180°	73°00'	-60'	180°	11
12	78°00'	-60'	180°	77°00'	-60'	180°	76°00'	-60'	180°	75°00'	-60'	180°	74°00'	-60'	180°	73°00'	-60'	180°	72°00'	-60'	180°	12
13	77°00'	-60'	180°	76°00'	-60'	180°	75°00'	-60'	180°	74°00'	-60'	180°	73°00'	-60'	180°	72°00'	-60'	180°	71°00'	-60'	180°	13
14	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°	14
15	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°	15
16	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°	16
17	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°	17
18	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°	18
19	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°	19
20	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°	20
21	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°	21
22	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°	22
23	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°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	0			1			2			3			4			5			6			

0° 360° LHA

Latitude CONTRARY to DECLINATION

0° 360° LHA

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

