

Sight Reduction Tables

Latitude 21° to 27°

Introduction.

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

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

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

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

LHA and Declination = SAME

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

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

LHA and Declination = CONTRARY

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

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

NOTE

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

Accuracy and Precision

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

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

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

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

The difference in d' is occasionally 0.1'.

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

Disclaimer

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

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

6° 354° LHA

Latitude SAME as Declination

6° 354° LHA

Table with 10 columns (Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°) and 24 rows of astronomical data for 6° 354° LHA.

6° 354° LHA

Latitude SAME as Declination

6° 354° LHA

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

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

7° 353° LHA

Latitude SAME as Declination

7° 353° LHA

Table with 10 columns (Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°) and 24 rows of astronomical data for 7° 353° LHA.

7° 353° LHA

Latitude SAME as Declination

7° 353° LHA

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

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

10° 350° LHA

Latitude SAME as Declination

10° 350° LHA

Table with 10 columns (Dec, 21, 22, 23, 24, 25, 26, 27, Dec) and 23 rows of astronomical data for 10° 350° LHA.

10° 350° LHA

Latitude SAME as Declination

10° 350° LHA

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

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

11° 349° LHA

Latitude SAME as Declination

11° 349° LHA

Table with 10 columns (Dec, 21, 22, 23, 24, 25, 26, 27, Dec) and 23 rows of astronomical data for 11° 349° LHA.

11° 349° LHA

Latitude SAME as Declination

11° 349° LHA

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

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

12° 348° LHA

Latitude SAME as Declination

12° 348° LHA

Table with 10 columns (Dec, 21-27, Dec) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°.

12° 348° LHA

Latitude SAME as Declination

12° 348° LHA

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

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

13° 347° LHA

Latitude SAME as Declination

13° 347° LHA

Table with 10 columns (Dec, 21-27, Dec) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°.

13° 347° LHA

Latitude SAME as Declination

13° 347° LHA

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

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

14° 346° LHA

Latitude SAME as Declination

14° 346° LHA

Table with 12 columns (Dec, 21-27, Dec) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is symmetric around the center column (24).

14° 346° LHA

Latitude SAME as Declination

14° 346° LHA

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

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

15° 345° LHA

Latitude SAME as Declination

15° 345° LHA

Table with 12 columns (Dec, 21-27, Dec) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is symmetric around the center column (24).

15° 345° LHA

Latitude SAME as Declination

15° 345° LHA

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

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

16° 344° LHA

Latitude SAME as Declination

16° 344° LHA

Table with 12 columns (Dec, 21-27, Dec) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is symmetric around the center.

16° 344° LHA

Latitude SAME as Declination

16° 344° LHA

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

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

17° 343° LHA

Latitude SAME as Declination

17° 343° LHA

Table with 12 columns (Dec, 21-27, Dec) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°. The table is symmetric around the center.

17° 343° LHA

Latitude SAME as Declination

17° 343° LHA

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

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

18° 342° LHA

Latitude SAME as Declination

18° 342° LHA

Table with 10 columns (Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°) and 24 rows of latitude/longitude data for North Latitude.

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 10 columns (Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°) and 24 rows of latitude/longitude data for North Latitude.

19° 341° LHA

Latitude SAME as Declination

19° 341° LHA

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

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

20° 340° LHA

Latitude SAME as Declination

20° 340° LHA

Table with 11 columns (Dec, Hc, d, Z) and 11 rows (0-11) for 20° 340° LHA.

20° 340° LHA

Latitude SAME as Declination

20° 340° LHA

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

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

21° 339° LHA

Latitude SAME as Declination

21° 339° LHA

Table with 11 columns (Dec, Hc, d, Z) and 11 rows (0-11) for 21° 339° LHA.

21° 339° LHA

Latitude SAME as Declination

21° 339° LHA

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

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

24° 336° LHA

Latitude SAME as Declination

24° 336° LHA

Table with columns for Dec°, 21, 22, 23, 24, 25, 26, 27, and Dec°. Each column contains three sub-columns for Hc°, d', and Z°.

24° 336° LHA

Latitude SAME as Declination

24° 336° LHA

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

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

25° 335° LHA

Latitude SAME as Declination

25° 335° LHA

Table with columns for Dec°, 21, 22, 23, 24, 25, 26, 27, and Dec°. Each column contains three sub-columns for Hc°, d', and Z°.

25° 335° LHA

Latitude SAME as Declination

25° 335° LHA

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

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

28° 332° LHA

Latitude SAME as Declination

28° 332° LHA

Table with 12 columns (Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°) and 24 rows of astronomical data for 28° 332° LHA.

28° 332° LHA

Latitude SAME as Declination

28° 332° LHA

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

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

29° 331° LHA

Latitude SAME as Declination

29° 331° LHA

Table with 12 columns (Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°) and 24 rows of astronomical data for 29° 331° LHA.

29° 331° LHA

Latitude SAME as Declination

29° 331° LHA

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

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

30° 330° LHA

Latitude SAME as Declination

30° 330° LHA

Table with 11 columns (Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°) and 24 rows of coordinate data.

30° 330° LHA

Latitude SAME as Declination

30° 330° LHA

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

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

31° 329° LHA

Latitude SAME as Declination

31° 329° LHA

Table with 11 columns (Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°) and 24 rows of coordinate data.

31° 329° LHA

Latitude SAME as Declination

31° 329° LHA

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

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

32° 328° LHA

Latitude SAME as Declination

32° 328° LHA

Table with columns: Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°. Each column contains coordinates (Hc°, d', Z°) for degrees 0 to 23.

32° 328° LHA

Latitude SAME as Declination

32° 328° LHA

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

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

33° 327° LHA

Latitude SAME as Declination

33° 327° LHA

Table with columns: Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°. Each column contains coordinates (Hc°, d', Z°) for degrees 0 to 23.

33° 327° LHA

Latitude SAME as Declination

33° 327° LHA

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

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

36° 324° LHA

Latitude SAME as Declination

36° 324° LHA

Table with 10 columns (Dec, 21-27, Dec) and 24 rows of astronomical data for 36° declination.

36° 324° LHA

Latitude SAME as Declination

36° 324° LHA

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

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

37° 323° LHA

Latitude SAME as Declination

37° 323° LHA

Table with 10 columns (Dec, 21-27, Dec) and 24 rows of astronomical data for 37° declination.

37° 323° LHA

Latitude SAME as Declination

37° 323° LHA

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

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

42° 318° LHA

Latitude SAME as Declination

42° 318° LHA

Table with 10 columns (Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°) and 24 rows of astronomical data including Hc°, d', and Z° values.

42° 318° LHA

Latitude SAME as Declination

42° 318° LHA

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

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

43° 317° LHA

Latitude SAME as Declination

43° 317° LHA

Table with 10 columns (Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°) and 24 rows of astronomical data including Hc°, d', and Z° values.

43° 317° LHA

Latitude SAME as Declination

43° 317° LHA

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

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

44° 316° LHA

Latitude SAME as Declination

44° 316° LHA

Table with 10 columns (Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°) and 24 rows of astronomical data for 44° LHA.

44° 316° LHA

Latitude SAME as Declination

44° 316° LHA

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

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

45° 315° LHA

Latitude SAME as Declination

45° 315° LHA

Table with 10 columns (Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°) and 24 rows of astronomical data for 45° LHA.

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

48° 312° LHA

Latitude SAME as Declination

48° 312° LHA

Table with 11 columns (Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°) and 24 rows of celestial coordinates.

48° 312° LHA

Latitude SAME as Declination

48° 312° LHA

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

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

49° 311° LHA

Latitude SAME as Declination

49° 311° LHA

Table with 11 columns (Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°) and 24 rows of celestial coordinates.

49° 311° LHA

Latitude SAME as Declination

49° 311° LHA

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

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

Table for 50° 310° LHA Latitude SAME as Declination. Columns: Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°. Rows 0-23. Each row contains three values (Hc°, d', Z°) for each column.

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

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

Table for 51° 309° LHA Latitude SAME as Declination. Columns: Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°. Rows 0-23. Each row contains three values (Hc°, d', Z°) for each column.

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 SAME as Declination

58° 302° LHA

Table with 9 columns (Dec, 21-27, Dec) and 24 rows (0-23). Each cell contains three values for Hc, d, and Z. The table is symmetric around the center column (24).

58° 302° LHA

Latitude SAME as Declination

58° 302° LHA

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

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

59° 301° LHA

Latitude SAME as Declination

59° 301° LHA

Table with 9 columns (Dec, 21-27, Dec) and 24 rows (0-23). Each cell contains three values for Hc, d, and Z. The table is symmetric around the center column (24).

59° 301° LHA

Latitude SAME as 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

62° 298° LHA

Latitude SAME as Declination

62° 298° LHA

Table with columns for Dec°, 21, 22, 23, 24, 25, 26, 27, and Dec°. Each column contains three sub-columns for Hc°, d', and Z°.

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°, 21, 22, 23, 24, 25, 26, 27, and Dec°. Each column contains three sub-columns for Hc°, d', and Z°.

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 for Dec°, 21, 22, 23, 24, 25, 26, 27, and Dec°. Each column contains three sub-columns for Hc°, d', and Z°. The table lists values for declinations from 0° to 23°.

72° 288° LHA

Latitude SAME as Declination

72° 288° LHA

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

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

73° 287° LHA

Latitude SAME as Declination

73° 287° LHA

Table with columns for Dec°, 21, 22, 23, 24, 25, 26, 27, and Dec°. Each column contains three sub-columns for Hc°, d', and Z°. The table lists values for declinations from 0° to 23°.

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 10 columns (Dec, 21-27, Dec) and 30 rows of celestial coordinates (Hc, d, Z) for declinations 0 to 23.

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 10 columns (Dec, 21-27, Dec) and 30 rows of celestial coordinates (Hc, d, Z) for declinations 0 to 23.

75° 285° LHA

Latitude SAME as Declination

75° 285° LHA

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

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

76° 284° LHA

Latitude SAME as Declination

76° 284° LHA

Table with 11 columns (Dec, 21-27, Dec) and 24 rows (0-23). Each cell contains three values (Hc, d, Z) for a specific declination and LHA range.

76° 284° LHA

Latitude SAME as Declination

76° 284° LHA

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

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

77° 283° LHA

Latitude SAME as Declination

77° 283° LHA

Table with 11 columns (Dec, 21-27, Dec) and 24 rows (0-23). Each cell contains three values (Hc, d, Z) for a specific declination and LHA range.

77° 283° LHA

Latitude SAME as Declination

77° 283° LHA

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

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

78° 282° LHA

Latitude SAME as Declination

78° 282° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	11°11.5'	+21.8'	94.4°	11°06.9'	+22.8'	94.6°	11°02.0'	+23.8'	94.7°	10°56.9'	+24.8'	94.9°	10°51.7'	+25.7'	95.1°	10°46.2'	+26.7'	95.3°	10°40.5'	+27.6'	95.5°	0
1	11°33.4'	+21.6'	93.4°	11°29.7'	+22.6'	93.6°	11°25.8'	+23.6'	93.8°	11°21.7'	+24.6'	94.0°	11°17.4'	+25.6'	94.2°	11°12.9'	+26.5'	94.4°	11°08.2'	+27.5'	94.6°	1
2	11°55.0'	+21.4'	92.5°	11°52.3'	+22.4'	92.7°	11°49.4'	+23.4'	92.9°	11°46.3'	+24.4'	93.1°	11°43.0'	+25.4'	93.3°	11°39.4'	+26.4'	93.5°	11°35.7'	+27.3'	93.7°	2
3	12°16.5'	+21.3'	91.5°	12°14.8'	+22.2'	91.7°	12°12.9'	+23.2'	91.9°	12°10.7'	+24.2'	92.1°	12°08.4'	+25.2'	92.4°	12°05.8'	+26.2'	92.6°	12°03.0'	+27.1'	92.8°	3
4	12°37.7'	+21.0'	90.5°	12°37.0'	+22.0'	90.8°	12°36.1'	+23.0'	91.0°	12°35.0'	+24.0'	91.2°	12°33.6'	+25.0'	91.4°	12°32.0'	+26.0'	91.7°	12°30.1'	+26.9'	91.9°	4
5	12°58.8'	+20.8'	89.6°	12°59.1'	+21.8'	89.8°	12°59.1'	+22.8'	90.0°	12°59.0'	+23.8'	90.3°	12°58.6'	+24.8'	90.5°	12°57.9'	+25.8'	90.7°	12°57.0'	+26.8'	91.0°	5
6	13°19.6'	+20.6'	88.6°	13°20.9'	+21.6'	88.9°	13°22.0'	+22.6'	89.1°	13°22.8'	+23.6'	89.3°	13°23.4'	+24.6'	89.6°	13°23.7'	+25.6'	89.8°	13°23.8'	+26.6'	90.0°	6
7	13°40.2'	+20.4'	87.7°	13°42.5'	+21.4'	87.9°	13°44.6'	+22.4'	88.1°	13°46.4'	+23.4'	88.4°	13°48.0'	+24.4'	88.6°	13°49.3'	+25.4'	88.9°	13°50.4'	+26.3'	89.1°	7
8	14°00.6'	+20.2'	86.7°	14°03.9'	+21.2'	86.9°	14°07.0'	+22.2'	87.2°	14°09.8'	+23.2'	87.4°	14°12.4'	+24.2'	87.7°	14°14.7'	+25.2'	87.9°	14°16.7'	+26.1'	88.2°	8
9	14°20.7'	+19.9'	85.7°	14°25.1'	+20.9'	86.0°	14°29.2'	+21.9'	86.2°	14°33.0'	+22.9'	86.5°	14°36.5'	+23.9'	86.7°	14°39.8'	+24.9'	87.0°	14°42.8'	+25.9'	87.3°	9
10	14°40.7'	+19.7'	84.7°	14°46.0'	+20.7'	85.0°	14°51.1'	+21.7'	85.3°	14°55.9'	+22.7'	85.5°	15°00.5'	+23.7'	85.8°	15°04.7'	+24.7'	86.1°	15°08.7'	+25.7'	86.3°	10
11	15°00.3'	+19.4'	83.8°	15°06.7'	+20.4'	84.0°	15°12.8'	+21.5'	84.3°	15°18.7'	+22.5'	84.6°	15°24.2'	+23.5'	84.8°	15°29.4'	+24.5'	85.1°	15°34.4'	+25.4'	85.4°	11
12	15°19.8'	+19.2'	82.8°	15°27.2'	+20.2'	83.1°	15°34.3'	+21.2'	83.3°	15°41.1'	+22.2'	83.6°	15°47.6'	+23.2'	83.9°	15°53.9'	+24.2'	84.2°	15°59.8'	+25.2'	84.5°	12
13	15°38.9'	+18.9'	81.8°	15°47.4'	+19.9'	82.1°	15°55.5'	+20.9'	82.4°	16°03.3'	+21.9'	82.6°	16°10.9'	+22.9'	82.9°	16°18.1'	+23.9'	83.2°	16°25.0'	+24.9'	83.5°	13
14	15°57.8'	+18.6'	80.8°	16°07.3'	+19.7'	81.1°	16°16.4'	+20.7'	81.4°	16°25.3'	+21.7'	81.7°	16°33.8'	+22.7'	82.0°	16°42.0'	+23.7'	82.3°	16°50.0'	+24.7'	82.6°	14
15	16°16.5'	+18.4'	79.8°	16°26.9'	+19.4'	80.1°	16°37.1'	+20.4'	80.4°	16°46.9'	+21.4'	80.7°	16°56.5'	+22.4'	81.0°	17°05.7'	+23.4'	81.3°	17°14.6'	+24.4'	81.6°	15
16	16°34.8'	+18.1'	78.8°	16°46.3'	+19.1'	79.1°	16°57.5'	+20.1'	79.4°	17°08.3'	+21.1'	79.7°	17°18.9'	+22.1'	80.0°	17°29.1'	+23.1'	80.3°	17°39.0'	+24.1'	80.6°	16
17	16°52.9'	+17.8'	77.8°	17°05.4'	+18.8'	78.1°	17°17.6'	+19.8'	78.4°	17°29.5'	+20.8'	78.7°	17°41.0'	+21.8'	79.1°	17°52.2'	+22.8'	79.4°	18°03.2'	+23.8'	79.7°	17
18	17°10.7'	+17.5'	76.8°	17°24.2'	+18.5'	77.1°	17°37.4'	+19.5'	77.4°	17°50.3'	+20.5'	77.8°	18°02.9'	+21.5'	78.1°	18°15.1'	+22.5'	78.4°	18°27.0'	+23.5'	78.7°	18
19	17°28.2'	+17.2'	75.8°	17°42.7'	+18.2'	76.1°	17°56.9'	+19.2'	76.5°	18°10.8'	+20.2'	76.8°	18°24.4'	+21.2'	77.1°	18°37.6'	+22.2'	77.4°	18°50.5'	+23.2'	77.7°	19
20	17°45.4'	+16.9'	74.8°	18°00.9'	+17.9'	75.1°	18°16.1'	+18.9'	75.5°	18°31.1'	+19.9'	75.8°	18°45.6'	+20.9'	76.1°	18°59.9'	+21.9'	76.4°	19°13.8'	+22.9'	76.8°	20
21	18°02.2'	+16.6'	73.8°	18°18.8'	+17.6'	74.1°	18°35.1'	+18.6'	74.5°	18°51.0'	+19.6'	74.8°	19°06.6'	+20.6'	75.1°	19°21.8'	+21.6'	75.5°	19°36.7'	+22.6'	75.8°	21
22	18°18.8'	+16.2'	72.8°	18°36.4'	+17.3'	73.1°	18°53.6'	+18.3'	73.4°	19°10.6'	+19.3'	73.8°	19°27.2'	+20.3'	74.1°	19°43.4'	+21.3'	74.5°	19°59.3'	+22.3'	74.8°	22
23	18°35.1'	+15.9'	71.8°	18°53.6'	+16.9'	72.1°	19°11.9'	+17.9'	72.4°	19°29.8'	+18.9'	72.8°	19°47.4'	+19.9'	73.1°	20°04.7'	+20.9'	73.5°	20°21.6'	+21.9'	73.8°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27			

78° 282° LHA

Latitude SAME as Declination

78° 282° LHA

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

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

79° 281° LHA

Latitude SAME as Declination

79° 281° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	10°15.7'	+21.8'	94.0°	10°11.4'	+22.8'	94.2°	10°07.0'	+23.7'	94.3°	10°02.3'	+24.7'	94.5°	9°57.5'	+25.7'	94.7°	9°52.5'	+26.6'	94.9°	9°47.3'	+27.6'	95.0°	0
1	10°37.4'	+21.6'	93.0°	10°34.2'	+22.6'	93.2°	10°30.7'	+23.6'	93.4°	10°27.0'	+24.5'	93.6°	10°23.2'	+25.5'	93.8°	10°19.1'	+26.5'	94.0°	10°14.9'	+27.4'	94.1°	1
2	10°59.0'	+21.4'	92.1°	10°56.7'	+22.4'	92.3°	10°54.3'	+23.4'	92.5°	10°51.6'	+24.4'	92.7°	10°48.7'	+25.3'	92.9°	10°45.6'	+26.3'	93.0°	10°42.3'	+27.3'	93.2°	2
3	11°20.5'	+21.2'	91.1°	11°19.2'	+22.2'	91.3°	11°17.7'	+23.2'	91.5°	11°15.9'	+24.2'	91.7°	11°14.0'	+25.2'	91.9°	11°11.9'	+26.1'	92.1°	11°09.6'	+27.1'	92.3°	3
4	11°41.7'	+21.0'	90.2°	11°41.4'	+22.0'	90.4°	11°40.9'	+23.0'	90.6°	11°40.2'	+24.0'	90.8°	11°39.2'	+25.0'	91.0°	11°38.0'	+26.0'	91.2°	11°36.7'	+26.9'	91.4°	4
5	12°02.7'	+20.9'	89.2°	12°03.4'	+21.9'	89.4°	12°03.9'	+22.8'	89.7°	12°04.2'	+23.8'	89.9°	12°04.2'	+24.8'	90.1°	12°04.0'	+25.8'	90.3°	12°03.6'	+26.7'	90.5°	5
6	12°23.6'	+20.6'	88.3°	12°25.3'	+21.7'	88.5°	12°26.8'	+22.6'	88.7°	12°28.0'	+23.6'	88.9°	12°29.0'	+24.6'	89.1°	12°29.8'	+25.6'	89.4°	12°30.3'	+26.6'	89.6°	6
7	12°44.2'	+20.4'	87.3°	12°46.9'	+21.4'	87.5°	12°49.4'	+22.4'	87.8°	12°51.6'	+23.4'	88.0°	12°53.6'	+24.4'	88.2°	12°55.4'	+25.4'	88.4°	12°56.9'	+26.4'	88.7°	7
8	13°04.7'	+20.2'	86.3°	13°08.4'	+21.2'	86.6°	13°11.9'	+22.2'	86.8°	13°15.1'	+23.2'	87.0°	13°18.1'	+24.2'	87.3°	13°20.8'	+25.2'	87.5°	13°23.3'	+26.2'	87.7°	8
9	13°24.9'	+20.0'	85.4°	13°29.6'	+21.0'	85.6°	13°34.1'	+22.0'	85.8°	13°38.3'	+23.0'	86.1°	13°42.3'	+24.0'	86.3°	13°46.0'	+25.0'	86.6°	13°49.4'	+26.0'	86.8°	9
10	13°44.9'	+19.8'	84.4°	13°50.6'	+20.8'	84.6°	13°56.1'	+21.8'	84.9°	14°01.3'	+22.8'	85.1°	14°06.3'	+23.8'	85.4°	14°11.0'	+24.8'	85.6°	14°15.4'	+25.7'	85.9°	10
11	14°04.7'	+19.5'	83.4°	14°11.4'	+20.6'	83.7°	14°17.9'	+21.6'	83.9°	14°24.1'	+22.6'	84.2°	14°30.0'	+23.5'	84.4°	14°35.7'	+24.5'	84.7°	14°41.1'	+25.5'	85.0°	11
12	14°24.2'	+19.3'	82.5°	14°32.0'	+20.3'	82.7°	14°39.4'	+21.3'	83.0°	14°46.7'	+22.3'	83.2°	14°53.6'	+23.3'	83.5°	15°00.3'	+24.3'	83.8°	15°06.6'	+25.3'	84.0°	12
13	14°43.5'	+19.1'	81.5°	14°52.3'	+20.1'	81.7°	15°00.8'	+21.1'	82.0°	15°09.0'	+22.1'	82.3°	15°16.9'	+23.1'	82.5°	15°24.6'	+24.1'	82.8°	15°31.9'	+25.0'	83.1°	13
14	15°02.6'	+18.8'	80.5°	15°12.3'	+19.8'	80.8°	15°21.8'	+20.8'	81.0°	15°31.1'	+21.8'	81.3°	15°40.0'	+22.8'	81.6°	15°48.6'	+23.8'	81.9°	15°57.0'	+24.8'	82.1°	14
15	15°21.4'	+18.5'	79.5°	15°32.2'	+19.6'	79.8°	15°42.7'	+20.6'	80.1°	15°52.9'	+21.6'	80.3°	16°02.8'	+22.6'	80.6°	16°12.4'	+23.6'	80.9°	16°21.8'	+24.5'	81.2°	15
16	15°39.9'	+18.3'	78.5°	15°51.7'	+19.3'	78.8°	16°03.2'	+20.3'	79.1°	16°14.4'	+21.3'	79.4°	16°25.4'	+22.3'	79.7°	16°36.0'	+23.3'	79.9°	16°46.3'	+24.3'	80.2°	16
17	15°58.2'	+18.0'	77.5°	16°11.0'	+19.0'	77.8°	16°23.5'	+20.0'	78.1°	16°35.7'	+21.0'	78.4°	16°47.7'	+22.0'	78.7°	16°59.3'	+23.0'	79.0°	17°10.6'	+24.0'	79.3°	17
18	16°16.2'	+17.7'	76.5°	16°30.0'	+18.7'	76.8°	16°43.5'	+19.7'	77.1°	16°56.8'	+20.7'	77.4°	17°09.7'	+21.7'	77.7°	17°22.3'	+22.7'	78.0°	17°34.6'	+23.7'	78.3°	18
19	16°33.9'	+17.4'	75.5°	16°48.7'	+18.4'	75.8°	17°03.3'	+19.5'	76.1°	17°17.5'	+20.5'	76.4°	17°31.4'	+21.5'	76.7°	17°45.0'	+22.4'	77.0°	17°58.3'	+23.4'	77.4°	19
20	16°51.3'	+17.1'	74.5°	17°07.2'	+18.2'	74.8°	17°22.7'	+19.2'	75.1°	17°38.0'	+20.2'	75.4°	17°52.9'	+21.2'	75.8°	18°07.5'	+22.2'	76.1°	18°21.8'	+23.1'	76.4°	20
21	17°08.5'	+16.8'	73.5°	17°25.3'	+17.9'	73.8°	17°41.9'	+18.9'	74.1°	17°58.1'	+19.9'	74.5°	18°14.0'	+20.9'	74.8°	18°29.6'	+21.9'	75.1°	18°44.9'	+22.8'	75.4°	21
22	17°25.3'	+16.5'	72.5°	17°43.2'	+17.5'	72.8°	18°00.7'	+18.6'	73.1°	18°												

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

80° 280° LHA

Latitude SAME as Declination

80° 280° LHA

Table with 10 columns (Dec, 21, 22, 23, 24, 25, 26, 27, Dec) and 24 rows of celestial coordinates (Hc, d, Z).

80° 280° LHA

Latitude SAME as Declination

80° 280° LHA

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

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

81° 279° LHA

Latitude SAME as Declination

81° 279° LHA

Table with 10 columns (Dec, 21, 22, 23, 24, 25, 26, 27, Dec) and 24 rows of celestial coordinates (Hc, d, Z).

81° 279° LHA

Latitude SAME as Declination

81° 279° LHA

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

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

82° 278° LHA

Latitude SAME as Declination

82° 278° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	7°27.9'	+21.6'	92.9°	7°24.8'	+22.6'	93.0°	7°21.6'	+23.6'	93.1°	7°18.3'	+24.5'	93.3°	7°14.8'	+25.5'	93.4°	7°11.2'	+26.5'	93.5°	7°07.4'	+27.4'	93.7°	0
1	7°49.6'	+21.5'	91.9°	7°47.5'	+22.5'	92.1°	7°45.2'	+23.5'	92.2°	7°42.8'	+24.4'	92.4°	7°40.3'	+25.4'	92.5°	7°37.6'	+26.3'	92.6°	7°34.8'	+27.3'	92.8°	1
2	8°11.1'	+21.4'	91.0°	8°09.9'	+22.4'	91.1°	8°08.7'	+23.3'	91.3°	8°07.2'	+24.3'	91.4°	8°05.7'	+25.3'	91.6°	8°03.9'	+26.2'	91.7°	8°02.1'	+27.2'	91.9°	2
3	8°32.4'	+21.2'	90.1°	8°32.3'	+22.2'	90.2°	8°32.0'	+23.2'	90.4°	8°31.5'	+24.2'	90.5°	8°30.9'	+25.1'	90.7°	8°30.2'	+26.1'	90.8°	8°29.3'	+27.0'	91.0°	3
4	8°53.7'	+21.1'	89.1°	8°54.5'	+22.1'	89.3°	8°55.2'	+23.1'	89.4°	8°55.7'	+24.0'	89.6°	8°56.1'	+25.0'	89.7°	8°56.3'	+26.0'	89.9°	8°56.3'	+26.9'	90.1°	4
5	9°14.7'	+20.9'	88.2°	9°16.6'	+21.9'	88.3°	9°18.3'	+22.9'	88.5°	9°19.8'	+23.9'	88.7°	9°21.1'	+24.9'	88.8°	9°22.2'	+25.8'	89.0°	9°23.2'	+26.8'	89.1°	5
6	9°35.7'	+20.8'	87.2°	9°38.5'	+21.8'	87.4°	9°41.2'	+22.8'	87.6°	9°43.6'	+23.7'	87.7°	9°45.9'	+24.7'	87.9°	9°48.1'	+25.7'	88.1°	9°50.0'	+26.6'	88.2°	6
7	9°56.5'	+20.6'	86.3°	10°00.3'	+21.6'	86.4°	10°03.9'	+22.6'	86.6°	10°07.4'	+23.6'	86.8°	10°10.6'	+24.6'	87.0°	10°13.7'	+25.5'	87.1°	10°16.6'	+26.5'	87.3°	7
8	10°17.1'	+20.5'	85.3°	10°21.9'	+21.4'	85.5°	10°26.5'	+22.4'	85.7°	10°31.0'	+23.4'	85.9°	10°35.2'	+24.4'	86.0°	10°39.2'	+25.4'	86.2°	10°43.1'	+26.3'	86.4°	8
9	10°37.5'	+20.3'	84.3°	10°43.3'	+21.3'	84.5°	10°49.0'	+22.3'	84.7°	10°54.4'	+23.2'	84.9°	10°59.6'	+24.2'	85.1°	11°04.6'	+25.2'	85.3°	11°09.4'	+26.2'	85.5°	9
10	10°57.8'	+20.1'	83.4°	11°04.6'	+21.1'	83.6°	11°11.2'	+22.1'	83.8°	11°17.6'	+23.1'	84.0°	11°23.8'	+24.0'	84.2°	11°29.8'	+25.0'	84.4°	11°35.6'	+26.0'	84.6°	10
11	11°17.9'	+19.9'	82.4°	11°25.7'	+20.9'	82.6°	11°33.3'	+21.9'	82.8°	11°40.7'	+22.9'	83.0°	11°47.9'	+23.9'	83.2°	11°54.8'	+24.8'	83.5°	12°01.5'	+25.8'	83.7°	11
12	11°37.8'	+19.7'	81.5°	11°46.6'	+20.7'	81.7°	11°55.2'	+21.7'	81.9°	12°03.6'	+22.7'	82.1°	12°11.7'	+23.7'	82.3°	12°19.6'	+24.6'	82.5°	12°27.3'	+25.6'	82.7°	12
13	11°57.5'	+19.5'	80.5°	12°07.3'	+20.5'	80.7°	12°16.9'	+21.5'	80.9°	12°26.3'	+22.5'	81.1°	12°35.4'	+23.5'	81.4°	12°44.3'	+24.4'	81.6°	12°52.9'	+25.4'	81.8°	13
14	12°17.1'	+19.3'	79.5°	12°27.9'	+20.3'	79.8°	12°38.4'	+21.3'	80.0°	12°48.8'	+22.3'	80.2°	12°58.9'	+23.3'	80.4°	13°08.7'	+24.2'	80.6°	13°18.4'	+25.2'	80.9°	14
15	12°36.4'	+19.1'	78.6°	12°48.2'	+20.1'	78.8°	12°59.7'	+21.1'	79.0°	13°11.0'	+22.1'	79.2°	13°22.1'	+23.1'	79.5°	13°33.0'	+24.0'	79.7°	13°43.6'	+25.0'	79.9°	15
16	12°55.5'	+18.9'	77.6°	13°08.3'	+19.9'	77.8°	13°20.8'	+20.9'	78.1°	13°33.1'	+21.9'	78.3°	13°45.2'	+22.8'	78.5°	13°57.0'	+23.8'	78.8°	14°08.6'	+24.8'	79.0°	16
17	13°14.4'	+18.7'	76.6°	13°28.2'	+19.7'	76.9°	13°41.7'	+20.6'	77.1°	13°55.0'	+21.6'	77.3°	14°08.0'	+22.6'	77.6°	14°20.8'	+23.6'	77.8°	14°33.3'	+24.6'	78.1°	17
18	13°33.1'	+18.4'	75.6°	13°47.8'	+19.4'	75.9°	14°02.3'	+20.4'	76.1°	14°16.6'	+21.4'	76.4°	14°30.6'	+22.4'	76.6°	14°44.4'	+23.4'	76.9°	14°57.9'	+24.3'	77.1°	18
19	13°51.5'	+18.2'	74.7°	14°07.3'	+19.2'	74.9°	14°22.8'	+20.2'	75.1°	14°38.0'	+21.2'	75.4°	14°53.0'	+22.1'	75.7°	15°07.7'	+23.1'	75.9°	15°22.2'	+24.1'	76.2°	19
20	14°09.7'	+18.0'	73.7°	14°26.4'	+19.0'	73.9°	14°42.9'	+19.9'	74.2°	14°59.2'	+20.9'	74.4°	15°15.1'	+21.9'	74.7°	15°30.8'	+22.9'	75.0°	15°46.3'	+23.8'	75.2°	20
21	14°27.7'	+17.7'	72.7°	14°45.4'	+18.7'	72.9°	15°02.9'	+19.7'	73.2°	15°20.1'	+20.7'	73.5°	15°37.0'	+21.6'	73.7°	15°53.7'	+22.6'	74.0°	16°10.1'	+23.6'	74.3°	21
22	14°45.4'	+17.5'	71.7°	15°04.1'	+18.4'	72.0°	15°22.6'	+19.4'	72.2°	15°40.7'	+20.4'	72.5°	15°58.7'	+21.4'	72.8°	16°16.3'	+22.3'	73.0°	16°33.7'	+23.3'	73.3°	22
23	15°02.9'	+17.2'	70.7°	15°22.6'	+18.2'	71.0°	15°42.0'	+19.2'	71.2°	16°01.1'	+20.1'	71.5°	16°20.0'	+21.1'	71.8°	16°38.7'	+22.1'	72.1°	16°57.0'	+23.0'	72.4°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27			

82° 278° LHA

Latitude SAME as Declination

82° 278° LHA

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

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

83° 277° LHA

Latitude SAME as Declination

83° 277° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	6°32.0'	+21.6'	92.5°	6°29.3'	+22.6'	92.6°	6°26.5'	+23.5'	92.7°	6°23.5'	+24.5'	92.9°	6°20.5'	+25.5'	93.0°	6°17.3'	+26.4'	93.1°	6°14.0'	+27.4'	93.2°	0
1	6°53.6'	+21.5'	91.6°	6°51.8'	+22.5'	91.7°	6°50.0'	+23.4'	91.8°	6°48.0'	+24.4'	91.9°	6°45.9'	+25.4'	92.1°	6°43.7'	+26.3'	92.2°	6°41.4'	+27.3'	92.3°	1
2	7°15.0'	+21.4'	90.6°	7°14.3'	+22.3'	90.8°	7°13.4'	+23.3'	90.9°	7°12.4'	+24.3'	91.0°	7°11.3'	+25.3'	91.1°	7°10.0'	+26.2'	91.3°	7°08.6'	+27.2'	91.4°	2
3	7°36.4'	+21.2'	89.7°	7°36.7'	+22.2'	89.8°	7°36.8'	+23.2'	90.0°	7°36.7'	+24.2'	90.1°	7°36.6'	+25.1'	90.2°	7°36.2'	+26.1'	90.4°	7°35.8'	+27.0'	90.5°	3
4	7°57.7'	+21.1'	88.8°	7°58.9'	+22.1'	88.9°	8°00.0'	+23.1'	89.0°	8°00.9'	+24.1'	89.2°	8°01.7'	+25.0'	89.3°	8°02.3'	+26.0'	89.5°	8°02.8'	+26.9'	89.6°	4
5	8°18.8'	+21.0'	87.8°	8°21.0'	+22.0'	88.0°	8°23.0'	+22.9'	88.1°	8°25.0'	+23.9'	88.2°	8°26.7'	+24.9'	88.4°	8°28.3'	+25.8'	88.5°	8°29.8'	+26.8'	88.7°	5
6	8°39.7'	+20.8'	86.9°	8°42.9'	+21.8'	87.0°	8°46.0'	+22.8'	87.2°	8°48.9'	+23.8'	87.3°	8°51.6'	+24.8'	87.5°	8°54.2'	+25.7'	87.6°	8°56.6'	+26.7'	87.8°	6
7	9°00.6'	+20.7'	85.9°	9°04.8'	+21.7'	86.1°	9°08.8'	+22.7'	86.2°	9°12.7'	+23.6'	86.4°	9°16.4'	+24.6'	86.6°	9°19.9'	+25.6'	86.7°	9°23.2'	+26.5'	86.9°	7
8	9°21.3'	+20.5'	85.0°	9°26.5'	+21.5'	85.1°	9°31.5'	+22.5'	85.3°	9°36.3'	+23.5'	85.5°	9°41.0'	+24.5'	85.6°	9°45.5'	+25.4'	85.8°	9°49.8'	+26.4'	86.0°	8
9	9°41.8'	+20.4'	84.0°	9°48.0'	+21.4'	84.2°	9°54.0'	+22.4'	84.4°	9°59.8'	+23.3'	84.5°	10°05.4'	+24.3'	84.7°	10°10.9'	+25.3'	84.9°	10°16.1'	+26.2'	85.1°	9
10	10°02.2'	+20.2'	83.1°	10°09.4'	+21.2'	83.2°	10°16.3'	+22.2'	83.4°	10°23.1'	+23.2'	83.6°	10°29.7'	+24.1'	83.8°	10°36.1'	+25.1'	84.0°	10°42.4'	+26.1'	84.1°	10
11	10°22.4'	+20.0'	82.1°	10°30.6'	+21.0'	82.3°	10°38.5'	+22.0'	82.5°	10°46.3'	+23.0'	82.7°	10°53.9'	+24.0'	82.8°	11°01.3'	+24.9'	83.0°	11°08.4'	+25.9'	83.2°	11
12	10°42.5'	+19.9'	81.1°	10°51.6'	+20.9'	81.3°	11°00.6'	+21.8'	81.5°	11°09.3'	+22.8'	81.7°	11°17.9'	+23.8'	81.9°	11°26.2'	+24.8'	82.1°	11°34.3'	+25.7'	82.3°	12
13	11°02.3'	+19.7'	80.2°	11°12.5'	+20.7'	80.4°	11°22.4'	+21.7'	80.6°	11°32.1'	+22.6'	80.8°	11°41.7'	+23.6'	81.0°	11°51.0'	+24.6'	81.2°	12°00.1'	+25.5'	81.4°	13
14	11°22.0'	+19.5'	79.2°	11°33.1'	+20.5'	79.4°	11°44.1'	+21.5'	79.6°	11°54.8'	+22.5'	79.8°	12°05.3'	+23.4'	80.0°	12°15.5'	+24.4'	80.2°	12°25.6'	+25.4'	80.5°	14
15	11°41.5'	+19.3'	78.2°	11°53.6'	+20.3'	78.5°	12°05.5'	+21.3'	78.7°	12°17.2'	+22.3'	78.9°	12°28.7'	+23.2'	79.1°	12°39.9'	+24.2'	79.3°	12°51.0'	+25.2'	79.5°	15
16	12°00.8'	+19.1'	77.3°	12°13.9'	+20.1'	77.5°	12°26.8'	+21.1'	77.7°	12°39.5'	+22.1'	77.9°	12°51.9'	+23.0'	78.1°	13°04.1'	+24.0'	78.4°	13°16.1'	+25.0'	78.6°	16
17	12°19.9'	+18.9'	76.3°	12°34.0'	+19.9'	76.5°	12°47.9'	+20.9'	76.7°	13°01.5'	+21.8'	77.0°	13°15.0'	+22.8'	77.2°	13°28.1'	+23.8'	77.4°	13°41.1'	+24.7'	77.7°	17
18	12°38.8'	+18.7'	75.3°	12°53.9'	+19.7'	75.6°	13°08.8'	+20.7'	75.8°	13°23.4'	+21.6'	76.0°	13°37.8'	+22.6'	76.2°	13°51.9'	+23.6'	76.5°	14°05.8'	+24.5'	76.7°	18
19	12°57.5'	+18.5'	74.4°	13°13.6'	+19.5'	74.6°	13°29.4'	+20.4'	74.8°	13°45.0'	+21.4'	75.1°	14°00.4'	+22.4'	75.3°	14°15.5'	+23.3'	75.5°	14°30.3'	+24.3'	75.8°	19
20	13°16.0'	+18.2'	73.4°	13°33.0'	+19.2'	73.6°	13°49.8'	+20.2'	73.9°	14°06.4'	+21.2'	74.1°	14°22.7'	+22.1'	74.3°	14°38.8'	+23.1'	74.6°	14°54.6'	+24.1'	74.8°	20
21	13°34.2'	+18.0'	72.4°	13°52.3'	+19.0'	72.6°	14°10.0'	+20.0'	72.9°	14°27.6'	+20.9'	73.1°	14°44.9'	+21.9'	73.4°	15°01.9'	+22.9'	73.6°	15°18.7'	+23.8'	73.9°	21
22	13°52.3'	+17.8'	71.4°	14°11.3'	+18.8'	71.7°	14°30.0'	+19.7'	71.9°	14°48.5'	+20.7'	72.2°										

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

84° 276° LHA

Latitude SAME as Declination

84° 276° LHA

Table with 12 columns (Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°) and 24 rows of astronomical data for 84° LHA. Each column contains three sub-columns for Hc°, d', and Z°.

84° 276° LHA

Latitude SAME as Declination

84° 276° LHA

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

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

85° 275° LHA

Latitude SAME as Declination

85° 275° LHA

Table with 12 columns (Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°) and 24 rows of astronomical data for 85° LHA. Each column contains three sub-columns for Hc°, d', and Z°.

85° 275° LHA

Latitude SAME as Declination

85° 275° LHA

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

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

86° 274° LHA

Latitude SAME as Declination

86° 274° LHA

Table with 11 columns (Dec, 21-27, Dec) and 23 rows (0-23). Each cell contains three values (Hc°, d', Z°) for each column.

86° 274° LHA

Latitude SAME as Declination

86° 274° LHA

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

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

87° 273° LHA

Latitude SAME as Declination

87° 273° LHA

Table with 11 columns (Dec, 21-27, Dec) and 23 rows (0-23). Each cell contains three values (Hc°, d', Z°) for each column.

87° 273° LHA

Latitude SAME as Declination

87° 273° LHA

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

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

88° 272° LHA

Latitude SAME as Declination

88° 272° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	1°52.0'	+21.5'	90.7°	1°51.3'	+22.5'	90.7°	1°50.5'	+23.4'	90.8°	1°49.6'	+24.4'	90.8°	1°48.8'	+25.4'	90.8°	1°47.9'	+26.3'	90.9°	1°46.9'	+27.2'	90.9°	0
1	2°13.5'	+21.5'	89.8°	2°13.7'	+22.4'	89.8°	2°13.9'	+23.4'	89.9°	2°14.0'	+24.4'	89.9°	2°14.1'	+25.3'	89.9°	2°14.2'	+26.3'	90.0°	2°14.2'	+27.2'	90.0°	1
2	2°35.0'	+21.4'	88.8°	2°36.2'	+22.4'	88.9°	2°37.3'	+23.4'	88.9°	2°38.4'	+24.3'	89.0°	2°39.4'	+25.3'	89.0°	2°40.4'	+26.2'	89.1°	2°41.4'	+27.2'	89.1°	2
3	2°56.4'	+21.4'	87.9°	2°58.6'	+22.3'	88.0°	3°00.7'	+23.3'	88.0°	3°02.7'	+24.3'	88.1°	3°04.7'	+25.2'	88.1°	3°06.6'	+26.2'	88.2°	3°08.5'	+27.1'	88.2°	3
4	3°17.8'	+21.3'	87.0°	3°20.9'	+22.3'	87.0°	3°24.0'	+23.3'	87.1°	3°27.0'	+24.2'	87.2°	3°29.9'	+25.2'	87.2°	3°32.8'	+26.1'	87.3°	3°35.6'	+27.1'	87.3°	4
5	3°39.1'	+21.3'	86.0°	3°43.2'	+22.2'	86.1°	3°47.3'	+23.2'	86.2°	3°51.2'	+24.2'	86.2°	3°55.1'	+25.1'	86.3°	3°59.0'	+26.1'	86.4°	4°02.7'	+27.0'	86.4°	5
6	4°00.4'	+21.2'	85.1°	4°05.5'	+22.2'	85.2°	4°10.5'	+23.1'	85.2°	4°15.4'	+24.1'	85.3°	4°20.3'	+25.1'	85.4°	4°25.0'	+26.0'	85.5°	4°29.7'	+26.9'	85.5°	6
7	4°21.6'	+21.1'	84.2°	4°27.6'	+22.1'	84.2°	4°33.6'	+23.1'	84.3°	4°39.5'	+24.0'	84.4°	4°45.3'	+25.0'	84.5°	4°51.0'	+25.9'	84.6°	4°56.7'	+26.9'	84.7°	7
8	4°42.7'	+21.1'	83.2°	4°49.7'	+22.0'	83.3°	4°56.7'	+23.0'	83.4°	5°03.5'	+24.0'	83.5°	5°10.3'	+24.9'	83.6°	5°17.0'	+25.9'	83.7°	5°23.5'	+26.8'	83.8°	8
9	5°03.7'	+21.0'	82.3°	5°11.8'	+21.9'	82.4°	5°19.7'	+22.9'	82.5°	5°27.5'	+23.9'	82.6°	5°35.2'	+24.8'	82.7°	5°42.8'	+25.8'	82.8°	5°50.3'	+26.7'	82.9°	9
10	5°24.7'	+20.9'	81.3°	5°33.7'	+21.9'	81.4°	5°42.6'	+22.8'	81.5°	5°51.4'	+23.8'	81.6°	6°00.0'	+24.7'	81.7°	6°08.6'	+25.7'	81.8°	6°17.0'	+26.6'	82.0°	10
11	5°45.6'	+20.8'	80.4°	5°55.6'	+21.8'	80.5°	6°05.4'	+22.7'	80.6°	6°15.1'	+23.7'	80.7°	6°24.8'	+24.6'	80.8°	6°34.3'	+25.6'	80.9°	6°43.7'	+26.5'	81.1°	11
12	6°06.4'	+20.7'	79.5°	6°17.3'	+21.7'	79.6°	6°28.1'	+22.6'	79.7°	6°38.8'	+23.6'	79.8°	6°49.4'	+24.5'	79.9°	6°59.8'	+25.5'	80.0°	7°10.2'	+26.4'	80.1°	12
13	6°27.1'	+20.6'	78.5°	6°39.0'	+21.6'	78.6°	6°50.7'	+22.5'	78.7°	7°02.4'	+23.5'	78.9°	7°13.9'	+24.4'	79.0°	7°25.3'	+25.4'	79.1°	7°36.6'	+26.3'	79.2°	13
14	6°47.7'	+20.5'	77.6°	7°00.5'	+21.4'	77.7°	7°13.3'	+22.4'	77.8°	7°25.9'	+23.4'	77.9°	7°38.3'	+24.3'	78.1°	7°50.7'	+25.2'	78.2°	8°02.9'	+26.2'	78.3°	14
15	7°08.2'	+20.4'	76.6°	7°22.0'	+21.3'	76.7°	7°35.7'	+22.3'	76.9°	7°49.2'	+23.2'	77.0°	8°02.6'	+24.2'	77.1°	8°15.9'	+25.1'	77.3°	8°29.1'	+26.0'	77.4°	15
16	7°28.5'	+20.2'	75.7°	7°43.3'	+21.2'	75.8°	7°57.9'	+22.2'	75.9°	8°12.5'	+23.1'	76.1°	8°26.8'	+24.0'	76.2°	8°41.0'	+25.0'	76.4°	8°55.1'	+25.9'	76.5°	16
17	7°48.8'	+20.1'	74.7°	8°04.5'	+21.1'	74.9°	8°20.1'	+22.0'	75.0°	8°35.6'	+23.0'	75.1°	8°50.9'	+23.9'	75.3°	9°06.0'	+24.8'	75.4°	9°21.0'	+25.8'	75.6°	17
18	8°08.9'	+20.0'	73.8°	8°25.6'	+20.9'	73.9°	8°42.1'	+21.9'	74.1°	8°58.5'	+22.8'	74.2°	9°14.8'	+23.8'	74.4°	9°30.9'	+24.7'	74.5°	9°46.8'	+25.6'	74.7°	18
19	8°28.9'	+19.8'	72.8°	8°46.5'	+20.8'	73.0°	9°04.0'	+21.7'	73.1°	9°21.4'	+22.7'	73.3°	9°38.5'	+23.6'	73.4°	9°55.6'	+24.5'	73.6°	10°12.4'	+25.5'	73.8°	19
20	8°48.7'	+19.7'	71.9°	9°07.3'	+20.6'	72.0°	9°25.7'	+21.6'	72.2°	9°44.0'	+22.5'	72.3°	10°02.2'	+23.5'	72.5°	10°20.1'	+24.4'	72.7°	10°37.9'	+25.3'	72.8°	20
21	9°08.4'	+19.5'	70.9°	9°27.9'	+20.5'	71.1°	9°47.3'	+21.4'	71.2°	10°06.6'	+22.4'	71.4°	10°25.6'	+23.3'	71.6°	10°44.5'	+24.2'	71.7°	11°03.2'	+25.1'	71.9°	21
22	9°27.9'	+19.4'	70.0°	9°48.4'	+20.3'	70.1°	10°08.8'	+21.3'	70.3°	10°28.9'	+22.2'	70.4°	10°48.9'	+23.1'	70.6°	11°08.7'	+24.0'	70.8°	11°28.4'	+25.0'	71.0°	22
23	9°47.3'	+19.2'	69.0°	10°08.8'	+20.2'	69.2°	10°30.0'	+21.1'	69.3°	10°51.1'	+22.0'	69.5°	11°12.0'	+22.9'	69.7°	11°32.8'	+23.9'	69.9°	11°53.3'	+24.8'	70.1°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27			

88° 272° LHA

Latitude SAME as Declination

88° 272° LHA

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

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

89° 271° LHA

Latitude SAME as Declination

89° 271° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°56.0'	+21.5'	90.4°	0°55.6'	+22.5'	90.4°	0°55.2'	+23.4'	90.4°	0°54.8'	+24.4'	90.4°	0°54.4'	+25.4'	90.4°	0°53.9'	+26.3'	90.4°	0°53.5'	+27.2'	90.5°	0
1	1°17.5'	+21.5'	89.4°	1°18.1'	+22.5'	89.4°	1°18.7'	+23.4'	89.5°	1°19.2'	+24.4'	89.5°	1°19.7'	+25.3'	89.5°	1°20.2'	+26.3'	89.5°	1°20.7'	+27.2'	89.6°	1
2	1°39.0'	+21.4'	88.5°	1°40.6'	+22.4'	88.5°	1°42.1'	+23.4'	88.5°	1°43.6'	+24.4'	88.6°	1°45.1'	+25.3'	88.6°	1°46.5'	+26.3'	88.6°	1°47.9'	+27.2'	88.7°	2
3	2°00.4'	+21.4'	87.6°	2°03.0'	+22.4'	87.6°	2°05.5'	+23.4'	87.6°	2°07.9'	+24.3'	87.7°	2°10.4'	+25.3'	87.7°	2°12.8'	+26.2'	87.7°	2°15.1'	+27.2'	87.8°	3
4	2°21.9'	+21.4'	86.6°	2°25.4'	+22.4'	86.7°	2°28.8'	+23.3'	86.7°	2°32.3'	+24.3'	86.7°	2°35.6'	+25.2'	86.8°	2°39.0'	+26.2'	86.8°	2°42.3'	+27.1'	86.9°	4
5	2°43.2'	+21.3'	85.7°	2°47.7'	+22.3'	85.7°	2°52.2'	+23.3'	85.8°	2°56.5'	+24.2'	85.8°	3°00.9'	+25.2'	85.9°	3°05.2'	+26.1'	85.9°	3°09.4'	+27.1'	86.0°	5
6	3°04.6'	+21.3'	84.8°	3°10.0'	+22.3'	84.8°	3°15.4'	+23.2'	84.9°	3°20.8'	+24.2'	84.9°	3°26.1'	+25.1'	85.0°	3°31.3'	+26.1'	85.0°	3°36.4'	+27.0'	85.1°	6
7	3°25.9'	+21.2'	83.8°	3°32.3'	+22.2'	83.9°	3°38.7'	+23.2'	83.9°	3°45.0'	+24.1'	84.0°	3°51.2'	+25.1'	84.1°	3°57.4'	+26.0'	84.1°	4°03.5'	+27.0'	84.2°	7
8	3°47.1'	+21.2'	82.9°	3°54.5'	+22.1'	82.9°	4°01.8'	+23.1'	83.0°	4°09.1'	+24.1'	83.1°	4°16.3'	+25.0'	83.2°	4°23.4'	+26.0'	83.2°	4°30.4'	+26.9'	83.3°	8
9	4°08.3'	+21.1'	81.9°	4°16.6'	+22.1'	82.0°	4°24.9'	+23.0'	82.1°	4°33.2'	+24.0'	82.2°	4°41.3'	+24.9'	82.2°	4°49.4'	+25.9'	82.3°	4°57.3'	+26.8'	82.4°	9
10	4°29.4'	+21.0'	81.0°	4°38.7'	+22.0'	81.1°	4°48.0'	+23.0'	81.2°	4°57.2'	+23.9'	81.2°	5°06.2'	+24.9'	81.3°	5°15.2'	+25.8'	81.4°	5°24.1'	+26.7'	81.5°	10
11	4°50.4'	+21.0'	80.1°	5°00.7'	+21.9'	80.1°	5°10.9'	+22.9'	80.2°	5°21.1'	+23.8'	80.3°	5°31.1'	+24.8'	80.4°	5°41.0'	+25.7'	80.5°	5°50.9'	+26.7'	80.6°	11
12	5°11.4'	+20.9'	79.1°	5°22.6'	+21.8'	79.2°	5°33.8'	+22.8'	79.3°	5°44.9'	+23.7'	79.4°	5°55.9'	+24.7'	79.5°	6°06.8'	+25.6'	79.6°	6°17.5'	+26.6'	79.7°	12
13	5°32.2'	+20.8'	78.2°	5°44.5'	+21.7'	78.3°	5°56.6'	+22.7'	78.4°	6°08.7'	+23.7'	78.5°	6°20.6'	+24.6'	78.6°	6°32.4'	+25.5'	78.7°	6°44.1'	+26.5'	78.8°	13
14	5°53.0'	+20.7'	77.2°	6°06.2'	+21.6'	77.3°	6°19.3'	+22.6'	77.4°	6°32.3'	+23.5'	77.6°	6°45.2'	+24.5'	77.7°	6°57.9'	+25.4'	77.8°	7°10.6'	+26.4'	77.9°	14
15	6°13.7'	+20.6'	76.3°	6°27.9'	+21.5'	76.4°	6°41.9'	+22.5'	76.5°	6°55.9'	+23.4'	76.6°	7°09.7'	+24.4'	76.7°	7°23.4'	+25.3'	76.9°	7°36.9'	+26.2'	77.0°	15
16	6°34.3'	+20.5'	75.3°	6°49.4'	+21.4'	75.5°	7°04.4'	+22.4'	75.6°	7°19.3'	+23.3'	75.7°	7°34.0'	+24.3'	75.8°	7°48.7'	+25.2'	76.0°	8°03.2'	+26.1'	76.1°	16
17	6°54.8'	+20.4'	74.4°	7°10.8'	+21.3'	74.5°	7°26.8'	+22.3'	74.6°	7°42.6'	+23.2'	74.8°	7°58.3'	+24.1'	74.9°	8°13.9'	+25.1'	75.0°	8°29.3'	+26.0'	75.2°	17
18	7°15.1'	+20.3'	73.5°	7°32.2'	+21.2'	73.6°	7°49.1'	+22.1'	73.7°	8°05.8'	+23.1'	73.8°	8°22.5'	+24.0'	74.0°	8°38.9'	+24.9'	74.1°	8°55.3'	+25.9'	74.3°	18
19	7°35.4'	+20.1'	72.5°	7°53.4'	+21.1'	72.6°	8°11.2'	+22.0'	72.8°	8°28.9'	+22.9'	72.9°	8°46.5'	+23.9'	73.1°	9°03.9'	+24.8'	73.2°	9°21.1'	+25.7'	73.4°	19
20	7°55.5'	+20.0'	71.6°	8°14.4'	+20.9'	71.7°	8°33.2'	+21.9'	71.8°	8°51.9'	+22.8'	72.0°	9°10.3'	+23.7'	72.1°	9°28.7'	+24.7'	72.3°	9°46.9'	+25.6'	72.4°	20
21	8°15.5'	+19.9'	70.6°	8°35.4'	+20.8'	70.7°	8°55.1'	+21.7'	70.9°	9°14.7'	+22.7'	71.0°	9°34.1'	+23.6'	71.2°	9°53.3'	+24.5'	71.4°	10°12.4'	+25.4'	71.5°	21
22	8°35.4'	+19.7'	69.6°	8°56.2'	+20.7'	69.8°	9°16.8'	+21.6'	69.9°	9°37.3'	+22.5'	70.1°	9°57.7'	+23.4'	70.3°	10°17.9'	+24.3'	70.4°	10°37.9'	+25.3'	70.6°	22
23	8°55.1'	+19.6'	68.7°	9°16.8'	+20.5'	68.8°	9°38.4'															

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

90° 270° LHA

Latitude CONTRARY or SAME as Declination

90° 270° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°00.0'	+21.5'	90.0°	0°00.0'	+22.5'	90.0°	0°00.0'	+23.4'	90.0°	0°00.0'	+24.4'	90.0°	0°00.0'	+25.4'	90.0°	0°00.0'	+26.3'	90.0°	0°00.0'	+27.2'	90.0°	0
1	0°21.5'	+21.5'	89.1°	0°22.5'	+22.5'	89.1°	0°23.4'	+23.4'	89.1°	0°24.4'	+24.4'	89.1°	0°25.4'	+25.3'	89.1°	0°26.3'	+26.3'	89.1°	0°27.2'	+27.2'	89.1°	1
2	0°43.0'	+21.5'	88.1°	0°44.9'	+22.5'	88.1°	0°46.9'	+23.4'	88.2°	0°48.8'	+24.4'	88.2°	0°50.7'	+25.3'	88.2°	0°52.6'	+26.3'	88.2°	0°54.5'	+27.2'	88.2°	2
3	1°04.5'	+21.5'	87.2°	1°07.4'	+22.4'	87.2°	1°10.3'	+23.4'	87.2°	1°13.2'	+24.4'	87.3°	1°16.0'	+25.3'	87.3°	1°18.9'	+26.3'	87.3°	1°21.7'	+27.2'	87.3°	3
4	1°25.9'	+21.4'	86.3°	1°29.8'	+22.4'	86.3°	1°33.7'	+23.4'	86.3°	1°37.6'	+24.3'	86.3°	1°41.4'	+25.3'	86.4°	1°45.1'	+26.2'	86.4°	1°48.9'	+27.2'	86.4°	4
5	1°47.4'	+21.4'	85.3°	1°52.3'	+22.4'	85.4°	1°57.1'	+23.4'	85.4°	2°01.9'	+24.3'	85.4°	2°06.7'	+25.3'	85.5°	2°11.4'	+26.2'	85.5°	2°16.1'	+27.1'	85.5°	5
6	2°08.8'	+21.4'	84.4°	2°14.6'	+22.4'	84.4°	2°20.4'	+23.3'	84.5°	2°26.2'	+24.3'	84.5°	2°31.9'	+25.2'	84.6°	2°37.6'	+26.2'	84.6°	2°43.2'	+27.1'	84.6°	6
7	2°30.2'	+21.3'	83.5°	2°37.0'	+22.3'	83.5°	2°43.8'	+23.3'	83.6°	2°50.5'	+24.2'	83.6°	2°57.1'	+25.2'	83.7°	3°03.7'	+26.1'	83.7°	3°10.3'	+27.1'	83.8°	7
8	2°51.5'	+21.3'	82.5°	2°59.3'	+22.3'	82.6°	3°07.0'	+23.2'	82.6°	3°14.7'	+24.2'	82.7°	3°22.3'	+25.1'	82.7°	3°29.9'	+26.1'	82.8°	3°37.4'	+27.0'	82.9°	8
9	3°12.8'	+21.2'	81.6°	3°21.6'	+22.2'	81.6°	3°30.3'	+23.2'	81.7°	3°38.9'	+24.1'	81.8°	3°47.4'	+25.1'	81.8°	3°55.9'	+26.0'	81.9°	4°04.4'	+26.9'	82.0°	9
10	3°34.1'	+21.2'	80.7°	3°43.8'	+22.2'	80.7°	3°53.4'	+23.1'	80.8°	4°03.0'	+24.1'	80.8°	4°12.5'	+25.0'	80.9°	4°21.9'	+25.9'	81.0°	4°31.3'	+26.9'	81.1°	10
11	3°55.3'	+21.1'	79.7°	4°05.9'	+22.1'	79.8°	4°16.5'	+23.0'	79.9°	4°27.1'	+24.0'	79.9°	4°37.5'	+24.9'	80.0°	4°47.9'	+25.9'	80.1°	4°58.2'	+26.8'	80.2°	11
12	4°16.4'	+21.1'	78.8°	4°28.0'	+22.0'	78.9°	4°39.6'	+23.0'	78.9°	4°51.1'	+23.9'	79.0°	5°02.5'	+24.9'	79.1°	5°13.8'	+25.8'	79.2°	5°25.0'	+26.7'	79.3°	12
13	4°37.4'	+21.0'	77.8°	4°50.0'	+21.9'	77.9°	5°02.6'	+22.9'	78.0°	5°15.0'	+23.8'	78.1°	5°27.3'	+24.8'	78.2°	5°39.6'	+25.7'	78.3°	5°51.7'	+26.6'	78.4°	13
14	4°58.4'	+20.9'	76.9°	5°12.0'	+21.9'	77.0°	5°25.4'	+22.8'	77.1°	5°38.8'	+23.8'	77.2°	5°52.1'	+24.7'	77.3°	6°05.3'	+25.6'	77.4°	6°18.3'	+26.5'	77.5°	14
15	5°19.3'	+20.8'	76.0°	5°33.8'	+21.8'	76.0°	5°48.3'	+22.7'	76.1°	6°02.6'	+23.7'	76.2°	6°16.8'	+24.6'	76.4°	6°30.9'	+25.5'	76.5°	6°44.9'	+26.4'	76.6°	15
16	5°40.1'	+20.7'	75.0°	5°55.6'	+21.7'	75.1°	6°11.0'	+22.6'	75.2°	6°26.2'	+23.6'	75.3°	6°41.4'	+24.5'	75.4°	6°56.4'	+25.4'	75.5°	7°11.3'	+26.3'	75.7°	16
17	6°00.9'	+20.6'	74.1°	6°17.3'	+21.6'	74.2°	6°33.6'	+22.5'	74.3°	6°49.8'	+23.5'	74.4°	7°05.9'	+24.4'	74.5°	7°21.8'	+25.3'	74.6°	7°37.7'	+26.2'	74.8°	17
18	6°21.5'	+20.5'	73.1°	6°38.8'	+21.5'	73.2°	6°56.1'	+22.4'	73.3°	7°13.2'	+23.3'	73.5°	7°30.2'	+24.3'	73.6°	7°47.1'	+25.2'	73.7°	8°03.9'	+26.1'	73.9°	18
19	6°42.0'	+20.4'	72.2°	7°00.3'	+21.4'	72.3°	7°18.5'	+22.3'	72.4°	7°36.6'	+23.2'	72.5°	7°54.5'	+24.1'	72.7°	8°12.3'	+25.1'	72.8°	8°30.0'	+26.0'	72.9°	19
20	7°02.4'	+20.3'	71.2°	7°21.7'	+21.2'	71.4°	7°40.8'	+22.2'	71.5°	7°59.8'	+23.1'	71.6°	8°18.7'	+24.0'	71.7°	8°37.4'	+24.9'	71.9°	8°56.0'	+25.8'	72.0°	20
21	7°22.7'	+20.2'	70.3°	7°42.9'	+21.1'	70.4°	8°03.0'	+22.0'	70.5°	8°22.9'	+23.0'	70.7°	8°42.7'	+23.9'	70.8°	9°02.3'	+24.8'	71.0°	9°21.8'	+25.7'	71.1°	21
22	7°42.9'	+20.1'	69.3°	8°04.0'	+21.0'	69.5°	8°25.0'	+21.9'	69.6°	8°45.8'	+22.8'	69.7°	9°06.5'	+23.7'	69.9°	9°27.1'	+24.6'	70.0°	9°47.5'	+25.6'	70.2°	22
23	8°03.0'	+19.9'	68.4°	8°25.0'	+20.8'	68.5°	8°46.9'	+21.8'	68.7°	9°08.7'	+22.7'	68.8°	9°30.3'	+23.6'	69.0°	9°51.8'	+24.5'	69.1°	10°13.1'	+25.4'	69.3°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27			

90° 270° LHA

Latitude CONTRARY or SAME as Declination

90° 270° LHA

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

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

89° 271° LHA

Latitude CONTRARY to Declination

89° 271° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°56.0'	-21.5'	90.4°	0°55.6'	-22.5'	90.4°	0°55.2'	-23.5'	90.4°	0°54.8'	-24.4'	90.4°	0°54.4'	-25.4'	90.4°	0°53.9'	-26.3'	90.4°	0°53.5'	-27.2'	90.5°	0
1	0°34.5'	-21.5'	91.3°	0°33.1'	-22.5'	91.3°	0°31.8'	-23.5'	91.3°	0°30.4'	-24.4'	91.3°	0°29.0'	-25.4'	91.3°	0°27.6'	-26.3'	91.3°	<u>0°26.2'</u>	-27.3'	91.3°	1
2	<u>0°13.0'</u>	-21.5'	92.2°	<u>0°10.7'</u>	-22.5'	92.2°	<u>0°08.3'</u>	-23.5'	92.2°	<u>0°06.0'</u>	-24.4'	92.2°	<u>0°03.6'</u>	-25.4'	92.2°	<u>0°01.3'</u>	-26.3'	92.2°	0°01.0'	+27.3'	87.8°	2
3	0°08.5'	+21.5'	86.8°	0°11.8'	+22.5'	86.8°	0°15.1'	+23.5'	86.8°	0°18.4'	+24.4'	86.9°	0°21.7'	+25.4'	86.9°	0°25.0'	+26.3'	86.9°	0°28.3'	+27.2'	86.9°	3
4	0°30.1'	+21.5'	85.9°	0°34.3'	+22.5'	85.9°	0°38.6'	+23.4'	85.9°	0°42.9'	+24.4'	85.9°	0°47.1'	+25.4'	86.0°	0°51.3'	+26.3'	86.0°	0°55.5'	+27.2'	86.0°	4
5	0°51.6'	+21.5'	85.0°	0°56.8'	+22.5'	85.0°	1°02.1'	+23.4'	85.0°	1°07.3'	+24.4'	85.0°	1°12.5'	+25.3'	85.0°	1°17.6'	+26.3'	85.1°	1°22.8'	+27.2'	85.1°	5
6	1°13.1'	+21.5'	84.0°	1°19.3'	+22.4'	84.1°	1°25.5'	+23.4'	84.1°	1°31.7'	+24.4'	84.1°	1°37.8'	+25.3'	84.1°	1°43.9'	+26.3'	84.2°	1°50.0'	+27.2'	84.2°	6
7	1°34.6'	+21.5'	83.1°	1°41.7'	+22.4'	83.1°	1°48.9'	+23.4'	83.2°	1°56.0'	+24.3'	83.2°	2°03.1'	+25.3'	83.2°	2°10.2'	+26.2'	83.3°	2°17.2'	+27.2'	83.3°	7
8	1°56.0'	+21.4'	82.2°	2°04.2'	+22.4'	82.2°	2°12.3'	+23.3'	82.2°	2°20.4'	+24.3'	82.3°	2°28.4'	+25.2'	82.3°	2°36.4'	+26.2'	82.4°	2°44.3'	+27.1'	82.4°	8
9	2°17.4'	+21.4'	81.2°	2°26.6'	+22.4'	81.3°	2°35.6'	+23.3'	81.3°	2°44.7'	+24.3'	81.4°	2°53.6'	+25.2'	81.4°	3°02.6'	+26.1'	81.5°	3°11.4'	+27.1'	81.5°	9
10	2°38.8'	+21.3'	80.3°	2°48.9'	+22.3'	80.3°	2°58.9'	+23.3'	80.4°	3°08.9'	+24.2'	80.5°	3°18.8'	+25.2'	80.5°	3°28.7'	+26.1'	80.6°	3°38.5'	+27.0'	80.6°	10
11	3°00.2'	+21.3'	79.4°	3°11.2'	+22.3'	79.4°	3°22.2'	+23.2'	79.5°	3°33.1'	+24.2'	79.5°	3°44.0'	+25.1'	79.6°	3°54.8'	+26.0'	79.7°	4°05.5'	+27.0'	79.7°	11
12	3°21.5'	+21.2'	78.4°	3°33.5'	+22.2'	78.5°	3°45.4'	+23.2'	78.6°	3°57.3'	+24.1'	78.6°	4°09.1'	+25.0'	78.7°	4°20.8'	+26.0'	78.8°	4°32.5'	+26.9'	78.8°	12
13	3°42.7'	+21.2'	77.5°	3°55.7'	+22.1'	77.6°	4°08.6'	+23.1'	77.6°	4°21.4'	+24.0'	77.7°	4°34.1'	+25.0'	77.8°	4°46.8'	+25.9'	77.9°	4°59.4'	+26.8'	77.9°	13
14	4°03.9'	+21.1'	76.6°	4°17.8'	+22.1'	76.6°	4°31.7'	+23.0'	76.7°	4°45.4'	+24.0'	76.8°	4°59.1'	+24.9'	76.9°	5°12.7'	+25.8'	77.0°	5°26.2'	+26.7'	77.0°	14
15	4°25.0'	+21.0'	75.6°	4°39.9'	+22.0'	75.7°	4°54.7'	+22.9'	75.8°	5°09.4'	+23.9'	75.9°	5°24.0'	+24.8'	75.9°	5°38.5'	+25.7'	76.0°	5°52.9'	+26.6'	76.1°	15
16	4°46.1'	+21.0'	74.7°	5°01.9'	+21.9'	74.8°	5°17.6'	+22.9'	74.8°	5°33.2'	+23.8'	74.9°	5°48.8'	+24.7'	75.0°	6°04.2'	+25.6'	75.1°	6°19.6'	+26.6'	75.2°	16
17	5°07.0'	+20.9'	73.7°	5°23.8'	+21.8'	73.8°	5°40.5'	+22.8'	73.9°	5°57.0'	+23.7'	74.0°	6°13.5'	+24.6'	74.1°	6°29.9'	+25.5'	74.2°	6°46.1'	+26.5'	74.3°	17
18	5°27.9'	+20.8'	72.8°	5°45.6'	+21.7'	72.9°	6°03.2'	+22.7'	73.0°	6°20.7'	+23.6'	73.1°	6°38.1'	+24.5'	73.2°	6°55.4'	+25.4'	73.3°	7°12.6'	+26.3'	73.4°	18
19	5°48.7'	+20.7'	71.9°	6°07.4'	+21.6'	72.0°	6°25.9'	+22.6'	72.1°	6°44.3'	+23.5'	72.2°	7°02.7'	+24.4'	72.3°	7°20.9'	+25.3'	72.4°	7°38.9'	+26.2'	72.5°	19
20	6°09.4'	+20.6'	70.9°	6°29.0'	+21.5'	71.0°	6°48.5'	+22.5'	71.1°	7°07.8'	+23.4'	71.2°	7°27.1'	+24.3'	71.4°	7°46.2'	+25.2'	71.5°	8°05.2'	+26.1'	71.6°	20
21	6°30.0'	+20.5'	70.0°	6°50.5'	+21.4'	70.1°	7°10.9'	+22.4'	70.2°	7°31.2'	+23.3'	70.3°	7°51.4'	+24.2'	70.4°	8°11.4'	+25.1'	70.6°	8°31.3'	+26.0'	70.7°	21
22	6°50.5'	+20.4'	69.0°	7°12.0'	+21.3'	69.1°	7°33.3'	+22.2'	69.3°	7°54.5'	+23.1'	69.4°	8°15.5'	+24.1'	69.5°	8°36.5'	+25.0'	69.7°	8°57.3'	+25.9'	69.8°	22
23	7°10.9'	+20.3'	68.1°																			

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

88° 272° LHA

Latitude CONTRARY to Declination

88° 272° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	1°52.0'	-21.5'	90.7°	1°51.3'	-22.5'	90.7°	1°50.5'	-23.5'	90.8°	1°49.6'	-24.4'	90.8°	1°48.8'	-25.4'	90.8°	1°47.9'	-26.3'	90.9°	1°46.9'	-27.3'	90.9°	0
1	1°30.4'	-21.6'	91.7°	1°28.8'	-22.5'	91.7°	1°27.0'	-23.5'	91.7°	1°25.2'	-24.5'	91.7°	1°23.4'	-25.4'	91.8°	1°21.5'	-26.3'	91.8°	1°19.7'	-27.3'	91.8°	1
2	1°08.9'	-21.6'	92.6°	1°06.2'	-22.5'	92.6°	1°03.5'	-23.5'	92.6°	1°00.7'	-24.5'	92.6°	0°58.0'	-25.4'	92.7°	0°55.2'	-26.4'	92.7°	0°52.4'	-27.3'	92.7°	2
3	0°47.4'	-21.6'	93.5°	0°43.7'	-22.6'	93.5°	0°40.0'	-23.5'	93.5°	0°36.3'	-24.5'	93.6°	0°32.5'	-25.4'	93.6°	0°28.8'	-26.4'	93.6°	0°25.1'	-27.3'	93.6°	3
4	0°25.8'	-21.6'	94.5°	0°21.1'	-22.6'	94.5°	0°16.5'	-23.5'	94.5°	0°11.8'	-24.5'	94.5°	0°07.1'	-25.4'	94.5°	0°02.4'	-26.4'	94.5°	0°02.2'	+27.3'	85.5°	4
5	0°04.2'	-21.6'	95.4°	0°01.4'	+22.6'	84.6°	0°07.1'	+23.5'	84.6°	0°12.7'	+24.5'	84.6°	0°18.3'	+25.4'	84.6°	0°23.9'	+26.4'	84.6°	0°29.5'	+27.3'	84.6°	5
6	0°17.4'	+21.6'	83.7°	0°24.0'	+22.6'	83.7°	0°30.6'	+23.5'	83.7°	0°37.2'	+24.5'	83.7°	0°43.7'	+25.4'	83.7°	0°50.3'	+26.4'	83.7°	0°56.8'	+27.3'	83.7°	6
7	0°39.0'	+21.6'	82.8°	0°46.5'	+22.5'	82.8°	0°54.1'	+23.5'	82.8°	1°01.6'	+24.5'	82.8°	1°09.1'	+25.4'	82.8°	1°16.6'	+26.3'	82.8°	1°24.1'	+27.3'	82.9°	7
8	1°00.5'	+21.6'	81.8°	1°09.1'	+22.5'	81.8°	1°17.6'	+23.5'	81.9°	1°26.1'	+24.4'	81.9°	1°34.5'	+25.4'	81.9°	1°43.0'	+26.3'	81.9°	1°51.4'	+27.2'	82.0°	8
9	1°22.1'	+21.5'	80.9°	1°31.6'	+22.5'	80.9°	1°41.1'	+23.5'	80.9°	1°50.5'	+24.4'	81.0°	1°59.9'	+25.3'	81.0°	2°09.3'	+26.3'	81.0°	2°18.6'	+27.2'	81.1°	9
10	1°43.6'	+21.5'	79.9°	1°54.1'	+22.5'	80.0°	2°04.5'	+23.4'	80.0°	2°14.9'	+24.4'	80.1°	2°25.2'	+25.3'	80.1°	2°35.5'	+26.2'	80.1°	2°45.8'	+27.2'	80.2°	10
11	2°05.2'	+21.5'	79.0°	2°16.6'	+22.4'	79.1°	2°27.9'	+23.4'	79.1°	2°39.3'	+24.3'	79.1°	2°50.6'	+25.3'	79.2°	3°01.8'	+26.2'	79.2°	3°13.0'	+27.1'	79.3°	11
12	2°26.6'	+21.4'	78.1°	2°39.0'	+22.4'	78.1°	2°51.3'	+23.3'	78.2°	3°03.6'	+24.3'	78.2°	3°15.8'	+25.2'	78.3°	3°28.0'	+26.1'	78.3°	3°40.1'	+27.1'	78.4°	12
13	2°48.1'	+21.4'	77.1°	3°01.4'	+22.3'	77.2°	3°14.7'	+23.3'	77.2°	3°27.9'	+24.2'	77.3°	3°41.0'	+25.2'	77.4°	3°54.1'	+26.1'	77.4°	4°07.1'	+27.0'	77.5°	13
14	3°09.5'	+21.3'	76.2°	3°23.7'	+22.3'	76.3°	3°37.9'	+23.2'	76.3°	3°52.1'	+24.2'	76.4°	4°06.2'	+25.1'	76.5°	4°20.2'	+26.0'	76.5°	4°34.1'	+26.9'	76.6°	14
15	3°30.8'	+21.3'	75.3°	3°46.0'	+22.2'	75.3°	4°01.2'	+23.2'	75.4°	4°16.3'	+24.1'	75.5°	4°31.3'	+25.0'	75.5°	4°46.2'	+25.9'	75.6°	5°01.1'	+26.9'	75.7°	15
16	3°52.1'	+21.2'	74.3°	4°08.3'	+22.2'	74.4°	4°24.3'	+23.1'	74.5°	4°40.4'	+24.0'	74.6°	4°56.3'	+25.0'	74.6°	5°12.2'	+25.9'	74.7°	5°27.9'	+26.8'	74.8°	16
17	4°13.3'	+21.2'	73.4°	4°30.4'	+22.1'	73.5°	4°47.4'	+23.0'	73.6°	5°04.4'	+24.0'	73.6°	5°21.3'	+24.9'	73.7°	5°38.0'	+25.8'	73.8°	5°54.7'	+26.7'	73.9°	17
18	4°34.5'	+21.1'	72.5°	4°52.5'	+22.0'	72.5°	5°10.5'	+22.9'	72.6°	5°28.3'	+23.9'	72.7°	5°46.1'	+24.8'	72.8°	6°03.8'	+25.7'	72.9°	6°21.4'	+26.6'	73.0°	18
19	4°55.6'	+21.0'	71.5°	5°14.5'	+21.9'	71.6°	5°33.4'	+22.9'	71.7°	5°52.2'	+23.8'	71.8°	6°10.9'	+24.7'	71.9°	6°29.5'	+25.6'	72.0°	6°48.0'	+26.5'	72.1°	19
20	5°16.6'	+20.9'	70.6°	5°36.5'	+21.8'	70.7°	5°56.3'	+22.8'	70.8°	6°16.0'	+23.7'	70.9°	6°35.6'	+24.6'	71.0°	6°55.1'	+25.5'	71.1°	7°14.5'	+26.4'	71.2°	20
21	5°37.5'	+20.8'	69.6°	5°58.3'	+21.7'	69.7°	6°19.0'	+22.7'	69.8°	6°39.7'	+23.6'	69.9°	7°00.2'	+24.5'	70.1°	7°20.6'	+25.4'	70.2°	7°40.9'	+26.3'	70.3°	21
22	5°58.3'	+20.7'	68.7°	6°20.1'	+21.6'	68.8°	6°41.7'	+22.6'	68.9°	7°03.2'	+23.5'	69.0°	7°24.7'	+24.4'	69.1°	7°46.0'	+25.3'	69.3°	8°07.2'	+26.2'	69.4°	22
23	6°19.0'	+20.6'	67.8°	6°41.7'	+21.5'	67.9°	7°04.3'	+22.4'	68.0°	7°26.7'	+23.3'	68.1°	7°49.0'	+24.2'	68.2°	8°11.2'	+25.1'	68.3°	8°33.3'	+26.0'	68.5°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27			

92° 268° LHA

Latitude SAME as DECLINATION

92° 268° LHA

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

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

87° 273° LHA

Latitude CONTRARY to Declination

87° 273° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	2°48.0'	-21.5'	91.1°	2°46.9'	-22.5'	91.1°	2°45.7'	-23.5'	91.2°	2°44.4'	-24.5'	91.2°	2°43.1'	-25.4'	91.3°	2°41.8'	-26.4'	91.3°	2°40.4'	-27.3'	91.4°	0
1	2°26.4'	-21.6'	92.0°	2°24.4'	-22.6'	92.1°	2°22.2'	-23.5'	92.1°	2°20.0'	-24.5'	92.1°	2°17.7'	-25.4'	92.2°	2°15.4'	-26.4'	92.2°	2°13.1'	-27.3'	92.3°	1
2	2°04.8'	-21.6'	92.9°	2°01.8'	-22.6'	93.0°	1°58.7'	-23.6'	93.0°	1°55.5'	-24.5'	93.0°	1°52.3'	-25.5'	93.1°	1°49.0'	-26.4'	93.1°	1°45.8'	-27.3'	93.1°	2
3	1°43.3'	-21.6'	93.9°	1°39.2'	-22.6'	93.9°	1°35.1'	-23.6'	93.9°	1°31.0'	-24.5'	94.0°	1°26.8'	-25.5'	94.0°	1°22.6'	-26.4'	94.0°	1°18.4'	-27.4'	94.0°	3
4	1°21.6'	-21.7'	94.8°	1°16.6'	-22.6'	94.8°	1°11.5'	-23.6'	94.9°	1°06.4'	-24.6'	94.9°	1°01.3'	-25.5'	94.9°	0°56.2'	-26.4'	94.9°	0°51.1'	-27.4'	94.9°	4
5	0°60.0'	-21.7'	95.7°	0°53.9'	-22.7'	95.8°	0°47.9'	-23.6'	95.8°	0°41.9'	-24.6'	95.8°	0°35.8'	-25.5'	95.8°	0°29.7'	-26.5'	95.8°	0°23.7'	-27.4'	95.8°	5
6	0°38.3'	-21.7'	96.7°	0°31.3'	-22.7'	96.7°	0°24.3'	-23.6'	96.7°	0°17.3'	-24.6'	96.7°	0°10.3'	-25.5'	96.7°	0°03.3'	-26.5'	96.7°	0°03.7'	+27.4'	83.3°	6
7	0°16.6'	-21.7'	97.6°	0°08.6'	-22.7'	97.6°	0°00.7'	-23.6'	97.6°	0°07.3'	+24.6'	82.4°	0°15.2'	+25.5'	82.4°	0°23.2'	+26.4'	82.4°	0°31.1'	+27.4'	82.4°	7
8	0°05.1'	+21.7'	81.5°	0°14.0'	+22.7'	81.5°	0°22.9'	+23.6'	81.5°	0°31.8'	+24.6'	81.5°	0°40.7'	+25.5'	81.5°	0°49.6'	+26.4'	81.5°	0°58.5'	+27.4'	81.5°	8
9	0°26.8'	+21.7'	80.5°	0°36.7'	+22.7'	80.5°	0°46.6'	+23.6'	80.5°	0°56.4'	+24.5'	80.6°	1°06.2'	+25.5'	80.6°	1°16.0'	+26.4'	80.6°	1°25.8'	+27.3'	80.6°	9
10	0°48.5'	+21.7'	79.6°	0°59.3'	+22.6'	79.6°	1°10.2'	+23.6'	79.6°	1°20.9'	+24.5'	79.7°	1°31.7'	+25.5'	79.7°	1°42.5'	+26.4'	79.7°	1°53.2'	+27.3'	79.7°	10
11	1°10.2'	+21.7'	78.7°	1°22.0'	+22.6'	78.7°	1°33.7'	+23.6'	78.7°	1°45.5'	+24.5'	78.7°	1°57.2'	+25.4'	78.8°	2°08.8'	+26.4'	78.8°	2°20.5'	+27.3'	78.8°	11
12	1°31.9'	+21.6'	77.7°	1°44.6'	+22.6'	77.8°	1°57.3'	+23.5'	77.8°	2°10.0'	+24.5'	77.8°	2°22.6'	+25.4'	77.9°	2°35.2'	+26.3'	77.9°	2°47.8'	+27.2'	78.0°	12
13	1°53.5'	+21.6'	76.8°	2°07.2'	+22.6'	76.8°	2°20.8'	+23.5'	76.9°	2°34.4'	+24.4'	76.9°	2°48.0'	+25.4'	77.0°	3°01.5'	+26.3'	77.0°	3°15.0'	+27.2'	77.1°	13
14	2°15.1'	+21.6'	75.9°	2°29.7'	+22.5'	75.9°	2°44.3'	+23.5'	75.9°	2°58.9'	+24.4'	76.0°	3°13.4'	+25.3'	76.0°	3°27.8'	+26.2'	76.1°	3°42.2'	+27.1'	76.2°	14
15	2°36.7'	+21.5'	74.9°	2°52.2'	+22.5'	75.0°	3°07.8'	+23.4'	75.0°	3°23.3'	+24.3'	75.1°	3°38.7'	+25.3'	75.1°	3°54.0'	+26.2'	75.2°	4°09.3'	+27.1'	75.3°	15
16	2°58.2'	+21.5'	74.0°	3°14.7'	+22.4'	74.0°	3°31.2'	+23.3'	74.1°	3°47.6'	+24.3'	74.2°	4°03.9'	+25.2'	74.2°	4°20.2'	+26.1'	74.3°	4°36.4'	+27.0'	74.4°	16
17	3°19.7'	+21.4'	73.1°	3°37.1'	+22.4'	73.1°	3°54.5'	+23.3'	73.2°	4°11.9'	+24.2'	73.2°	4°29.1'	+25.1'	73.3°	4°46.3'	+26.0'	73.4°	5°03.4'	+26.9'	73.5°	17
18	3°41.1'	+21.4'	72.1°	3°59.5'	+22.3'	72.2°	4°17.8'	+23.2'	72.3°	4°36.1'	+24.1'	72.3°	4°54.2'	+25.0'	72.4°	5°12.3'	+26.0'	72.5°	5°30.3'	+26.9'	72.6°	18
19	4°02.5'	+21.3'	71.2°	4°21.8'	+22.2'	71.3°	4°41.0'	+23.1'	71.3°	5°00.2'	+24.1'	71.4°	5°19.3'	+25.0'	71.5°	5°38.3'	+25.9'	71.6°	5°57.2'	+26.8'	71.7°	19
20	4°23.8'	+21.2'	70.2°	4°44.0'	+22.2'	70.3°	5°04.2'	+23.1'	70.4°	5°24.3'	+24.0'	70.5°	5°44.3'	+24.9'	70.6°	6°04.2'	+25.8'	70.7°	6°23.9'	+26.7'	70.8°	20
21	4°45.0'	+21.2'	69.3°	5°06.2'	+22.1'	69.4°	5°27.2'	+23.0'	69.5°	5°48.2'	+23.9'	69.6°	6°09.1'	+24.8'	69.7°	6°29.9'	+25.7'	69.8°	6°50.6'	+26.6'	69.9°	21
22	5°06.2'	+21.1'	68.4°	5°28.2'	+22.0'	68.5°	5°50.2'	+22.9'	68.6°	6°12.1'	+23.8'	68.6°	6°33.9'	+24.7'	68.8°	6°55.6'	+25.6'	68.9°	7°17.2'	+26.5'	69.0°	22
23	5°27.3'	+21.0'	67.4°	5°50.2'	+21.9'	67.5°	6°13.1'	+22.8'	67.6°	6°35.9'												

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

86° 274° LHA

Latitude CONTRARY to Declination

86° 274° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	3°44.0'	-21.6'	91.4°	3°42.5'	-22.6'	91.5°	3°40.9'	-23.5'	91.6°	3°39.2'	-24.5'	91.6°	3°37.5'	-25.4'	91.7°	3°35.7'	-26.4'	91.8°	3°33.8'	-27.3'	91.8°	0
1	3°22.4'	-21.6'	92.4°	3°19.9'	-22.6'	92.4°	3°17.4'	-23.6'	92.5°	3°14.7'	-24.5'	92.5°	3°12.0'	-25.5'	92.6°	3°09.3'	-26.4'	92.7°	3°06.5'	-27.4'	92.7°	1
2	3°00.8'	-21.7'	93.3°	2°57.3'	-22.7'	93.4°	2°53.8'	-23.6'	93.4°	2°50.2'	-24.6'	93.5°	2°46.6'	-25.5'	93.5°	2°42.9'	-26.5'	93.6°	2°39.1'	-27.4'	93.6°	2
3	2°39.2'	-21.7'	94.2°	2°34.7'	-22.7'	94.3°	2°30.2'	-23.7'	94.3°	2°25.6'	-24.6'	94.4°	2°21.0'	-25.6'	94.4°	2°16.4'	-26.5'	94.5°	2°11.7'	-27.4'	94.5°	3
4	2°17.4'	-21.8'	95.2°	2°12.0'	-22.7'	95.2°	2°06.5'	-23.7'	95.2°	2°01.0'	-24.6'	95.3°	1°55.5'	-25.6'	95.3°	1°49.9'	-26.5'	95.4°	1°44.3'	-27.5'	95.4°	4
5	1°55.7'	-21.8'	96.1°	1°49.3'	-22.8'	96.1°	1°42.8'	-23.7'	96.2°	1°36.4'	-24.7'	96.2°	1°29.9'	-25.6'	96.2°	1°23.4'	-26.5'	96.2°	1°16.8'	-27.5'	96.3°	5
6	1°33.9'	-21.8'	97.0°	1°26.5'	-22.8'	97.1°	1°19.1'	-23.7'	97.1°	1°11.7'	-24.7'	97.1°	1°04.3'	-25.6'	97.1°	0°56.8'	-26.6'	97.1°	0°49.4'	-27.5'	97.2°	6
7	1°12.1'	-21.8'	98.0°	1°03.7'	-22.8'	98.0°	0°55.4'	-23.7'	98.0°	0°47.0'	-24.7'	98.0°	0°38.7'	-25.6'	98.0°	0°30.3'	-26.6'	98.0°	0°21.9'	-27.5'	98.0°	7
8	0°50.2'	-21.8'	98.9°	0°41.0'	-22.8'	98.9°	0°31.7'	-23.8'	98.9°	0°22.3'	-24.7'	98.9°	0°13.0'	-25.6'	98.9°	0°03.7'	-26.6'	98.9°	0°05.6'	+27.5'	81.1°	8
9	0°28.4'	-21.9'	99.8°	0°18.1'	-22.8'	99.8°	0°07.9'	-23.8'	99.8°	0°02.4'	+24.7'	80.2°	0°12.6'	+25.6'	80.2°	0°22.9'	+26.6'	80.2°	0°33.1'	+27.5'	80.2°	9
10	0°06.5'	-21.9'	100.8°	0°04.7'	+22.8'	79.2°	0°15.9'	+23.8'	79.2°	0°27.1'	+24.7'	79.2°	0°38.3'	+25.6'	79.3°	0°49.4'	+26.6'	79.3°	1°00.6'	+27.5'	79.3°	10
11	0°15.3'	+21.8'	78.3°	0°27.5'	+22.8'	78.3°	0°39.6'	+23.7'	78.3°	0°51.8'	+24.7'	78.3°	1°03.9'	+25.6'	78.4°	1°16.0'	+26.5'	78.4°	1°28.1'	+27.4'	78.4°	11
12	0°37.2'	+21.8'	77.4°	0°50.3'	+22.8'	77.4°	1°03.4'	+23.7'	77.4°	1°16.4'	+24.7'	77.4°	1°29.5'	+25.6'	77.4°	1°42.5'	+26.5'	77.5°	1°55.5'	+27.4'	77.5°	12
13	0°59.0'	+21.8'	76.4°	1°13.1'	+22.8'	76.5°	1°27.1'	+23.7'	76.5°	1°41.1'	+24.6'	76.5°	1°55.1'	+25.6'	76.5°	2°09.0'	+26.5'	76.6°	2°22.9'	+27.4'	76.6°	13
14	1°20.8'	+21.8'	75.5°	1°35.8'	+22.7'	75.5°	1°50.8'	+23.7'	75.6°	2°05.7'	+24.6'	75.6°	2°20.6'	+25.5'	75.6°	2°35.5'	+26.4'	75.7°	2°50.3'	+27.3'	75.7°	14
15	1°42.6'	+21.8'	74.6°	1°58.6'	+22.7'	74.6°	2°14.5'	+23.6'	74.6°	2°30.3'	+24.6'	74.7°	2°46.2'	+25.5'	74.7°	3°01.9'	+26.4'	74.8°	3°17.7'	+27.3'	74.8°	15
16	2°04.4'	+21.7'	73.6°	2°21.3'	+22.7'	73.7°	2°38.1'	+23.6'	73.7°	2°54.9'	+24.5'	73.8°	3°11.6'	+25.4'	73.8°	3°28.3'	+26.3'	73.9°	3°45.0'	+27.2'	73.9°	16
17	2°26.1'	+21.7'	72.7°	2°44.0'	+22.6'	72.8°	3°01.7'	+23.6'	72.8°	3°19.4'	+24.5'	72.9°	3°37.1'	+25.4'	72.9°	3°54.7'	+26.3'	73.0°	4°12.2'	+27.2'	73.0°	17
18	2°47.8'	+21.7'	71.8°	3°06.6'	+22.6'	71.8°	3°25.3'	+23.5'	71.9°	3°43.9'	+24.4'	71.9°	4°02.5'	+25.3'	72.0°	4°21.0'	+26.2'	72.1°	4°39.4'	+27.1'	72.2°	18
19	3°09.5'	+21.6'	70.8°	3°29.2'	+22.5'	70.9°	3°48.8'	+23.4'	71.0°	4°08.3'	+24.4'	71.0°	4°27.8'	+25.3'	71.1°	4°47.2'	+26.1'	71.2°	5°06.5'	+27.0'	71.3°	19
20	3°31.1'	+21.6'	69.9°	3°51.7'	+22.5'	70.0°	4°12.2'	+23.4'	70.0°	4°32.7'	+24.3'	70.1°	4°53.0'	+25.2'	70.2°	5°13.3'	+26.1'	70.3°	5°33.5'	+27.0'	70.4°	20
21	3°52.7'	+21.5'	69.0°	4°14.2'	+22.4'	69.0°	4°35.6'	+23.3'	69.1°	4°56.9'	+24.2'	69.2°	5°18.2'	+25.1'	69.3°	5°39.4'	+26.0'	69.4°	6°00.5'	+26.9'	69.5°	21
22	4°14.2'	+21.4'	68.0°	4°36.6'	+22.3'	68.1°	4°58.9'	+23.2'	68.2°	5°21.1'	+24.1'	68.3°	5°43.3'	+25.0'	68.4°	6°05.4'	+25.9'	68.5°	6°27.4'	+26.8'	68.6°	22
23	4°35.6'	+21.4'	67.1°	4°58.9'	+22.2'	67.2°	5°22.1'	+23.1'	67.3°	5°45.3'	+24.0'	67.4°	6°08.3'	+24.9'	67.5°	6°31.3'	+25.8'	67.6°	6°54.1'	+26.7'	67.7°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27			

94° 266° LHA

Latitude SAME as DECLINATION

94° 266° LHA

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

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

85° 275° LHA

Latitude CONTRARY to Declination

85° 275° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	4°40.0'	-21.6'	91.8°	4°38.1'	-22.6'	91.9°	4°36.1'	-23.6'	92.0°	4°34.0'	-24.5'	92.0°	4°31.8'	-25.5'	92.1°	4°29.6'	-26.4'	92.2°	4°27.2'	-27.4'	92.3°	0
1	4°18.4'	-21.7'	92.7°	4°15.5'	-22.7'	92.8°	4°12.5'	-23.6'	92.9°	4°09.5'	-24.6'	93.0°	4°06.4'	-25.5'	93.0°	4°03.2'	-26.5'	93.1°	3°59.9'	-27.4'	93.2°	1
2	3°56.7'	-21.7'	93.7°	3°52.9'	-22.7'	93.7°	3°48.9'	-23.7'	93.8°	3°44.9'	-24.6'	93.9°	3°40.8'	-25.6'	93.9°	3°36.7'	-26.5'	94.0°	3°32.5'	-27.5'	94.1°	2
3	3°35.0'	-21.8'	94.6°	3°30.2'	-22.8'	94.7°	3°25.2'	-23.7'	94.7°	3°20.3'	-24.7'	94.8°	3°15.2'	-25.6'	94.8°	3°10.2'	-26.6'	94.9°	3°05.0'	-27.5'	94.9°	3
4	3°13.2'	-21.8'	95.5°	3°07.4'	-22.8'	95.6°	3°01.5'	-23.8'	95.6°	2°55.6'	-24.7'	95.7°	2°49.6'	-25.7'	95.7°	2°43.6'	-26.6'	95.8°	2°37.5'	-27.5'	95.8°	4
5	2°51.4'	-21.9'	96.5°	2°44.6'	-22.9'	96.5°	2°37.7'	-23.8'	96.6°	2°30.9'	-24.8'	96.6°	2°23.9'	-25.7'	96.6°	2°17.0'	-26.6'	96.7°	2°10.0'	-27.6'	96.7°	5
6	2°29.5'	-21.9'	97.4°	2°21.7'	-22.9'	97.4°	2°13.9'	-23.9'	97.5°	2°06.1'	-24.8'	97.5°	1°58.2'	-25.7'	97.6°	1°50.3'	-26.7'	97.6°	1°42.4'	-27.6'	97.6°	6
7	2°07.5'	-22.0'	98.3°	1°58.8'	-22.9'	98.4°	1°50.1'	-23.9'	98.4°	1°41.3'	-24.8'	98.4°	1°32.5'	-25.8'	98.5°	1°23.6'	-26.7'	98.5°	1°14.8'	-27.6'	98.5°	7
8	1°45.6'	-22.0'	99.3°	1°35.9'	-23.0'	99.3°	1°26.2'	-23.9'	99.3°	1°16.5'	-24.8'	99.3°	1°06.7'	-25.8'	99.4°	0°56.9'	-26.7'	99.4°	0°47.2'	-27.6'	99.4°	8
9	1°23.6'	-22.0'	100.2°	1°12.9'	-23.0'	100.2°	1°02.3'	-23.9'	100.2°	0°51.6'	-24.9'	100.2°	0°40.9'	-25.8'	100.3°	0°30.2'	-26.7'	100.3°	0°19.5'	-27.6'	100.3°	9
10	1°01.5'	-22.0'	101.1°	0°50.0'	-23.0'	101.1°	0°38.4'	-23.9'	101.2°	0°26.8'	-24.9'	101.2°	0°15.1'	-25.8'	101.2°	0°03.5'	-26.7'	101.2°	0°08.1'	+27.6'	78.8°	10
11	0°39.5'	-22.0'	102.1°	0°27.0'	-23.0'	102.1°	0°14.4'	-23.9'	102.1°	0°01.9'	-24.9'	102.1°	0°10.7'	+25.8'	77.9°	0°23.2'	+26.7'	77.9°	0°35.7'	+27.6'	77.9°	11
12	0°17.5'	-22.0'	103.0°	0°04.0'	-23.0'	103.0°	0°09.5'	+23.9'	77.0°	0°23.0'	+24.9'	77.0°	0°36.5'	+25.8'	77.0°	0°49.9'	+26.7'	77.0°	1°03.4'	+27.6'	77.1°	12
13	0°04.6'	+22.0'	76.1°	0°19.0'	+23.0'	76.1°	0°33.4'	+23.9'	76.1°	0°47.8'	+24.8'	76.1°	1°02.2'	+25.8'	76.1°	1°16.6'	+26.7'	76.1°	1°31.0'	+27.6'	76.2°	13
14	0°26.6'	+22.0'	75.2°	0°42.0'	+23.0'	75.2°	0°57.4'	+23.9'	75.2°	1°12.7'	+24.8'	75.2°	1°28.0'	+25.7'	75.2°	1°43.3'	+26.7'	75.2°	1°58.6'	+27.6'	75.3°	14
15	0°48.7'	+22.0'	74.2°	1°05.0'	+23.0'	74.2°	1°21.3'	+23.9'	74.3°	1°37.5'	+24.8'	74.3°	1°53.8'	+25.7'	74.3°	2°10.0'	+26.6'	74.4°	2°26.1'	+27.5'	74.4°	15
16	1°10.7'	+22.0'	73.3°	1°27.9'	+22.9'	73.3°	1°45.1'	+23.9'	73.3°	2°02.3'	+24.8'	73.4°	2°19.5'	+25.7'	73.4°	2°36.6'	+26.6'	73.5°	2°53.6'	+27.5'	73.5°	16
17	1°32.7'	+22.0'	72.4°	1°50.9'	+22.9'	72.4°	2°09.0'	+23.8'	72.4°	2°27.1'	+24.7'	72.5°	2°45.2'	+25.6'	72.5°	3°03.2'	+26.5'	72.6°	3°21.1'	+27.4'	72.6°	17
18	1°54.7'	+22.0'	71.4°	2°13.8'	+22.9'	71.5°	2°32.8'	+23.8'	71.5°	2°51.8'	+24.7'	71.6°	3°10.8'	+25.6'	71.6°	3°29.7'	+26.5'	71.7°	3°48.6'	+27.4'	71.7°	18
19	2°16.6'	+21.9'	70.5°	2°36.7'	+22.8'	70.5°	2°56.6'	+23.7'	70.6°	3°16.5'	+24.6'	70.6°	3°36.4'	+25.5'	70.7°	3°56.2'	+26.4'	70.8°	4°15.9'	+27.3'	70.8°	19
20	2°38.6'	+21.9'	69.6°	2°59.5'	+22.8'	69.6°	3°20.4'	+23.7'	69.7°	3°41.2'	+24.6'	69.7°	4°01.9'	+25.5'	69.8°	4°22.6'	+26.4'	69.9°	4°43.2'	+27.2'	69.9°	20
21	3°00.4'	+21.8'	68.6°	3°22.3'	+22.7'	68.7°	3°44.0'	+23.6'	68.7°	4°05.8'	+24.5'	68.8°	4°27.4'	+25.4'	68.9°	4°49.0'	+26.3'	69.0°	5°10.5'	+27.2'	69.0°	21
22	3°22.3'	+21.8'	67.7°	3°45.0'	+22.7'	67.8°	4°07.7'	+23.6'	67.8°	4°30.3'	+24.5'	67.9°	4°52.8'	+25.3'	68.0°	5°15.3'	+26.2'	68.1°	5°37.7'	+27.1'	68.1°	22
23	3°44.0'	+21.7'	66.8°	4°07.7'	+22.6'	66.8°	4°31.2'	+23.5'														

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

84° 276° LHA Latitude CONTRARY to Declination 84° 276° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°36.0'	-21.6'	92.2°	5°33.7'	-22.6'	92.3°	5°31.3'	-23.6'	92.4°	5°28.8'	-24.6'	92.4°	5°26.2'	-25.5'	92.5°	5°23.5'	-26.5'	92.6°	5°20.6'	-27.4'	92.7°	0
1	5°14.3'	-21.7'	93.1°	5°11.1'	-22.7'	93.2°	5°07.7'	-23.7'	93.3°	5°04.2'	-24.6'	93.4°	5°00.7'	-25.6'	93.5°	4°57.0'	-26.5'	93.5°	4°53.2'	-27.5'	93.6°	1
2	4°52.6'	-21.8'	94.0°	4°48.4'	-22.8'	94.1°	4°44.0'	-23.7'	94.2°	4°39.6'	-24.7'	94.3°	4°35.1'	-25.7'	94.4°	4°30.5'	-26.6'	94.4°	4°25.8'	-27.5'	94.5°	2
3	4°30.8'	-21.9'	95.0°	4°25.6'	-22.9'	95.0°	4°20.3'	-23.8'	95.1°	4°14.9'	-24.8'	95.2°	4°09.4'	-25.7'	95.3°	4°03.9'	-26.7'	95.3°	3°58.2'	-27.6'	95.4°	3
4	4°08.9'	-21.9'	95.9°	4°02.7'	-22.9'	96.0°	3°56.5'	-23.9'	96.0°	3°50.1'	-24.8'	96.1°	3°43.7'	-25.8'	96.2°	3°37.2'	-26.7'	96.2°	3°30.7'	-27.6'	96.3°	4
5	3°47.0'	-22.0'	96.8°	3°39.8'	-23.0'	96.9°	3°32.6'	-23.9'	97.0°	3°25.3'	-24.9'	97.0°	3°17.9'	-25.8'	97.1°	3°10.5'	-26.8'	97.1°	3°03.0'	-27.7'	97.2°	5
6	3°25.0'	-22.1'	97.8°	3°16.8'	-23.0'	97.8°	3°08.7'	-24.0'	97.9°	3°00.4'	-24.9'	97.9°	2°52.1'	-25.9'	98.0°	2°43.7'	-26.8'	98.0°	2°35.3'	-27.7'	98.1°	6
7	3°02.9'	-22.1'	98.7°	2°53.8'	-23.1'	98.7°	2°44.7'	-24.0'	98.8°	2°35.5'	-25.0'	98.8°	2°26.2'	-25.9'	98.9°	2°16.9'	-26.8'	98.9°	2°07.6'	-27.8'	99.0°	7
8	2°40.8'	-22.2'	99.6°	2°30.8'	-23.1'	99.7°	2°20.7'	-24.1'	99.7°	2°10.5'	-25.0'	99.8°	2°00.3'	-25.9'	99.8°	1°50.1'	-26.9'	99.8°	1°39.9'	-27.8'	99.9°	8
9	2°18.7'	-22.2'	100.6°	2°07.6'	-23.1'	100.6°	1°56.6'	-24.1'	100.6°	1°45.5'	-25.0'	100.7°	1°34.4'	-26.0'	100.7°	1°23.3'	-26.9'	100.7°	1°12.1'	-27.8'	100.7°	9
10	1°56.5'	-22.2'	101.5°	1°44.5'	-23.2'	101.5°	1°32.5'	-24.1'	101.5°	1°20.5'	-25.0'	101.6°	1°08.4'	-26.0'	101.6°	0°56.4'	-26.9'	101.6°	0°44.3'	-27.8'	101.6°	10
11	1°34.3'	-22.2'	102.4°	1°21.3'	-23.2'	102.4°	1°08.4'	-24.1'	102.5°	0°55.4'	-25.1'	102.5°	0°42.5'	-26.0'	102.5°	0°29.5'	-26.9'	102.5°	0°16.5'	-27.8'	102.5°	11
12	1°12.0'	-22.3'	103.3°	0°58.1'	-23.2'	103.4°	0°44.3'	-24.1'	103.4°	0°30.4'	-25.1'	103.4°	0°16.5'	-26.0'	103.4°	0°02.6'	-26.9'	103.4°	0°11.3'	+27.8'	76.6°	12
13	0°49.7'	-22.3'	104.3°	0°34.9'	-23.2'	104.3°	0°20.1'	-24.1'	104.3°	0°05.3'	-25.1'	104.3°	0°09.5'	+26.0'	75.7°	0°24.3'	+26.9'	75.7°	0°39.1'	+27.8'	75.7°	13
14	0°27.5'	-22.3'	105.2°	0°11.7'	-23.2'	105.2°	0°04.0'	+24.1'	74.8°	0°19.7'	+25.1'	74.8°	0°35.5'	+26.0'	74.8°	0°51.2'	+26.9'	74.8°	1°06.9'	+27.8'	74.8°	14
15	0°05.2'	-22.3'	106.1°	0°11.5'	+23.2'	73.9°	0°28.1'	+24.1'	73.9°	0°44.8'	+25.1'	73.9°	1°01.5'	+26.0'	73.9°	1°18.1'	+26.9'	73.9°	1°34.7'	+27.8'	73.9°	15
16	0°17.1'	+22.3'	72.9°	0°34.7'	+23.2'	72.9°	0°52.3'	+24.1'	73.0°	1°09.9'	+25.0'	73.0°	1°27.4'	+25.9'	73.0°	1°44.9'	+26.8'	73.0°	2°02.4'	+27.7'	73.1°	16
17	0°39.4'	+22.3'	72.0°	0°57.9'	+23.2'	72.0°	1°16.4'	+24.1'	72.0°	1°34.9'	+25.0'	72.1°	1°53.3'	+25.9'	72.1°	2°11.8'	+26.8'	72.1°	2°30.2'	+27.7'	72.2°	17
18	1°01.6'	+22.3'	71.1°	1°21.1'	+23.2'	71.1°	1°40.5'	+24.1'	71.1°	1°59.9'	+25.0'	71.2°	2°19.3'	+25.9'	71.2°	2°38.6'	+26.8'	71.2°	2°57.9'	+27.6'	71.3°	18
19	1°23.9'	+22.2'	70.2°	1°44.3'	+23.1'	70.2°	2°04.6'	+24.0'	70.2°	2°24.9'	+24.9'	70.2°	2°45.1'	+25.8'	70.3°	3°05.3'	+26.7'	70.3°	3°25.5'	+27.6'	70.4°	19
20	1°46.1'	+22.2'	69.2°	2°07.4'	+23.1'	69.3°	2°28.6'	+24.0'	69.3°	2°49.8'	+24.9'	69.3°	3°11.0'	+25.8'	69.4°	3°32.1'	+26.7'	69.4°	3°53.1'	+27.5'	69.5°	20
21	2°08.3'	+22.2'	68.3°	2°30.5'	+23.1'	68.3°	2°52.6'	+24.0'	68.4°	3°14.7'	+24.9'	68.4°	3°36.8'	+25.7'	68.5°	3°58.7'	+26.6'	68.5°	4°20.6'	+27.5'	68.6°	21
22	2°30.5'	+22.1'	67.4°	2°53.6'	+23.0'	67.4°	3°16.6'	+23.9'	67.5°	3°39.6'	+24.8'	67.5°	4°02.5'	+25.7'	67.6°	4°25.3'	+26.5'	67.6°	4°48.1'	+27.4'	67.7°	22
23	2°52.6'	+22.1'	66.4°	3°16.6'	+23.0'	66.5°	3°40.5'	+23.9'	66.5°	4°04.4'	+24.7'	66.6°	4°28.2'	+25.6'	66.7°	4°51.9'	+26.5'	66.7°	5°15.5'	+27.3'	66.8°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27			

96° 264° LHA Latitude SAME as DECLINATION 96° 264° LHA

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

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

83° 277° LHA Latitude CONTRARY to Declination 83° 277° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	6°31.9'	-21.7'	92.5°	6°29.3'	-22.7'	92.6°	6°26.5'	-23.6'	92.7°	6°23.5'	-24.6'	92.9°	6°20.5'	-25.6'	93.0°	6°17.3'	-26.5'	93.1°	6°14.0'	-27.4'	93.2°	0
1	6°10.2'	-21.8'	93.5°	6°06.6'	-22.8'	93.6°	6°02.8'	-23.7'	93.7°	5°58.9'	-24.7'	93.8°	5°54.9'	-25.6'	93.9°	5°50.8'	-26.6'	94.0°	5°46.6'	-27.5'	94.1°	1
2	5°48.4'	-21.9'	94.4°	5°43.8'	-22.9'	94.5°	5°39.1'	-23.8'	94.6°	5°34.2'	-24.8'	94.7°	5°29.3'	-25.7'	94.8°	5°24.2'	-26.7'	94.9°	5°19.1'	-27.6'	95.0°	2
3	5°26.6'	-22.0'	95.3°	5°21.0'	-22.9'	95.4°	5°15.3'	-23.9'	95.5°	5°09.4'	-24.9'	95.6°	5°03.5'	-25.8'	95.7°	4°57.5'	-26.7'	95.8°	4°51.4'	-27.7'	95.9°	3
4	5°04.6'	-22.1'	96.3°	4°58.0'	-23.0'	96.4°	4°51.4'	-24.0'	96.4°	4°44.6'	-24.9'	96.5°	4°37.7'	-25.9'	96.6°	4°30.8'	-26.8'	96.7°	4°23.8'	-27.7'	96.8°	4
5	4°42.6'	-22.1'	97.2°	4°35.0'	-23.1'	97.3°	4°27.4'	-24.0'	97.4°	4°19.7'	-25.0'	97.4°	4°11.9'	-25.9'	97.5°	4°04.0'	-26.9'	97.6°	3°56.0'	-27.8'	97.6°	5
6	4°20.5'	-22.2'	98.1°	4°11.9'	-23.2'	98.2°	4°03.3'	-24.1'	98.3°	3°54.7'	-25.1'	98.3°	3°45.9'	-26.0'	98.4°	3°37.1'	-26.9'	98.5°	3°28.2'	-27.8'	98.5°	6
7	3°58.3'	-22.3'	99.1°	3°48.8'	-23.2'	99.1°	3°39.2'	-24.2'	99.2°	3°29.6'	-25.1'	99.3°	3°19.9'	-26.0'	99.3°	3°10.2'	-27.0'	99.4°	3°00.4'	-27.9'	99.4°	7
8	3°36.0'	-22.3'	100.0°	3°25.6'	-23.3'	100.1°	3°15.1'	-24.2'	100.1°	3°04.5'	-25.2'	100.2°	2°53.9'	-26.1'	100.2°	2°43.2'	-27.0'	100.3°	2°32.5'	-27.9'	100.3°	8
9	3°13.7'	-22.4'	100.9°	3°02.3'	-23.3'	101.0°	2°50.8'	-24.3'	101.0°	2°39.3'	-25.2'	101.1°	2°27.8'	-26.1'	101.1°	2°16.2'	-27.0'	101.2°	2°04.6'	-28.0'	101.2°	9
10	2°51.3'	-22.4'	101.9°	2°39.0'	-23.4'	101.9°	2°26.6'	-24.3'	101.9°	2°14.1'	-25.2'	102.0°	2°01.7'	-26.2'	102.0°	1°49.2'	-27.1'	102.1°	1°36.6'	-28.0'	102.1°	10
11	2°28.9'	-22.4'	102.8°	2°15.6'	-23.4'	102.8°	2°02.3'	-24.3'	102.9°	1°48.9'	-25.3'	102.9°	1°35.5'	-26.2'	102.9°	1°22.1'	-27.1'	102.9°	1°08.6'	-28.0'	103.0°	11
12	2°06.5'	-22.5'	103.7°	1°52.2'	-23.4'	103.7°	1°38.0'	-24.4'	103.8°	1°23.7'	-25.3'	103.8°	1°09.3'	-26.2'	103.8°	0°55.0'	-27.1'	103.8°	0°40.6'	-28.0'	103.9°	12
13	1°44.0'	-22.5'	104.6°	1°28.8'	-23.4'	104.7°	1°13.6'	-24.4'	104.7°	0°58.4'	-25.3'	104.7°	0°43.2'	-26.2'	104.7°	0°27.9'	-27.1'	104.7°	0°12.6'	-28.0'	104.7°	13
14	1°21.5'	-22.5'	105.6°	1°05.4'	-23.5'	105.6°	0°49.2'	-24.4'	105.6°	0°33.1'	-25.3'	105.6°	0°16.9'	-26.2'	105.6°	0°00.8'	-27.1'	105.6°	0°15.4'	+28.0'	74.4°	14
15	0°58.9'	-22.5'	106.5°	0°41.9'	-23.5'	106.5°	0°24.9'	-24.4'	106.5°	0°07.8'	-25.3'	106.5°	0°09.3'	+26.2'	73.5°	0°26.3'	+27.1'	73.5°	0°43.4'	+28.0'	73.5°	15
16	0°36.4'	-22.6'	107.4°	0°18.4'	-23.5'	107.4°	0°00.5'	-24.4'	107.4°	0°17.5'	+25.3'	72.6°	0°35.5'	+26.2'	72.6°	0°53.4'	+27.1'	72.6°	1°11.4'	+28.0'	72.6°	16
17	0°13.8'	-22.6'	108.3°	0°05.0'	+23.5'	71.7°	0°23.9'	+24.4'	71.7°	0°42.8'	+25.3'	71.7°	1°01.7'	+26.2'	71.7°	1°20.5'	+27.1'	71.7°	1°39.3'	+28.0'	71.7°	17
18	0°08.7'	+22.6'	70.7°	0°28.5'	+23.5'	70.7°	0°48.3'	+24.4'	70.7°	1°08.1'	+25.3'	70.8°	1°27.8'	+26.2'	70.8°	1°47.6'	+27.0'	70.8°	2°07.3'	+27.9'	70.8°	18
19	0°31.3'	+22.5'	69.8°	0°52.0'	+23.5'	69.8°	1°12.7'	+24.4'	69.8°	1°33.4'	+25.2'	69.9°	1°54.0'	+26.1'	69.9°	2°14.6'	+27.0'	69.9°	2°35.2'	+27.9'	70.0°	19
20	0°53.8'	+22.5'	68.9°	1°15.4'	+23.4'	68.9°	1°37.0'	+24.3'	68.9°	1°58.6'	+25.2'	68.9°	2°20.1'	+26.1'	69.0°	2°41.6'	+27.0'	69.0°	3°03.1'	+27.8'	69.1°	20
21	1°16.4'	+22.5'	67.9°	1°38.9'	+23.4'	68.0°	2°01.4'	+24.3'	68.0°	2°23.8'	+25.2'	68.0°	2°46.2'	+26.1'	68.1°	3°08.6'	+26.9'	68.1°	3°30.9'	+27.8'	68.2°	21
22	1°38.9'	+22.5'	67.0°	2°02.3'	+23.4'	67.1°	2°25.7'	+24.3'	67.1°	2°49.0'	+25.1'	67.1°	3°12.3'	+26.0'	67.2°	3°35.5'	+26.9'	67.2°	3°58.7'	+27.7'	67.3°	22
23	2°01.4'	+22.5'	66.1°	2°25.7'	+23.3'	66.1°	2°49.9'	+24.2'	66.2°	3°14.1'	+25.1'	66.2°	3°38.3'	+26.0'	66.3°	4°02.4'	+26.8'	66.3°	4°26.5'	+27.7'	66.4°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24												

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

82° 278° LHA **Latitude CONTRARY to Declination** **82° 278° LHA**

Dec°	21			22			23			24			25			26			27			Dec°	
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°		
0	7°27.9'	-21.7'	92.9°	7°24.8'	-22.7'	93.0°	7°21.6'	-23.7'	93.1°	7°18.3'	-24.7'	93.3°	7°14.8'	-25.6'	93.4°	7°11.2'	-26.6'	93.5°	7°07.4'	-27.5'	93.7°	0	
1	7°06.1'	-21.9'	93.8°	7°02.1'	-22.8'	93.9°	6°57.9'	-23.8'	94.1°	6°53.6'	-24.8'	94.2°	6°49.2'	-25.7'	94.3°	6°44.6'	-26.7'	94.4°	6°39.9'	-27.6'	94.5°	1	
2	6°44.3'	-22.0'	94.8°	6°39.3'	-22.9'	94.9°	6°34.1'	-23.9'	95.0°	6°28.8'	-24.9'	95.1°	6°23.4'	-25.8'	95.2°	6°17.9'	-26.8'	95.3°	6°12.3'	-27.7'	95.4°	2	
3	6°22.4'	-22.1'	95.7°	6°16.3'	-23.0'	95.8°	6°10.2'	-24.0'	95.9°	6°04.0'	-25.0'	96.0°	5°57.6'	-25.9'	96.1°	5°51.2'	-26.8'	96.2°	5°44.6'	-27.8'	96.3°	3	
4	6°00.3'	-22.2'	96.6°	5°53.3'	-23.1'	96.7°	5°46.2'	-24.1'	96.8°	5°39.0'	-25.0'	96.9°	5°31.7'	-26.0'	97.0°	5°24.3'	-26.9'	97.1°	5°16.8'	-27.8'	97.2°	4	
5	5°38.1'	-22.3'	97.6°	5°30.2'	-23.2'	97.7°	5°22.1'	-24.2'	97.8°	5°14.0'	-25.1'	97.9°	5°05.7'	-26.1'	97.9°	4°57.4'	-27.0'	98.0°	4°49.0'	-27.9'	98.1°	5	
6	5°15.9'	-22.3'	98.5°	5°07.0'	-23.3'	98.6°	4°58.0'	-24.2'	98.7°	4°48.9'	-25.2'	98.8°	4°39.7'	-26.1'	98.8°	4°30.4'	-27.1'	98.9°	4°21.1'	-28.0'	99.0°	6	
7	4°53.6'	-22.4'	99.4°	4°43.7'	-23.4'	99.5°	4°33.7'	-24.3'	99.6°	4°23.7'	-25.3'	99.7°	4°13.6'	-26.2'	99.7°	4°03.4'	-27.1'	99.8°	3°53.1'	-28.0'	99.9°	7	
8	4°31.1'	-22.5'	100.4°	4°20.3'	-23.4'	100.4°	4°09.4'	-24.4'	100.5°	3°58.4'	-25.3'	100.6°	3°47.4'	-26.2'	100.6°	3°36.2'	-27.2'	100.7°	3°25.1'	-28.1'	100.8°	8	
9	4°08.7'	-22.5'	101.3°	3°56.9'	-23.5'	101.4°	3°45.0'	-24.4'	101.4°	3°33.1'	-25.4'	101.5°	3°21.1'	-26.3'	101.5°	3°09.1'	-27.2'	101.6°	2°57.0'	-28.1'	101.7°	9	
10	3°46.1'	-22.6'	102.2°	3°33.4'	-23.6'	102.3°	3°20.6'	-24.5'	102.3°	3°07.7'	-25.4'	102.4°	2°54.8'	-26.3'	102.4°	2°41.9'	-27.3'	102.5°	2°28.9'	-28.2'	102.5°	10	
11	3°23.5'	-22.7'	103.1°	3°09.8'	-23.6'	103.2°	2°56.1'	-24.5'	103.3°	2°42.3'	-25.5'	103.3°	2°28.5'	-26.4'	103.3°	2°14.6'	-27.3'	103.4°	2°00.7'	-28.2'	103.4°	11	
12	3°00.8'	-22.7'	104.1°	2°46.2'	-23.6'	104.1°	2°31.6'	-24.6'	104.2°	2°16.8'	-25.5'	104.2°	2°02.1'	-26.4'	104.2°	1°47.3'	-27.3'	104.3°	1°32.5'	-28.2'	104.3°	12	
13	2°38.1'	-22.7'	105.0°	2°22.6'	-23.7'	105.0°	2°07.0'	-24.6'	105.1°	1°51.4'	-25.5'	105.1°	1°35.7'	-26.4'	105.1°	1°20.0'	-27.3'	105.2°	1°04.3'	-28.2'	105.2°	13	
14	2°15.4'	-22.8'	105.9°	1°58.9'	-23.7'	106.0°	1°42.4'	-24.6'	106.0°	1°25.8'	-25.5'	106.0°	1°09.3'	-26.4'	106.0°	0°52.7'	-27.3'	106.1°	0°36.1'	-28.2'	106.1°	14	
15	1°52.6'	-22.8'	106.9°	1°35.2'	-23.7'	106.9°	1°17.8'	-24.6'	106.9°	1°00.3'	-25.6'	106.9°	0°42.8'	-26.5'	106.9°	<u>0°25.3' -27.4' 107.0°</u>	<u>0°25.3' -27.4' 107.0°</u>	<u>0°25.3' -27.4' 107.0°</u>	<u>0°07.8' -28.2' 107.0°</u>	<u>0°07.8' -28.2' 107.0°</u>	<u>0°07.8' -28.2' 107.0°</u>	15	
16	1°29.8'	-22.8'	107.8°	1°11.5'	-23.8'	107.8°	0°53.1'	-24.7'	107.8°	0°34.7'	-25.6'	107.8°	<u>0°16.4' -26.5' 107.8°</u>	0°16.4'	-26.5'	107.8°	0°02.0'	+27.4'	72.2°	0°20.4'	+28.2'	72.2°	16
17	1°07.0'	-22.9'	108.7°	0°47.7'	-23.8'	108.7°	0°28.4'	-24.7'	108.7°	<u>0°09.2' -25.6' 108.7°</u>	0°09.2'	-25.6'	108.7°	0°10.1'	+26.5'	71.3°	0°29.4'	+27.3'	71.3°	0°48.6'	+28.2'	71.3°	17
18	0°44.1'	-22.9'	109.6°	0°23.9'	-23.8'	109.6°	<u>0°03.8' -24.7' 109.6°</u>	0°03.8'	-24.7'	109.6°	0°16.4'	+25.6'	70.4°	0°36.6'	+26.5'	70.4°	0°56.7'	+27.3'	70.4°	1°16.9'	+28.2'	70.4°	18
19	<u>0°21.2' -22.9' 110.6°</u>	<u>0°00.2' -23.8' 110.6°</u>	<u>0°00.2' -23.8' 110.6°</u>	0°20.9'	+24.7'	69.4°	0°20.9'	+24.7'	69.4°	0°42.0'	+25.6'	69.5°	1°03.0'	+26.4'	69.5°	1°24.0'	+27.3'	69.5°	1°45.1'	+28.2'	69.5°	19	
20	0°01.6'	+22.9'	68.5°	0°23.6'	+23.8'	68.5°	0°45.6'	+24.7'	68.5°	1°07.5'	+25.5'	68.5°	1°29.5'	+26.4'	68.6°	1°51.4'	+27.3'	68.6°	2°13.2'	+28.1'	68.6°	20	
21	0°24.5'	+22.9'	67.6°	0°47.4'	+23.8'	67.6°	1°10.2'	+24.6'	67.6°	1°33.1'	+25.5'	67.6°	1°55.9'	+26.4'	67.7°	2°18.6'	+27.2'	67.7°	2°41.4'	+28.1'	67.7°	21	
22	0°47.4'	+22.9'	66.7°	1°11.1'	+23.7'	66.7°	1°34.9'	+24.6'	66.7°	1°58.6'	+25.5'	66.7°	2°22.2'	+26.3'	66.8°	2°45.9'	+27.2'	66.8°	3°09.5'	+28.1'	66.9°	22	
23	1°10.2'	+22.8'	65.7°	1°34.9'	+23.7'	65.8°	1°59.5'	+24.6'	65.8°	2°24.1'	+25.4'	65.8°	2°48.6'	+26.3'	65.9°	3°13.1'	+27.2'	65.9°	3°37.6'	+28.0'	66.0°	23	
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°	
	21			22			23			24			25			26			27			Dec°	

98° 262° LHA **Latitude SAME as DECLINATION** **98° 262° LHA**

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

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

81° 279° LHA **Latitude CONTRARY to Declination** **81° 279° LHA**

Dec°	21			22			23			24			25			26			27			Dec°		
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°			
0	8°23.8'	-21.8'	93.2°	8°20.4'	-22.8'	93.4°	8°16.8'	-23.8'	93.5°	8°13.0'	-24.7'	93.7°	8°09.0'	-25.7'	93.8°	8°05.0'	-26.6'	94.0°	8°00.7'	-27.6'	94.1°	0		
1	8°02.0'	-21.9'	94.2°	7°57.6'	-22.9'	94.3°	7°53.0'	-23.9'	94.5°	7°48.3'	-24.8'	94.6°	7°43.4'	-25.8'	94.7°	7°38.3'	-26.7'	94.9°	7°33.2'	-27.7'	95.0°	1		
2	7°40.1'	-22.1'	95.1°	7°34.7'	-23.0'	95.3°	7°29.1'	-24.0'	95.4°	7°23.4'	-25.0'	95.5°	7°17.6'	-25.9'	95.7°	7°11.6'	-26.8'	95.8°	7°05.5'	-27.8'	95.9°	2		
3	7°18.1'	-22.2'	96.1°	7°11.7'	-23.1'	96.2°	7°05.1'	-24.1'	96.3°	6°58.5'	-25.1'	96.4°	6°51.7'	-26.0'	96.6°	6°44.8'	-26.9'	96.7°	6°37.7'	-27.9'	96.8°	3		
4	6°55.9'	-22.3'	97.0°	6°48.5'	-23.2'	97.1°	6°41.0'	-24.2'	97.2°	6°33.4'	-25.2'	97.4°	6°25.7'	-26.1'	97.5°	6°17.8'	-27.0'	97.6°	6°09.8'	-28.0'	97.7°	4		
5	6°33.6'	-22.3'	97.9°	6°25.3'	-23.3'	98.1°	6°16.8'	-24.3'	98.2°	6°08.3'	-25.2'	98.3°	5°59.6'	-26.2'	98.4°	5°50.8'	-27.1'	98.5°	5°41.9'	-28.0'	98.6°	5		
6	6°11.3'	-22.5'	98.9°	6°01.9'	-23.4'	99.0°	5°52.5'	-24.4'	99.1°	5°43.0'	-25.3'	99.2°	5°33.4'	-26.3'	99.3°	5°23.7'	-27.2'	99.4°	5°13.8'	-28.1'	99.5°	6		
7	5°48.8'	-22.6'	99.8°	5°38.5'	-23.5'	99.9°	5°28.1'	-24.5'	100.0°	5°17.7'	-25.4'	100.1°	5°07.1'	-26.3'	100.2°	4°56.5'	-27.3'	100.3°	4°45.7'	-28.2'	100.4°	7		
8	5°26.2'	-22.7'	100.7°	5°15.0'	-23.6'	100.8°	5°03.7'	-24.6'	100.9°	4°52.3'	-25.5'	101.0°	4°40.8'	-26.4'	101.1°	4°29.2'	-27.3'	101.2°	4°17.5'	-28.2'	101.2°	8		
9	5°03.6'	-22.7'	101.7°	4°51.4'	-23.7'	101.8°	4°39.1'	-24.6'	101.8°	4°26.8'	-25.6'	101.9°	4°14.4'	-26.5'	102.0°	4°01.9'	-27.4'	102.1°	3°49.3'	-28.3'	102.1°	9		
10	4°40.8'	-22.8'	102.6°	4°27.7'	-23.8'	102.7°	4°14.5'	-24.7'	102.7°	4°01.2'	-25.6'	102.8°	3°47.9'	-26.5'	102.9°	3°34.5'	-27.4'	102.9°	3°21.0'	-28.3'	103.0°	10		
11	4°18.0'	-22.9'	103.5°	4°03.9'	-23.8'	103.6°	3°49.8'	-24.7'	103.7°	3°35.6'	-25.7'	103.7°	3°21.3'	-26.6'	103.8°	3°07.0'	-27.5'	103.8°	2°52.6'	-28.4'	103.9°	11		
12	3°55.1'	-22.9'	104.4°	3°40.1'	-23.9'	104.5°	3°25.1'	-24.8'	104.6°	3°09.9'	-25.7'	104.6°	2°54.8'	-26.6'	104.7°	2°39.5'	-27.5'	104.7°	2°24.3'	-28.4'	104.8°	12		
13	3°32.2'	-23.0'	105.4°	3°16.3'	-23.9'	105.4°	3°00.3'	-24.8'	105.5°	2°44.2'	-25.8'	105.5°	2°28.1'	-26.7'	105.6°	2°12.0'	-27.6'	105.6°	1°55.8'	-28.5'	105.7°	13		
14	3°09.2'	-23.0'	106.3°	2°52.3'	-24.0'	106.4°	2°35.4'	-24.9'	106.4°	2°18.5'	-25.8'	106.4°	2°01.5'	-26.7'	106.5°	1°44.4'	-27.6'	106.5°	1°27.4'	-28.5'	106.5°	14		
15	2°46.2'	-23.1'	107.2°	2°28.4'	-24.0'	107.3°	2°10.5'	-24.9'	107.3°	1°52.7'	-25.8'	107.3°	1°34.8'	-26.7'	107.4°	1°16.8'	-27.6'	107.4°	0°58.9'	-28.5'	107.4°	15		
16	2°23.1'	-23.1'	108.1°	2°04.4'	-24.0'	108.2°	1°45.6'	-24.9'	108.2°	1°26.9'	-25.8'	108.2°	1°08.1'	-26.7'	108.3°	0°49.2'	-27.6'	108.3°	0°30.4'	-28.5'	108.3°	16		
17	1°60.0'	-23.2'	109.1°	1°40.3'	-24.1'	109.1°	1°20.7'	-25.0'	109.1°	1°01.0'	-25.9'	109.1°	0°41.3'	-26.7'	109.2°	<u>0°21.6' -27.6' 109.2°</u>	<u>0°21.6' -27.6' 109.2°</u>	<u>0°21.6' -27.6' 109.2°</u>	<u>0°01.9' -28.5' 109.2°</u>	<u>0°01.9' -28.5' 109.2°</u>	<u>0°01.9' -28.5' 109.2°</u>	17		
18	1°36.8'	-23.2'	110.0°	1°16.3'	-24.1'	110.0°	0°55.7'	-25.0'	110.0°	0°35.2'	-25.9'	110.0°	<u>0°14.6' -26.7' 110.1°</u>	0°14.6'	-26.7'	110.1°	0°06.0'	+27.6'	69.9°	0°26.6'	+28.5'	69.9°	18	
19	1°13.6'	-23.2'	110.9°	0°52.2'	-24.1'	110.9°	0°30.7'	-25.0'	110.9°	<u>0°09.3' -25.9' 111.0°</u>	<u>0°09.3' -25.9' 111.0°</u>	0°09.3'	-25.9'	111.0°	0°12.2'	+26.7'	69.0°	0°33.6'	+27.6'	69.1°	0°55.1'	+28.5'	69.1°	19
20	0°50.4'	-23.2'	111.8°	0°28.1'	-24.1'	111.9°	<u>0°05.8' -25.0' 111.9°</u>	<u>0°05.8' -25.0' 111.9°</u>	0°19.2'	+25.0'	67.2°	0°42.4'	+25.9'	67.2°	1°05.6'	+26.7'	67.3°	1°28.8'	+27.6'	67.3°	1°52.0'	+28.4'	67.3°	20
21	0°27.2'	-23.2'	112.8°	<u>0°04.0' -24.1' 112.8°</u>	<u>0°04.0' -24.1' 112.8°</u>	0°19.2'	+25.0'	67.2°	0°42.4'	+25.9'	67.2°	1°08.3'	+25.8'	66.3°	1°32.4'	+26.7'	66.4°	1°56.4'	+27.5'	66.4°	2°20.4'	+28.		

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

80° 280° LHA

Latitude CONTRARY to Declination

80° 280° LHA

Table with 12 columns (Dec, 21, 22, 23, 24, 25, 26, 27, Dec) and 24 rows of astronomical data including Hc, d, Z values.

100° 260° LHA

Latitude SAME as DECLINATION

100° 260° 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 12 columns (Dec, 21, 22, 23, 24, 25, 26, 27, Dec) and 24 rows of astronomical data including Hc, d, Z values.

101° 259° LHA

Latitude SAME as DECLINATION

101° 259° LHA

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

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

78° 282° LHA

Latitude CONTRARY to Declination

78° 282° LHA

Table with 10 columns (Dec, 21, 22, 23, 24, 25, 26, 27, Dec) and 24 rows of astronomical data including Hc, d, and Z values.

102° 258° LHA

Latitude SAME as DECLINATION

102° 258° LHA

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

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

77° 283° LHA

Latitude CONTRARY to Declination

77° 283° LHA

Table with 10 columns (Dec, 21, 22, 23, 24, 25, 26, 27, Dec) and 24 rows of astronomical data including Hc, d, and Z values.

103° 257° LHA

Latitude SAME as DECLINATION

103° 257° LHA

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

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

76° 284° LHA			Latitude CONTRARY to Declination												76° 284° LHA							
Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	13°03.1'	-22.2'	95.1°	12°57.7'	-23.2'	95.3°	12°52.0'	-24.1'	95.6°	12°46.1'	-25.1'	95.8°	12°39.9'	-26.1'	96.0°	12°33.5'	-27.0'	96.2°	12°26.9'	-28.0'	96.5°	0
1	12°41.0'	-22.4'	96.1°	12°34.6'	-23.4'	96.3°	12°27.9'	-24.3'	96.5°	12°21.0'	-25.3'	96.7°	12°13.8'	-26.3'	96.9°	12°06.5'	-27.2'	97.2°	11°58.9'	-28.2'	97.4°	1
2	12°18.6'	-22.6'	97.0°	12°11.2'	-23.6'	97.2°	12°03.5'	-24.5'	97.4°	11°55.7'	-25.5'	97.6°	11°47.6'	-26.4'	97.9°	11°39.3'	-27.4'	98.1°	11°30.7'	-28.3'	98.3°	2
3	11°56.1'	-22.8'	98.0°	11°47.6'	-23.7'	98.2°	11°39.0'	-24.7'	98.4°	11°30.2'	-25.7'	98.6°	11°21.1'	-26.6'	98.8°	11°11.9'	-27.6'	99.0°	11°02.4'	-28.5'	99.2°	3
4	11°33.3'	-22.9'	98.9°	11°23.9'	-23.9'	99.1°	11°14.3'	-24.9'	99.3°	11°04.5'	-25.8'	99.5°	10°54.5'	-26.8'	99.7°	10°44.3'	-27.7'	99.9°	10°33.9'	-28.6'	100.1°	4
5	11°10.3'	-23.1'	99.8°	10°60.0'	-24.1'	100.0°	10°49.4'	-25.0'	100.2°	10°38.7'	-26.0'	100.4°	10°27.7'	-26.9'	100.6°	10°16.6'	-27.9'	100.8°	10°05.3'	-28.8'	101.0°	5
6	10°47.2'	-23.3'	100.8°	10°35.9'	-24.3'	101.0°	10°24.4'	-25.2'	101.2°	10°12.7'	-26.1'	101.3°	10°00.8'	-27.1'	101.5°	9°48.8'	-28.0'	101.7°	9°36.5'	-28.9'	101.8°	6
7	10°23.9'	-23.5'	101.7°	10°11.6'	-24.4'	101.9°	9°59.2'	-25.4'	102.1°	9°46.5'	-26.3'	102.2°	9°33.7'	-27.2'	102.4°	9°20.8'	-28.1'	102.6°	9°07.6'	-29.0'	102.7°	7
8	10°00.5'	-23.6'	102.7°	9°47.2'	-24.6'	102.8°	9°33.8'	-25.5'	103.0°	9°20.2'	-26.4'	103.2°	9°06.5'	-27.4'	103.3°	8°52.6'	-28.3'	103.5°	8°38.6'	-29.2'	103.6°	8
9	9°36.8'	-23.8'	103.6°	9°22.7'	-24.7'	103.8°	9°08.3'	-25.6'	103.9°	8°53.8'	-26.6'	104.1°	8°39.2'	-27.5'	104.2°	8°24.4'	-28.4'	104.4°	8°09.4'	-29.3'	104.5°	9
10	9°13.1'	-23.9'	104.5°	8°58.0'	-24.8'	104.7°	8°42.7'	-25.8'	104.8°	8°27.3'	-26.7'	105.0°	8°11.7'	-27.6'	105.1°	7°56.0'	-28.5'	105.3°	7°40.1'	-29.4'	105.4°	10
11	8°49.2'	-24.0'	105.4°	8°33.1'	-25.0'	105.6°	8°16.9'	-25.9'	105.7°	8°00.6'	-26.8'	105.9°	7°44.1'	-27.7'	106.0°	7°27.5'	-28.6'	106.1°	7°10.7'	-29.5'	106.3°	11
12	8°25.1'	-24.2'	106.4°	8°08.1'	-25.1'	106.5°	7°51.0'	-26.0'	106.7°	7°33.8'	-26.9'	106.8°	7°16.4'	-27.8'	106.9°	6°58.9'	-28.7'	107.0°	6°41.2'	-29.6'	107.1°	12
13	8°01.0'	-24.3'	107.3°	7°43.1'	-25.2'	107.4°	7°25.0'	-26.1'	107.6°	7°06.8'	-27.0'	107.7°	6°48.6'	-27.9'	107.8°	6°30.2'	-28.8'	107.9°	6°11.7'	-29.7'	108.0°	13
14	7°36.7'	-24.4'	108.2°	7°17.8'	-25.3'	108.3°	6°58.9'	-26.2'	108.5°	6°39.8'	-27.1'	108.6°	6°20.7'	-28.0'	108.7°	6°01.4'	-28.9'	108.8°	5°42.0'	-29.7'	108.9°	14
15	7°12.2'	-24.5'	109.1°	6°52.5'	-25.4'	109.3°	6°32.7'	-26.3'	109.4°	6°12.7'	-27.2'	109.5°	5°52.7'	-28.1'	109.6°	5°32.5'	-29.0'	109.7°	5°12.3'	-29.8'	109.8°	15
16	6°47.7'	-24.6'	110.1°	6°27.1'	-25.5'	110.2°	6°06.3'	-26.4'	110.3°	5°45.5'	-27.3'	110.4°	5°24.6'	-28.2'	110.5°	5°03.5'	-29.0'	110.6°	4°42.4'	-29.9'	110.6°	16
17	6°23.1'	-24.7'	111.0°	6°01.6'	-25.6'	111.1°	5°39.9'	-26.5'	111.2°	5°18.2'	-27.4'	111.3°	4°56.4'	-28.2'	111.4°	4°34.5'	-29.1'	111.4°	4°12.6'	-29.9'	111.5°	17
18	5°58.4'	-24.8'	111.9°	5°35.9'	-25.7'	112.0°	5°13.4'	-26.6'	112.1°	4°50.8'	-27.4'	112.2°	4°28.2'	-28.3'	112.2°	4°05.4'	-29.1'	112.3°	3°42.6'	-30.0'	112.4°	18
19	5°33.6'	-24.9'	112.8°	5°10.2'	-25.8'	112.9°	4°46.9'	-26.6'	113.0°	4°23.4'	-27.5'	113.1°	3°59.9'	-28.4'	113.1°	3°36.3'	-29.2'	113.2°	3°12.6'	-30.0'	113.2°	19
20	5°08.7'	-25.0'	113.7°	4°44.5'	-25.8'	113.8°	4°20.2'	-26.7'	113.9°	3°55.9'	-27.6'	113.9°	3°31.5'	-28.4'	114.0°	3°07.1'	-29.2'	114.1°	2°42.6'	-30.1'	114.1°	20
21	4°43.7'	-25.1'	114.6°	4°18.6'	-25.9'	114.7°	3°53.5'	-26.8'	114.8°	3°28.3'	-27.6'	114.8°	3°03.1'	-28.4'	114.9°	2°37.8'	-29.3'	114.9°	2°12.5'	-30.1'	115.0°	21
22	4°18.6'	-25.1'	115.6°	3°52.7'	-26.0'	115.6°	3°26.7'	-26.8'	115.7°	3°00.7'	-27.7'	115.7°	2°34.7'	-28.5'	115.8°	2°08.6'	-29.3'	115.8°	1°42.4'	-30.1'	115.8°	22
23	3°53.5'	-25.2'	116.5°	3°26.7'	-26.0'	116.5°	2°59.9'	-26.9'	116.6°	2°33.1'	-27.7'	116.6°	2°06.2'	-28.5'	116.6°	1°39.3'	-29.3'	116.7°	1°12.3'	-30.1'	116.7°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27			

76° 284° LHA Latitude CONTRARY to DECLINATION 76° 284° LHA

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

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

75° 285° LHA			Latitude CONTRARY to Declination												75° 285° LHA							
Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	13°58.9'	-22.3'	95.5°	13°53.1'	-23.3'	95.7°	13°47.0'	-24.2'	96.0°	13°40.6'	-25.2'	96.2°	13°34.0'	-26.2'	96.5°	13°27.1'	-27.1'	96.7°	13°20.0'	-28.1'	96.9°	0
1	13°36.6'	-22.5'	96.4°	13°29.8'	-23.5'	96.7°	13°22.7'	-24.5'	96.9°	13°15.4'	-25.4'	97.2°	13°07.8'	-26.4'	97.4°	12°60.0'	-27.3'	97.6°	12°51.9'	-28.3'	97.8°	1
2	13°14.2'	-22.7'	97.4°	13°06.4'	-23.7'	97.6°	12°58.3'	-24.7'	97.9°	12°50.0'	-25.6'	98.1°	12°41.4'	-26.6'	98.3°	12°32.6'	-27.5'	98.5°	12°23.6'	-28.5'	98.7°	2
3	12°51.5'	-22.9'	98.3°	12°42.7'	-23.9'	98.6°	12°33.6'	-24.8'	98.8°	12°24.3'	-25.8'	99.0°	12°14.8'	-26.8'	99.2°	12°05.1'	-27.7'	99.4°	11°55.2'	-28.6'	99.6°	3
4	12°28.6'	-23.1'	99.3°	12°18.8'	-24.1'	99.5°	12°08.8'	-25.0'	99.7°	11°58.5'	-26.0'	99.9°	11°48.1'	-26.9'	100.1°	11°37.4'	-27.9'	100.3°	11°26.5'	-28.8'	100.5°	4
5	12°05.5'	-23.3'	100.2°	11°54.7'	-24.3'	100.4°	11°43.7'	-25.2'	100.7°	11°32.5'	-26.2'	100.9°	11°21.1'	-27.1'	101.1°	11°09.5'	-28.0'	101.2°	10°57.7'	-28.9'	101.4°	5
6	11°42.2'	-23.5'	101.2°	11°30.5'	-24.4'	101.4°	11°18.5'	-25.4'	101.6°	11°06.4'	-26.3'	101.8°	10°54.0'	-27.3'	102.0°	10°41.5'	-28.2'	102.1°	10°28.8'	-29.1'	102.3°	6
7	11°18.7'	-23.7'	102.1°	11°06.0'	-24.6'	102.3°	10°53.1'	-25.6'	102.5°	10°40.1'	-26.5'	102.7°	10°26.8'	-27.4'	102.9°	10°13.3'	-28.3'	103.0°	9°59.7'	-29.2'	103.2°	7
8	10°55.1'	-23.8'	103.1°	10°41.4'	-24.8'	103.2°	10°27.6'	-25.7'	103.4°	10°13.6'	-26.6'	103.6°	9°59.4'	-27.6'	103.8°	9°45.0'	-28.5'	103.9°	9°30.5'	-29.4'	104.1°	8
9	10°31.2'	-24.0'	104.0°	10°16.7'	-24.9'	104.2°	10°01.9'	-25.9'	104.3°	9°46.9'	-26.8'	104.5°	9°31.8'	-27.7'	104.7°	9°16.5'	-28.6'	104.8°	9°01.1'	-29.5'	105.0°	9
10	10°07.3'	-24.1'	104.9°	9°51.7'	-25.1'	105.1°	9°36.0'	-26.0'	105.3°	9°20.2'	-26.9'	105.4°	9°04.1'	-27.8'	105.6°	8°47.9'	-28.7'	105.7°	8°31.6'	-29.6'	105.9°	10
11	9°43.1'	-24.3'	105.8°	9°26.6'	-25.2'	106.0°	9°10.0'	-26.1'	106.2°	8°53.2'	-27.1'	106.3°	8°36.3'	-28.0'	106.5°	8°19.2'	-28.8'	106.6°	8°02.0'	-29.7'	106.7°	11
12	9°18.8'	-24.4'	106.8°	9°01.4'	-25.4'	106.9°	8°43.9'	-26.3'	107.1°	8°26.2'	-27.2'	107.2°	8°08.3'	-28.1'	107.4°	7°50.4'	-29.0'	107.5°	7°32.3'	-29.8'	107.6°	12
13	8°54.4'	-24.6'	107.7°	8°36.1'	-25.5'	107.8°	8°17.6'	-26.4'	108.0°	7°59.0'	-27.3'	108.1°	7°40.3'	-28.2'	108.3°	7°21.4'	-29.1'	108.4°	7°02.4'	-29.9'	108.5°	13
14	8°29.8'	-24.7'	108.6°	8°10.6'	-25.6'	108.8°	7°51.2'	-26.5'	108.9°	7°31.7'	-27.4'	109.0°	7°12.1'	-28.3'	109.1°	6°52.4'	-29.2'	109.3°	6°32.5'	-30.0'	109.4°	14
15	8°05.1'	-24.8'	109.5°	7°45.0'	-25.7'	109.7°	7°24.7'	-26.6'	109.8°	7°04.3'	-27.5'	109.9°	6°43.8'	-28.4'	110.0°	6°23.2'	-29.2'	110.1°	6°02.5'	-30.1'	110.2°	15
16	7°40.3'	-24.9'	110.5°	7°19.2'	-25.8'	110.6°	6°58.1'	-26.7'	110.7°	6°36.8'	-27.6'	110.8°	6°15.4'	-28.5'	110.9°	5°54.0'	-29.3'	111.0°	5°32.4'	-30.2'	111.1°	16
17	7°15.3'	-25.1'	111.4°	6°53.4'	-25.9'	111.5°	6°31.4'	-26.8'	111.6°	6°09.2'	-27.7'	111.7°	5°47.0'	-28.5'	111.8°	5°24.6'	-29.4'	111.9°	5°02.2'	-30.2'	112.0°	17
18	6°50.3'	-25.2'	112.3°	6°27.5'	-26.0'	112.4°	6°04.5'	-26.9'	112.5°	5°41.5'	-27.8'	112.6°	5°18.4'	-28.6'	112.7°	4°55.2'	-29.5'	112.8°	4°32.0'	-30.3'	112.8°	18
19	6°25.1'	-25.3'	113.2°	6°01.4'	-26.1'	113.3°	5°37.6'	-27.0'	113.4°	5°13.8'	-27.8'	113.5°	4°49.8'	-28.7'	113.6°	4°25.8'	-29.5'	113.6°	4°01.7'	-30.4'	113.7°	19
20	5°59.9'	-25.3'	114.1°	5°35.3'	-26.2'	114.2°	5°10.6'	-27.1'	114.3°	4°45.9'	-27.9'	114.4°	4°21.1'	-28.8'	114.5°	3°56.2'	-29.6'	114.5°	3°31.3'	-30.4'	114.6°	20
21	5°34.5'	-25.4'	115.0°	5°09.1'	-26.3'	115.1°	4°43.6'	-27.1'	115.2°	4°18.0'	-28.0'	115.3°	3°52.4'	-28.8'	115.3°	3°26.7'	-29.6'	115.4°	3°00.9'	-30.5'	115.4°	21
22	5°09.1'	-25.5'	115.9°	4°42.8'	-26.4'	116.0°	4°16.4'	-27.2'	116.1°	3°50.0'	-28.0'	116.2°	3°23.5'	-28.9'	116.2°	2°57.0'	-29.7'	116.3°	2°30.4'	-30.5'	116.3°	

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

74° 286° LHA

Latitude CONTRARY to Declination

74° 286° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	14°54.7'	-22.4'	95.9°	14°48.4'	-23.4'	96.1°	14°41.9'	-24.4'	96.4°	14°35.1'	-25.3'	96.7°	14°28.0'	-26.3'	96.9°	14°20.6'	-27.3'	97.2°	14°13.0'	-28.2'	97.4°	0
1	14°32.3'	-22.6'	96.8°	14°25.1'	-23.6'	97.1°	14°17.5'	-24.6'	97.3°	14°09.7'	-25.5'	97.6°	14°01.7'	-26.5'	97.8°	13°53.4'	-27.5'	98.1°	13°44.8'	-28.4'	98.3°	1
2	14°09.7'	-22.8'	97.8°	14°01.5'	-23.8'	98.0°	13°53.0'	-24.8'	98.3°	13°44.2'	-25.8'	98.5°	13°35.2'	-26.7'	98.8°	13°25.9'	-27.7'	99.0°	13°16.4'	-28.6'	99.2°	2
3	13°46.9'	-23.0'	98.7°	13°37.7'	-24.0'	99.0°	13°28.2'	-25.0'	99.2°	13°18.4'	-26.0'	99.4°	13°08.5'	-26.9'	99.7°	12°58.3'	-27.8'	99.9°	12°47.8'	-28.8'	100.1°	3
4	13°23.8'	-23.3'	99.7°	13°13.6'	-24.2'	99.9°	13°03.2'	-25.2'	100.1°	12°52.5'	-26.1'	100.4°	12°41.6'	-27.1'	100.6°	12°30.4'	-28.0'	100.8°	12°19.0'	-29.0'	101.0°	4
5	13°00.6'	-23.5'	100.6°	12°49.4'	-24.4'	100.9°	12°38.0'	-25.4'	101.1°	12°26.3'	-26.3'	101.3°	12°14.5'	-27.3'	101.5°	12°02.4'	-28.2'	101.7°	11°50.1'	-29.1'	101.9°	5
6	12°37.1'	-23.7'	101.6°	12°25.0'	-24.6'	101.8°	12°12.6'	-25.6'	102.0°	12°00.0'	-26.5'	102.2°	11°47.2'	-27.4'	102.4°	11°34.2'	-28.4'	102.6°	11°21.0'	-29.3'	102.8°	6
7	12°13.5'	-23.9'	102.5°	12°00.3'	-24.8'	102.7°	11°47.0'	-25.8'	102.9°	11°33.5'	-26.7'	103.1°	11°19.8'	-27.6'	103.3°	11°05.8'	-28.5'	103.5°	10°51.7'	-29.4'	103.7°	7
8	11°49.6'	-24.0'	103.5°	11°35.5'	-25.0'	103.7°	11°21.3'	-25.9'	103.9°	11°06.8'	-26.9'	104.0°	10°52.1'	-27.8'	104.2°	10°37.3'	-28.7'	104.4°	10°22.3'	-29.6'	104.6°	8
9	11°25.6'	-24.2'	104.4°	11°10.5'	-25.2'	104.6°	10°55.3'	-26.1'	104.8°	10°39.9'	-27.0'	105.0°	10°24.4'	-27.9'	105.1°	10°08.6'	-28.8'	105.3°	9°52.7'	-29.7'	105.5°	9
10	11°01.3'	-24.4'	105.3°	10°45.4'	-25.3'	105.5°	10°29.3'	-26.2'	105.7°	10°12.9'	-27.2'	105.9°	9°56.4'	-28.1'	106.0°	9°39.8'	-29.0'	106.2°	9°23.0'	-29.8'	106.4°	10
11	10°36.9'	-24.6'	106.3°	10°20.1'	-25.5'	106.4°	10°03.0'	-26.4'	106.6°	9°45.8'	-27.3'	106.8°	9°28.4'	-28.2'	106.9°	9°10.8'	-29.1'	107.1°	8°53.1'	-30.0'	107.2°	11
12	10°12.4'	-24.7'	107.2°	9°54.6'	-25.6'	107.4°	9°36.6'	-26.5'	107.5°	9°18.5'	-27.4'	107.7°	9°00.2'	-28.3'	107.8°	8°41.7'	-29.2'	108.0°	8°23.1'	-30.1'	108.1°	12
13	9°47.7'	-24.9'	108.1°	9°29.0'	-25.8'	108.3°	9°10.1'	-26.7'	108.4°	8°51.0'	-27.6'	108.6°	8°31.8'	-28.5'	108.7°	8°12.5'	-29.3'	108.9°	7°53.1'	-30.2'	109.0°	13
14	9°22.8'	-25.0'	109.0°	9°03.2'	-25.9'	109.2°	8°43.4'	-26.8'	109.3°	8°23.5'	-27.7'	109.5°	8°03.4'	-28.6'	109.6°	7°43.2'	-29.4'	109.7°	7°22.9'	-30.3'	109.9°	14
15	8°57.8'	-25.1'	110.0°	8°37.3'	-26.0'	110.1°	8°16.6'	-26.9'	110.2°	7°55.8'	-27.8'	110.4°	7°34.8'	-28.7'	110.5°	7°13.8'	-29.5'	110.6°	6°52.6'	-30.4'	110.7°	15
16	8°32.7'	-25.3'	110.9°	8°11.2'	-26.2'	111.0°	7°49.7'	-27.0'	111.1°	7°28.0'	-27.9'	111.3°	7°06.2'	-28.8'	111.4°	6°44.2'	-29.6'	111.5°	6°22.2'	-30.5'	111.6°	16
17	8°07.4'	-25.4'	111.8°	7°45.1'	-26.3'	111.9°	7°22.6'	-27.1'	112.0°	7°00.1'	-28.0'	112.2°	6°37.4'	-28.9'	112.3°	6°14.6'	-29.7'	112.4°	5°51.7'	-30.6'	112.5°	17
18	7°42.0'	-25.5'	112.7°	7°18.8'	-26.4'	112.8°	6°55.5'	-27.2'	112.9°	6°32.0'	-28.1'	113.0°	6°08.5'	-29.0'	113.1°	5°44.9'	-29.8'	113.2°	5°21.2'	-30.6'	113.3°	18
19	7°16.5'	-25.6'	113.6°	6°52.4'	-26.5'	113.7°	6°28.2'	-27.3'	113.8°	6°03.9'	-28.2'	113.9°	5°39.6'	-29.0'	114.0°	5°15.1'	-29.9'	114.1°	4°50.5'	-30.7'	114.2°	19
20	6°50.9'	-25.7'	114.5°	6°25.9'	-26.6'	114.6°	6°00.9'	-27.4'	114.7°	5°35.7'	-28.3'	114.8°	5°10.5'	-29.1'	114.9°	4°45.2'	-29.9'	115.0°	4°19.8'	-30.8'	115.1°	20
21	6°25.2'	-25.8'	115.4°	5°59.4'	-26.7'	115.5°	5°33.5'	-27.5'	115.6°	5°07.5'	-28.3'	115.7°	4°41.4'	-29.2'	115.8°	4°15.3'	-30.0'	115.9°	3°49.1'	-30.8'	115.9°	21
22	5°59.4'	-25.9'	116.3°	5°32.7'	-26.7'	116.4°	5°05.9'	-27.6'	116.5°	4°39.1'	-28.4'	116.6°	4°12.2'	-29.2'	116.7°	3°45.3'	-30.0'	116.7°	3°18.3'	-30.8'	116.8°	22
23	5°33.5'	-26.0'	117.2°	5°05.9'	-26.8'	117.3°	4°38.4'	-27.7'	117.4°	4°10.7'	-28.5'	117.5°	3°43.0'	-29.3'	117.5°	3°15.2'	-30.1'	117.6°	2°47.4'	-30.9'	117.6°	23

74° 286° LHA

Latitude CONTRARY to DECLINATION

74° 286° LHA

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

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

73° 287° LHA

Latitude CONTRARY to Declination

73° 287° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	15°50.4'	-22.5'	96.3°	15°43.7'	-23.5'	96.5°	15°36.7'	-24.5'	96.8°	15°29.5'	-25.4'	97.1°	15°21.9'	-26.4'	97.4°	15°14.1'	-27.4'	97.6°	15°06.0'	-28.3'	97.9°	0
1	15°27.9'	-22.7'	97.2°	15°20.2'	-23.7'	97.5°	15°12.3'	-24.7'	97.8°	15°04.0'	-25.7'	98.0°	14°55.5'	-26.6'	98.3°	14°46.7'	-27.6'	98.6°	14°37.7'	-28.5'	98.8°	1
2	15°05.1'	-23.0'	98.2°	14°56.5'	-24.0'	98.4°	14°47.6'	-24.9'	98.7°	14°38.4'	-25.9'	99.0°	14°28.9'	-26.9'	99.2°	14°19.1'	-27.8'	99.5°	14°09.1'	-28.7'	99.7°	2
3	14°42.2'	-23.2'	99.1°	14°32.6'	-24.2'	99.4°	14°22.7'	-25.2'	99.6°	14°12.5'	-26.1'	99.9°	14°02.0'	-27.1'	100.1°	13°51.3'	-28.0'	100.4°	13°40.4'	-28.9'	100.6°	3
4	14°19.0'	-23.4'	100.1°	14°08.4'	-24.4'	100.3°	13°57.5'	-25.4'	100.6°	13°46.4'	-26.3'	100.8°	13°35.0'	-27.3'	101.1°	13°23.3'	-28.2'	101.3°	13°11.5'	-29.1'	101.5°	4
5	13°55.6'	-23.6'	101.0°	13°44.0'	-24.6'	101.3°	13°32.1'	-25.6'	101.5°	13°20.0'	-26.5'	101.7°	13°07.7'	-27.5'	102.0°	12°55.1'	-28.4'	102.2°	12°42.4'	-29.3'	102.4°	5
6	13°32.0'	-23.9'	102.0°	13°19.4'	-24.8'	102.2°	13°06.6'	-25.8'	102.4°	12°53.5'	-26.7'	102.7°	12°40.3'	-27.6'	102.9°	12°26.8'	-28.6'	103.1°	12°13.0'	-29.5'	103.3°	6
7	13°08.1'	-24.1'	102.9°	12°54.6'	-25.0'	103.1°	12°40.8'	-26.0'	103.4°	12°26.8'	-26.9'	103.6°	12°12.6'	-27.8'	103.8°	11°58.2'	-28.7'	104.0°	11°43.6'	-29.6'	104.2°	7
8	12°44.0'	-24.3'	103.9°	12°29.5'	-25.2'	104.1°	12°14.8'	-26.1'	104.3°	11°59.9'	-27.1'	104.5°	11°44.8'	-28.0'	104.7°	11°29.5'	-28.9'	104.9°	11°13.9'	-29.8'	105.1°	8
9	12°19.8'	-24.5'	104.8°	12°04.3'	-25.4'	105.0°	11°48.7'	-26.3'	105.2°	11°32.8'	-27.2'	105.4°	11°16.8'	-28.2'	105.6°	11°00.6'	-29.1'	105.8°	10°44.1'	-29.9'	106.0°	9
10	11°55.3'	-24.6'	105.7°	11°38.9'	-25.6'	105.9°	11°22.4'	-26.5'	106.1°	11°05.6'	-27.4'	106.3°	10°48.6'	-28.3'	106.5°	10°31.5'	-29.2'	106.7°	10°14.2'	-30.1'	106.9°	10
11	11°30.7'	-24.8'	106.7°	11°13.4'	-25.7'	106.9°	10°55.9'	-26.7'	107.0°	10°38.2'	-27.6'	107.2°	10°20.3'	-28.5'	107.4°	10°02.3'	-29.3'	107.6°	9°44.1'	-30.2'	107.7°	11
12	11°05.8'	-25.0'	107.6°	10°47.6'	-25.9'	107.8°	10°29.2'	-26.8'	108.0°	10°10.6'	-27.7'	108.1°	9°51.9'	-28.6'	108.3°	9°33.0'	-29.5'	108.5°	9°13.9'	-30.3'	108.6°	12
13	10°40.9'	-25.1'	108.5°	10°21.7'	-26.1'	108.7°	10°02.4'	-27.0'	108.9°	9°42.9'	-27.9'	109.0°	9°23.3'	-28.7'	109.2°	9°03.5'	-29.6'	109.3°	8°43.5'	-30.5'	109.5°	13
14	10°15.7'	-25.3'	109.4°	9°55.7'	-26.2'	109.6°	9°35.4'	-27.1'	109.8°	9°15.1'	-28.0'	109.9°	8°54.5'	-28.9'	110.1°	8°33.9'	-29.7'	110.2°	8°13.1'	-30.6'	110.4°	14
15	9°50.4'	-25.5'	110.4°	9°29.5'	-26.3'	110.5°	9°08.3'	-27.2'	110.7°	8°47.1'	-28.1'	110.8°	8°25.7'	-29.0'	111.0°	8°04.2'	-29.8'	111.1°	7°42.5'	-30.7'	111.2°	15
16	9°25.0'	-25.6'	111.3°	9°03.1'	-26.5'	111.4°	8°41.1'	-27.4'	111.6°	8°19.0'	-28.2'	111.7°	7°56.7'	-29.1'	111.8°	7°34.3'	-29.9'	112.0°	7°11.8'	-30.8'	112.1°	16
17	8°59.4'	-25.7'	112.2°	8°36.6'	-26.6'	112.3°	8°13.7'	-27.5'	112.5°	7°50.7'	-28.3'	112.6°	7°27.6'	-29.2'	112.7°	7°04.4'	-30.0'	112.8°	6°41.0'	-30.9'	113.0°	17
18	8°33.6'	-25.9'	113.1°	8°10.0'	-26.7'	113.2°	7°46.3'	-27.6'	113.4°	7°22.4'	-28.4'	113.5°	6°58.4'	-29.3'	113.6°	6°34.3'	-30.1'	113.7°	6°10.1'	-31.0'	113.8°	18
19	8°07.8'	-26.0'	114.0°	7°43.3'	-26.8'	114.2°	7°18.7'	-27.7'	114.3°	6°54.0'	-28.5'	114.4°	6°29.1'	-29.4'	114.5°	6°04.2'	-30.2'	114.6°	5°39.2'	-31.0'	114.7°	19
20	7°41.8'	-26.1'	114.9°	7°16.4'	-27.0'	115.1°	6°51.0'	-27.8'	115.2°	6°25.4'	-28.6'	115.3°	5°59.7'	-29.5'	115.4°	5°34.0'	-30.3'	115.5°	5°08.2'	-31.1'	115.5°	20
21	7°15.7'	-26.2'	115.8°	6°49.5'	-27.1'	116.0°	6°23.2'	-27.9'	116.1°	5°56.8'	-28.7'	116.2°	5°30.3'	-29.5'	116.2°	5°03.7'	-30.4'	116.3°	4°37.1'	-31.2'	116.4°	21
22	6°49.5'	-26.3'	116.7°	6°22.4'	-27.1'	116.9°	5°55.3'	-28.0'	116.9°	5°28.0'	-28.8'	117.0°	5°00.7'	-29.6'	117.1°	4°33.3'	-30.4'	117.2°	4°05.9'	-31.2'	117.3°	22

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

72° 288° LHA

Latitude CONTRARY to Declination

72° 288° LHA

Dec°	21			22			23			24			25			26			27			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	16°46.0'	-22.6'	96.6°	16°39.0'	-23.6'	96.9°	16°31.6'	-24.6'	97.2°	16°23.9'	-25.6'	97.5°	16°15.8'	-26.5'	97.8°	16°07.5'	-27.5'	98.1°	15°58.9'	-28.4'	98.4°	0			
1	16°23.4'	-22.9'	97.6°	16°15.4'	-23.8'	97.9°	16°07.0'	-24.8'	98.2°	15°58.3'	-25.8'	98.5°	15°49.3'	-26.8'	98.8°	15°40.0'	-27.7'	99.0°	15°30.5'	-28.7'	99.3°	1			
2	16°00.6'	-23.1'	98.6°	15°51.5'	-24.1'	98.9°	15°42.1'	-25.1'	99.1°	15°32.5'	-26.0'	99.4°	15°22.5'	-27.0'	99.7°	15°12.3'	-28.0'	100.0°	15°01.8'	-28.9'	100.2°	2			
3	15°37.5'	-23.4'	99.5°	15°27.4'	-24.3'	99.8°	15°17.1'	-25.3'	100.1°	15°06.4'	-26.3'	100.3°	14°55.5'	-27.2'	100.6°	14°44.4'	-28.2'	100.9°	14°32.9'	-29.1'	101.1°	3			
4	15°14.1'	-23.6'	100.5°	15°03.1'	-24.6'	100.8°	14°51.8'	-25.5'	101.0°	14°40.2'	-26.5'	101.3°	14°28.3'	-27.4'	101.5°	14°16.2'	-28.4'	101.8°	14°03.8'	-29.3'	102.0°	4			
5	14°50.5'	-23.8'	101.4°	14°38.5'	-24.8'	101.7°	14°26.2'	-25.8'	101.9°	14°13.7'	-26.7'	102.2°	14°00.9'	-27.6'	102.4°	13°47.8'	-28.6'	102.7°	13°34.5'	-29.5'	102.9°	5			
6	14°26.7'	-24.1'	102.4°	14°13.7'	-25.0'	102.6°	14°00.5'	-26.0'	102.9°	13°47.0'	-26.9'	103.1°	13°33.2'	-27.8'	103.4°	13°19.2'	-28.8'	103.6°	13°05.0'	-29.7'	103.8°	6			
7	14°02.6'	-24.3'	103.3°	13°48.7'	-25.2'	103.6°	13°34.5'	-26.2'	103.8°	13°20.0'	-27.1'	104.0°	13°05.4'	-28.0'	104.3°	12°50.5'	-28.9'	104.5°	12°35.3'	-29.9'	104.7°	7			
8	13°38.4'	-24.5'	104.3°	13°23.4'	-25.4'	104.5°	13°08.3'	-26.4'	104.7°	12°52.9'	-27.3'	105.0°	12°37.3'	-28.2'	105.2°	12°21.5'	-29.1'	105.4°	12°05.5'	-30.0'	105.6°	8			
9	13°13.9'	-24.7'	105.2°	12°58.0'	-25.6'	105.4°	12°41.9'	-26.6'	105.7°	12°25.6'	-27.5'	105.9°	12°09.1'	-28.4'	106.1°	11°52.4'	-29.3'	106.3°	11°35.5'	-30.2'	106.5°	9			
10	12°49.2'	-24.9'	106.1°	12°32.4'	-25.8'	106.4°	12°15.4'	-26.7'	106.6°	11°58.1'	-27.7'	106.8°	11°40.7'	-28.6'	107.0°	11°23.1'	-29.5'	107.2°	11°05.3'	-30.3'	107.4°	10			
11	12°24.3'	-25.1'	107.1°	12°06.5'	-26.0'	107.3°	11°48.6'	-26.9'	107.5°	11°30.5'	-27.8'	107.7°	11°12.2'	-28.7'	107.9°	10°53.6'	-29.6'	108.1°	10°35.0'	-30.5'	108.2°	11			
12	11°59.2'	-25.3'	108.0°	11°40.5'	-26.2'	108.2°	11°21.7'	-27.1'	108.4°	11°02.7'	-28.0'	108.6°	10°43.4'	-28.9'	108.8°	10°24.0'	-29.8'	108.9°	10°04.5'	-30.6'	109.1°	12			
13	11°33.9'	-25.4'	108.9°	11°14.3'	-26.4'	109.1°	10°54.6'	-27.3'	109.3°	10°34.7'	-28.1'	109.5°	10°14.6'	-29.0'	109.7°	9°54.3'	-29.9'	109.8°	9°33.9'	-30.7'	110.0°	13			
14	11°08.5'	-25.6'	109.9°	10°48.0'	-26.5'	110.0°	10°27.3'	-27.4'	110.2°	10°06.5'	-28.3'	110.4°	9°45.5'	-29.2'	110.6°	9°24.4'	-30.0'	110.7°	9°03.1'	-30.9'	110.9°	14			
15	10°42.9'	-25.8'	110.8°	10°21.5'	-26.7'	111.0°	9°59.9'	-27.6'	111.1°	9°38.2'	-28.4'	111.3°	9°16.4'	-29.3'	111.4°	8°54.4'	-30.1'	111.6°	8°32.2'	-31.0'	111.7°	15			
16	10°17.1'	-25.9'	111.7°	9°54.8'	-26.8'	111.9°	9°32.4'	-27.7'	112.0°	9°09.8'	-28.6'	112.2°	8°47.1'	-29.4'	112.3°	8°24.2'	-30.3'	112.5°	8°01.3'	-31.1'	112.6°	16			
17	9°51.1'	-26.1'	112.6°	9°28.0'	-27.0'	112.8°	9°04.7'	-27.8'	112.9°	8°41.3'	-28.7'	113.1°	8°17.7'	-29.5'	113.2°	7°54.0'	-30.4'	113.3°	7°30.2'	-31.2'	113.5°	17			
18	9°25.1'	-26.2'	113.5°	9°01.0'	-27.1'	113.7°	8°36.9'	-27.9'	113.8°	8°12.6'	-28.8'	114.0°	7°48.2'	-29.6'	114.1°	7°23.6'	-30.5'	114.2°	6°59.0'	-31.3'	114.3°	18			
19	8°58.8'	-26.4'	114.4°	8°34.0'	-27.2'	114.6°	8°08.9'	-28.1'	114.7°	7°43.8'	-28.9'	114.8°	7°18.5'	-29.7'	115.0°	6°53.1'	-30.6'	115.1°	6°27.7'	-31.4'	115.2°	19			
20	8°32.5'	-26.5'	115.3°	8°06.7'	-27.3'	115.5°	7°40.9'	-28.2'	115.6°	7°14.9'	-29.0'	115.7°	6°48.8'	-29.8'	115.8°	6°22.6'	-30.6'	115.9°	5°56.3'	-31.5'	116.0°	20			
21	8°06.0'	-26.6'	116.3°	7°39.4'	-27.4'	116.4°	7°12.7'	-28.3'	116.5°	6°45.9'	-29.1'	116.6°	6°19.0'	-29.9'	116.7°	5°51.9'	-30.7'	116.8°	5°24.8'	-31.5'	116.9°	21			
22	7°39.4'	-26.7'	117.2°	7°12.0'	-27.5'	117.3°	6°44.4'	-28.4'	117.4°	6°16.8'	-29.2'	117.5°	5°49.0'	-30.0'	117.6°	5°21.2'	-30.8'	117.7°	4°53.3'	-31.6'	117.7°	22			
23	7°12.7'	-26.8'	118.1°	6°44.4'	-27.6'	118.2°	6°16.0'	-28.5'	118.3°	5°47.6'	-29.3'	118.4°	5°19.0'	-30.1'	118.4°	4°50.4'	-30.9'	118.5°	4°21.7'	-31.6'	118.6°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27						

72° 288° LHA

Latitude CONTRARY to DECLINATION

72° 288° LHA

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

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

71° 289° LHA

Latitude CONTRARY to Declination

71° 289° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	17°41.6'	-22.7'	97.0°	17°34.2'	-23.7'	97.3°	17°26.3'	-24.7'	97.7°	17°18.2'	-25.7'	98.0°	17°09.7'	-26.7'	98.3°	17°00.9'	-27.6'	98.6°	16°51.8'	-28.6'	98.9°	0
1	17°18.9'	-23.0'	98.0°	17°10.5'	-24.0'	98.3°	17°01.6'	-25.0'	98.6°	16°52.5'	-26.0'	98.9°	16°43.0'	-26.9'	99.2°	16°33.3'	-27.9'	99.5°	16°23.2'	-28.8'	99.8°	1
2	16°55.9'	-23.3'	99.0°	16°46.5'	-24.3'	99.3°	16°36.6'	-25.2'	99.6°	16°26.5'	-26.2'	99.9°	16°16.1'	-27.2'	100.1°	16°05.4'	-28.1'	100.4°	15°54.4'	-29.1'	100.7°	2
3	16°32.7'	-23.5'	99.9°	16°22.2'	-24.5'	100.2°	16°11.4'	-25.5'	100.5°	16°00.3'	-26.4'	100.8°	15°48.9'	-27.4'	101.1°	15°37.3'	-28.3'	101.4°	15°25.3'	-29.3'	101.6°	3
4	16°09.2'	-23.8'	100.9°	15°57.7'	-24.8'	101.2°	15°45.9'	-25.7'	101.5°	15°33.9'	-26.7'	101.7°	15°21.5'	-27.6'	102.0°	15°08.9'	-28.6'	102.3°	14°56.0'	-29.5'	102.5°	4
5	15°45.4'	-24.0'	101.8°	15°45.4'	-25.0'	102.1°	15°20.2'	-26.0'	102.4°	15°07.2'	-26.9'	102.7°	14°53.9'	-27.8'	102.9°	14°40.4'	-28.8'	103.2°	14°26.6'	-29.7'	103.4°	5
6	15°21.4'	-24.3'	102.8°	15°07.9'	-25.2'	103.1°	14°54.2'	-26.2'	103.3°	14°40.3'	-27.1'	103.6°	14°26.1'	-28.1'	103.8°	14°11.6'	-29.0'	104.1°	13°56.9'	-29.9'	104.3°	6
7	14°57.1'	-24.5'	103.7°	14°42.7'	-25.5'	104.0°	14°28.1'	-26.4'	104.3°	14°13.2'	-27.3'	104.5°	13°58.0'	-28.3'	104.7°	13°42.6'	-29.2'	105.0°	13°27.0'	-30.1'	105.2°	7
8	14°32.6'	-24.7'	104.7°	14°17.3'	-25.7'	104.9°	14°01.7'	-26.6'	105.2°	13°45.8'	-27.5'	105.4°	13°29.8'	-28.5'	105.7°	13°13.5'	-29.4'	105.9°	12°56.9'	-30.3'	106.1°	8
9	14°07.9'	-24.9'	105.6°	13°51.6'	-25.9'	105.9°	13°35.1'	-26.8'	106.1°	13°18.3'	-27.7'	106.3°	13°01.3'	-28.6'	106.6°	12°44.1'	-29.5'	106.8°	12°26.7'	-30.4'	107.0°	9
10	13°42.9'	-25.2'	106.6°	13°25.7'	-26.1'	106.8°	13°08.2'	-27.0'	107.0°	12°50.6'	-27.9'	107.2°	12°32.7'	-28.8'	107.5°	12°14.6'	-29.7'	107.7°	11°56.2'	-30.6'	107.9°	10
11	13°17.8'	-25.4'	107.5°	12°59.6'	-26.3'	107.7°	12°41.2'	-27.2'	107.9°	12°22.6'	-28.1'	108.2°	12°03.8'	-29.0'	108.4°	11°44.8'	-29.9'	108.6°	11°25.7'	-30.7'	108.8°	11
12	12°52.4'	-25.6'	108.4°	12°33.3'	-26.5'	108.6°	12°14.0'	-27.4'	108.9°	11°54.5'	-28.3'	109.1°	11°34.8'	-29.2'	109.3°	11°15.0'	-30.0'	109.4°	10°54.9'	-30.9'	109.6°	12
13	12°26.8'	-25.7'	109.4°	12°06.8'	-26.7'	109.6°	11°46.6'	-27.6'	109.8°	11°26.3'	-28.4'	110.0°	11°05.7'	-29.3'	110.1°	10°44.9'	-30.2'	110.3°	10°24.0'	-31.0'	110.5°	13
14	12°01.1'	-25.9'	110.3°	11°40.2'	-26.8'	110.5°	11°19.1'	-27.7'	110.7°	10°57.8'	-28.6'	110.9°	10°36.4'	-29.5'	111.0°	10°14.8'	-30.3'	111.2°	9°53.0'	-31.2'	111.4°	14
15	11°35.1'	-26.1'	111.2°	11°13.4'	-27.0'	111.4°	10°51.4'	-27.9'	111.6°	10°29.2'	-28.7'	111.7°	10°06.9'	-29.6'	111.9°	9°44.4'	-30.5'	112.1°	9°21.8'	-31.3'	112.2°	15
16	11°09.0'	-26.3'	112.1°	10°46.4'	-27.2'	112.3°	10°23.5'	-28.0'	112.5°	10°00.5'	-28.9'	112.6°	9°37.3'	-29.7'	112.8°	9°14.0'	-30.6'	113.0°	8°50.5'	-31.4'	113.1°	16
17	10°42.8'	-26.4'	113.0°	10°19.2'	-27.3'	113.2°	9°55.5'	-28.2'	113.4°	9°31.6'	-29.0'	113.5°	9°07.6'	-29.9'	113.7°	8°43.4'	-30.7'	113.8°	8°19.1'	-31.5'	114.0°	17
18	10°16.3'	-26.6'	114.0°	9°51.9'	-27.4'	114.1°	9°27.3'	-28.3'	114.3°	9°02.6'	-29.1'	114.4°	8°37.7'	-30.0'	114.6°	8°12.7'	-30.8'	114.7°	7°47.6'	-31.6'	114.8°	18
19	9°49.8'	-26.7'	114.9°	9°24.5'	-27.6'	115.0°	8°59.0'	-28.4'	115.2°	8°33.4'	-29.3'	115.3°	8°07.7'	-30.1'	115.4°	7°41.9'	-30.9'	115.6°	7°16.0'	-31.7'	115.7°	19
20	9°23.0'	-26.9'	115.8°	8°56.9'	-27.7'	115.9°	8°30.6'	-28.6'	116.1°	8°04.2'	-29.4'	116.2°	7°37.6'	-30.2'	116.3°	7°11.0'	-31.0'	116.4°	6°44.2'	-31.8'	116.5°	20
21	8°56.2'	-27.0'	116.7°	8°29.2'	-27.8'	116.8°	8°02.0'	-28.7'	116.9													

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

70° 290° LHA

Latitude CONTRARY to Declination

70° 290° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	18°37.2'	-22.8'	97.4°	18°29.3'	-23.8'	97.8°	18°21.0'	-24.8'	98.1°	18°12.4'	-25.8'	98.4°	18°03.5'	-26.8'	98.7°	17°54.2'	-27.8'	99.1°	17°44.6'	-28.7'	99.4°	0
1	18°14.4'	-23.1'	98.4°	18°05.5'	-24.1'	98.7°	17°56.2'	-25.1'	99.1°	17°46.6'	-26.1'	99.4°	17°36.7'	-27.1'	99.7°	17°26.4'	-28.0'	100.0°	17°15.8'	-29.0'	100.3°	1
2	17°51.2'	-23.4'	99.4°	17°41.3'	-24.4'	99.7°	17°31.1'	-25.4'	100.0°	17°20.5'	-26.4'	100.3°	17°09.6'	-27.3'	100.6°	16°58.4'	-28.3'	100.9°	16°46.9'	-29.2'	101.2°	2
3	17°27.9'	-23.7'	100.3°	17°16.9'	-24.7'	100.7°	17°05.7'	-25.7'	101.0°	16°54.1'	-26.6'	101.3°	16°42.3'	-27.6'	101.6°	16°30.1'	-28.5'	101.8°	16°17.6'	-29.5'	102.1°	3
4	17°04.2'	-24.0'	101.3°	16°52.2'	-24.9'	101.6°	16°40.0'	-25.9'	101.9°	16°27.5'	-26.9'	102.2°	16°14.7'	-27.8'	102.5°	16°01.6'	-28.8'	102.8°	15°48.2'	-29.7'	103.0°	4
5	16°40.2'	-24.2'	102.3°	16°27.3'	-25.2'	102.6°	16°14.1'	-26.2'	102.8°	16°00.6'	-27.1'	103.1°	15°46.9'	-28.0'	103.4°	15°32.8'	-29.0'	103.7°	15°18.5'	-29.9'	103.9°	5
6	16°16.0'	-24.5'	103.2°	16°02.1'	-25.4'	103.5°	15°47.9'	-26.4'	103.8°	15°33.5'	-27.3'	104.0°	15°18.8'	-28.3'	104.3°	15°03.8'	-29.2'	104.6°	14°48.6'	-30.1'	104.8°	6
7	15°51.5'	-24.7'	104.2°	15°36.6'	-25.7'	104.4°	15°21.5'	-26.6'	104.7°	15°06.2'	-27.6'	105.0°	14°50.5'	-28.5'	105.2°	14°34.7'	-29.4'	105.5°	14°18.5'	-30.3'	105.7°	7
8	15°26.7'	-25.0'	105.1°	15°10.9'	-25.9'	105.4°	14°54.9'	-26.9'	105.6°	14°38.6'	-27.8'	105.9°	14°22.1'	-28.7'	106.1°	14°05.3'	-29.6'	106.4°	13°48.2'	-30.5'	106.6°	8
9	15°01.8'	-25.2'	106.1°	14°45.0'	-26.1'	106.3°	14°28.1'	-27.1'	106.6°	14°10.8'	-28.0'	106.8°	13°53.4'	-28.9'	107.0°	13°35.7'	-29.8'	107.3°	13°17.7'	-30.7'	107.5°	9
10	14°36.5'	-25.4'	107.0°	14°18.9'	-26.4'	107.2°	14°01.0'	-27.3'	107.5°	13°42.8'	-28.2'	107.7°	13°24.5'	-29.1'	107.9°	13°05.9'	-30.0'	108.2°	12°47.0'	-30.8'	108.4°	10
11	14°11.1'	-25.6'	107.9°	13°52.5'	-26.6'	108.2°	13°33.7'	-27.5'	108.4°	13°14.7'	-28.4'	108.6°	12°55.4'	-29.3'	108.8°	12°35.9'	-30.1'	109.1°	12°16.2'	-31.0'	109.3°	11
12	13°45.5'	-25.9'	108.9°	13°26.0'	-26.8'	109.1°	13°06.2'	-27.7'	109.3°	12°46.3'	-28.6'	109.5°	12°26.1'	-29.4'	109.7°	12°05.7'	-30.3'	109.9°	11°45.2'	-31.2'	110.1°	12
13	13°19.6'	-26.1'	109.8°	12°59.2'	-27.0'	110.0°	12°38.5'	-27.9'	110.2°	12°17.7'	-28.7'	110.4°	11°56.7'	-29.6'	110.6°	11°35.4'	-30.5'	110.8°	11°14.0'	-31.3'	111.0°	13
14	12°53.5'	-26.3'	110.7°	12°32.2'	-27.1'	110.9°	12°10.7'	-28.0'	111.1°	11°49.0'	-28.9'	111.3°	11°27.1'	-29.8'	111.5°	11°05.0'	-30.6'	111.7°	10°42.7'	-31.5'	111.9°	14
15	12°27.3'	-26.4'	111.6°	12°05.1'	-27.3'	111.8°	11°42.7'	-28.2'	112.0°	11°20.1'	-29.1'	112.2°	10°57.3'	-29.9'	112.4°	10°34.3'	-30.8'	112.6°	10°11.2'	-31.6'	112.7°	15
16	12°00.9'	-26.6'	112.6°	11°37.7'	-27.5'	112.7°	11°14.5'	-28.4'	112.9°	10°51.0'	-29.2'	113.1°	10°27.4'	-30.1'	113.3°	10°03.6'	-30.9'	113.5°	9°39.6'	-31.7'	113.6°	16
17	11°34.2'	-26.8'	113.5°	11°10.2'	-27.7'	113.7°	10°46.1'	-28.5'	113.8°	10°21.8'	-29.4'	114.0°	9°57.3'	-30.2'	114.2°	9°32.6'	-31.0'	114.3°	9°07.9'	-31.9'	114.5°	17
18	11°07.4'	-27.0'	114.4°	10°42.6'	-27.8'	114.6°	10°17.6'	-28.7'	114.7°	9°52.4'	-29.5'	114.9°	9°27.1'	-30.3'	115.0°	9°01.6'	-31.2'	115.2°	8°36.0'	-32.0'	115.3°	18
19	10°40.5'	-27.1'	115.3°	10°14.8'	-28.0'	115.5°	9°48.9'	-28.8'	115.6°	9°22.9'	-29.6'	115.8°	8°56.7'	-30.5'	115.9°	8°30.4'	-31.3'	116.1°	8°04.0'	-32.1'	116.2°	19
20	10°13.4'	-27.3'	116.2°	9°46.8'	-28.1'	116.4°	9°20.1'	-28.9'	116.5°	8°53.3'	-29.8'	116.7°	8°26.3'	-30.6'	116.8°	7°59.2'	-31.4'	116.9°	7°32.0'	-32.2'	117.0°	20
21	9°46.1'	-27.4'	117.1°	9°18.7'	-28.2'	117.3°	8°51.2'	-29.1'	117.4°	8°23.5'	-29.9'	117.5°	7°55.7'	-30.7'	117.7°	7°27.8'	-31.5'	117.8°	6°59.8'	-32.3'	117.9°	21
22	9°18.7'	-27.5'	118.0°	8°50.5'	-28.4'	118.1°	8°22.1'	-29.2'	118.3°	7°53.6'	-30.0'	118.4°	7°25.0'	-30.8'	118.5°	6°56.3'	-31.6'	118.6°	6°27.5'	-32.4'	118.7°	22
23	8°51.2'	-27.7'	118.9°	8°22.1'	-28.5'	119.0°	7°52.9'	-29.3'	119.2°	7°23.6'	-30.1'	119.3°	6°54.2'	-30.9'	119.4°	6°24.7'	-31.7'	119.5°	5°55.2'	-32.4'	119.6°	23

70° 290° LHA

Latitude CONTRARY to DECLINATION

70° 290° LHA

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

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

69° 291° LHA

Latitude CONTRARY to Declination

69° 291° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	19°32.7'	-23.0'	97.8°	19°24.4'	-24.0'	98.2°	19°15.7'	-25.0'	98.5°	19°06.6'	-26.0'	98.9°	18°57.2'	-27.0'	99.2°	18°47.4'	-27.9'	99.6°	18°37.3'	-28.9'	99.9°	0
1	19°09.7'	-23.3'	98.8°	19°00.4'	-24.3'	99.2°	18°50.7'	-25.3'	99.5°	18°40.6'	-26.3'	99.8°	18°30.2'	-27.2'	100.2°	18°19.5'	-28.2'	100.5°	18°08.4'	-29.1'	100.8°	1
2	18°46.5'	-23.6'	99.8°	18°36.1'	-24.6'	100.1°	18°25.4'	-25.6'	100.4°	18°14.4'	-26.5'	100.8°	18°03.0'	-27.5'	101.1°	17°51.3'	-28.5'	101.4°	17°39.2'	-29.4'	101.7°	2
3	18°22.9'	-23.9'	100.8°	18°11.6'	-24.9'	101.1°	17°59.9'	-25.8'	101.4°	17°47.8'	-26.8'	101.7°	17°35.5'	-27.8'	102.0°	17°22.8'	-28.7'	102.3°	17°09.9'	-29.6'	102.6°	3
4	17°59.0'	-24.2'	101.7°	17°46.7'	-25.1'	102.0°	17°34.0'	-26.1'	102.3°	17°21.0'	-27.1'	102.7°	17°07.7'	-28.0'	103.0°	16°54.1'	-29.0'	103.3°	16°40.2'	-29.9'	103.6°	4
5	17°34.9'	-24.4'	102.7°	17°21.5'	-25.4'	103.0°	17°07.9'	-26.4'	103.3°	16°54.0'	-27.3'	103.6°	16°39.7'	-28.3'	103.9°	16°25.2'	-29.2'	104.2°	16°10.3'	-30.1'	104.5°	5
6	17°10.4'	-24.7'	103.6°	16°56.1'	-25.7'	103.9°	16°41.5'	-26.6'	104.2°	16°26.6'	-27.6'	104.5°	16°11.4'	-28.5'	104.8°	15°56.0'	-29.4'	105.1°	15°40.2'	-30.3'	105.4°	6
7	16°45.7'	-25.0'	104.6°	16°30.5'	-25.9'	104.9°	16°14.9'	-26.9'	105.2°	15°59.1'	-27.8'	105.4°	15°43.0'	-28.7'	105.7°	15°26.6'	-29.6'	106.0°	15°09.9'	-30.5'	106.2°	7
8	16°20.7'	-25.2'	105.5°	16°04.5'	-26.2'	105.8°	15°48.0'	-27.1'	106.1°	15°31.3'	-28.0'	106.4°	15°14.2'	-28.9'	106.6°	14°56.9'	-29.8'	106.9°	14°39.4'	-30.7'	107.1°	8
9	15°55.5'	-25.5'	106.5°	15°38.4'	-26.4'	106.8°	15°20.9'	-27.3'	107.0°	15°03.2'	-28.3'	107.3°	14°45.3'	-29.2'	107.5°	14°27.1'	-30.0'	107.8°	14°08.6'	-30.9'	108.0°	9
10	15°30.1'	-25.7'	107.4°	15°12.0'	-26.6'	107.7°	14°53.6'	-27.6'	107.9°	14°35.0'	-28.5'	108.2°	14°16.1'	-29.4'	108.4°	13°57.0'	-30.2'	108.7°	13°37.7'	-31.1'	108.9°	10
11	15°04.3'	-25.9'	108.4°	14°45.3'	-26.9'	108.6°	14°26.0'	-27.8'	108.9°	14°06.5'	-28.7'	109.1°	13°46.8'	-29.6'	109.3°	13°26.8'	-30.4'	109.6°	13°06.6'	-31.3'	109.8°	11
12	14°38.4'	-26.2'	109.3°	14°18.5'	-27.1'	109.5°	13°58.3'	-28.0'	109.8°	13°37.9'	-28.9'	110.0°	13°17.2'	-29.7'	110.2°	12°56.4'	-30.6'	110.5°	12°35.3'	-31.5'	110.7°	12
13	14°12.2'	-26.4'	110.2°	13°51.4'	-27.3'	110.5°	13°30.3'	-28.2'	110.7°	13°09.0'	-29.0'	110.9°	12°47.5'	-29.9'	111.1°	12°25.7'	-30.8'	111.3°	12°03.8'	-31.6'	111.5°	13
14	13°45.9'	-26.6'	111.2°	13°24.1'	-27.5'	111.4°	13°02.1'	-28.4'	111.6°	12°39.9'	-29.2'	111.8°	12°17.6'	-30.1'	112.0°	11°55.0'	-30.9'	112.2°	11°32.2'	-31.8'	112.4°	14
15	13°19.3'	-26.8'	112.1°	12°56.6'	-27.7'	112.3°	12°33.8'	-28.5'	112.5°	12°10.7'	-29.4'	112.7°	11°47.5'	-30.3'	112.9°	11°24.0'	-31.1'	113.1°	11°00.4'	-31.9'	113.3°	15
16	12°52.5'	-27.0'	113.0°	12°29.0'	-27.8'	113.2°	12°05.2'	-28.7'	113.4°	11°41.3'	-29.6'	113.6°	11°17.2'	-30.4'	113.8°	10°52.9'	-31.2'	114.0°	10°28.5'	-32.1'	114.1°	16
17	12°25.5'	-27.2'	113.9°	12°01.1'	-28.0'	114.1°	11°36.5'	-28.9'	114.3°	11°11.7'	-29.7'	114.5°	10°46.8'	-30.6'	114.7°	10°21.7'	-31.4'	114.8°	9°56.4'	-32.2'	115.0°	17
18	11°58.4'	-27.3'	114.8°	11°33.1'	-28.2'	115.0°	11°07.6'	-29.0'	115.2°	10°42.0'	-29.9'	115.4°	10°16.2'	-30.7'	115.5°	9°50.3'	-31.5'	115.7°	9°24.2'	-32.3'	115.8°	18
19	11°31.0'	-27.5'	115.7°	11°04.9'	-28.3'	115.9°	10°38.6'	-29.2'	116.1°	10°12.2'	-30.0'	116.2°	9°45.5'	-30.8'	116.4°	9°18.8'	-31.6'	116.6°	8°51.9'	-32.4'	116.7°	19
20	11°03.5'	-27.7'	116.6°	10°36.6'	-28.5'	116.8°	10°09.4'	-29.3'	117.0°	9°42.1'	-30.1'	117.1°	9°14.7'	-31.0'	117.3°	8°47.2'	-31.8'	117.4°	8°19.5'	-32.5'	117.5°	20
21	10°35.9'	-27.8'	117.5°	10°08.1'	-28.6'	117.7°	9°40.1'	-29.5'	117.9°	9°12.0'	-30.3'	118.0°	8°43.8'	-31.1'	118.1°	8°15.4'	-31.9'	118.3°	7°46.9'	-32.6'	118.4°	21
22	10°08.1'	-28.0'	118.4°	9°39.4'	-28.8'	118.6°	9°10.6'	-29.6'	118.7°	8°41.7'												

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

68° 292° LHA

Latitude CONTRARY to Declination

68° 292° LHA

Table with columns for Dec°, 21, 22, 23, 24, 25, 26, 27, and Dec°. Each column contains three sub-columns for Hc°, d', and Z°. The table lists values for declinations from 0 to 23 degrees.

68° 292° LHA

Latitude CONTRARY to DECLINATION

68° 292° LHA

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

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

67° 293° LHA

Latitude CONTRARY to Declination

67° 293° LHA

Table with columns for Dec°, 21, 22, 23, 24, 25, 26, 27, and Dec°. Each column contains three sub-columns for Hc°, d', and Z°. The table lists values for declinations from 0 to 23 degrees.

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 for Dec, 21, 22, 23, 24, 25, 26, 27, Dec. Each column contains Hc, d', and Z values for degrees 0 through 23.

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 for Dec, 21, 22, 23, 24, 25, 26, 27, Dec. Each column contains Hc, d', and Z values for degrees 0 through 23.

65° 295° LHA

Latitude CONTRARY to DECLINATION

65° 295° LHA

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

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

64° 296° LHA

Latitude CONTRARY to Declination

64° 296° LHA

Table with 10 columns (Dec, 21-27, Dec) and 23 rows of latitude and declination data for 64° 296° LHA.

64° 296° LHA

Latitude CONTRARY to DECLINATION

64° 296° LHA

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

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

63° 297° LHA

Latitude CONTRARY to Declination

63° 297° LHA

Table with 10 columns (Dec, 21-27, Dec) and 23 rows of latitude and declination data for 63° 297° LHA.

63° 297° LHA

Latitude CONTRARY to DECLINATION

63° 297° LHA

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

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

62° 298° LHA				Latitude CONTRARY to Declination								62° 298° LHA													
Dec°	21			22			23			24			25			26			27			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	25°59.6'	-24.1'	100.8°	25°48.2'	-25.2'	101.3°	25°36.2'	-26.2'	101.7°	25°23.8'	-27.2'	102.2°	25°10.9'	-28.2'	102.7°	24°57.5'	-29.2'	103.1°	24°43.6'	-30.2'	103.6°	0			
1	25°35.5'	-24.6'	101.8°	25°23.0'	-25.6'	102.3°	25°10.0'	-26.6'	102.7°	24°56.6'	-27.6'	103.2°	24°42.7'	-28.6'	103.6°	24°28.3'	-29.6'	104.1°	24°13.5'	-30.5'	104.5°	1			
2	25°10.9'	-25.0'	102.8°	24°57.5'	-26.0'	103.3°	24°43.5'	-27.0'	103.7°	24°29.0'	-28.0'	104.2°	24°14.1'	-28.9'	104.6°	23°58.7'	-29.9'	105.0°	23°43.0'	-30.9'	105.5°	2			
3	24°46.0'	-25.4'	103.8°	24°31.5'	-26.4'	104.3°	24°16.5'	-27.4'	104.7°	24°01.0'	-28.3'	105.1°	23°45.1'	-29.3'	105.6°	23°28.8'	-30.3'	106.0°	23°12.1'	-31.2'	106.4°	3			
4	24°20.7'	-25.7'	104.8°	24°05.1'	-26.7'	105.2°	23°49.1'	-27.7'	105.7°	23°32.7'	-28.7'	106.1°	23°15.8'	-29.6'	106.5°	22°58.6'	-30.6'	106.9°	22°40.9'	-31.5'	107.3°	4			
5	23°54.9'	-26.1'	105.8°	23°38.4'	-27.1'	106.2°	23°21.4'	-28.1'	106.6°	23°04.0'	-29.0'	107.1°	22°46.2'	-30.0'	107.5°	22°28.0'	-30.9'	107.9°	22°09.4'	-31.8'	108.2°	5			
6	23°28.8'	-26.5'	106.8°	23°11.3'	-27.5'	107.2°	22°53.3'	-28.4'	107.6°	22°35.0'	-29.4'	108.0°	22°16.2'	-30.3'	108.4°	21°57.1'	-31.2'	108.8°	21°37.6'	-32.1'	109.2°	6			
7	23°02.3'	-26.9'	107.8°	22°43.8'	-27.8'	108.2°	22°24.9'	-28.8'	108.6°	22°05.6'	-29.7'	108.9°	21°45.9'	-30.6'	109.3°	21°25.9'	-31.5'	109.7°	21°05.5'	-32.4'	110.1°	7			
8	22°35.5'	-27.2'	108.7°	22°16.0'	-28.1'	109.1°	21°56.1'	-29.1'	109.5°	21°35.9'	-30.0'	109.9°	21°15.3'	-30.9'	110.3°	20°54.4'	-31.8'	110.6°	20°33.1'	-32.7'	111.0°	8			
9	22°08.3'	-27.5'	109.7°	21°47.8'	-28.5'	110.1°	21°27.1'	-29.4'	110.4°	21°05.9'	-30.3'	110.8°	20°44.4'	-31.2'	111.2°	20°22.6'	-32.1'	111.5°	20°00.4'	-32.9'	111.9°	9			
10	21°40.7'	-27.9'	110.7°	21°19.4'	-28.8'	111.0°	20°57.7'	-29.7'	111.4°	20°35.6'	-30.6'	111.7°	20°13.2'	-31.5'	112.1°	19°50.5'	-32.3'	112.4°	19°27.5'	-33.2'	112.7°	10			
11	21°12.9'	-28.2'	111.6°	20°50.6'	-29.1'	112.0°	20°28.0'	-30.0'	112.3°	20°05.0'	-30.9'	112.7°	19°41.8'	-31.7'	113.0°	19°18.2'	-32.6'	113.3°	18°54.3'	-33.4'	113.6°	11			
12	20°44.7'	-28.5'	112.6°	20°21.5'	-29.4'	112.9°	19°58.0'	-30.3'	113.2°	19°34.2'	-31.1'	113.6°	19°10.0'	-32.0'	113.9°	18°45.6'	-32.9'	114.2°	18°20.8'	-33.7'	114.5°	12			
13	20°16.2'	-28.8'	113.5°	19°52.1'	-29.7'	113.8°	19°27.7'	-30.5'	114.2°	19°03.0'	-31.4'	114.5°	18°38.0'	-32.3'	114.8°	18°12.7'	-33.1'	115.1°	17°47.1'	-33.9'	115.4°	13			
14	19°47.4'	-29.1'	114.4°	19°22.4'	-30.0'	114.7°	18°57.2'	-30.8'	115.1°	18°31.6'	-31.7'	115.4°	18°05.7'	-32.5'	115.7°	17°39.6'	-33.3'	116.0°	17°13.2'	-34.1'	116.2°	14			
15	19°18.3'	-29.4'	115.4°	18°52.5'	-30.2'	115.7°	18°26.3'	-31.1'	116.0°	17°59.9'	-31.9'	116.3°	17°33.2'	-32.7'	116.6°	17°06.3'	-33.5'	116.8°	16°39.1'	-34.3'	117.1°	15			
16	18°49.0'	-29.6'	116.3°	18°22.3'	-30.5'	116.6°	17°55.3'	-31.3'	116.9°	17°28.0'	-32.1'	117.2°	17°00.5'	-33.0'	117.4°	16°32.7'	-33.8'	117.7°	16°04.7'	-34.5'	118.0°	16			
17	18°19.3'	-29.9'	117.2°	17°51.8'	-30.7'	117.5°	17°24.0'	-31.6'	117.8°	16°55.9'	-32.4'	118.0°	16°27.6'	-33.2'	118.3°	15°59.0'	-34.0'	118.6°	15°30.2'	-34.7'	118.8°	17			
18	17°49.4'	-30.1'	118.1°	17°21.1'	-31.0'	118.4°	16°52.4'	-31.8'	118.7°	16°23.5'	-32.6'	118.9°	15°54.4'	-33.4'	119.2°	15°25.0'	-34.2'	119.4°	14°55.4'	-34.9'	119.7°	18			
19	17°19.3'	-30.4'	119.0°	16°50.1'	-31.2'	119.3°	16°20.6'	-32.0'	119.5°	15°50.9'	-32.8'	119.8°	15°21.0'	-33.6'	120.0°	14°50.9'	-34.3'	120.3°	14°20.5'	-35.1'	120.5°	19			
20	16°48.9'	-30.6'	119.9°	16°18.9'	-31.4'	120.2°	15°48.6'	-32.2'	120.4°	15°18.1'	-33.0'	120.7°	14°47.4'	-33.8'	120.9°	14°16.5'	-34.5'	121.1°	13°45.4'	-35.3'	121.3°	20			
21	16°18.3'	-30.8'	120.8°	15°47.5'	-31.6'	121.1°	15°16.4'	-32.4'	121.3°	14°45.1'	-33.2'	121.5°	14°13.6'	-33.9'	121.7°	13°42.0'	-34.7'	122.0°	13°10.1'	-35.4'	122.2°	21			
22	15°47.5'	-31.1'	121.7°	15°15.8'	-31.8'	121.9°	14°44.0'	-32.6'	122.2°	14°11.9'	-33.4'	122.4°	13°39.7'	-34.1'	122.6°	13°07.3'	-34.9'	122.8°	12°34.7'	-35.6'	123.0°	22			
23	15°16.4'	-31.3'	122.6°	14°44.0'	-32.0'	122.8°	14°11.4'	-32.8'	123.0°	13°38.6'	-33.5'	123.2°	13°05.6'	-34.3'	123.4°	12°32.4'	-35.0'	123.6°	11°59.1'	-35.7'	123.8°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27						

62° 298° LHA Latitude CONTRARY to DECLINATION 62° 298° LHA
 South Lat. LHA > 180° .. Zn = 180-Z LHA < 180° .. Zn= 180+Z

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

61° 299° LHA				Latitude CONTRARY to Declination								61° 299° LHA										
Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°54.6'	-24.3'	101.2°	26°42.7'	-25.4'	101.7°	26°30.3'	-26.4'	102.2°	26°17.3'	-27.4'	102.7°	26°03.9'	-28.4'	103.2°	25°50.0'	-29.4'	103.7°	25°35.6'	-30.4'	104.1°	0
1	26°30.3'	-24.8'	102.3°	26°17.3'	-25.8'	102.7°	26°03.9'	-26.8'	103.2°	25°49.9'	-27.8'	103.7°	25°35.5'	-28.8'	104.2°	25°20.5'	-29.8'	104.6°	25°05.2'	-30.8'	105.1°	1
2	26°05.5'	-25.2'	103.3°	25°51.5'	-26.2'	103.7°	25°37.1'	-27.2'	104.2°	25°22.1'	-28.2'	104.7°	25°06.6'	-29.2'	105.1°	24°50.8'	-30.2'	105.6°	24°34.4'	-31.1'	106.0°	2
3	25°40.4'	-25.6'	104.3°	25°25.3'	-26.6'	104.7°	25°09.8'	-27.6'	105.2°	24°53.9'	-28.6'	105.7°	24°37.5'	-29.6'	106.1°	24°20.6'	-30.5'	106.5°	24°03.3'	-31.4'	107.0°	3
4	25°14.8'	-26.0'	105.3°	24°58.7'	-27.0'	105.7°	24°42.2'	-28.0'	106.2°	24°25.3'	-29.0'	106.6°	24°07.9'	-29.9'	107.1°	23°50.1'	-30.8'	107.5°	23°31.9'	-31.8'	107.9°	4
5	24°48.8'	-26.4'	106.3°	24°31.7'	-27.4'	106.7°	24°14.2'	-28.4'	107.2°	23°56.3'	-29.3'	107.6°	23°38.0'	-30.3'	108.0°	23°19.2'	-31.2'	108.4°	23°00.1'	-32.1'	108.8°	5
6	24°22.4'	-26.8'	107.3°	24°04.3'	-27.8'	107.7°	23°45.9'	-28.7'	108.1°	23°27.2'	-29.7'	108.5°	23°07.7'	-30.6'	108.9°	22°48.1'	-31.5'	109.3°	22°28.0'	-32.4'	109.7°	6
7	23°55.6'	-27.2'	108.2°	23°36.6'	-28.1'	108.7°	23°17.2'	-29.1'	109.1°	22°57.4'	-30.0'	109.5°	22°37.2'	-30.9'	109.9°	22°16.6'	-31.8'	110.3°	21°55.6'	-32.7'	110.6°	7
8	23°28.4'	-27.5'	109.2°	23°08.5'	-28.5'	109.6°	22°48.1'	-29.4'	110.0°	22°27.4'	-30.3'	110.4°	22°06.3'	-31.2'	110.8°	21°44.8'	-32.1'	111.2°	21°22.9'	-33.0'	111.5°	8
9	23°00.9'	-27.9'	110.2°	22°40.0'	-28.8'	110.6°	22°18.7'	-29.7'	111.0°	21°57.1'	-30.6'	111.4°	21°35.0'	-31.5'	111.7°	21°12.7'	-32.4'	112.1°	20°49.9'	-33.3'	112.4°	9
10	22°33.0'	-28.2'	111.1°	22°11.2'	-29.1'	111.5°	21°49.0'	-30.0'	111.9°	21°26.4'	-30.9'	112.3°	21°03.5'	-31.8'	112.6°	20°40.3'	-32.7'	113.0°	20°16.7'	-33.5'	113.3°	10
11	22°04.8'	-28.5'	112.1°	21°42.1'	-29.4'	112.5°	21°19.0'	-30.3'	112.8°	20°55.5'	-31.2'	113.2°	20°31.7'	-32.1'	113.5°	20°07.6'	-32.9'	113.9°	19°43.1'	-33.8'	114.2°	11
12	21°36.3'	-28.9'	113.1°	21°12.6'	-29.7'	113.4°	20°48.6'	-30.6'	113.8°	20°24.3'	-31.5'	114.1°	19°59.6'	-32.4'	114.4°	19°34.6'	-33.2'	114.8°	19°09.4'	-34.0'	115.1°	12
13	21°07.5'	-29.2'	114.0°	20°42.9'	-30.0'	114.3°	20°18.0'	-30.9'	114.7°	19°52.8'	-31.8'	115.0°	19°27.3'	-32.6'	115.3°	19°01.4'	-33.5'	115.7°	18°35.3'	-34.3'	116.0°	13
14	20°38.3'	-29.5'	114.9°	20°12.8'	-30.3'	115.3°	19°47.1'	-31.2'	115.6°	19°21.0'	-32.0'	115.9°	18°54.6'	-32.9'	116.2°	18°28.0'	-33.7'	116.5°	18°01.0'	-34.5'	116.8°	14
15	20°08.8'	-29.8'	115.9°	19°42.5'	-30.6'	116.2°	19°15.9'	-31.5'	116.5°	18°49.0'	-32.3'	116.8°	18°21.8'	-33.1'	117.1°	17°54.3'	-33.9'	117.4°	17°26.5'	-34.7'	117.7°	15
16	19°39.1'	-30.0'	116.8°	19°11.9'	-30.9'	117.1°	18°44.4'	-31.7'	117.4°	18°16.7'	-32.5'	117.7°	17°48.7'	-33.3'	118.0°	17°20.4'	-34.1'	118.3°	16°51.8'	-34.9'	118.5°	16
17	19°09.0'	-30.3'	117.7°	18°41.0'	-31.1'	118.0°	18°12.7'	-32.0'	118.3°	17°44.1'	-32.8'	118.6°	17°15.3'	-33.6'	118.9°	16°46.2'	-34.4'	119.1°	16°16.9'	-35.1'	119.4°	17
18	18°38.7'	-30.6'	118.6°	18°09.9'	-31.4'	118.9°	17°40.7'	-32.2'	119.2°	17°11.4'	-33.0'	119.5°	16°41.7'	-33.8'	119.7°	16°11.9'	-34.6'	120.0°	15°41.8'	-35.3'	120.2°	18
19	18°08.2'	-30.8'	119.5°	17°38.5'	-31.6'	119.8°	17°08.5'	-32.4'	120.1°	16°38.4'	-33.2'	120.3°	16°07.9'	-34.0'	120.6°	15°37.3'	-34.8'	120.8°	15°06.4'	-35.5'	121.1°	19
20	17°37.3'	-31.1'	120.4°	17°06.8'	-31.9'	120.7°	16°36.1'	-32.7'	120.9°	16°05.1'	-33.4'	121.2°	15°33.9'	-34.2'	121.4°	15°02.5'	-34.9'	121.7°	14°30.9'	-35.7'	121.9°	20
21	17°06.3'	-31.3'	121.3°	16°35.0'	-32.1'	121.6°	16°03.5'	-32.9'	121.8°	15°31.7'	-33.6'	122.1°	14°59.8'	-34.4'	122.3°	14°27.6'	-35.1'	122.5°	13°55.3'	-3		

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

60° 300° LHA			Latitude CONTRARY to Declination												60° 300° LHA							
Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	27°49.5'	-24.5'	101.7°	27°37.1'	-25.6'	102.2°	27°24.2'	-26.6'	102.7°	27°10.7'	-27.6'	103.2°	26°56.8'	-28.6'	103.7°	26°42.3'	-29.6'	104.2°	26°27.3'	-30.6'	104.7°	0
1	27°25.0'	-25.0'	102.7°	27°11.6'	-26.0'	103.2°	26°57.6'	-27.1'	103.7°	26°43.1'	-28.1'	104.2°	26°28.1'	-29.1'	104.7°	26°12.7'	-30.0'	105.2°	25°56.7'	-31.0'	105.6°	1
2	27°00.0'	-25.4'	103.7°	26°45.5'	-26.5'	104.2°	26°30.5'	-27.5'	104.7°	26°15.0'	-28.5'	105.2°	25°59.1'	-29.4'	105.7°	25°42.6'	-30.4'	106.1°	25°25.7'	-31.4'	106.6°	2
3	26°34.6'	-25.9'	104.8°	26°19.1'	-26.9'	105.2°	26°03.1'	-27.9'	105.7°	25°46.6'	-28.8'	106.2°	25°29.6'	-29.8'	106.6°	25°12.2'	-30.8'	107.1°	24°54.4'	-31.7'	107.5°	3
4	26°08.7'	-26.3'	105.8°	25°52.2'	-27.3'	106.2°	25°35.2'	-28.3'	106.7°	25°17.7'	-29.2'	107.1°	24°59.8'	-30.2'	107.6°	24°41.5'	-31.1'	108.0°	24°22.7'	-32.0'	108.5°	4
5	25°42.5'	-26.7'	106.8°	25°24.9'	-27.7'	107.2°	25°06.9'	-28.6'	107.7°	24°48.5'	-29.6'	108.1°	24°29.6'	-30.5'	108.5°	24°10.3'	-31.5'	109.0°	23°50.6'	-32.4'	109.4°	5
6	25°15.8'	-27.1'	107.8°	24°57.3'	-28.1'	108.2°	24°38.3'	-29.0'	108.6°	24°18.9'	-30.0'	109.1°	23°59.1'	-30.9'	109.5°	23°38.9'	-31.8'	109.9°	23°18.2'	-32.7'	110.3°	6
7	24°48.7'	-27.5'	108.7°	24°29.2'	-28.4'	109.2°	24°09.3'	-29.4'	109.6°	23°49.0'	-30.3'	110.0°	23°28.2'	-31.2'	110.4°	23°07.1'	-32.1'	110.8°	22°45.5'	-33.0'	111.2°	7
8	24°21.2'	-27.8'	109.7°	24°00.8'	-28.8'	110.1°	23°39.9'	-29.7'	110.6°	23°18.7'	-30.6'	111.0°	22°57.0'	-31.5'	111.4°	22°35.0'	-32.4'	111.7°	22°12.5'	-33.3'	112.1°	8
9	23°53.4'	-28.2'	110.7°	23°32.0'	-29.1'	111.1°	23°10.2'	-30.1'	111.5°	22°48.0'	-31.0'	111.9°	22°25.5'	-31.8'	112.3°	22°02.5'	-32.7'	112.7°	21°39.2'	-33.6'	113.0°	9
10	23°25.2'	-28.6'	111.7°	23°02.9'	-29.5'	112.1°	22°40.2'	-30.4'	112.4°	22°17.1'	-31.3'	112.8°	21°53.6'	-32.2'	113.2°	21°29.8'	-33.0'	113.6°	21°05.6'	-33.9'	113.9°	10
11	22°56.7'	-28.9'	112.6°	22°33.4'	-29.8'	113.0°	22°09.8'	-30.7'	113.4°	21°45.8'	-31.6'	113.7°	21°21.5'	-32.4'	114.1°	20°56.8'	-33.3'	114.5°	20°31.8'	-34.1'	114.8°	11
12	22°27.8'	-29.2'	113.6°	22°03.6'	-30.1'	113.9°	21°39.1'	-31.0'	114.3°	21°14.2'	-31.9'	114.7°	20°49.0'	-32.7'	115.0°	20°23.5'	-33.6'	115.3°	19°57.7'	-34.4'	115.7°	12
13	21°58.5'	-29.5'	114.5°	21°33.5'	-30.4'	114.9°	21°08.1'	-31.3'	115.2°	20°42.3'	-32.2'	115.6°	20°16.3'	-33.0'	115.9°	19°49.9'	-33.8'	116.2°	19°23.3'	-34.6'	116.5°	13
14	21°29.0'	-29.9'	115.4°	21°03.0'	-30.7'	115.8°	20°36.8'	-31.6'	116.1°	20°10.2'	-32.4'	116.5°	19°43.3'	-33.3'	116.8°	19°16.1'	-34.1'	117.1°	18°48.6'	-34.9'	117.4°	14
15	20°59.1'	-30.2'	116.4°	20°32.3'	-31.0'	116.7°	20°05.2'	-31.9'	117.0°	19°37.8'	-32.7'	117.4°	19°10.1'	-33.5'	117.7°	18°42.0'	-34.3'	118.0°	18°13.8'	-35.1'	118.3°	15
16	20°29.0'	-30.4'	117.3°	20°01.3'	-31.3'	117.6°	19°33.3'	-32.1'	117.9°	19°05.1'	-32.9'	118.2°	18°36.5'	-33.7'	118.5°	18°07.7'	-34.5'	118.8°	17°38.7'	-35.3'	119.1°	16
17	19°58.5'	-30.7'	118.2°	19°30.0'	-31.6'	118.5°	19°01.2'	-32.4'	118.8°	18°32.1'	-33.2'	119.1°	18°02.8'	-34.0'	119.4°	17°33.2'	-34.8'	119.7°	17°03.3'	-35.5'	120.0°	17
18	19°27.8'	-31.0'	119.1°	18°58.5'	-31.8'	119.4°	18°28.8'	-32.6'	119.7°	17°59.0'	-33.4'	120.0°	17°28.8'	-34.2'	120.3°	16°58.4'	-35.0'	120.6°	16°27.8'	-35.7'	120.8°	18
19	18°56.8'	-31.3'	120.0°	18°26.6'	-32.1'	120.3°	17°56.2'	-32.9'	120.6°	17°25.5'	-33.6'	120.9°	16°54.6'	-34.4'	121.1°	16°23.5'	-35.2'	121.4°	15°52.1'	-35.9'	121.6°	19
20	18°25.5'	-31.5'	120.9°	17°54.6'	-32.3'	121.2°	17°23.3'	-33.1'	121.5°	16°51.9'	-33.9'	121.7°	16°20.2'	-34.6'	122.0°	15°48.3'	-35.4'	122.2°	15°16.2'	-36.1'	122.5°	20
21	17°54.0'	-31.8'	121.8°	17°22.2'	-32.5'	122.1°	16°50.2'	-33.3'	122.4°	16°18.0'	-34.1'	122.6°	15°45.6'	-34.8'	122.9°	15°12.9'	-35.6'	123.1°	14°40.1'	-36.3'	123.3°	21
22	17°22.2'	-32.1'	122.7°	16°49.7'	-32.8'	123.0°	16°16.9'	-33.5'	123.2°	15°43.9'	-34.3'	123.5°	15°10.8'	-35.0'	123.7°	14°37.4'	-35.7'	123.9°	14°03.8'	-36.4'	124.1°	22
23	16°50.2'	-32.2'	123.6°	16°16.9'	-33.0'	123.9°	15°43.4'	-33.7'	124.1°	15°09.7'	-34.5'	124.3°	14°35.8'	-35.2'	124.5°	14°01.6'	-35.9'	124.7°	13°27.4'	-36.6'	124.9°	23

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°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	28°44.3'	-24.8'	102.2°	28°31.5'	-25.8'	102.7°	28°18.0'	-26.9'	103.2°	28°04.0'	-27.9'	103.7°	27°49.5'	-28.9'	104.2°	27°34.5'	-29.9'	104.8°	27°19.0'	-30.9'	105.3°	0
1	28°19.6'	-25.2'	103.2°	28°05.7'	-26.3'	103.7°	27°51.2'	-27.3'	104.2°	27°36.2'	-28.3'	104.7°	27°20.7'	-29.3'	105.2°	27°04.6'	-30.3'	105.7°	26°48.1'	-31.2'	106.2°	1
2	27°54.3'	-25.7'	104.2°	27°39.4'	-26.7'	104.7°	27°23.9'	-27.7'	105.2°	27°07.9'	-28.7'	105.7°	26°51.4'	-29.7'	106.2°	26°34.4'	-30.7'	106.7°	26°16.9'	-31.6'	107.2°	2
3	27°28.7'	-26.1'	105.2°	27°12.7'	-27.1'	105.7°	26°56.2'	-28.1'	106.2°	26°39.2'	-29.1'	106.7°	26°21.7'	-30.1'	107.2°	26°03.7'	-31.0'	107.7°	25°45.3'	-32.0'	108.1°	3
4	27°02.6'	-26.6'	106.3°	26°45.5'	-27.6'	106.7°	26°28.0'	-28.5'	107.2°	26°10.0'	-29.5'	107.7°	25°51.6'	-30.5'	108.2°	25°32.6'	-31.4'	108.6°	25°13.3'	-32.3'	109.1°	4
5	26°36.0'	-27.0'	107.3°	26°18.0'	-28.0'	107.7°	25°59.5'	-28.9'	108.2°	25°40.5'	-29.9'	108.7°	25°21.1'	-30.8'	109.1°	25°01.2'	-31.8'	109.6°	24°40.9'	-32.7'	110.0°	5
6	26°09.1'	-27.4'	108.3°	25°50.0'	-28.4'	108.7°	25°30.5'	-29.3'	109.2°	25°10.6'	-30.3'	109.6°	24°50.3'	-31.2'	110.1°	24°29.5'	-32.1'	110.5°	24°08.3'	-33.0'	110.9°	6
7	25°41.7'	-27.8'	109.2°	25°21.7'	-28.7'	109.7°	25°01.2'	-29.7'	110.1°	24°40.4'	-30.6'	110.6°	24°19.1'	-31.5'	111.0°	23°57.4'	-32.4'	111.4°	23°35.3'	-33.3'	111.8°	7
8	25°13.9'	-28.2'	110.2°	24°52.9'	-29.1'	110.7°	24°31.5'	-30.0'	111.1°	24°09.7'	-31.0'	111.5°	23°47.5'	-31.9'	111.9°	23°24.9'	-32.8'	112.3°	23°01.9'	-33.6'	112.7°	8
9	24°45.7'	-28.5'	111.2°	24°23.8'	-29.5'	111.6°	24°01.5'	-30.4'	112.0°	23°38.8'	-31.3'	112.5°	23°15.7'	-32.2'	112.9°	22°52.2'	-33.1'	113.2°	22°28.3'	-33.9'	113.6°	9
10	24°17.2'	-28.9'	112.2°	23°54.3'	-29.8'	112.6°	23°31.1'	-30.7'	113.0°	23°07.5'	-31.6'	113.4°	22°43.5'	-32.5'	113.8°	22°19.1'	-33.4'	114.1°	21°54.4'	-34.2'	114.5°	10
11	23°48.3'	-29.3'	113.1°	23°24.5'	-30.2'	113.5°	23°00.4'	-31.1'	113.9°	22°35.9'	-31.9'	114.3°	22°11.0'	-32.8'	114.7°	21°45.8'	-33.6'	115.0°	21°20.2'	-34.5'	115.4°	11
12	23°19.0'	-29.6'	114.1°	22°54.3'	-30.5'	114.5°	22°29.3'	-31.4'	114.8°	22°03.9'	-32.2'	115.2°	21°38.2'	-33.1'	115.6°	21°12.1'	-33.9'	115.9°	20°45.7'	-34.7'	116.3°	12
13	22°49.4'	-29.9'	115.0°	22°23.8'	-30.8'	115.4°	21°57.9'	-31.7'	115.8°	21°31.7'	-32.5'	116.1°	21°05.1'	-33.4'	116.5°	20°38.2'	-34.2'	116.8°	20°11.0'	-35.0'	117.1°	13
14	22°19.5'	-30.3'	116.0°	21°53.0'	-31.1'	116.3°	21°26.2'	-32.0'	116.7°	20°59.1'	-32.8'	117.0°	20°31.7'	-33.6'	117.4°	20°04.0'	-34.5'	117.7°	19°36.0'	-35.2'	118.0°	14
15	21°49.2'	-30.6'	116.9°	21°21.9'	-31.4'	117.2°	20°54.3'	-32.3'	117.6°	20°26.3'	-33.1'	117.9°	19°58.1'	-33.9'	118.2°	19°29.5'	-34.7'	118.6°	19°00.7'	-35.5'	118.9°	15
16	21°18.6'	-30.9'	117.8°	20°50.5'	-31.7'	118.2°	20°22.0'	-32.5'	118.5°	19°53.2'	-33.4'	118.8°	19°24.2'	-34.2'	119.1°	18°54.8'	-34.9'	119.4°	18°25.2'	-35.7'	119.7°	16
17	20°47.8'	-31.2'	118.7°	20°18.8'	-32.0'	119.1°	19°49.5'	-32.8'	119.4°	19°19.9'	-33.6'	119.7°	18°50.0'	-34.4'	120.0°	18°19.9'	-35.2'	120.3°	17°49.5'	-35.9'	120.6°	17
18	20°16.6'	-31.4'	119.6°	19°46.8'	-32.3'	120.0°	19°16.7'	-33.1'	120.3°	18°46.3'	-33.8'	120.6°	18°15.6'	-34.6'	120.9°	17°44.7'	-35.4'	121.1°	17°13.6'	-36.1'	121.4°	18
19	19°45.2'	-31.7'	120.6°	19°14.5'	-32.5'	120.9°	18°43.6'	-33.3'	121.2°	18°12.4'	-34.1'	121.4°	17°41.0'	-34.8'	121.7°	17°09.4'	-35.6'	122.0°	16°37.5'	-36.3'	122.2°	19
20	19°13.4'	-32.0'	121.5°	18°42.0'	-32.8'	121.7°	18°10.3'	-33.5'	122.0°	17°38.4'	-34.3'	122.3°	17°06.2'	-35.1'	122.6°	16°33.8'	-35.8'	122.8°	16°01.1'	-36.5'	123.1°	20
21	18°41.5'	-32.2'	122.4°	18°09.2'	-33.0'	122.6°	17°36.8'	-33.8'	122.9°	17°04.1'	-34.5'	123.2°	16°31.1'	-35.3'	123.4°	15°58.0'	-36.0'	123.7°	15°24.6'	-36.7'	123.9°	21
22	18°09.2'	-32.5'	123.2°	17°36.2'	-33.2'	123.5°	17°03.0'	-34.0'	123.8°	16°29.5'	-34.7'	124.0°	15°55.9'	-35.5'	124.3°	15°22.0'	-36.2'	124.5°	14°47.9'	-36.9'	124.7°	22

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

58° 302° LHA

Latitude CONTRARY to Declination

58° 302° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	29°39.0'	-25.0'	102.6°	29°25.7'	-26.0'	103.2°	29°11.7'	-27.1'	103.7°	28°57.2'	-28.1'	104.3°	28°42.2'	-29.1'	104.8°	28°26.6'	-30.1'	105.3°	28°10.5'	-31.1'	105.8°	0
1	29°14.0'	-25.5'	103.7°	28°59.6'	-26.5'	104.2°	28°44.7'	-27.5'	104.7°	28°29.1'	-28.6'	105.3°	28°13.1'	-29.6'	105.8°	27°56.5'	-30.5'	106.3°	27°39.4'	-31.5'	106.8°	1
2	28°48.6'	-25.9'	104.7°	28°33.1'	-27.0'	105.2°	28°17.1'	-28.0'	105.8°	28°00.6'	-29.0'	106.3°	27°43.5'	-30.0'	106.8°	27°25.9'	-30.9'	107.3°	27°07.9'	-31.9'	107.8°	2
3	28°22.7'	-26.4'	105.7°	28°06.2'	-27.4'	106.2°	27°49.1'	-28.4'	106.8°	27°31.6'	-29.4'	107.3°	27°13.5'	-30.4'	107.7°	26°55.0'	-31.3'	108.2°	26°36.0'	-32.3'	108.7°	3
4	27°56.3'	-26.8'	106.7°	27°38.7'	-27.8'	107.3°	27°20.7'	-28.8'	107.7°	27°02.2'	-29.8'	108.2°	26°43.2'	-30.8'	108.7°	26°23.7'	-31.7'	109.2°	26°03.7'	-32.6'	109.7°	4
5	27°29.4'	-27.3'	107.8°	27°10.9'	-28.3'	108.2°	26°51.9'	-29.2'	108.7°	26°32.4'	-30.2'	109.2°	26°12.4'	-31.1'	109.7°	25°52.0'	-32.1'	110.1°	25°31.1'	-33.0'	110.6°	5
6	27°02.2'	-27.7'	108.8°	26°42.6'	-28.7'	109.2°	26°22.6'	-29.6'	109.7°	26°02.2'	-30.6'	110.2°	25°41.3'	-31.5'	110.6°	25°19.9'	-32.4'	111.1°	24°58.1'	-33.3'	111.5°	6
7	26°34.5'	-28.1'	109.8°	26°14.0'	-29.1'	110.2°	25°53.0'	-30.0'	110.7°	25°31.6'	-30.9'	111.1°	25°09.7'	-31.9'	111.6°	24°47.5'	-32.8'	112.0°	24°24.8'	-33.6'	112.4°	7
8	26°06.4'	-28.5'	110.7°	25°44.9'	-29.5'	111.2°	25°23.0'	-30.4'	111.6°	25°00.6'	-31.3'	112.1°	24°37.9'	-32.2'	112.5°	24°14.7'	-33.1'	112.9°	23°51.1'	-34.0'	113.3°	8
9	25°37.8'	-28.9'	111.7°	25°15.4'	-29.8'	112.2°	24°52.6'	-30.7'	112.6°	24°29.3'	-31.7'	113.0°	24°05.7'	-32.5'	113.4°	23°41.6'	-33.4'	113.8°	23°17.2'	-34.3'	114.2°	9
10	25°09.0'	-29.3'	112.7°	24°45.6'	-30.2'	113.1°	24°21.8'	-31.1'	113.5°	23°57.7'	-32.0'	113.9°	23°33.1'	-32.9'	114.3°	23°08.2'	-33.7'	114.7°	22°42.9'	-34.6'	115.1°	10
11	24°39.7'	-29.6'	113.6°	24°15.4'	-30.5'	114.1°	23°50.7'	-31.4'	114.5°	23°25.7'	-32.3'	114.9°	23°00.3'	-33.2'	115.3°	22°34.5'	-34.0'	115.6°	22°08.4'	-34.8'	116.0°	11
12	24°10.0'	-30.0'	114.6°	23°44.9'	-30.9'	115.0°	23°19.3'	-31.8'	115.4°	22°53.4'	-32.6'	115.8°	22°27.1'	-33.5'	116.2°	22°00.5'	-34.3'	116.5°	21°33.5'	-35.1'	116.9°	12
13	23°40.0'	-30.3'	115.6°	23°14.0'	-31.2'	115.9°	22°47.6'	-32.1'	116.3°	22°20.8'	-32.9'	116.7°	21°53.6'	-33.8'	117.1°	21°26.2'	-34.6'	117.4°	20°58.4'	-35.4'	117.8°	13
14	23°09.7'	-30.7'	116.5°	22°42.8'	-31.5'	116.9°	22°15.5'	-32.4'	117.2°	21°47.8'	-33.2'	117.6°	21°19.9'	-34.0'	117.9°	20°51.6'	-34.8'	118.3°	20°23.0'	-35.6'	118.6°	14
15	22°39.0'	-31.0'	117.4°	22°11.2'	-31.8'	117.8°	21°43.1'	-32.7'	118.1°	21°14.6'	-33.5'	118.5°	20°45.9'	-34.3'	118.8°	20°16.8'	-35.1'	119.2°	19°47.4'	-35.9'	119.5°	15
16	22°08.1'	-31.3'	118.4°	21°39.4'	-32.1'	118.7°	21°10.4'	-33.0'	119.0°	20°41.1'	-33.8'	119.4°	20°11.6'	-34.6'	119.7°	19°41.7'	-35.3'	120.0°	19°11.5'	-36.1'	120.3°	16
17	21°36.8'	-31.6'	119.3°	21°07.3'	-32.4'	119.6°	20°37.5'	-33.2'	119.9°	20°07.4'	-34.0'	120.3°	19°37.0'	-34.8'	120.6°	19°06.3'	-35.6'	120.9°	18°35.4'	-36.3'	121.2°	17
18	21°05.2'	-31.9'	120.2°	20°34.8'	-32.7'	120.5°	20°04.2'	-33.5'	120.8°	19°33.3'	-34.3'	121.1°	19°02.2'	-35.0'	121.4°	18°30.8'	-35.8'	121.7°	17°59.1'	-36.5'	122.0°	18
19	20°33.3'	-32.2'	121.1°	20°02.1'	-33.0'	121.4°	19°30.7'	-33.8'	121.7°	18°59.1'	-34.5'	122.0°	18°27.1'	-35.3'	122.3°	17°55.0'	-36.0'	122.6°	17°22.5'	-36.8'	122.8°	19
20	20°01.1'	-32.4'	122.0°	19°29.2'	-33.2'	122.3°	18°57.0'	-34.0'	122.6°	18°24.5'	-34.8'	122.9°	17°51.9'	-35.5'	123.1°	17°18.9'	-36.2'	123.4°	16°45.8'	-36.9'	123.7°	20
21	19°28.6'	-32.7'	122.9°	18°55.9'	-33.5'	123.2°	18°23.0'	-34.2'	123.5°	17°49.8'	-35.0'	123.7°	17°16.4'	-35.7'	124.0°	16°42.7'	-36.4'	124.2°	16°08.8'	-37.1'	124.5°	21
22	18°55.9'	-33.0'	123.8°	18°22.5'	-33.7'	124.1°	17°48.8'	-34.5'	124.3°	17°14.8'	-35.2'	124.6°	16°40.6'	-35.9'	124.8°	16°06.3'	-36.6'	125.1°	15°31.7'	-37.3'	125.3°	22
23	18°23.0'	-33.2'	124.7°	17°48.8'	-33.9'	124.9°	17°14.3'	-34.7'	125.2°	16°39.6'	-35.4'	125.4°	16°04.7'	-36.1'	125.7°	15°29.7'	-36.8'	125.9°	14°54.4'	-37.5'	126.1°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27			

58° 302° LHA

Latitude CONTRARY to DECLINATION

58° 302° LHA

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

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

57° 303° LHA

Latitude CONTRARY to Declination

57° 303° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	30°33.6'	-25.2'	103.1°	30°19.8'	-26.3'	103.7°	30°05.3'	-27.3'	104.2°	29°50.3'	-28.4'	104.8°	29°34.7'	-29.4'	105.3°	29°18.5'	-30.4'	105.9°	29°01.8'	-31.4'	106.4°	0
1	30°08.4'	-25.7'	104.2°	29°53.5'	-26.8'	104.7°	29°38.0'	-27.8'	105.3°	29°21.9'	-28.8'	105.8°	29°05.3'	-29.8'	106.3°	28°48.2'	-30.8'	106.9°	28°30.5'	-31.8'	107.4°	1
2	29°42.7'	-26.2'	105.2°	29°26.7'	-27.2'	105.7°	29°10.2'	-28.3'	106.3°	28°53.1'	-29.3'	106.8°	28°35.5'	-30.2'	107.3°	28°17.3'	-31.2'	107.9°	27°58.7'	-32.2'	108.4°	2
3	29°16.5'	-26.7'	106.2°	28°59.5'	-27.7'	106.8°	28°41.9'	-28.7'	107.3°	28°23.8'	-29.7'	107.8°	28°05.2'	-30.7'	108.3°	27°46.1'	-31.6'	108.8°	27°26.5'	-32.6'	109.3°	3
4	28°49.9'	-27.1'	107.3°	28°31.8'	-28.1'	107.8°	28°13.2'	-29.1'	108.3°	27°54.1'	-30.1'	108.8°	27°34.6'	-31.1'	109.3°	27°14.5'	-32.0'	109.8°	26°54.0'	-32.9'	110.3°	4
5	28°22.7'	-27.6'	108.3°	28°03.7'	-28.6'	108.8°	27°44.1'	-29.6'	109.3°	27°24.0'	-30.5'	109.8°	27°03.5'	-31.5'	110.3°	26°42.5'	-32.4'	110.7°	26°21.0'	-33.3'	111.2°	5
6	27°55.1'	-28.0'	109.3°	27°35.1'	-29.0'	109.8°	27°14.5'	-30.0'	110.3°	26°53.5'	-30.9'	110.7°	26°32.0'	-31.8'	111.2°	26°10.1'	-32.7'	111.7°	25°47.1'	-33.6'	112.1°	6
7	27°27.1'	-28.4'	110.3°	27°06.1'	-29.4'	110.8°	26°44.6'	-30.4'	111.2°	26°22.6'	-31.3'	111.7°	26°00.2'	-32.2'	112.2°	25°37.4'	-33.1'	112.6°	25°14.1'	-34.0'	113.0°	7
8	26°58.7'	-28.9'	111.3°	26°36.7'	-29.8'	111.7°	26°14.2'	-30.7'	112.2°	25°51.3'	-31.7'	112.6°	25°28.0'	-32.6'	113.1°	25°04.3'	-33.4'	113.5°	24°40.1'	-34.3'	113.9°	8
9	26°29.8'	-29.3'	112.2°	26°06.9'	-30.2'	112.7°	25°43.5'	-31.1'	113.2°	25°19.7'	-32.0'	113.6°	24°55.5'	-32.9'	114.0°	24°30.8'	-33.8'	114.4°	24°05.8'	-34.6'	114.8°	9
10	26°00.5'	-29.6'	113.2°	25°36.7'	-30.6'	113.7°	25°12.4'	-31.5'	114.1°	24°47.7'	-32.4'	114.5°	24°22.6'	-33.2'	114.9°	23°57.1'	-34.1'	115.3°	23°31.2'	-34.9'	115.7°	10
11	25°30.9'	-30.0'	114.2°	25°06.1'	-30.9'	114.6°	24°40.9'	-31.8'	115.0°	24°15.3'	-32.7'	115.4°	23°49.3'	-33.5'	115.9°	23°23.0'	-34.4'	116.2°	22°56.3'	-35.2'	116.6°	11
12	25°00.9'	-30.4'	115.1°	24°35.2'	-31.3'	115.6°	24°09.1'	-32.2'	116.0°	23°42.6'	-33.0'	116.4°	23°15.8'	-33.9'	116.8°	22°48.6'	-34.7'	117.1°	22°21.1'	-35.5'	117.5°	12
13	24°30.5'	-30.7'	116.1°	24°03.9'	-31.6'	116.5°	23°36.9'	-32.5'	116.9°	23°09.6'	-33.3'	117.3°	22°41.9'	-34.2'	117.7°	22°13.9'	-35.0'	118.0°	21°45.6'	-35.8'	118.4°	13
14	23°59.7'	-31.1'	117.0°	23°32.3'	-31.9'	117.4°	23°04.5'	-32.8'	117.8°	22°36.3'	-33.6'	118.2°	22°07.8'	-34.4'	118.5°	21°39.0'	-35.2'	118.9°	21°09.8'	-36.0'	119.2°	14
15	23°28.6'	-31.4'	118.0°	23°00.3'	-32.3'	118.3°	22°31.7'	-33.1'	118.7°	22°02.7'	-33.9'	119.1°	21°33.4'	-34.7'	119.4°	21°03.7'	-35.5'	119.8°	20°33.8'	-36.3'	120.1°	15
16	22°57.2'	-31.7'	118.9°	22°28.1'	-32.6'	119.3°	21°58.6'	-33.4'	119.6°	21°28.8'	-34.2'	120.0°	20°58.6'	-35.0'	120.3°	20°28.2'	-35.8'	120.6°	19°57.5'	-36.5'	120.9°	16
17	22°25.5'	-32.0'	119.8°	21°55.5'	-32.9'	120.2°	21°25.2'	-33.7'	120.5°	20°54.6'	-34.5'	120.8°	20°23.7'	-35.2'	121.2°	19°52.5'	-36.0'	121.5°	19°21.0'	-36.7'	121.8°	17
18	21°53.4'	-32.3'	120.7°	21°22.6'	-33.2'	121.1°	20°51.5'	-33.9'	121.4°	20°20.1'	-34.7'	121.7°	19°48.4'	-35.5'	122.0°	19°16.5'	-36.2'	122.3°	18°44.3'	-37.0'	122.6°	18
19	21°21.1'	-32.6'	121.6°	20°49.5'	-33.4'	122.0°	20°17.6'	-34.2'	122.3°	19°45.4'	-35.0'	122.6°	19°12.9'	-35.7'	122.9°	18°40.2'	-36.5'	123.2°	18°07.3'	-37.2'	123.5°	19
20	20°48.5'	-32.9'	122.5°	20°16.0'	-33.7'	122.8°	19°43.4'	-34.5'	123.2°	19°10.4'	-35.2'	123.4°	18°37.2'	-35.9'								

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

56° 304° LHA

Latitude CONTRARY to Declination

56° 304° LHA

Table with 10 columns (Dec, 21-27, Dec) and 24 rows of celestial coordinates (Hc, d, Z).

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

Table with 10 columns (Dec, 21-27, Dec) and 24 rows of celestial coordinates (Hc, d, Z).

55° 305° LHA

Latitude CONTRARY to DECLINATION

55° 305° LHA

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

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

54° 306° LHA

Latitude CONTRARY to Declination

54° 306° LHA

Table with 10 columns (Dec, 21-27, Dec) and 24 rows of celestial coordinates (Hc, d, Z).

54° 306° LHA

Latitude CONTRARY to DECLINATION

54° 306° LHA

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

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

53° 307° LHA

Latitude CONTRARY to Declination

53° 307° LHA

Table with 10 columns (Dec, 21-27, Dec) and 24 rows of celestial coordinates (Hc, d, Z).

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

Table with 12 columns (Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°) and 24 rows. Each cell contains three values (Hc°, d', Z°). The table is bordered and includes degree symbols.

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

Table with 12 columns (Dec°, 21, 22, 23, 24, 25, 26, 27, Dec°) and 24 rows. Each cell contains three values (Hc°, d', Z°). The table is bordered and includes degree symbols.

51° 309° LHA

Latitude CONTRARY to DECLINATION

51° 309° LHA

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

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

50° 310° LHA			Latitude CONTRARY to Declination							50° 310° LHA												
Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	36°52.5'	-27.2'	106.7°	36°35.0'	-28.3'	107.4°	36°16.6'	-29.4'	108.2°	35°57.6'	-30.4'	108.8°	35°37.9'	-31.5'	109.5°	35°17.5'	-32.5'	110.2°	34°56.4'	-33.5'	110.9°	0
1	36°25.4'	-27.8'	107.8°	36°06.7'	-28.9'	108.5°	35°47.2'	-29.9'	109.2°	35°27.1'	-31.0'	109.9°	35°06.4'	-32.0'	110.6°	34°45.0'	-33.0'	111.2°	34°23.0'	-34.0'	111.9°	1
2	35°57.6'	-28.4'	108.9°	35°37.8'	-29.5'	109.6°	35°17.3'	-30.5'	110.3°	34°56.2'	-31.5'	111.0°	34°34.4'	-32.5'	111.6°	34°12.0'	-33.5'	112.2°	33°49.0'	-34.4'	112.9°	2
3	35°29.2'	-29.0'	110.0°	35°08.3'	-30.0'	110.7°	34°46.8'	-31.0'	111.3°	34°24.7'	-32.0'	112.0°	34°01.9'	-33.0'	112.6°	33°38.5'	-34.0'	113.2°	33°14.5'	-34.9'	113.8°	3
4	35°00.2'	-29.5'	111.1°	34°38.3'	-30.6'	111.8°	34°15.8'	-31.6'	112.4°	33°52.6'	-32.5'	113.0°	33°28.9'	-33.5'	113.6°	33°04.5'	-34.4'	114.2°	32°39.6'	-35.3'	114.8°	4
5	34°30.7'	-30.1'	112.2°	34°07.8'	-31.1'	112.8°	33°44.2'	-32.1'	113.4°	33°20.1'	-33.0'	114.0°	32°55.4'	-34.0'	114.6°	32°30.1'	-34.9'	115.2°	32°04.3'	-35.8'	115.8°	5
6	34°00.6'	-30.6'	113.2°	33°36.7'	-31.6'	113.8°	33°12.2'	-32.5'	114.4°	32°47.1'	-33.5'	115.0°	32°21.4'	-34.4'	115.6°	31°55.2'	-35.3'	116.2°	31°28.5'	-36.2'	116.7°	6
7	33°30.0'	-31.1'	114.2°	33°05.1'	-32.1'	114.8°	32°39.6'	-33.0'	115.4°	32°13.6'	-33.9'	116.0°	31°47.0'	-34.8'	116.6°	31°19.9'	-35.7'	117.1°	30°52.4'	-36.6'	117.6°	7
8	32°58.9'	-31.6'	115.3°	32°33.0'	-32.5'	115.8°	32°06.6'	-33.5'	116.4°	31°39.7'	-34.4'	117.0°	31°12.2'	-35.3'	117.5°	30°44.2'	-36.1'	118.0°	30°15.8'	-37.0'	118.6°	8
9	32°27.3'	-32.1'	116.3°	32°00.5'	-33.0'	116.8°	31°33.2'	-33.9'	117.4°	31°05.3'	-34.8'	117.9°	30°36.9'	-35.7'	118.5°	30°08.1'	-36.5'	119.0°	29°38.8'	-37.3'	119.5°	9
10	31°55.3'	-32.5'	117.3°	31°27.5'	-33.4'	117.8°	30°59.2'	-34.3'	118.4°	30°30.5'	-35.2'	118.9°	30°01.3'	-36.0'	119.4°	29°31.6'	-36.9'	119.9°	29°01.5'	-37.7'	120.4°	10
11	31°22.7'	-33.0'	118.3°	30°54.1'	-33.9'	118.8°	30°24.9'	-34.7'	119.3°	29°55.3'	-35.6'	119.8°	29°25.3'	-36.4'	120.3°	28°54.8'	-37.2'	120.8°	28°23.8'	-38.0'	121.3°	11
12	30°49.7'	-33.4'	119.2°	30°20.2'	-34.3'	119.8°	29°50.2'	-35.1'	120.3°	29°19.7'	-36.0'	120.7°	28°48.8'	-36.8'	121.2°	28°17.5'	-37.6'	121.7°	27°45.8'	-38.3'	122.1°	12
13	30°16.3'	-33.8'	120.2°	29°45.9'	-34.7'	120.7°	29°15.0'	-35.5'	121.2°	28°43.7'	-36.3'	121.7°	28°12.1'	-37.1'	122.1°	27°40.0'	-37.9'	122.6°	27°07.5'	-38.7'	123.0°	13
14	29°42.4'	-34.2'	121.2°	29°11.2'	-35.1'	121.6°	28°39.5'	-35.9'	122.1°	28°07.4'	-36.7'	122.6°	27°34.9'	-37.5'	123.0°	27°02.0'	-38.2'	123.4°	26°28.8'	-39.0'	123.9°	14
15	29°08.2'	-34.6'	122.1°	28°36.1'	-35.5'	122.6°	28°03.6'	-36.2'	123.0°	27°30.7'	-37.0'	123.5°	26°57.5'	-37.8'	123.9°	26°23.8'	-38.5'	124.3°	25°49.8'	-39.3'	124.7°	15
16	28°33.6'	-35.0'	123.0°	28°00.7'	-35.8'	123.5°	27°27.4'	-36.6'	123.9°	26°53.7'	-37.4'	124.3°	26°19.7'	-38.1'	124.8°	25°45.3'	-38.8'	125.2°	25°10.6'	-39.5'	125.5°	16
17	27°58.5'	-35.4'	124.0°	27°24.8'	-36.2'	124.4°	26°50.8'	-36.9'	124.8°	26°16.3'	-37.7'	125.2°	25°41.6'	-38.4'	125.6°	25°06.5'	-39.1'	126.0°	24°31.0'	-39.8'	126.4°	17
18	27°23.2'	-35.7'	124.9°	26°48.7'	-36.5'	125.3°	26°13.8'	-37.2'	125.7°	25°38.7'	-38.0'	126.1°	25°03.2'	-38.7'	126.5°	24°27.4'	-39.4'	126.8°	23°51.2'	-40.1'	127.2°	18
19	26°47.4'	-36.1'	125.8°	26°12.2'	-36.8'	126.2°	25°36.6'	-37.6'	126.6°	25°00.7'	-38.3'	126.9°	24°24.5'	-39.0'	127.3°	23°48.0'	-39.6'	127.7°	23°11.2'	-40.3'	128.0°	19
20	26°11.3'	-36.4'	126.7°	25°35.4'	-37.1'	127.0°	24°59.1'	-37.8'	127.4°	24°22.4'	-38.5'	127.8°	23°45.5'	-39.2'	128.1°	23°08.3'	-39.9'	128.5°	22°30.9'	-40.5'	128.8°	20
21	25°34.9'	-36.7'	127.5°	24°58.2'	-37.4'	127.9°	24°21.2'	-38.1'	128.3°	23°43.9'	-38.8'	128.6°	23°06.3'	-39.5'	129.0°	22°28.4'	-40.1'	129.3°	21°50.5'	-40.8'	129.6°	21
22	24°58.2'	-37.0'	128.4°	24°20.8'	-37.7'	128.8°	23°43.1'	-38.4'	129.1°	23°05.1'	-39.1'	129.5°	22°26.8'	-39.7'	129.8°	21°48.3'	-40.4'	130.1°	21°09.5'	-41.0'	130.4°	22
23	24°21.2'	-37.3'	129.3°	23°43.1'	-38.0'	129.6°	23°04.7'	-38.7'	130.0°	22°26.0'	-39.3'	130.3°	21°47.1'	-40.0'	130.6°	21°07.9'	-40.6'	130.9°	20°28.5'	-41.2'	131.2°	23
Dec°	21			22			23			24			25			26			27			Dec°

50° 310° LHA Latitude CONTRARY to DECLINATION 50° 310° LHA

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

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

49° 311° LHA			Latitude CONTRARY to Declination							49° 311° LHA												
Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	37°46.1'	-27.5'	107.3°	37°27.9'	-28.6'	108.0°	37°09.0'	-29.7'	108.8°	36°49.4'	-30.8'	109.5°	36°29.0'	-31.8'	110.2°	36°08.0'	-32.8'	110.9°	35°46.3'	-33.8'	111.5°	0
1	37°18.6'	-28.1'	108.4°	36°59.3'	-29.2'	109.1°	36°39.3'	-30.3'	109.8°	36°18.6'	-31.3'	110.5°	35°57.2'	-32.4'	111.2°	35°35.1'	-33.4'	111.9°	35°12.5'	-34.3'	112.6°	1
2	36°50.4'	-28.8'	109.5°	36°30.1'	-29.8'	110.2°	36°09.0'	-30.9'	110.9°	35°47.2'	-31.9'	111.6°	35°24.8'	-32.9'	112.3°	35°01.8'	-33.9'	112.9°	34°38.1'	-34.8'	113.6°	2
3	36°21.7'	-29.3'	110.6°	36°00.3'	-30.4'	111.3°	35°38.1'	-31.4'	112.0°	35°15.4'	-32.4'	112.6°	34°52.0'	-33.4'	113.3°	34°27.9'	-34.3'	113.9°	34°03.3'	-35.3'	114.5°	3
4	35°52.4'	-29.9'	111.7°	35°29.9'	-30.9'	112.4°	35°06.7'	-31.9'	113.0°	34°43.0'	-32.9'	113.7°	34°18.6'	-33.9'	114.3°	33°53.6'	-34.8'	114.9°	33°28.0'	-35.7'	115.5°	4
5	35°22.5'	-30.5'	112.8°	34°58.9'	-31.5'	113.4°	34°34.8'	-32.5'	114.1°	34°10.0'	-33.4'	114.7°	33°44.7'	-34.4'	115.3°	33°18.8'	-35.3'	115.9°	32°52.3'	-36.2'	116.5°	5
6	34°52.0'	-31.0'	113.8°	34°27.5'	-32.0'	114.5°	34°02.3'	-33.0'	115.1°	33°36.6'	-33.9'	115.7°	33°10.3'	-34.8'	116.3°	32°43.5'	-35.7'	116.9°	32°16.1'	-36.6'	117.4°	6
7	34°21.0'	-31.5'	114.9°	33°55.5'	-32.5'	115.5°	33°29.4'	-33.4'	116.1°	33°02.7'	-34.4'	116.7°	32°35.5'	-35.3'	117.2°	32°07.8'	-36.1'	117.8°	31°39.6'	-37.0'	118.4°	7
8	33°49.5'	-32.0'	115.9°	33°23.0'	-33.0'	116.5°	32°55.9'	-33.9'	117.1°	32°28.4'	-34.8'	117.6°	32°00.3'	-35.7'	118.2°	31°31.7'	-36.5'	118.7°	31°02.6'	-37.4'	119.3°	8
9	33°17.4'	-32.5'	116.9°	32°50.0'	-33.4'	117.5°	32°22.0'	-34.3'	118.1°	31°53.6'	-35.2'	118.6°	31°24.6'	-36.1'	119.1°	30°55.1'	-36.9'	119.7°	30°25.2'	-37.7'	120.2°	9
10	32°44.9'	-33.0'	117.9°	32°16.6'	-33.9'	118.5°	31°47.7'	-34.8'	119.0°	31°18.3'	-35.6'	119.6°	30°48.5'	-36.5'	120.1°	30°18.2'	-37.3'	120.6°	29°47.5'	-38.1'	121.1°	10
11	32°11.9'	-33.5'	118.9°	31°42.7'	-34.3'	119.4°	31°12.9'	-35.2'	120.0°	30°42.7'	-36.0'	120.5°	30°12.0'	-36.9'	121.0°	29°40.9'	-37.7'	121.5°	29°09.4'	-38.5'	122.0°	11
12	31°38.4'	-33.9'	119.9°	31°08.3'	-34.8'	120.4°	30°37.7'	-35.6'	120.9°	30°06.7'	-36.4'	121.4°	29°35.2'	-37.2'	121.9°	29°03.2'	-38.0'	122.4°	28°30.9'	-38.8'	122.8°	12
13	31°04.5'	-34.3'	120.8°	30°33.6'	-35.2'	121.4°	30°02.1'	-36.0'	121.9°	29°30.2'	-36.8'	122.3°	28°57.9'	-37.6'	122.8°	28°25.2'	-38.4'	123.3°	27°52.1'	-39.1'	123.7°	13
14	30°30.2'	-34.7'	121.8°	29°58.4'	-35.6'	122.3°	29°26.1'	-36.4'	122.8°	28°53.4'	-37.2'	123.2°	28°20.3'	-37.9'	123.7°	27°46.9'	-38.7'	124.1°	27°13.0'	-39.4'	124.6°	14
15	29°55.5'	-35.1'	122.7°	29°22.8'	-35.9'	123.2°	28°49.7'	-36.7'	123.7°	28°16.3'	-37.5'	124.1°	27°42.4'	-38.3'	124.6°	27°08.2'	-39.0'	125.0°	26°33.6'	-39.7'	125.4°	15
16	29°20.3'	-35.5'	123.7°	28°46.9'	-36.3'	124.1°	28°13.0'	-37.1'	124.6°	27°38.8'	-37.8'	125.0°	27°04.2'	-38.6'	125.4°	26°29.2'	-39.3'	125.9°	25°53.9'	-40.0'	126.2°	16
17	28°44.8'	-35.9'	124.6°	28°10.6'	-36.7'	125.0°	27°35.9'	-37.4'	125.5°	27°00.9'	-38.2'	125.9°	26°25.6'	-38.9'	126.3°	25°49.9'	-39.6'	126.7°	25°13.9'	-40.3'	127.1°	17
18	28°08.9'	-36.2'	125.5°	27°33.9'	-37.0'	125.9°	26°58.5'	-37.7'	126.4°	26°22.8'	-38.5'	126.8°	25°46.7'	-39.2'	127.1°	25°10.3'	-39.9'	127.5°	24°33.6'	-40.5'	127.9°	18
19	27°32.7'	-36.6'	126.4°	26°56.9'	-37.3'	126.8°	26°20.8'	-38.1'	127.2°	25°44.3'	-38.8'	127.6°	25°07.5'	-39.4'	128.0°	24°30.5'	-40.1'	128.3°	23°53.1'	-40.8'	128.7°	19
20	26°56.1'	-36.9'	127.3°	26°19.6'	-37.6'	127.7°	25°42.7'	-38.4'	128.1°	25°05.6'	-39.0'	128.5°	24°28.1'	-39.7'	128.8°	23°50.3'	-40.4'	129.2°	23°12.3'	-41.0'	129.5°	20
21	26°19.2'	-37.2'	128.2°	25°41.9'	-38.0'	128.6°	25°04.4'	-38.6'	128.9°	24°26.5'	-39.3'	129.3°	23°48.4'	-40.0'	129.6°	23°10.0'	-40.6'	130.0°	22°31.3'	-41.2'	130.3°	21
22	25°41.9'	-37.6'	129.1°	25°04.0'	-38.2'	129.4°	24°25.7'	-38.9'	129.8°	23°47.2'	-39.6'											

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

48° 312° LHA

Latitude CONTRARY to Declination

48° 312° LHA

Table with columns for Dec°, 21, 22, 23, 24, 25, 26, 27, and Dec°. Each column contains three sub-columns for Hc°, d', and Z°. The table lists astronomical data for declinations from 0° to 23°.

48° 312° LHA

Latitude CONTRARY to DECLINATION

48° 312° LHA

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

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

47° 313° LHA

Latitude CONTRARY to Declination

47° 313° LHA

Table with columns for Dec°, 21, 22, 23, 24, 25, 26, 27, and Dec°. Each column contains three sub-columns for Hc°, d', and Z°. The table lists astronomical data for declinations from 0° to 23°.

47° 313° LHA

Latitude CONTRARY to DECLINATION

47° 313° LHA

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

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

46° 314° LHA

Latitude CONTRARY to Declination

46° 314° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	40°25.8'	-28.6'	109.1°	40°05.8'	-29.7'	109.9°	39°45.0'	-30.8'	110.7°	39°23.4'	-31.9'	111.4°	39°01.1'	-32.9'	112.2°	38°38.1'	-34.0'	112.9°	38°14.3'	-35.0'	113.7°	0
1	39°57.2'	-29.3'	110.2°	39°36.1'	-30.4'	111.0°	39°14.2'	-31.4'	111.8°	38°51.5'	-32.5'	112.5°	38°28.2'	-33.5'	113.3°	38°04.1'	-34.5'	114.0°	37°39.4'	-35.5'	114.7°	1
2	39°27.9'	-29.9'	111.4°	39°05.7'	-31.0'	112.1°	38°42.7'	-32.0'	112.9°	38°19.1'	-33.1'	113.6°	37°54.7'	-34.1'	114.3°	37°29.6'	-35.0'	115.0°	37°03.9'	-36.0'	115.7°	2
3	38°58.0'	-30.5'	112.5°	38°34.7'	-31.6'	113.2°	38°10.7'	-32.6'	114.0°	37°46.0'	-33.6'	114.7°	37°20.6'	-34.6'	115.4°	36°54.6'	-35.6'	116.0°	36°27.9'	-36.5'	116.7°	3
4	38°27.5'	-31.2'	113.6°	38°03.1'	-32.2'	114.3°	37°38.1'	-33.2'	115.0°	37°12.4'	-34.2'	115.7°	36°46.0'	-35.1'	116.4°	36°19.0'	-36.1'	117.1°	35°51.4'	-37.0'	117.7°	4
5	37°56.3'	-31.8'	114.7°	37°30.9'	-32.8'	115.4°	37°04.9'	-33.7'	116.1°	36°38.2'	-34.7'	116.7°	36°10.9'	-35.6'	117.4°	35°43.0'	-36.5'	118.0°	35°14.5'	-37.4'	118.7°	5
6	37°24.6'	-32.3'	115.8°	36°58.2'	-33.3'	116.4°	36°31.1'	-34.3'	117.1°	36°03.5'	-35.2'	117.8°	35°35.3'	-36.1'	118.4°	35°06.4'	-37.0'	119.0°	34°37.1'	-37.9'	119.6°	6
7	36°52.2'	-32.9'	116.8°	36°24.9'	-33.8'	117.5°	35°56.9'	-34.8'	118.1°	35°28.3'	-35.7'	118.8°	34°59.2'	-36.6'	119.4°	34°29.5'	-37.4'	120.0°	33°59.2'	-38.3'	120.6°	7
8	36°19.4'	-33.4'	117.9°	35°51.0'	-34.3'	118.5°	35°22.1'	-35.3'	119.1°	34°52.6'	-36.1'	119.7°	34°22.6'	-37.0'	120.3°	33°52.0'	-37.9'	120.9°	33°20.9'	-38.7'	121.5°	8
9	35°46.0'	-33.9'	118.9°	35°16.7'	-34.8'	119.5°	34°46.9'	-35.7'	120.1°	34°16.5'	-36.6'	120.7°	33°45.6'	-37.4'	121.3°	33°14.2'	-38.3'	121.8°	32°42.3'	-39.1'	122.4°	9
10	35°12.0'	-34.4'	119.9°	34°41.8'	-35.3'	120.5°	34°11.1'	-36.2'	121.1°	33°39.9'	-37.0'	121.7°	33°08.1'	-37.9'	122.2°	32°35.9'	-38.7'	122.8°	32°03.2'	-39.4'	123.3°	10
11	34°37.6'	-34.9'	120.9°	34°06.5'	-35.8'	121.5°	33°34.9'	-36.6'	122.0°	33°02.8'	-37.5'	122.6°	32°30.3'	-38.3'	123.1°	31°57.2'	-39.0'	123.7°	31°23.8'	-39.8'	124.2°	11
12	34°02.7'	-35.4'	121.9°	33°30.7'	-36.2'	122.4°	32°58.3'	-37.1'	123.0°	32°25.4'	-37.9'	123.5°	31°52.0'	-38.6'	124.1°	31°18.2'	-39.4'	124.6°	30°43.9'	-40.2'	125.1°	12
13	33°27.3'	-35.8'	122.9°	32°54.5'	-36.7'	123.4°	32°21.3'	-37.5'	123.9°	31°47.5'	-38.2'	124.4°	31°13.4'	-39.0'	125.0°	30°38.8'	-39.8'	125.4°	30°03.8'	-40.5'	125.9°	13
14	32°51.5'	-36.3'	123.8°	32°17.9'	-37.1'	124.3°	31°43.8'	-37.9'	124.9°	31°09.3'	-38.6'	125.4°	30°34.4'	-39.4'	125.8°	29°59.0'	-40.1'	126.3°	29°23.3'	-40.8'	126.8°	14
15	32°15.2'	-36.7'	124.8°	31°40.8'	-37.5'	125.3°	31°05.9'	-38.2'	125.8°	30°30.7'	-39.0'	126.2°	29°55.0'	-39.7'	126.7°	29°18.9'	-40.4'	127.2°	28°42.5'	-41.1'	127.6°	15
16	31°38.5'	-37.1'	125.7°	31°03.3'	-37.8'	126.2°	30°27.7'	-38.6'	126.7°	29°51.7'	-39.3'	127.1°	29°15.3'	-40.0'	127.6°	28°38.5'	-40.7'	128.0°	28°01.4'	-41.4'	128.4°	16
17	31°01.5'	-37.5'	126.6°	30°25.5'	-38.2'	127.1°	29°49.1'	-38.9'	127.5°	29°12.4'	-39.7'	128.0°	28°35.3'	-40.3'	128.4°	27°57.8'	-41.0'	128.8°	27°20.0'	-41.7'	129.3°	17
18	30°24.0'	-37.8'	127.5°	29°47.3'	-38.6'	128.0°	29°10.2'	-39.3'	128.4°	28°32.7'	-40.0'	128.8°	27°54.9'	-40.7'	129.3°	27°16.8'	-41.3'	129.7°	26°38.3'	-42.0'	130.1°	18
19	29°46.2'	-38.2'	128.4°	29°08.7'	-38.9'	128.9°	28°30.9'	-39.6'	129.3°	27°52.7'	-40.3'	129.7°	27°14.3'	-40.9'	130.1°	26°35.5'	-41.6'	130.5°	25°56.4'	-42.2'	130.9°	19
20	29°08.0'	-38.5'	129.3°	28°29.8'	-39.2'	129.7°	27°51.3'	-39.9'	130.1°	27°12.5'	-40.6'	130.5°	26°33.3'	-41.2'	130.9°	25°53.9'	-41.8'	131.3°	25°14.1'	-42.5'	131.6°	20
21	28°29.4'	-38.9'	130.2°	27°50.6'	-39.5'	130.6°	27°11.4'	-40.2'	131.0°	26°31.2'	-40.9'	131.4°	25°52.1'	-41.5'	131.7°	24°29.0'	-42.1'	132.1°	24°11.7'	-42.7'	132.4°	21
22	27°50.6'	-1211.4'	131.0°	27°11.0'	-1201.4'	131.4°	26°31.2'	-1191.2'	131.8°	25°51.0'	-1180.8'	132.2°	25°10.6'	-1170.1'	132.5°	24°29.9'	-1159.3'	132.9°	23°49.0'	-1148.3'	133.2°	22
23	27°11.4'	+847.2'	131.9°	26°31.2'	+866.8'	132.3°	25°50.7'	+885.9'	132.6°	25°09.9'	+904.4'	133.0°	24°28.9'	+922.5'	133.3°	23°47.6'	+940.0'	133.6°	23°06.1'	+957.1'	134.0°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27			

134° 226° LHA

Latitude SAME as DECLINATION

134° 226° LHA

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

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

45° 315° LHA

Latitude CONTRARY to Declination

45° 315° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	41°18.6'	-29.0'	109.7°	40°58.0'	-30.1'	110.5°	40°36.5'	-31.2'	111.3°	40°14.3'	-32.3'	112.1°	39°51.3'	-33.3'	112.9°	39°27.6'	-34.4'	113.7°	39°03.2'	-35.4'	114.4°	0
1	40°49.6'	-29.7'	110.9°	40°27.9'	-30.8'	111.7°	40°05.3'	-31.8'	112.5°	39°42.0'	-32.9'	113.2°	39°18.0'	-33.9'	114.0°	38°53.3'	-34.9'	114.7°	38°27.8'	-35.9'	115.5°	1
2	40°19.9'	-30.3'	112.0°	39°57.1'	-31.4'	112.8°	39°33.5'	-32.5'	113.6°	39°09.1'	-33.5'	114.3°	38°44.1'	-34.5'	115.1°	38°18.3'	-35.5'	115.8°	37°51.9'	-36.4'	116.5°	2
3	39°49.7'	-31.0'	113.1°	39°25.7'	-32.0'	113.9°	39°01.0'	-33.1'	114.7°	38°35.7'	-34.1'	115.4°	38°09.6'	-35.0'	116.1°	37°42.9'	-36.0'	116.8°	37°15.5'	-36.9'	117.5°	3
4	39°18.7'	-31.6'	114.3°	38°53.7'	-32.6'	115.0°	38°28.0'	-33.6'	115.7°	38°01.6'	-34.6'	116.4°	37°34.6'	-35.6'	117.1°	37°06.9'	-36.5'	117.8°	36°38.6'	-37.4'	118.5°	4
5	38°47.1'	-32.2'	115.4°	38°21.0'	-33.2'	116.1°	37°54.3'	-34.2'	116.8°	37°27.0'	-35.1'	117.5°	36°59.0'	-36.1'	118.1°	36°30.4'	-37.0'	118.8°	36°01.2'	-37.9'	119.4°	5
6	38°14.9'	-32.8'	116.4°	37°47.8'	-33.8'	117.1°	37°20.2'	-34.7'	117.8°	36°51.8'	-35.7'	118.5°	36°22.9'	-36.6'	119.1°	35°53.4'	-37.4'	119.8°	35°23.4'	-38.3'	120.4°	6
7	37°42.1'	-33.4'	117.5°	37°14.1'	-34.3'	118.2°	36°45.4'	-35.2'	118.8°	36°16.2'	-36.1'	119.5°	35°46.4'	-37.0'	120.1°	35°16.0'	-37.9'	120.7°	34°45.1'	-38.7'	121.3°	7
8	37°08.7'	-33.9'	118.5°	36°39.8'	-34.8'	119.2°	36°10.2'	-35.7'	119.8°	35°40.1'	-36.6'	120.5°	35°09.4'	-37.5'	121.1°	34°38.1'	-38.3'	121.7°	34°06.3'	-39.1'	122.3°	8
9	36°34.8'	-34.4'	119.6°	36°04.9'	-35.3'	120.2°	35°34.5'	-36.2'	120.8°	35°03.4'	-37.1'	121.4°	34°31.9'	-37.9'	122.0°	33°59.8'	-38.7'	122.6°	33°27.2'	-39.5'	123.2°	9
10	36°00.4'	-34.9'	120.6°	35°29.6'	-35.8'	121.2°	34°58.2'	-36.7'	121.8°	34°26.4'	-37.5'	122.4°	33°54.0'	-38.3'	123.0°	33°21.1'	-39.1'	123.5°	32°47.7'	-39.9'	124.1°	10
11	35°25.5'	-35.4'	121.6°	34°53.8'	-36.3'	122.2°	34°21.6'	-37.1'	122.8°	33°48.8'	-37.9'	123.3°	33°15.6'	-38.7'	123.9°	32°41.9'	-39.5'	124.4°	32°07.8'	-40.3'	125.0°	11
12	34°50.1'	-35.9'	122.6°	34°17.5'	-36.7'	123.2°	33°44.4'	-37.6'	123.7°	33°10.9'	-38.4'	124.3°	32°36.9'	-39.1'	124.8°	32°02.4'	-39.9'	125.3°	31°27.5'	-40.6'	125.8°	12
13	34°14.2'	-36.3'	123.6°	33°40.8'	-37.2'	124.1°	33°06.9'	-38.0'	124.7°	32°32.5'	-38.7'	125.2°	31°57.7'	-39.5'	125.7°	31°22.5'	-40.2'	126.2°	30°46.9'	-41.0'	126.7°	13
14	33°37.8'	-36.8'	124.5°	33°03.6'	-37.6'	125.1°	32°28.9'	-38.4'	125.6°	31°53.8'	-39.1'	126.1°	31°18.2'	-39.9'	126.6°	30°42.3'	-40.6'	127.1°	30°05.9'	-41.3'	127.5°	14
15	33°01.0'	-37.2'	125.5°	32°26.0'	-38.0'	126.0°	31°50.6'	-38.7'	126.5°	31°14.7'	-39.5'	127.0°	30°38.4'	-40.2'	127.5°	30°01.7'	-40.9'	127.9°	29°24.6'	-41.6'	128.4°	15
16	32°23.8'	-37.6'	126.4°	31°48.0'	-38.4'	126.9°	31°11.8'	-39.1'	127.4°	30°35.2'	-39.8'	127.9°	29°58.2'	-40.5'	128.3°	29°20.8'	-41.2'	128.8°	28°43.1'	-41.9'	129.2°	16
17	31°46.2'	-38.0'	127.3°	31°09.7'	-38.7'	127.8°	30°32.7'	-39.5'	128.3°	29°55.4'	-40.2'	128.7°	29°17.6'	-40.9'	129.2°	28°39.6'	-41.5'	129.6°	28°01.2'	-42.2'	130.0°	17
18	31°08.2'	-38.4'	128.2°	30°30.9'	-39.1'	128.7°	29°53.2'	-39.8'	129.1°	29°15.2'	-40.5'	129.6°	28°36.8'	-41.2'	130.0°	27°58.1'	-41.8'	130.4°	27°19.0'	-42.4'	130.8°	18
19	30°29.9'	-38.7'	129.1°	29°51.8'	-39.4'	129.6°	29°13.4'	-40.1'	130.0°	28°34.7'	-40.8'	130.4°	27°55.6'	-41.4'	130.8°	27°16.3'	-42.1'	131.2°	26°36.6'	-42.7'	131.6°	19
20	29°51.1'	-39.1'	130.0°	29°12.4'	-39.8'	130.4°	28°33.3'	-40.4'	130.8°	27°53.9'	-41.1'	131.2°	27°14.2'	-41.7'	131.6°	26°34.2'	-42.3'	132.0°	25°			

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

44° 316° LHA

Latitude CONTRARY to Declination

44° 316° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	42°11.2'	-29.4'	110.4°	41°50.0'	-30.5'	111.2°	41°27.9'	-31.6'	112.0°	41°05.0'	-32.7'	112.8°	40°41.3'	-33.7'	113.6°	40°16.9'	-34.8'	114.4°	39°51.7'	-35.8'	115.2°	0
1	41°41.8'	-30.1'	111.5°	41°19.5'	-31.2'	112.4°	40°56.3'	-32.3'	113.2°	40°32.3'	-33.3'	113.9°	40°07.5'	-34.3'	114.7°	39°42.1'	-35.3'	115.5°	39°15.9'	-36.3'	116.2°	1
2	41°11.7'	-30.8'	112.7°	40°48.3'	-31.8'	113.5°	40°24.0'	-32.9'	114.3°	39°59.0'	-33.9'	115.0°	39°33.2'	-34.9'	115.8°	39°06.8'	-35.9'	116.5°	38°39.6'	-36.8'	117.2°	2
3	40°41.0'	-31.4'	113.8°	40°16.4'	-32.5'	114.6°	39°51.1'	-33.5'	115.4°	39°25.0'	-34.5'	116.1°	38°58.3'	-35.5'	116.8°	38°30.9'	-36.4'	117.6°	38°02.8'	-37.3'	118.3°	3
4	40°09.6'	-32.1'	114.9°	39°44.0'	-33.1'	115.7°	39°17.6'	-34.1'	116.4°	38°50.5'	-35.1'	117.2°	38°22.8'	-36.0'	117.9°	37°54.4'	-36.9'	118.6°	37°25.4'	-37.8'	119.2°	4
5	39°37.6'	-32.7'	116.0°	39°10.9'	-33.7'	116.8°	38°43.5'	-34.7'	117.5°	38°15.5'	-35.6'	118.2°	37°46.8'	-36.5'	118.9°	37°17.5'	-37.4'	119.6°	36°47.6'	-38.3'	120.2°	5
6	39°04.9'	-33.3'	117.1°	38°37.2'	-34.2'	117.8°	38°08.8'	-35.2'	118.5°	37°39.9'	-36.1'	119.2°	37°10.3'	-37.0'	119.9°	36°40.1'	-37.9'	120.5°	36°09.3'	-38.8'	121.2°	6
7	38°31.6'	-33.8'	118.2°	38°02.9'	-34.8'	118.9°	37°33.6'	-35.7'	119.6°	37°03.7'	-36.6'	120.2°	36°33.2'	-37.5'	120.9°	36°02.2'	-38.4'	121.5°	35°30.5'	-39.2'	122.1°	7
8	37°57.8'	-34.4'	119.2°	37°28.1'	-35.3'	119.9°	36°57.9'	-36.2'	120.6°	36°27.1'	-37.1'	121.2°	35°55.7'	-38.0'	121.8°	35°23.8'	-38.8'	122.4°	34°51.4'	-39.6'	123.0°	8
9	37°23.4'	-34.9'	120.3°	36°52.8'	-35.8'	120.9°	36°21.7'	-36.7'	121.6°	35°50.0'	-37.6'	122.2°	35°17.8'	-38.4'	122.8°	34°45.0'	-39.2'	123.4°	34°11.8'	-40.0'	124.0°	9
10	36°48.5'	-35.4'	121.3°	36°17.0'	-36.3'	121.9°	35°45.0'	-37.2'	122.5°	35°12.4'	-38.0'	123.1°	34°39.4'	-38.8'	123.7°	34°05.8'	-39.6'	124.3°	33°31.8'	-40.4'	124.8°	10
11	36°13.0'	-35.9'	122.3°	35°40.7'	-36.8'	122.9°	35°07.8'	-37.6'	123.5°	34°34.4'	-38.4'	124.1°	34°00.6'	-39.2'	124.7°	33°26.2'	-40.0'	125.2°	32°51.4'	-40.7'	125.7°	11
12	35°37.1'	-36.4'	123.3°	35°03.9'	-37.2'	123.9°	34°30.2'	-38.1'	124.5°	33°56.0'	-38.9'	125.0°	33°21.3'	-39.6'	125.6°	32°46.2'	-40.4'	126.1°	32°10.6'	-41.1'	126.6°	12
13	35°00.7'	-36.9'	124.3°	34°26.6'	-37.7'	124.8°	33°52.1'	-38.5'	125.4°	33°17.1'	-39.3'	125.9°	32°41.7'	-40.0'	126.5°	32°05.8'	-40.7'	127.0°	31°29.5'	-41.4'	127.5°	13
14	34°23.8'	-37.3'	125.2°	33°48.9'	-38.1'	125.8°	33°13.6'	-38.9'	126.3°	32°37.9'	-39.6'	126.8°	32°01.7'	-40.4'	127.3°	31°25.1'	-41.1'	127.8°	30°48.1'	-41.8'	128.3°	14
15	33°46.5'	-37.7'	126.2°	33°10.8'	-38.5'	126.7°	32°34.8'	-39.3'	127.2°	31°58.2'	-40.0'	127.7°	31°21.3'	-40.7'	128.2°	30°44.0'	-41.4'	128.7°	30°06.3'	-42.1'	129.1°	15
16	33°08.7'	-38.2'	127.1°	32°32.3'	-38.9'	127.6°	31°55.5'	-39.6'	128.1°	31°18.2'	-40.3'	128.6°	30°40.6'	-41.0'	129.1°	30°02.6'	-41.7'	129.5°	29°24.3'	-42.4'	130.0°	16
17	32°30.6'	-38.5'	128.0°	31°53.4'	-39.3'	128.5°	31°15.8'	-40.0'	129.0°	30°37.9'	-40.7'	129.5°	29°59.6'	-41.4'	129.9°	29°20.9'	-42.0'	130.3°	28°41.9'	-42.7'	130.8°	17
18	31°52.0'	-38.9'	128.9°	31°14.1'	-39.6'	129.4°	30°35.9'	-40.3'	129.9°	29°57.2'	-41.0'	130.3°	29°18.2'	-41.7'	130.7°	28°38.9'	-42.3'	131.2°	27°59.2'	-42.9'	131.6°	18
19	31°13.1'	-39.3'	129.8°	30°34.5'	-40.0'	130.3°	29°55.5'	-40.7'	130.7°	29°16.2'	-41.3'	131.2°	28°36.6'	-42.0'	131.6°	27°56.6'	-42.6'	132.0°	27°16.3'	-43.2'	132.4°	19
20	30°33.8'	-39.6'	130.7°	29°54.5'	-40.3'	131.1°	29°14.9'	-41.0'	131.6°	28°34.9'	-41.6'	132.0°	27°54.6'	-42.2'	132.4°	27°14.0'	-42.9'	132.8°	26°33.1'	-43.4'	133.1°	20
21	29°54.2'	-40.0'	131.6°	29°14.2'	-40.6'	132.0°	28°33.9'	-41.3'	132.4°	27°53.3'	-41.9'	132.8°	27°12.4'	-42.5'	133.2°	26°31.2'	-43.1'	133.5°	25°49.7'	-43.7'	133.9°	21
22	29°14.2'	-40.3'	132.4°	28°33.5'	-40.9'	132.8°	27°52.6'	-41.6'	133.2°	27°11.4'	-42.2'	133.6°	26°29.8'	-42.8'	134.0°	25°48.0'	-43.3'	134.3°	25°06.0'	-43.9'	134.7°	22
23	28°33.9'	-40.6'	133.3°	27°52.6'	-41.2'	133.7°	27°11.0'	-41.8'	134.0°	26°29.2'	-42.4'	134.4°	25°47.1'	-43.0'	134.8°	25°04.7'	-43.6'	135.1°	24°22.1'	-44.1'	135.4°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27			

44° 316° LHA

Latitude CONTRARY to DECLINATION

44° 316° LHA

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

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

43° 317° LHA

Latitude CONTRARY to Declination

43° 317° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	43°03.6'	-29.8'	111.0°	42°41.7'	-30.9'	111.9°	42°18.9'	-32.0'	112.7°	41°55.4'	-33.1'	113.6°	41°31.0'	-34.2'	114.4°	41°05.8'	-35.2'	115.2°	40°39.9'	-36.2'	116.0°	0
1	42°33.8'	-30.5'	112.2°	42°10.8'	-31.6'	113.0°	41°46.9'	-32.7'	113.9°	41°22.2'	-33.8'	114.7°	40°56.8'	-34.8'	115.5°	40°30.6'	-35.8'	116.2°	40°03.7'	-36.8'	117.0°	1
2	42°03.3'	-31.2'	113.4°	41°39.2'	-32.3'	114.2°	41°14.2'	-33.3'	115.0°	40°48.5'	-34.4'	115.8°	40°22.0'	-35.4'	116.5°	39°54.8'	-36.3'	117.3°	39°27.0'	-37.3'	118.0°	2
3	41°32.1'	-31.9'	114.5°	41°06.9'	-32.9'	115.3°	40°40.8'	-34.0'	116.1°	40°14.1'	-35.0'	116.9°	39°46.6'	-35.9'	117.6°	39°18.5'	-36.9'	118.3°	38°49.7'	-37.8'	119.0°	3
4	41°00.3'	-32.5'	115.6°	40°33.9'	-33.6'	116.4°	40°06.9'	-34.6'	117.2°	39°39.1'	-35.5'	117.9°	39°10.7'	-36.5'	118.6°	38°41.6'	-37.4'	119.3°	38°11.9'	-38.3'	120.0°	4
5	40°27.7'	-33.2'	116.8°	40°00.4'	-34.2'	117.5°	39°32.3'	-35.1'	118.2°	39°03.6'	-36.1'	119.0°	38°34.2'	-37.0'	119.7°	38°04.2'	-37.9'	120.3°	37°33.6'	-38.8'	121.0°	5
6	39°54.6'	-33.8'	117.8°	39°26.2'	-34.7'	118.6°	38°57.2'	-35.7'	119.3°	38°27.5'	-36.6'	120.0°	37°57.2'	-37.5'	120.7°	37°26.3'	-38.4'	121.3°	36°54.8'	-39.2'	122.0°	6
7	39°20.8'	-34.3'	118.9°	38°51.5'	-35.3'	119.6°	38°21.5'	-36.2'	120.3°	37°50.9'	-37.1'	121.0°	37°19.7'	-38.0'	121.6°	36°48.0'	-38.8'	122.3°	36°15.6'	-39.7'	122.9°	7
8	38°46.5'	-34.9'	120.0°	38°16.2'	-35.8'	120.7°	37°45.3'	-36.7'	121.3°	37°13.8'	-37.6'	122.0°	36°41.7'	-38.4'	122.6°	36°09.1'	-39.3'	123.2°	35°36.0'	-40.1'	123.8°	8
9	38°11.6'	-35.4'	121.0°	37°40.4'	-36.3'	121.7°	37°08.6'	-37.2'	122.3°	36°36.2'	-38.1'	123.0°	36°03.3'	-38.9'	123.6°	35°29.8'	-39.7'	124.2°	34°55.9'	-40.5'	124.8°	9
10	37°36.1'	-36.0'	122.0°	37°04.0'	-36.8'	122.7°	36°31.3'	-37.7'	123.3°	35°58.1'	-38.5'	123.9°	35°24.4'	-39.3'	124.5°	34°50.2'	-40.1'	125.1°	34°15.4'	-40.9'	125.6°	10
11	37°00.2'	-36.5'	123.0°	36°27.2'	-37.3'	123.7°	35°53.7'	-38.1'	124.3°	35°19.6'	-39.0'	124.9°	34°45.1'	-39.7'	125.4°	34°10.0'	-40.5'	126.0°	33°34.6'	-41.2'	126.5°	11
12	36°23.7'	-36.9'	124.0°	35°49.9'	-37.8'	124.6°	35°15.5'	-38.6'	125.2°	34°40.7'	-39.4'	125.8°	34°05.3'	-40.1'	126.3°	33°29.6'	-40.9'	126.9°	32°53.3'	-41.6'	127.4°	12
13	35°46.7'	-37.4'	125.0°	35°12.1'	-38.2'	125.6°	34°36.9'	-39.0'	126.2°	34°01.3'	-39.8'	126.7°	33°25.2'	-40.5'	127.2°	32°48.7'	-41.2'	127.8°	32°11.7'	-41.9'	128.3°	13
14	35°09.3'	-37.9'	126.0°	34°33.9'	-38.6'	126.5°	33°57.9'	-39.4'	127.1°	33°21.5'	-40.2'	127.6°	32°44.7'	-40.9'	128.1°	32°07.5'	-41.6'	128.6°	31°29.8'	-42.3'	129.1°	14
15	34°31.5'	-38.3'	126.9°	33°55.2'	-39.1'	127.5°	33°18.5'	-39.8'	128.0°	32°41.4'	-40.5'	128.5°	32°03.8'	-41.2'	129.0°	31°25.9'	-41.9'	129.5°	30°47.6'	-42.6'	129.9°	15
16	33°53.2'	-38.7'	127.8°	33°16.2'	-39.4'	128.4°	32°38.7'	-40.2'	128.9°	32°00.9'	-40.9'	129.4°	31°22.6'	-41.6'	129.8°	30°44.0'	-42.2'	130.3°	30°05.0'	-42.9'	130.7°	16
17	33°14.5'	-39.1'	128.8°	32°36.7'	-39.8'	129.3°	31°58.5'	-40.5'	129.7°	31°20.0'	-41.2'	130.2°	30°41.1'	-41.9'	130.7°	30°01.8'	-42.5'	131.1°	29°22.1'	-43.1'	131.5°	17
18	32°35.4'	-39.5'	129.7°	31°56.9'	-40.2'	130.1°	31°18.0'	-40.9'	130.6°	30°38.8'	-41.5'	131.1°	29°59.2'	-42.2'	131.5°	29°19.3'	-42.8'	131.9°	28°39.0'	-43.4'	132.3°	18
19	31°55.9'	-39.9'	130.6°	31°16.7'	-40.5'	131.0°	30°37.1'	-41.2'	131.5°	29°57.2'	-41.8'	131.9°	29°17.0'	-42.5'	132.3°	28°36.4'	-43.1'	132.7°	27°55.6'	-43.7'	133.1°	19
20	31°16.0'	-40.2'	131.4°	30°36.2'	-40.9'	131.9°	29°55.9'	-41.5'	132.3°	29°14.4'	-42.1'	132.7°	28°34.5'	-42.8'								

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

42° 318° LHA		Latitude CONTRARY to Declination												42° 318° LHA											
Dec°	21			22			23			24			25			26			27			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	43°55.8'	-30.2'	111.7°	43°33.2'	-31.4'	112.6°	43°09.7'	-32.5'	113.5°	42°45.4'	-33.6'	114.3°	42°20.3'	-34.6'	115.1°	41°54.5'	-35.6'	116.0°	41°27.8'	-36.6'	116.8°	0			
1	43°25.5'	-31.0'	112.9°	43°01.8'	-32.1'	113.8°	42°37.3'	-33.2'	114.6°	42°11.9'	-34.2'	115.4°	41°45.7'	-35.2'	116.2°	41°18.8'	-36.2'	117.0°	40°51.2'	-37.2'	117.8°	1			
2	42°54.6'	-31.7'	114.1°	42°29.8'	-32.8'	114.9°	42°04.1'	-33.8'	115.7°	41°37.7'	-34.8'	116.5°	41°10.5'	-35.8'	117.3°	40°42.6'	-36.8'	118.1°	40°14.0'	-37.7'	118.8°	2			
3	42°23.0'	-32.4'	115.2°	41°57.0'	-33.4'	116.0°	41°30.3'	-34.4'	116.8°	41°02.8'	-35.4'	117.6°	40°34.7'	-36.4'	118.4°	40°05.8'	-37.3'	119.1°	39°36.2'	-38.3'	119.9°	3			
4	41°50.6'	-33.0'	116.4°	41°23.6'	-34.0'	117.2°	40°55.8'	-35.0'	117.9°	40°27.4'	-36.0'	118.7°	39°58.2'	-37.0'	119.4°	39°28.4'	-37.9'	120.1°	38°58.0'	-38.8'	120.9°	4			
5	41°17.6'	-33.7'	117.5°	40°49.5'	-34.7'	118.2°	40°20.8'	-35.6'	119.0°	39°51.4'	-36.6'	119.7°	39°21.3'	-37.5'	120.4°	38°50.6'	-38.4'	121.1°	38°19.2'	-39.2'	121.8°	5			
6	40°43.9'	-34.3'	118.6°	40°14.9'	-35.2'	119.3°	39°45.2'	-36.2'	120.1°	39°14.8'	-37.1'	120.8°	38°43.8'	-38.0'	121.5°	38°12.2'	-38.9'	122.1°	37°40.0'	-39.7'	122.8°	6			
7	40°09.7'	-34.9'	119.7°	39°39.7'	-35.8'	120.4°	39°09.0'	-36.7'	121.1°	38°37.7'	-37.6'	121.8°	38°05.8'	-38.5'	122.4°	37°33.3'	-39.3'	123.1°	37°00.3'	-40.1'	123.7°	7			
8	39°34.8'	-35.4'	120.7°	39°03.9'	-36.3'	121.4°	38°32.3'	-37.2'	122.1°	38°00.1'	-38.1'	122.8°	37°27.3'	-38.9'	123.4°	36°54.0'	-39.8'	124.0°	36°20.2'	-40.6'	124.7°	8			
9	38°59.4'	-36.0'	121.8°	38°27.5'	-36.9'	122.4°	37°55.0'	-37.7'	123.1°	37°22.0'	-38.6'	123.7°	36°48.4'	-39.4'	124.4°	36°14.3'	-40.2'	125.0°	35°39.6'	-41.0'	125.6°	9			
10	38°23.4'	-36.5'	122.8°	37°50.6'	-37.4'	123.4°	37°17.3'	-38.2'	124.1°	36°43.4'	-39.0'	124.7°	36°09.0'	-39.8'	125.3°	35°34.1'	-40.6'	125.9°	34°58.6'	-41.3'	126.5°	10			
11	37°46.9'	-37.0'	123.8°	37°13.3'	-37.9'	124.4°	36°39.1'	-38.7'	125.0°	36°04.4'	-39.5'	125.6°	35°29.2'	-40.2'	126.2°	34°53.5'	-41.0'	126.8°	34°17.3'	-41.7'	127.3°	11			
12	37°09.9'	-37.5'	124.8°	36°35.4'	-38.3'	125.4°	36°00.4'	-39.1'	126.0°	35°24.9'	-39.9'	126.6°	34°48.9'	-40.6'	127.1°	34°12.5'	-41.4'	127.7°	33°35.6'	-42.1'	128.2°	12			
13	36°32.4'	-38.0'	125.8°	35°57.1'	-38.8'	126.4°	35°21.3'	-39.5'	126.9°	34°45.0'	-40.3'	127.5°	34°08.3'	-41.0'	128.0°	33°31.1'	-41.7'	128.6°	32°53.5'	-42.4'	129.1°	13			
14	35°54.5'	-38.4'	126.7°	35°18.3'	-39.2'	127.3°	34°41.8'	-39.9'	127.8°	34°04.7'	-40.7'	128.4°	33°27.3'	-41.4'	128.9°	32°49.4'	-42.1'	129.4°	32°11.1'	-42.7'	129.9°	14			
15	35°16.0'	-38.8'	127.7°	34°39.2'	-39.6'	128.2°	34°01.8'	-40.3'	128.7°	33°24.0'	-41.0'	129.3°	32°45.9'	-41.7'	129.8°	32°07.3'	-42.4'	130.3°	31°28.3'	-43.1'	130.7°	15			
16	34°37.2'	-39.3'	128.6°	33°59.6'	-40.0'	129.1°	33°21.5'	-40.7'	129.6°	32°43.0'	-41.4'	130.1°	32°04.1'	-42.1'	130.6°	31°24.9'	-42.7'	131.1°	30°45.3'	-43.4'	131.5°	16			
17	33°57.9'	-39.7'	129.5°	33°19.6'	-40.4'	130.0°	32°40.8'	-41.1'	130.5°	32°01.6'	-41.7'	131.0°	31°22.1'	-42.4'	131.5°	30°42.2'	-43.0'	131.9°	30°01.9'	-43.6'	132.3°	17			
18	33°18.3'	-40.0'	130.4°	32°39.2'	-40.7'	130.9°	31°59.7'	-41.4'	131.4°	31°19.9'	-42.1'	131.8°	30°39.7'	-42.7'	132.3°	29°59.1'	-43.3'	132.7°	29°18.3'	-43.9'	133.1°	18			
19	32°38.2'	-40.4'	131.3°	31°58.4'	-41.1'	131.8°	31°18.3'	-41.7'	132.2°	30°37.8'	-42.4'	132.7°	29°57.0'	-43.0'	133.1°	29°15.8'	-43.6'	133.5°	28°34.3'	-44.2'	133.9°	19			
20	31°57.8'	-40.8'	132.2°	31°17.3'	-41.4'	132.6°	30°36.5'	-42.1'	133.1°	29°55.4'	-42.7'	133.5°	29°14.0'	-43.3'	133.9°	28°32.2'	-43.9'	134.3°	27°50.2'	-44.4'	134.7°	20			
21	31°17.0'	-41.1'	133.0°	30°35.9'	-41.7'	133.5°	29°54.5'	-42.4'	133.9°	29°12.7'	-43.0'	134.3°	28°30.7'	-43.6'	134.7°	27°04.2'	-44.1'	135.1°	27°05.7'	-44.7'	135.4°	21			
22	30°35.9'	-41.4'	133.9°	29°54.2'	-42.1'	134.3°	29°12.1'	-42.7'	134.7°	28°29.8'	-43.2'	135.1°	27°47.1'	-43.8'	135.5°	27°04.2'	-44.4'	135.8°	26°21.0'	-44.9'	136.2°	22			
23	29°54.5'	-41.8'	134.7°	29°12.1'	-42.4'	135.1°	28°29.4'	-42.9'	135.5°	27°46.5'	-43.5'	135.9°	27°03.3'	-44.1'	136.2°	26°19.8'	-44.6'	136.6°	25°36.1'	-45.1'	136.9°	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°
	21			22			23			24			25			26			27					Dec°	

42° 318° LHA Latitude CONTRARY to DECLINATION 42° 318° LHA
 South Lat. LHA > 180° . . Zn = 180-Z LHA < 180° . . Zn= 180+Z

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

41° 319° LHA		Latitude CONTRARY to Declination												41° 319° LHA								
Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	44°47.7'	-30.7'	112.4°	44°24.4'	-31.8'	113.3°	44°00.3'	-32.9'	114.2°	43°35.2'	-34.0'	115.1°	43°09.4'	-35.1'	115.9°	42°42.8'	-36.1'	116.8°	42°15.4'	-37.1'	117.6°	0
1	44°17.0'	-31.4'	113.6°	43°52.6'	-32.5'	114.5°	43°27.3'	-33.6'	115.4°	43°01.2'	-34.7'	116.2°	42°34.3'	-35.7'	117.0°	42°06.7'	-36.7'	117.8°	41°38.3'	-37.7'	118.6°	1
2	43°45.6'	-32.2'	114.8°	43°20.1'	-33.2'	115.7°	42°53.7'	-34.3'	116.5°	42°26.5'	-35.3'	117.3°	41°58.6'	-36.3'	118.1°	41°30.0'	-37.3'	118.9°	41°00.6'	-38.2'	119.7°	2
3	43°13.5'	-32.8'	116.0°	42°46.8'	-33.9'	116.8°	42°19.4'	-34.9'	117.6°	41°51.2'	-35.9'	118.4°	41°22.3'	-36.9'	119.2°	40°52.7'	-37.8'	119.9°	40°22.4'	-38.7'	120.7°	3
4	42°40.6'	-33.5'	117.1°	42°12.9'	-34.5'	117.9°	41°44.5'	-35.5'	118.7°	41°15.3'	-36.5'	119.5°	40°45.4'	-37.4'	120.2°	40°14.9'	-38.4'	121.0°	39°43.7'	-39.2'	121.7°	4
5	42°07.1'	-34.2'	118.2°	41°38.4'	-35.2'	119.0°	41°08.9'	-36.1'	119.8°	40°38.8'	-37.1'	120.5°	40°08.0'	-38.0'	121.3°	39°36.5'	-38.9'	122.0°	39°04.4'	-39.7'	122.7°	5
6	41°33.0'	-34.8'	119.3°	41°03.2'	-35.8'	120.1°	40°32.8'	-36.7'	120.8°	40°01.7'	-37.6'	121.6°	39°30.0'	-38.5'	122.3°	38°57.7'	-39.4'	123.0°	38°24.7'	-40.2'	123.6°	6
7	40°58.2'	-35.4'	120.4°	40°27.5'	-36.3'	121.2°	39°56.1'	-37.2'	121.9°	39°24.1'	-38.1'	122.6°	38°51.5'	-39.0'	123.3°	38°18.3'	-39.8'	123.9°	37°44.5'	-40.6'	124.6°	7
8	40°22.8'	-36.0'	121.5°	39°51.1'	-36.9'	122.2°	39°18.9'	-37.8'	122.9°	38°46.0'	-38.6'	123.6°	38°12.5'	-39.5'	124.2°	37°38.5'	-40.3'	124.9°	37°03.9'	-41.1'	125.5°	8
9	39°46.8'	-36.5'	122.5°	39°14.3'	-37.4'	123.2°	38°41.1'	-38.3'	123.9°	38°07.4'	-39.1'	124.5°	37°33.1'	-39.9'	125.2°	36°58.2'	-40.7'	125.8°	36°22.9'	-41.5'	126.4°	9
10	39°10.3'	-37.0'	123.6°	38°36.9'	-37.9'	124.2°	38°02.8'	-38.7'	124.9°	37°28.3'	-39.6'	125.5°	36°53.1'	-40.3'	126.1°	36°17.5'	-41.1'	126.7°	35°41.4'	-41.8'	127.3°	10
11	38°33.3'	-37.6'	124.6°	37°58.9'	-38.4'	125.2°	37°24.1'	-39.2'	125.8°	36°48.7'	-40.0'	126.4°	36°12.8'	-40.8'	127.0°	35°36.4'	-41.5'	127.6°	34°59.6'	-42.2'	128.2°	11
12	37°55.7'	-38.1'	125.6°	37°20.5'	-38.9'	126.2°	36°44.9'	-39.7'	126.8°	36°08.7'	-40.4'	127.4°	35°32.0'	-41.2'	127.9°	34°54.9'	-41.9'	128.5°	34°17.3'	-42.6'	129.0°	12
13	37°17.7'	-38.5'	126.5°	36°41.7'	-39.3'	127.1°	36°05.2'	-40.1'	127.7°	35°28.3'	-40.8'	128.3°	34°50.9'	-41.5'	128.8°	34°13.0'	-42.2'	129.4°	33°34.8'	-42.9'	129.9°	13
14	36°39.1'	-39.0'	127.5°	36°02.4'	-39.7'	128.1°	35°25.1'	-40.5'	128.6°	34°47.5'	-41.2'	129.2°	34°09.3'	-41.9'	129.7°	33°30.8'	-42.6'	130.2°	32°51.8'	-43.2'	130.7°	14
15	36°00.2'	-39.4'	128.4°	35°22.6'	-40.2'	129.0°	34°44.7'	-40.9'	129.5°	34°06.2'	-41.6'	130.1°	33°27.4'	-42.3'	130.6°	32°48.2'	-42.9'	131.1°	32°08.6'	-43.6'	131.5°	15
16	35°20.7'	-39.8'	129.4°	34°42.5'	-40.6'	129.9°	34°03.8'	-41.3'	130.4°	33°24.7'	-41.9'	130.9°	32°45.2'	-42.6'	131.4°	32°05.3'	-43.2'	131.9°	31°25.0'	-43.9'	132.4°	16
17	34°40.9'	-40.2'	130.3°	34°01.9'	-40.9'	130.8°	33°22.5'	-41.6'	131.3°	32°42.7'	-42.3'	131.8°	32°02.6'	-42.9'	132.3°	31°22.0'	-43.5'	132.7°	30°41.2'	-44.1'	133.2°	17
18	34°00.7'	-40.6'	131.2°	33°21.0'	-41.3'	131.7°	32°40.9'	-42.0'	132.2°	32°00.4'	-42.6'	132.6°	31°19.6'	-43.2'	133.1°	30°38.5'	-43.8'	133.5°	29°57.0'	-44.4'	133.9°	18
19	33°20.1'	-41.0'	132.1°	32°39.7'	-41.7'	132.5°	31°58.9'	-42.3'	133.0°	31°17.8'	-42.9'	133.5°	30°36.4'	-43.5'	133.9°	29°54.7'	-44.1'	134.3°	29°12.6'	-44.7'	134.7°	19
20	32°39.1'	-41.3'	132.9°	31°58.0'	-42.0'	133.4°	31°16.6'	-42.6'	133.8°	30°34.9'	-43.2'	134.3°	29°52.9'	-43.8'	134.7°	29°10.5'	-44.4'	135.1°	28°27.9'	-44.9'	135.5°	20
21	31°57.7'	-41.7'	133.8°	31°16.0'	-42.3'	134.2°	30°34.0'	-42.9'	134.7°	29°51.7'	-43.5'	135.1°	29°09									

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

40° 320° LHA

Latitude CONTRARY to Declination

40° 320° LHA

Table with 9 columns (Dec, 21, 22, 23, 24, 25, 26, 27, Dec) and 24 rows of astronomical data including Hc, d, and Z values.

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

Table with 9 columns (Dec, 21, 22, 23, 24, 25, 26, 27, Dec) and 24 rows of astronomical data including Hc, d, and Z values.

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

Table with 10 columns (Dec, 21-27, Dec) and 23 rows of astronomical data for 38° 322° LHA.

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

Table with 10 columns (Dec, 21-27, Dec) and 23 rows of astronomical data for 37° 323° LHA.

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°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	49°03.0'	-33.2'	116.3°	48°36.0'	-34.4'	117.3°	48°08.0'	-35.5'	118.3°	47°39.2'	-36.6'	119.2°	47°09.4'	-37.6'	120.2°	46°38.8'	-38.6'	121.1°	46°07.4'	-39.6'	122.0°	0
1	48°29.7'	-34.0'	117.5°	48°01.6'	-35.2'	118.5°	47°32.5'	-36.2'	119.5°	47°02.6'	-37.3'	120.4°	46°31.8'	-38.3'	121.3°	46°00.2'	-39.3'	122.2°	45°27.8'	-40.2'	123.1°	1
2	47°55.7'	-34.8'	118.8°	47°26.4'	-35.9'	119.7°	46°56.3'	-36.9'	120.6°	46°25.3'	-38.0'	121.6°	45°53.5'	-38.9'	122.4°	45°20.9'	-39.9'	123.3°	44°47.6'	-40.8'	124.1°	2
3	47°20.9'	-35.6'	120.0°	46°50.5'	-36.6'	120.9°	46°19.3'	-37.6'	121.8°	45°47.3'	-38.6'	122.7°	45°14.6'	-39.5'	123.5°	44°41.1'	-40.4'	124.4°	44°06.9'	-41.3'	125.2°	3
4	46°45.4'	-36.3'	121.1°	46°13.9'	-37.3'	122.0°	45°41.7'	-38.3'	122.9°	45°08.7'	-39.2'	123.8°	44°35.0'	-40.1'	124.6°	44°00.6'	-41.0'	125.4°	43°25.5'	-41.8'	126.2°	4
5	46°09.1'	-37.0'	122.3°	45°36.6'	-37.9'	123.2°	45°03.4'	-38.9'	124.0°	44°29.5'	-39.8'	124.8°	43°54.9'	-40.7'	125.6°	43°19.6'	-41.5'	126.4°	42°43.7'	-42.3'	127.1°	5
6	45°32.1'	-37.6'	123.4°	44°58.7'	-38.6'	124.3°	44°24.6'	-39.5'	125.1°	43°49.7'	-40.3'	125.9°	43°14.3'	-41.2'	126.6°	42°38.1'	-42.0'	127.4°	42°01.4'	-42.8'	128.1°	6
7	44°54.5'	-38.2'	124.5°	44°20.2'	-39.2'	125.3°	43°45.1'	-40.0'	126.1°	43°09.4'	-40.9'	126.9°	42°33.1'	-41.7'	127.6°	41°56.1'	-42.5'	128.3°	41°18.6'	-43.2'	129.0°	7
8	44°16.3'	-38.8'	125.6°	43°41.0'	-39.7'	126.4°	43°05.1'	-40.6'	127.2°	42°28.5'	-41.4'	127.9°	41°51.4'	-42.2'	128.6°	41°13.7'	-42.9'	129.3°	40°35.4'	-43.7'	130.0°	8
9	43°37.4'	-39.4'	126.7°	43°01.3'	-40.3'	127.4°	42°24.5'	-41.1'	128.2°	41°47.1'	-41.9'	128.9°	41°09.2'	-42.6'	129.6°	40°30.7'	-43.4'	130.2°	39°51.7'	-44.1'	130.9°	9
10	42°58.0'	-40.0'	127.7°	42°21.0'	-40.8'	128.4°	41°43.4'	-41.6'	129.1°	41°05.3'	-42.3'	129.8°	40°26.6'	-43.1'	130.5°	39°47.4'	-43.8'	131.1°	39°07.7'	-44.5'	131.7°	10
11	42°18.1'	-40.5'	128.7°	41°40.2'	-41.3'	129.4°	41°01.9'	-42.0'	130.1°	40°22.9'	-42.8'	130.8°	39°43.5'	-43.5'	131.4°	39°03.6'	-44.2'	132.0°	38°23.2'	-44.8'	132.6°	11
12	41°37.6'	-41.0'	129.7°	40°59.0'	-41.8'	130.4°	40°19.8'	-42.5'	131.0°	39°40.2'	-43.2'	131.7°	39°00.0'	-43.9'	132.3°	38°19.4'	-44.5'	132.9°	37°38.4'	-45.2'	133.4°	12
13	40°56.6'	-41.5'	130.7°	40°17.2'	-42.2'	131.3°	39°37.3'	-42.9'	132.0°	38°57.0'	-43.6'	132.6°	38°16.2'	-44.3'	133.2°	37°34.9'	-44.9'	133.7°	36°53.2'	-45.5'	134.3°	13
14	40°15.1'	-41.9'	131.6°	39°35.0'	-42.6'	132.3°	38°54.4'	-43.3'	132.9°	38°13.4'	-44.0'	133.5°	37°31.9'	-44.6'	134.0°	36°50.0'	-45.2'	134.6°	36°07.7'	-45.8'	135.1°	14
15	39°33.2'	-42.4'	132.6°	38°52.4'	-43.1'	133.2°	38°11.1'	-43.7'	133.8°	37°29.4'	-44.4'	134.3°	36°47.3'	-45.0'	134.9°	36°04.8'	-45.6'	135.4°	35°21.9'	-46.1'	135.9°	15
16	38°50.8'	-42.8'	133.5°	38°09.3'	-43.4'	134.1°	37°27.4'	-44.1'	134.6°	36°45.0'	-44.7'	135.2°	36°02.3'	-45.3'	135.7°	35°19.2'	-45.9'	136.2°	34°35.7'	-46.4'	136.7°	16
17	38°08.0'	-43.2'	134.4°	37°25.9'	-43.8'	134.9°	36°43.3'	-44.4'	135.5°	36°00.3'	-45.0'	136.0°	35°17.0'	-45.6'	136.5°	34°33.3'	-46.2'	137.0°	33°49.3'	-46.7'	137.4°	17
18	37°24.9'	-43.6'	135.3°	36°42.0'	-44.2'	135.8°	35°58.8'	-44.8'	136.3°	35°15.3'	-45.4'	136.8°	34°31.4'	-45.9'	137.3°	33°47.1'	-46.5'	137.7°	33°02.6'	-47.0'	138.2°	18
19	36°41.3'	-43.9'	136.1°	35°57.9'	-44.5'	136.6°	35°14.1'	-45.1'	137.1°	34°29.9'	-45.7'	137.6°	33°45.5'	-46.2'	138.1°	33°00.7'	-46.7'	138.5°	32°15.6'	-47.2'	138.9°	19
20	35°57.4'	-44.3'	137.0°	35°13.3'	-44.9'	137.5°	34°29.0'	-45.4'	137.9°	33°44.3'	-46.0'	138.4°	32°59.2'	-46.5'	138.8°	32°13.9'	-47.0'	139.2°	31°28.4'	-47.5'	139.6°	20
21	35°13.1'	-44.6'	137.8°	34°28.5'	-45.2'	138.3°	33°43.5'	-45.7'	138.7°	32°58.3'	-46.2'	139.1°	32°12.8'	-46.7'	139.6°	31°27.0'	-47.2'	140.0°	30°40.9'	-47.7'	140.4°	21
22	34°28.5'	-44.9'	138.6°	33°43.3'	-45.5'	139.1°	32°57.8'	-46.0'	139.5°	32°12.1'	-46.5'	139.9°	31°26.0'	-47.0'	140.3°	30°39.7'	-47.5'	140.7°	29°53.2'	-47.9'	141.1°	22
23	33°43.5'	-45.2'	139.4°	32°57.8'	-45.8'	139.8°	32°11.8'	-46.3'	140.3°	31°25.6'	-46.8'	140.6°	30°39.0'	-47.2'	141.0°	29°52.3'	-47.7'	141.4°	29°05.3'	-48.1'	141.7°	23

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°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	49°53.0'	-33.8'	117.1°	49°25.2'	-35.0'	118.1°	48°56.5'	-36.1'	119.2°	48°26.8'	-37.2'	120.2°	47°56.2'	-38.2'	121.1°	47°24.8'	-39.2'	122.0°	46°52.5'	-40.2'	123.0°	0
1	49°19.2'	-34.6'	118.4°	48°50.3'	-35.7'	119.4°	48°20.4'	-36.8'	120.4°	47°49.6'	-37.9'	121.3°	47°18.0'	-38.9'	122.3°	46°45.6'	-39.8'	123.2°	46°12.4'	-40.8'	124.0°	1
2	48°44.6'	-35.4'	119.6°	48°14.5'	-36.5'	120.6°	47°43.6'	-37.5'	121.6°	47°11.8'	-38.5'	122.5°	46°39.1'	-39.5'	123.4°	46°05.8'	-40.4'	124.2°	45°31.6'	-41.3'	125.1°	2
3	48°09.2'	-36.2'	120.8°	47°38.1'	-37.2'	121.8°	47°06.0'	-38.2'	122.7°	46°33.2'	-39.2'	123.6°	45°59.6'	-40.1'	124.5°	45°25.3'	-41.0'	125.3°	44°50.3'	-41.9'	126.1°	3
4	47°33.1'	-36.9'	122.0°	47°00.9'	-37.9'	122.9°	46°27.8'	-38.9'	123.8°	45°54.1'	-39.8'	124.7°	45°19.5'	-40.7'	125.5°	44°44.3'	-41.5'	126.3°	44°08.4'	-42.4'	127.1°	4
5	46°56.2'	-37.6'	123.2°	46°23.0'	-38.5'	124.1°	45°49.0'	-39.5'	124.9°	45°14.3'	-40.4'	125.8°	44°38.9'	-41.2'	126.6°	44°02.8'	-42.1'	127.3°	43°26.1'	-42.9'	128.1°	5
6	46°18.6'	-38.2'	124.3°	45°44.4'	-39.2'	125.2°	45°09.5'	-40.1'	126.0°	44°33.9'	-40.9'	126.8°	43°57.6'	-41.8'	127.6°	43°20.7'	-42.6'	128.3°	42°43.2'	-43.3'	129.1°	6
7	45°40.4'	-38.9'	125.4°	45°05.3'	-39.8'	126.3°	44°29.4'	-40.6'	127.1°	43°53.0'	-41.5'	127.8°	43°15.9'	-42.3'	128.6°	42°38.2'	-43.0'	129.3°	41°59.9'	-43.8'	130.0°	7
8	45°01.6'	-39.5'	126.5°	44°25.5'	-40.3'	127.3°	43°48.8'	-41.2'	128.1°	43°11.5'	-42.0'	128.8°	42°33.6'	-42.7'	129.5°	41°55.1'	-43.5'	130.2°	41°16.1'	-44.2'	130.9°	8
9	44°22.1'	-40.0'	127.6°	43°45.2'	-40.9'	128.3°	43°07.7'	-41.7'	129.1°	42°29.5'	-42.5'	129.8°	41°50.9'	-43.2'	130.5°	41°11.6'	-43.9'	131.2°	40°31.9'	-44.6'	131.8°	9
10	43°42.1'	-40.6'	128.6°	43°04.3'	-41.4'	129.4°	42°26.0'	-42.2'	130.1°	41°47.1'	-42.9'	130.8°	41°07.7'	-43.6'	131.4°	40°27.7'	-44.3'	132.1°	39°47.3'	-45.0'	132.7°	10
11	43°01.5'	-41.1'	129.6°	42°22.9'	-41.9'	130.3°	41°43.8'	-42.6'	131.0°	41°04.2'	-43.4'	131.7°	40°24.0'	-44.1'	132.3°	39°43.4'	-44.7'	132.9°	39°02.3'	-45.4'	133.5°	11
12	42°20.4'	-41.6'	130.6°	41°41.0'	-42.4'	131.3°	41°01.2'	-43.1'	132.0°	40°20.8'	-43.8'	132.6°	39°40.0'	-44.4'	133.2°	38°58.7'	-45.1'	133.8°	38°16.9'	-45.7'	134.4°	12
13	41°38.8'	-42.1'	131.6°	40°58.7'	-42.8'	132.2°	40°18.1'	-43.5'	132.9°	39°37.0'	-44.2'	133.5°	38°55.5'	-44.8'	134.1°	38°13.6'	-45.4'	134.6°	37°31.2'	-46.0'	135.2°	13
14	40°56.7'	-42.5'	132.5°	40°15.9'	-43.2'	133.2°	39°34.6'	-43.9'	133.8°	38°52.9'	-44.6'	134.4°	38°10.7'	-45.2'	134.9°	37°28.1'	-45.8'	135.5°	36°45.1'	-46.4'	136.0°	14
15	40°14.1'	-43.0'	133.5°	39°32.6'	-43.7'	134.1°	38°50.7'	-44.3'	134.7°	38°08.3'	-44.9'	135.2°	37°25.5'	-45.5'	135.8°	36°42.3'	-46.1'	136.3°	35°58.8'	-46.7'	136.8°	15
16	39°31.2'	-43.4'	134.4°	38°49.0'	-44.0'	135.0°	38°06.4'	-44.7'	135.5°	37°23.4'	-45.3'	136.1°	36°40.0'	-45.9'	136.6°	35°56.2'	-46.4'	137.1°	35°12.1'	-47.0'	137.6°	16
17	38°47.8'	-43.8'	135.3°	38°04.9'	-44.4'	135.8°	37°21.7'	-45.0'	136.4°	36°38.1'	-45.6'	136.9°	35°54.1'	-46.2'	137.4°	35°09.8'	-46.7'	137.9°	34°25.2'	-47.2'	138.3°	17
18	38°04.0'	-44.2'	136.1°	37°20.5'	-44.8'	136.7°	36°36.7'	-45.4'	137.2°	35°52.5'	-45.9'	137.7°	35°08.0'	-46.5'	138.2°	34°23.1'	-47.0'	138.6°	33°37.9'	-47.5'	139.1°	18
19	37°19.8'	-44.5'	137.0°	36°35.7'	-45.1'	137.5°	35°51.3'	-45.7'	138.0°	35°06.6'	-46.2'	138.5°	34°21.5'	-46.7'	138.9°	33°36.1'	-47.3'	139.4°	32°50.4'	-47.7'	139.8°	19
20	36°35.3'	-44.9'	137.8°	35°50.6'	-45.4'	138.3°	35°05.6'	-46.0'	138.8°	34°20.3'	-46.5'	139.3°	33°34.7'	-47.0'	139.7°	32°48.8'	-47.5'	140.1°	32°02.7'	-48.0'	140.5°	20
21	35°50.4'	-45.2'	138.7°	35°05.2'	-45.8'	139.1°	34°19.7'	-46.3'	139.6°	33°33.8'	-46.8'	140.0°	32°47.7'	-47.3'	140.4°	32°01.3'	-47.8'	140.8°	31°14.7'	-48.2'	141.2°	21

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

34° 326° LHA

Latitude CONTRARY to Declination

34° 326° LHA

Table with 10 columns (Dec, 21, 22, 23, 24, 25, 26, 27, Dec) and 24 rows of celestial coordinates (Hc, d, Z).

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

Table with 10 columns (Dec, 21, 22, 23, 24, 25, 26, 27, Dec) and 24 rows of celestial coordinates (Hc, d, Z).

33° 327° LHA

Latitude CONTRARY to DECLINATION

33° 327° LHA

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

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

32° 328° LHA

Latitude CONTRARY to Declination

32° 328° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	52°20.7'	-35.6'	119.8°	51°50.4'	-36.8'	120.9°	51°19.1'	-37.9'	122.0°	50°46.8'	-39.0'	123.1°	50°13.7'	-40.0'	124.1°	49°39.6'	-41.0'	125.1°	49°04.8'	-41.9'	126.0°	0
1	51°45.1'	-36.5'	121.1°	51°13.7'	-37.6'	122.2°	50°41.2'	-38.7'	123.2°	50°07.9'	-39.7'	124.3°	49°33.7'	-40.7'	125.2°	48°58.7'	-41.6'	126.2°	48°22.9'	-42.5'	127.1°	1
2	51°08.6'	-37.3'	122.4°	50°36.1'	-38.4'	123.4°	50°02.5'	-39.4'	124.4°	49°28.2'	-40.4'	125.4°	48°53.0'	-41.3'	126.4°	48°17.1'	-42.2'	127.3°	47°40.4'	-43.1'	128.1°	2
3	50°31.4'	-38.1'	123.7°	49°57.7'	-39.1'	124.7°	49°23.2'	-40.1'	125.6°	48°47.8'	-41.0'	126.5°	48°11.7'	-41.9'	127.5°	47°34.9'	-42.8'	128.3°	46°57.3'	-43.6'	129.2°	3
4	49°53.3'	-38.8'	124.9°	49°18.6'	-39.8'	125.8°	48°43.1'	-40.7'	126.8°	48°06.8'	-41.6'	127.6°	47°29.8'	-42.5'	128.5°	46°52.1'	-43.3'	129.4°	46°13.7'	-44.1'	130.2°	4
5	49°14.5'	-39.5'	126.0°	48°38.8'	-40.4'	127.0°	48°02.4'	-41.3'	127.9°	47°25.2'	-42.2'	128.7°	46°47.3'	-43.0'	129.6°	46°08.8'	-43.8'	130.4°	45°29.6'	-44.6'	131.1°	5
6	48°35.0'	-40.2'	127.2°	47°58.4'	-41.1'	128.1°	47°21.0'	-41.9'	128.9°	46°43.0'	-42.8'	129.8°	46°04.3'	-43.6'	130.6°	45°25.0'	-44.3'	131.3°	44°45.0'	-45.0'	132.1°	6
7	47°54.9'	-40.8'	128.3°	47°17.3'	-41.7'	129.2°	46°39.1'	-42.5'	130.0°	46°00.2'	-43.3'	130.8°	45°20.7'	-44.0'	131.6°	44°40.6'	-44.8'	132.3°	43°60.0'	-45.5'	133.0°	7
8	47°14.1'	-41.4'	129.4°	46°35.7'	-42.2'	130.2°	45°56.6'	-43.0'	131.0°	45°16.9'	-43.8'	131.8°	44°36.7'	-44.5'	132.5°	43°55.9'	-45.2'	133.2°	43°14.5'	-45.9'	133.9°	8
9	46°32.7'	-42.0'	130.4°	45°53.4'	-42.8'	131.2°	45°13.6'	-43.5'	132.0°	44°33.2'	-44.3'	132.7°	43°52.2'	-45.0'	133.4°	43°10.6'	-45.6'	134.1°	42°28.6'	-46.3'	134.8°	9
10	45°50.7'	-42.5'	131.5°	45°10.7'	-43.3'	132.2°	44°30.1'	-44.0'	133.0°	43°48.9'	-44.7'	133.7°	43°07.2'	-45.4'	134.4°	42°25.0'	-46.0'	135.0°	41°42.3'	-46.7'	135.7°	10
11	45°08.2'	-43.0'	132.5°	44°27.4'	-43.8'	133.2°	43°46.1'	-44.5'	133.9°	43°04.2'	-45.1'	134.6°	42°21.8'	-45.8'	135.3°	41°39.0'	-46.4'	135.9°	40°55.7'	-47.0'	136.5°	11
12	44°25.2'	-43.5'	133.5°	43°43.6'	-44.2'	134.2°	43°01.6'	-44.9'	134.8°	42°19.0'	-45.6'	135.5°	41°36.0'	-46.2'	136.1°	40°52.5'	-46.8'	136.7°	40°08.7'	-47.4'	137.3°	12
13	43°41.7'	-44.0'	134.4°	42°59.4'	-44.7'	135.1°	42°16.7'	-45.3'	135.7°	41°33.5'	-45.9'	136.4°	40°49.8'	-46.5'	137.0°	40°05.8'	-47.1'	137.5°	39°21.3'	-47.7'	138.1°	13
14	42°57.7'	-44.4'	135.4°	42°14.8'	-45.1'	136.0°	41°31.4'	-45.7'	136.6°	40°47.5'	-46.3'	137.2°	40°03.3'	-46.9'	137.8°	39°18.7'	-47.4'	138.4°	38°33.6'	-48.0'	138.9°	14
15	42°13.3'	-44.9'	136.3°	41°29.7'	-45.5'	136.9°	40°45.7'	-46.1'	137.5°	40°01.2'	-46.7'	138.1°	39°16.4'	-47.2'	138.6°	38°31.2'	-47.8'	139.1°	37°45.7'	-48.3'	139.6°	15
16	41°28.4'	-45.3'	137.2°	40°44.2'	-45.9'	137.8°	39°59.6'	-46.4'	138.3°	39°14.6'	-47.0'	138.9°	38°29.2'	-47.5'	139.4°	37°43.5'	-48.0'	139.9°	36°57.4'	-48.5'	140.4°	16
17	40°43.1'	-45.6'	138.0°	39°58.3'	-46.2'	138.6°	39°13.1'	-46.8'	139.1°	38°27.6'	-47.3'	139.7°	37°41.7'	-47.8'	140.2°	36°55.4'	-48.3'	140.7°	36°08.8'	-48.8'	141.1°	17
18	39°57.5'	-46.0'	138.9°	39°12.1'	-46.6'	139.4°	38°26.3'	-47.1'	140.0°	37°40.2'	-47.6'	140.5°	36°53.8'	-48.1'	140.9°	36°07.1'	-48.6'	141.4°	35°20.0'	-49.1'	141.8°	18
19	39°11.5'	-46.4'	139.7°	38°25.5'	-46.9'	140.2°	37°39.2'	-47.4'	140.7°	36°52.6'	-47.9'	141.2°	36°05.7'	-48.4'	141.7°	35°18.5'	-48.8'	142.1°	34°31.0'	-49.3'	142.5°	19
20	38°25.1'	-46.7'	140.5°	37°38.6'	-47.2'	141.0°	36°51.8'	-47.7'	141.5°	36°04.7'	-48.2'	142.0°	35°17.3'	-48.6'	142.4°	34°29.6'	-49.1'	142.8°	33°41.7'	-49.5'	143.2°	20
21	37°38.4'	-47.0'	141.3°	36°51.4'	-47.5'	141.8°	36°04.1'	-48.0'	142.3°	35°16.5'	-48.4'	142.7°	34°28.7'	-48.9'	143.1°	33°40.6'	-49.3'	143.5°	32°52.2'	-49.7'	143.9°	21
22	36°51.4'	-47.3'	142.1°	36°03.9'	-47.8'	142.6°	35°16.2'	-48.2'	143.0°	34°28.1'	-48.7'	143.4°	33°39.8'	-49.1'	143.8°	32°51.2'	-49.5'	144.2°	32°02.5'	-49.9'	144.6°	22
23	36°04.1'	-47.6'	142.9°	35°16.2'	-48.1'	143.3°	34°27.9'	-48.5'	143.7°	33°39.4'	-48.9'	144.1°	32°50.7'	-49.3'	144.5°	32°01.7'	-49.7'	144.9°	31°12.5'	-50.1'	145.2°	23

32° 328° LHA

Latitude CONTRARY to DECLINATION

32° 328° LHA

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

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

31° 329° LHA

Latitude CONTRARY to Declination

31° 329° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	53°09.1'	-36.3'	120.8°	52°37.9'	-37.5'	121.9°	52°05.7'	-38.6'	123.0°	51°32.5'	-39.6'	124.1°	50°58.4'	-40.6'	125.1°	50°23.5'	-41.6'	126.1°	49°47.7'	-42.5'	127.1°	0
1	52°32.8'	-37.2'	122.1°	52°00.5'	-38.3'	123.2°	51°27.1'	-39.3'	124.3°	50°52.9'	-40.3'	125.3°	50°17.8'	-41.3'	126.3°	49°41.9'	-42.2'	127.2°	49°05.2'	-43.1'	128.2°	1
2	51°55.7'	-38.0'	123.4°	51°22.2'	-39.0'	124.5°	50°47.8'	-40.0'	125.5°	50°12.6'	-41.0'	126.5°	49°36.5'	-41.9'	127.4°	48°59.7'	-42.8'	128.3°	48°22.1'	-43.7'	129.2°	2
3	51°17.7'	-38.7'	124.7°	50°43.2'	-39.8'	125.7°	50°07.8'	-40.7'	126.6°	49°31.6'	-41.7'	127.6°	48°54.6'	-42.5'	128.5°	48°16.9'	-43.4'	129.4°	47°38.4'	-44.2'	130.2°	3
4	50°39.0'	-39.5'	125.9°	50°03.4'	-40.4'	126.8°	49°27.1'	-41.4'	127.8°	48°49.9'	-42.3'	128.7°	48°12.0'	-43.1'	129.6°	47°33.5'	-43.9'	130.4°	46°54.3'	-44.7'	131.2°	4
5	49°59.5'	-40.2'	127.1°	49°23.0'	-41.1'	128.0°	48°45.7'	-42.0'	128.9°	48°07.7'	-42.8'	129.8°	47°28.9'	-43.7'	130.6°	46°49.6'	-44.4'	131.4°	46°09.6'	-45.2'	132.2°	5
6	49°19.4'	-40.8'	128.2°	48°41.9'	-41.7'	129.1°	48°03.7'	-42.6'	130.0°	47°24.8'	-43.4'	130.8°	46°45.3'	-44.2'	131.6°	46°05.1'	-44.9'	132.4°	45°24.4'	-45.6'	133.1°	6
7	48°38.5'	-41.5'	129.3°	48°00.2'	-42.3'	130.2°	47°21.1'	-43.1'	131.0°	46°41.4'	-43.9'	131.8°	46°01.1'	-44.7'	132.6°	45°20.2'	-45.4'	133.3°	44°38.7'	-46.1'	134.1°	7
8	47°57.1'	-42.1'	130.4°	47°17.8'	-42.9'	131.2°	46°38.0'	-43.7'	132.0°	45°57.5'	-44.4'	132.8°	45°16.4'	-45.1'	133.6°	44°34.8'	-45.8'	134.3°	43°52.7'	-46.5'	135.0°	8
9	47°15.0'	-42.6'	131.5°	46°35.0'	-43.4'	132.3°	45°54.3'	-44.2'	133.0°	45°13.1'	-44.9'	133.8°	44°31.3'	-45.6'	134.5°	43°49.0'	-46.2'	135.2°	43°06.2'	-46.9'	135.8°	9
10	46°32.4'	-43.2'	132.5°	45°51.5'	-43.9'	133.3°	45°10.1'	-44.6'	134.0°	44°28.2'	-45.3'	134.7°	43°45.7'	-46.0'	135.4°	43°02.8'	-46.6'	136.0°	42°19.4'	-47.2'	136.7°	10
11	45°49.2'	-43.7'	133.5°	45°07.6'	-44.4'	134.2°	44°25.5'	-45.1'	134.9°	43°42.9'	-45.8'	135.6°	42°59.7'	-46.4'	136.3°	42°16.2'	-47.0'	136.9°	41°32.1'	-47.6'	137.5°	11
12	45°05.5'	-44.2'	134.5°	44°23.2'	-44.9'	135.2°	43°40.4'	-45.5'	135.9°	42°57.1'	-46.2'	136.5°	42°13.4'	-46.8'	137.1°	41°29.2'	-47.3'	137.7°	40°44.6'	-47.9'	138.3°	12
13	44°21.3'	-44.6'	135.4°	43°38.3'	-45.3'	136.1°	42°54.9'	-45.9'	136.7°	42°11.0'	-46.5'	137.4°	41°26.6'	-47.1'	138.0°	40°41.8'	-47.7'	138.6°	39°56.7'	-48.2'	139.1°	13
14	43°36.7'	-45.1'	136.4°	42°53.1'	-45.7'	137.0°	42°08.9'	-46.3'	137.6°	41°24.4'	-46.9'	138.2°	40°39.5'	-47.5'	138.8°	39°54.1'	-48.0'	139.4°	39°08.4'	-48.5'	139.9°	14
15	42°51.6'	-45.5'	137.3°	42°07.3'	-46.1'	137.9°	41°22.6'	-46.7'	138.5°	40°37.5'	-47.2'	139.0°	39°52.0'	-47.8'	139.6°	39°06.1'	-48.3'	140.1°	38°19.9'	-48.8'	140.6°	15
16	42°06.1'	-45.9'	138.1°	41°21.2'	-46.5'	138.7°	40°35.9'	-47.0'	139.3°	39°50.3'	-47.6'	139.9°	39°04.2'	-48.1'	140.4°	38°17.8'	-48.6'	140.9°	37°31.1'	-49.1'	141.4°	16
17	41°20.2'	-46.3'	139.0°	40°34.8'	-46.8'	139.6°	39°48.9'	-47.4'	140.1°	39°02.7'	-47.9'	140.6°	38°16.1'	-48.4'	141.1°	37°29.2'	-48.9'	141.6°	36°42.0'	-49.3'	142.1°	17
18	40°34.0'	-46.6'	139.8°	39°47.9'	-47.2'	140.4°	39°01.5'	-47.7'	140.9°	38°14.8'	-48.2'	141.4°	37°27.7'	-48.7'	141.9°	36°40.4'	-49.1'	142.4°	35°52.7'	-49.6'	142.8°	18
19	39°47.3'	-47.0'	140.7°	39°00.8'	-47.5'	141.2°	38°13.8'	-48.0'	141.7°	37°26.6'	-48.5'	142.2°	36°39.1'	-48.9'	142.6°	35°51.2'	-49.4'	143.1°	35°03.2'	-49.8'	143.5°	19
20	39°00.4'	-47.3'	141.5°	38°13.3'	-47.8'	142.0°	37°25.9'	-48.3'	142.4°	36°38.1'	-48.7'	142.9°	35°50.1'	-49.2'	143.3°	35°01.9'	-49.6'	143.8°	34°13.4'	-50.0'	144.2°	20
21	38°13.1'	-47.6'	142.3°	37°25.5'	-48.1'	142.7°	36°37.6'	-48.5'	143.2°	35°49.4'	-49.0'	143.6°	35°01.0'	-49.4'	144.0°	34°12.3'	-49.8'	144.5°	33°23.3'	-50.2'	144.8	

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

30° 330° LHA

Latitude CONTRARY to Declination

30° 330° LHA

Table with 10 columns (Dec, 21, 22, 23, 24, 25, 26, 27, Dec) and 24 rows of astronomical data including Hc, d, and Z values.

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

Table with 10 columns (Dec, 21, 22, 23, 24, 25, 26, 27, Dec) and 24 rows of astronomical data including Hc, d, and Z values.

29° 331° LHA

Latitude CONTRARY to DECLINATION

29° 331° LHA

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

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

28° 332° LHA

Latitude CONTRARY to Declination

28° 332° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	55°31.0'	-38.4'	124.0°	54°57.0'	-39.6'	125.2°	54°22.0'	-40.6'	126.3°	53°46.0'	-41.7'	127.4°	53°09.1'	-42.6'	128.5°	52°31.3'	-43.6'	129.5°	51°52.8'	-44.4'	130.5°	0
1	54°52.6'	-39.3'	125.3°	54°17.5'	-40.4'	126.5°	53°41.3'	-41.4'	127.6°	53°04.3'	-42.4'	128.6°	52°26.5'	-43.3'	129.6°	51°47.8'	-44.2'	130.6°	51°08.3'	-45.0'	131.6°	1
2	54°13.3'	-40.1'	126.6°	53°37.1'	-41.1'	127.7°	52°59.9'	-42.1'	128.8°	52°22.0'	-43.0'	129.8°	51°43.2'	-43.9'	130.8°	51°03.6'	-44.8'	131.7°	50°23.3'	-45.5'	132.6°	2
3	53°33.2'	-40.9'	127.9°	52°56.0'	-41.9'	128.9°	52°17.8'	-42.8'	130.0°	51°38.9'	-43.7'	130.9°	50°59.2'	-44.5'	131.9°	50°18.9'	-45.3'	132.8°	49°37.8'	-46.1'	133.6°	3
4	52°52.4'	-41.6'	129.1°	52°14.1'	-42.5'	130.1°	51°35.0'	-43.4'	131.1°	50°55.2'	-44.3'	132.0°	50°14.7'	-45.1'	132.9°	49°33.5'	-45.8'	133.8°	48°51.7'	-46.5'	134.6°	4
5	52°10.7'	-42.3'	130.3°	51°31.6'	-43.2'	131.3°	50°51.6'	-44.0'	132.2°	50°11.0'	-44.8'	133.1°	49°29.7'	-45.6'	133.9°	48°47.7'	-46.3'	134.8°	48°05.2'	-47.0'	135.6°	5
6	51°28.4'	-43.0'	131.4°	50°48.4'	-43.8'	132.4°	50°07.6'	-44.6'	133.3°	49°26.2'	-45.4'	134.1°	48°44.1'	-46.1'	134.9°	48°01.4'	-46.8'	135.7°	47°18.2'	-47.4'	136.5°	6
7	50°45.5'	-43.6'	132.6°	50°04.6'	-44.4'	133.4°	49°23.0'	-45.1'	134.3°	48°40.8'	-45.9'	135.1°	47°58.0'	-46.6'	135.9°	47°14.6'	-47.2'	136.7°	46°30.7'	-47.8'	137.4°	7
8	50°01.9'	-44.1'	133.6°	49°20.2'	-44.9'	134.5°	48°37.9'	-45.6'	135.3°	47°54.9'	-46.3'	136.1°	47°11.4'	-47.0'	136.8°	46°27.4'	-47.6'	137.6°	45°42.9'	-48.2'	138.3°	8
9	49°17.8'	-44.7'	134.7°	48°35.3'	-45.4'	135.5°	47°52.2'	-46.1'	136.3°	47°08.6'	-46.8'	137.0°	46°24.4'	-47.4'	137.7°	45°39.8'	-48.0'	138.4°	44°54.7'	-48.6'	139.1°	9
10	48°33.1'	-45.2'	135.7°	47°49.9'	-45.9'	136.5°	47°06.1'	-46.6'	137.2°	46°21.8'	-47.2'	137.9°	45°37.0'	-47.8'	138.6°	44°51.8'	-48.4'	139.3°	44°06.1'	-48.9'	139.9°	10
11	47°47.9'	-45.7'	136.7°	47°03.9'	-46.4'	137.4°	46°19.5'	-47.0'	138.1°	45°34.6'	-47.6'	138.8°	44°49.2'	-48.2'	139.5°	44°03.4'	-48.7'	140.1°	43°17.1'	-49.3'	140.7°	11
12	47°02.2'	-46.2'	137.6°	46°17.6'	-46.8'	138.3°	45°32.5'	-47.4'	139.0°	44°47.0'	-48.0'	139.7°	44°01.0'	-48.5'	140.3°	43°14.6'	-49.1'	140.9°	42°27.9'	-49.6'	141.5°	12
13	46°16.0'	-46.6'	138.6°	45°30.8'	-47.2'	139.2°	44°45.1'	-47.8'	139.9°	43°59.0'	-48.4'	140.5°	43°12.5'	-48.9'	141.1°	42°25.6'	-49.4'	141.7°	41°38.3'	-49.9'	142.3°	13
14	45°29.4'	-47.0'	139.5°	44°43.5'	-47.6'	140.1°	43°57.3'	-48.2'	140.7°	43°10.6'	-48.7'	141.3°	42°23.6'	-49.2'	141.9°	41°36.2'	-49.7'	142.5°	40°48.4'	-50.1'	143.0°	14
15	44°42.3'	-47.4'	140.4°	43°55.9'	-48.0'	141.0°	43°09.1'	-48.5'	141.6°	42°21.9'	-49.0'	142.1°	41°34.4'	-49.5'	142.7°	40°46.5'	-50.0'	143.2°	39°58.3'	-50.4'	143.7°	15
16	43°54.9'	-47.8'	141.2°	43°07.9'	-48.3'	141.8°	42°20.6'	-48.8'	142.4°	41°32.9'	-49.3'	142.9°	40°44.9'	-49.8'	143.4°	39°56.5'	-50.2'	143.9°	39°07.9'	-50.7'	144.4°	16
17	43°07.1'	-48.2'	142.0°	42°19.6'	-48.7'	142.6°	41°31.8'	-49.1'	143.2°	40°43.6'	-49.6'	143.7°	39°55.1'	-50.1'	144.2°	39°06.3'	-50.5'	144.7°	38°17.2'	-50.9'	145.1°	17
18	42°18.9'	-48.5'	142.9°	41°31.0'	-49.0'	143.4°	40°42.6'	-49.4'	143.9°	39°54.0'	-49.9'	144.4°	39°05.0'	-50.3'	144.9°	38°15.8'	-50.7'	145.3°	37°26.3'	-51.1'	145.8°	18
19	41°30.5'	-48.8'	143.6°	40°42.0'	-49.3'	144.2°	39°53.2'	-49.7'	144.7°	39°04.1'	-50.1'	145.1°	38°14.7'	-50.6'	145.6°	37°25.1'	-50.9'	146.0°	36°35.2'	-51.3'	146.4°	19
20	40°41.7'	-49.1'	144.4°	39°52.7'	-49.6'	144.9°	39°03.5'	-50.0'	145.4°	38°14.0'	-50.4'	145.8°	37°24.2'	-50.8'	146.3°	36°34.2'	-51.2'	146.7°	35°43.9'	-51.5'	147.1°	20
21	39°52.5'	-49.4'	145.2°	39°03.2'	-49.8'	145.6°	38°13.5'	-50.2'	146.1°	37°23.6'	-50.6'	146.5°	36°33.4'	-51.0'	146.9°	35°43.0'	-51.4'	147.3°	34°52.4'	-51.7'	147.7°	21
22	39°03.2'	-49.7'	145.9°	38°13.3'	-50.1'	146.4°	37°23.3'	-50.5'	146.8°	36°32.9'	-50.8'	147.2°	35°42.4'	-51.2'	147.6°	34°51.7'	-51.6'	148.0°	34°00.7'	-51.9'	148.3°	22
23	38°13.5'	-49.9'	146.6°	37°23.3'	-50.3'	147.1°	36°32.8'	-50.7'	147.5°	35°42.1'	-51.1'	147.8°	34°51.2'	-51.4'	148.2°	34°00.1'	-51.7'	148.6°	33°08.8'	-52.1'	148.9°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27			

28° 332° LHA

Latitude CONTRARY to DECLINATION

28° 332° LHA

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

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

27° 333° LHA

Latitude CONTRARY to Declination

27° 333° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	56°17.2'	-39.2'	125.1°	55°42.2'	-40.3'	126.3°	55°06.1'	-41.4'	127.5°	54°29.2'	-42.4'	128.6°	53°51.3'	-43.3'	129.7°	53°12.6'	-44.2'	130.7°	52°33.0'	-45.1'	131.7°	0
1	55°38.0'	-40.1'	126.5°	55°01.9'	-41.1'	127.6°	54°24.8'	-42.1'	128.7°	53°46.8'	-43.1'	129.8°	53°08.0'	-44.0'	130.8°	52°28.3'	-44.8'	131.8°	51°48.0'	-45.7'	132.8°	1
2	54°57.9'	-40.9'	127.8°	54°20.7'	-41.9'	128.9°	53°42.6'	-42.8'	130.0°	53°03.7'	-43.7'	131.0°	52°24.0'	-44.6'	132.0°	51°43.5'	-45.4'	132.9°	51°02.3'	-46.2'	133.8°	2
3	54°17.1'	-41.6'	129.0°	53°38.9'	-42.6'	130.1°	52°59.8'	-43.5'	131.1°	52°20.0'	-44.4'	132.1°	51°39.4'	-45.2'	133.0°	50°58.1'	-46.0'	134.0°	50°16.1'	-46.7'	134.8°	3
4	53°35.5'	-42.4'	130.3°	52°56.3'	-43.3'	131.3°	52°16.3'	-44.1'	132.3°	51°35.6'	-45.0'	133.2°	50°54.2'	-45.7'	134.1°	50°12.1'	-46.5'	135.0°	49°29.4'	-47.2'	135.8°	4
5	52°53.1'	-43.0'	131.5°	52°13.0'	-43.9'	132.4°	51°32.2'	-44.7'	133.4°	50°50.6'	-45.5'	134.3°	50°08.4'	-46.3'	135.1°	49°25.6'	-47.0'	135.9°	48°42.2'	-47.6'	136.7°	5
6	52°10.1'	-43.7'	132.6°	51°29.1'	-44.5'	133.5°	50°47.4'	-45.3'	134.4°	50°05.1'	-46.0'	135.3°	49°22.2'	-46.7'	136.1°	48°38.7'	-47.4'	136.9°	47°54.6'	-48.1'	137.7°	6
7	51°26.4'	-44.3'	133.7°	50°44.6'	-45.1'	134.6°	50°02.1'	-45.8'	135.4°	49°19.1'	-46.5'	136.3°	48°35.4'	-47.2'	137.1°	47°51.2'	-47.8'	137.8°	47°06.5'	-48.4'	138.5°	7
8	50°42.1'	-44.9'	134.8°	49°59.5'	-45.6'	135.6°	49°16.3'	-46.3'	136.4°	48°32.5'	-47.0'	137.2°	47°48.2'	-47.6'	138.0°	47°03.4'	-48.2'	138.7°	46°18.1'	-48.8'	139.4°	8
9	49°57.2'	-45.4'	135.8°	49°13.9'	-46.1'	136.6°	48°30.0'	-46.8'	137.4°	47°45.6'	-47.4'	138.2°	47°00.6'	-48.0'	138.9°	46°15.2'	-48.6'	139.6°	45°29.3'	-49.2'	140.2°	9
10	49°11.8'	-45.9'	136.8°	48°27.8'	-46.6'	137.6°	47°43.2'	-47.2'	138.4°	46°58.1'	-47.9'	139.1°	46°12.6'	-48.4'	139.8°	45°26.5'	-49.0'	140.4°	44°40.1'	-49.5'	141.0°	10
11	48°25.9'	-46.4'	137.8°	47°41.2'	-47.0'	138.5°	46°56.0'	-47.7'	139.3°	46°10.3'	-48.2'	139.9°	45°24.1'	-48.8'	140.6°	44°37.5'	-49.3'	141.2°	43°50.6'	-49.8'	141.8°	11
12	47°39.5'	-46.9'	138.8°	46°54.1'	-47.5'	139.5°	46°08.3'	-48.1'	140.1°	45°22.0'	-48.6'	140.8°	44°35.3'	-49.1'	141.4°	43°48.2'	-49.6'	142.0°	43°00.7'	-50.1'	142.6°	12
13	46°52.6'	-47.3'	139.7°	46°06.7'	-47.9'	140.4°	45°20.2'	-48.4'	141.0°	44°33.4'	-49.0'	141.6°	43°46.2'	-49.5'	142.2°	42°58.6'	-50.0'	142.8°	42°10.6'	-50.4'	143.4°	13
14	46°05.4'	-47.7'	140.6°	45°18.8'	-48.3'	141.2°	44°31.8'	-48.8'	141.8°	43°44.5'	-49.3'	142.4°	42°56.7'	-49.8'	143.0°	42°08.6'	-50.2'	143.6°	41°20.2'	-50.7'	144.1°	14
15	45°17.7'	-48.1'	141.4°	44°30.5'	-48.6'	142.1°	43°43.0'	-49.1'	142.6°	42°55.2'	-49.6'	143.2°	42°06.9'	-50.1'	143.8°	41°18.4'	-50.5'	144.3°	40°29.5'	-50.9'	144.8°	15
16	44°29.6'	-48.4'	142.3°	43°41.9'	-48.9'	142.9°	42°53.9'	-49.4'	143.4°	42°05.6'	-49.9'	144.0°	41°16.9'	-50.3'	144.5°	40°27.9'	-50.8'	145.0°	39°38.6'	-51.2'	145.5°	16
17	43°41.1'	-48.8'	143.1°	42°53.0'	-49.3'	143.7°	42°04.5'	-49.7'	144.2°	41°15.7'	-50.2'	144.7°	40°26.5'	-50.6'	145.2°	39°37.1'	-51.0'	145.7°	38°47.4'	-51.4'	146.2°	17
18	42°52.4'	-49.1'	143.9°	42°03.7'	-49.6'	144.4°	41°14.7'	-50.0'	145.0°	40°25.5'	-50.4'	145.4°	39°35.9'	-50.9'	145.9°	38°46.1'	-51.2'	146.4°	37°56.0'	-51.6'	146.8°	18
19	42°03.3'	-49.4'	144.7°	41°14.1'	-49.9'	145.2°	40°24.7'	-50.3'	145.7°	39°35.0'	-50.7'	146.2°	38°45.1'	-51.1'	146.6°	37°54.9'	-51.5'	147.0°	37°04.4'	-51.8'	147.5°	19
20	41°13.8'	-49.7'	145.4°	40°24.3'	-50.1'	145.9°	39°34.4'	-50.5'	146.4°	38°44.3'	-50.9'	146.8°	37°54.0'	-51.3'	147.3°							

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

26° 334° LHA

Latitude CONTRARY to Declination

26° 334° LHA

Table with 10 columns (Dec, 21-27, Dec) and 24 rows of latitude/longitude data for 26° 334° LHA.

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

Table with 10 columns (Dec, 21-27, Dec) and 24 rows of latitude/longitude data for 25° 335° LHA.

25° 335° LHA

Latitude CONTRARY to DECLINATION

25° 335° LHA

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

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

24° 336° LHA

Latitude CONTRARY to Declination

24° 336° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	58°31.5'	41.6'	128.8°	57°53.4'	42.7'	130.1°	57°14.3'	43.7'	131.3°	56°34.2'	44.7'	132.4°	55°53.3'	45.5'	133.5°	55°11.6'	46.4'	134.6°	54°29.2'	47.2'	135.6°	0
1	57°49.8'	42.5'	130.2°	57°10.7'	43.5'	131.4°	56°30.6'	44.4'	132.5°	55°49.6'	45.3'	133.6°	55°07.8'	46.2'	134.7°	54°25.3'	47.0'	135.7°	53°42.0'	47.7'	136.6°	1
2	57°07.4'	43.3'	131.5°	56°27.2'	44.2'	132.6°	55°46.1'	45.1'	133.7°	55°04.3'	46.0'	134.8°	54°21.6'	46.8'	135.8°	53°38.3'	47.5'	136.7°	52°54.3'	48.2'	137.6°	2
3	56°24.1'	44.0'	132.8°	55°43.0'	44.9'	133.9°	55°01.0'	45.8'	134.9°	54°18.3'	46.5'	135.9°	53°34.9'	47.3'	136.8°	52°50.8'	48.0'	137.7°	52°06.1'	48.7'	138.6°	3
4	55°40.1'	44.7'	134.0°	54°58.1'	45.6'	135.0°	54°15.3'	46.4'	136.0°	53°31.8'	47.1'	137.0°	52°47.6'	47.8'	137.9°	52°02.8'	48.5'	138.7°	51°17.4'	49.1'	139.5°	4
5	54°55.4'	45.4'	135.2°	54°12.5'	46.2'	136.1°	53°28.9'	46.9'	137.1°	52°44.6'	47.6'	138.0°	51°59.8'	48.3'	138.8°	51°14.3'	48.9'	139.7°	50°28.3'	49.5'	140.5°	5
6	54°10.1'	46.0'	136.3°	53°26.4'	46.7'	137.2°	52°42.0'	47.4'	138.1°	51°57.0'	48.1'	139.0°	51°11.5'	48.7'	139.8°	50°25.4'	49.3'	140.6°	49°38.8'	49.9'	141.3°	6
7	53°24.1'	46.5'	137.4°	52°39.6'	47.3'	138.3°	51°54.6'	47.9'	139.1°	51°08.9'	48.6'	139.9°	50°22.7'	49.2'	140.7°	49°36.0'	49.7'	141.5°	48°48.9'	50.3'	142.2°	7
8	52°37.6'	47.1'	138.4°	51°52.4'	47.8'	139.3°	51°06.6'	48.4'	140.1°	50°20.4'	49.0'	140.9°	49°33.6'	49.6'	141.6°	48°46.3'	50.1'	142.3°	47°58.6'	50.6'	143.0°	8
9	51°50.5'	47.6'	139.4°	51°04.6'	48.2'	140.3°	50°18.3'	48.8'	141.0°	49°31.4'	49.4'	141.8°	48°44.0'	49.9'	142.5°	47°56.2'	50.4'	143.2°	47°08.0'	50.9'	143.8°	9
10	51°02.9'	48.0'	140.4°	50°16.4'	48.7'	141.2°	49°29.4'	49.2'	141.9°	48°42.0'	49.8'	142.6°	47°54.1'	50.3'	143.3°	47°05.7'	50.8'	144.0°	46°17.0'	51.2'	144.6°	10
11	50°14.9'	48.5'	141.4°	49°27.8'	49.1'	142.1°	48°40.2'	49.6'	142.8°	47°52.2'	50.1'	143.5°	47°03.8'	50.6'	144.1°	46°15.0'	51.1'	144.7°	45°25.8'	51.5'	145.3°	11
12	49°26.4'	48.9'	142.3°	48°38.7'	49.5'	143.0°	47°50.6'	50.0'	143.6°	47°02.1'	50.5'	144.3°	46°13.2'	50.9'	144.9°	45°23.9'	51.4'	145.5°	44°34.3'	51.8'	146.0°	12
13	48°37.5'	49.3'	143.2°	47°49.2'	49.8'	143.8°	47°00.6'	50.3'	144.5°	46°11.6'	50.8'	145.1°	45°22.2'	51.2'	145.7°	44°32.5'	51.6'	146.2°	43°42.5'	52.0'	146.8°	13
14	47°48.2'	49.7'	144.0°	46°59.4'	50.2'	144.6°	46°10.3'	50.6'	145.3°	45°20.8'	51.1'	145.8°	44°31.0'	51.5'	146.4°	43°40.9'	51.9'	146.9°	42°50.5'	52.3'	147.4°	14
15	46°58.5'	50.0'	144.8°	46°09.3'	50.5'	145.4°	45°19.7'	50.9'	146.0°	44°29.7'	51.4'	146.6°	43°39.5'	51.8'	147.1°	42°49.0'	52.1'	147.6°	41°58.2'	52.5'	148.1°	15
16	46°08.5'	50.3'	145.6°	45°18.8'	50.8'	146.2°	44°28.7'	51.2'	146.8°	43°38.4'	51.6'	147.3°	42°47.8'	52.0'	147.8°	41°56.9'	52.4'	148.3°	41°05.7'	52.7'	148.7°	16
17	45°18.1'	50.7'	146.4°	44°28.0'	51.1'	147.0°	43°37.5'	51.5'	147.5°	42°46.8'	51.9'	148.0°	41°55.8'	52.2'	148.5°	41°04.5'	52.6'	148.9°	40°13.0'	52.9'	149.4°	17
18	44°27.5'	50.9'	147.2°	43°36.9'	51.4'	147.7°	42°46.0'	51.7'	148.2°	41°54.9'	52.1'	148.7°	41°03.5'	52.4'	149.1°	40°11.9'	52.8'	149.6°	39°20.1'	53.1'	150.0°	18
19	43°36.5'	51.2'	147.9°	42°45.5'	51.6'	148.4°	41°54.3'	52.0'	148.9°	41°02.8'	52.3'	149.3°	40°11.1'	52.7'	149.8°	39°19.1'	53.0'	150.2°	38°27.0'	53.3'	150.6°	19
20	42°45.3'	51.5'	148.6°	41°53.9'	51.8'	149.1°	41°02.3'	52.2'	149.6°	40°10.5'	52.5'	150.0°	39°18.4'	52.8'	150.4°	38°26.2'	53.2'	150.8°	37°33.7'	53.4'	151.2°	20
21	41°53.8'	51.7'	149.3°	41°02.1'	52.1'	149.8°	40°10.1'	52.4'	150.2°	39°18.0'	52.7'	150.6°	38°25.6'	53.0'	151.0°	37°33.0'	53.3'	151.4°	36°40.2'	53.6'	151.7°	21
22	41°02.1'	52.0'	150.0°	40°10.0'	52.3'	150.4°	39°17.7'	52.6'	150.8°	38°25.2'	52.9'	151.2°	37°32.5'	53.2'	151.6°	36°39.7'	53.5'	152.0°	35°46.6'	53.8'	152.3°	22
23	40°10.1'	52.2'	150.7°	39°17.7'	52.5'	151.1°	38°25.1'	52.8'	151.5°	37°32.3'	53.1'	151.8°	36°39.3'	53.4'	152.2°	35°46.2'	53.6'	152.5°	34°52.9'	53.9'	152.8°	23

24° 336° LHA

Latitude CONTRARY to DECLINATION

24° 336° LHA

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

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

23° 337° LHA

Latitude CONTRARY to Declination

23° 337° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	59°14.7'	42.5'	130.2°	58°35.5'	43.5'	131.4°	57°55.3'	44.5'	132.6°	57°14.3'	45.4'	133.8°	56°32.3'	46.3'	134.9°	55°49.6'	47.1'	135.9°	55°06.1'	47.9'	136.9°	0
1	58°32.2'	43.3'	131.5°	57°52.0'	44.3'	132.7°	57°10.8'	45.2'	133.9°	56°28.8'	46.1'	135.0°	55°46.0'	46.9'	136.0°	55°02.5'	47.7'	137.0°	54°18.3'	48.4'	138.0°	1
2	57°48.9'	44.1'	132.9°	57°07.7'	45.0'	134.0°	56°25.6'	45.9'	135.1°	55°42.7'	46.7'	136.1°	54°59.1'	47.5'	137.1°	54°14.8'	48.2'	138.1°	53°29.9'	48.9'	139.0°	2
3	57°04.8'	44.8'	134.1°	56°22.6'	45.7'	135.2°	55°39.7'	46.5'	136.2°	54°56.0'	47.3'	137.2°	54°11.6'	48.0'	138.2°	53°26.6'	48.7'	139.1°	52°41.0'	49.3'	139.9°	3
4	56°20.0'	45.5'	135.3°	55°36.9'	46.3'	136.4°	54°53.2'	47.1'	137.3°	54°08.7'	47.8'	138.3°	53°23.6'	48.5'	139.2°	52°37.9'	49.2'	140.0°	51°51.6'	49.8'	140.9°	4
5	55°34.5'	46.1'	136.5°	54°50.6'	46.9'	137.5°	54°06.1'	47.7'	138.4°	53°20.9'	48.3'	139.3°	52°35.1'	49.0'	140.2°	51°48.7'	49.6'	141.0°	50°10.9'	50.2'	141.8°	5
6	54°48.3'	46.7'	137.6°	54°03.7'	47.5'	138.5°	53°18.4'	48.2'	139.4°	52°32.5'	48.8'	140.3°	51°46.1'	49.4'	141.1°	50°59.1'	50.0'	141.9°	50°11.7'	50.5'	142.6°	6
7	54°01.6'	47.3'	138.7°	53°16.2'	48.0'	139.6°	52°30.2'	48.6'	140.4°	51°43.7'	49.3'	141.2°	50°56.7'	49.8'	142.0°	50°09.2'	50.4'	142.8°	49°21.2'	50.9'	143.5°	7
8	53°14.3'	47.8'	139.7°	52°28.2'	48.5'	140.6°	51°41.6'	49.1'	141.4°	50°54.5'	49.7'	142.1°	50°06.9'	50.2'	142.9°	49°18.8'	50.7'	143.6°	48°30.3'	51.2'	144.3°	8
9	52°26.4'	48.3'	140.7°	51°39.7'	48.9'	141.5°	50°52.5'	49.5'	142.3°	50°04.8'	50.1'	143.0°	49°16.6'	50.6'	143.7°	48°28.1'	51.1'	144.4°	47°39.1'	51.5'	145.0°	9
10	51°38.1'	48.8'	141.7°	50°50.8'	49.3'	142.5°	50°03.0'	49.9'	143.2°	49°14.8'	50.4'	143.9°	48°26.1'	50.9'	144.6°	47°37.0'	51.4'	145.2°	46°47.6'	51.8'	145.8°	10
11	50°49.4'	49.2'	142.6°	50°01.5'	49.7'	143.3°	49°13.1'	50.3'	144.0°	48°24.3'	50.8'	144.7°	47°35.2'	51.2'	145.3°	46°45.6'	51.7'	146.0°	45°55.8'	52.1'	146.5°	11
12	50°00.2'	49.6'	143.5°	49°11.7'	50.1'	144.2°	48°22.8'	50.6'	144.9°	47°33.6'	51.1'	145.5°	46°44.0'	51.5'	146.1°	45°54.0'	51.9'	146.7°	45°03.7'	52.3'	147.2°	12
13	49°10.6'	50.0'	144.4°	48°21.6'	50.5'	145.0°	47°32.2'	50.9'	145.7°	46°42.5'	51.4'	146.3°	45°52.4'	51.8'	146.9°	45°02.0'	52.2'	147.4°	44°11.3'	52.6'	147.9°	13
14	48°20.6'	50.3'	145.2°	47°31.1'	50.8'	145.8°	46°41.3'	51.2'	146.4°	45°51.1'	51.7'	147.0°	45°00.6'	52.1'	147.6°	44°09.9'	52.4'	148.1°	43°18.8'	52.8'	148.6°	14
15	47°30.3'	50.7'	146.0°	46°40.3'	51.1'	146.6°	45°50.1'	51.5'	147.2°	44°59.5'	51.9'	147.7°	44°08.6'	52.3'	148.3°	43°17.4'	52.7'	148.8°	42°26.0'	53.0'	149.2°	15
16	46°39.6'	51.0'	146.8°	45°49.2'	51.4'	147.4°	44°58.5'	51.8'	147.9°	44°07.5'	52.2'	148.4°	43°16.3'	52.5'	148.9°	42°24.7'	52.9'	149.4°	41°33.0'	53.2'	149.9°	16
17	45°48.6'	51.3'	147.6°	44°57.8'	51.7'	148.1°	44°06.7'	52.1'	148.6°	43°15.4'	52.4'	149.1°	42°23.7'	52.8'	149.6°	41°31.9'	53.1'	150.1°	40°39.8'	53.4'	150.5°	17
18	44°57.4'	51.6'	148.3°	44°06.2'	51.9'	148.8°	43°14.7'	52.3'	149.3°	42°22.9'	52.6'	149.8°	41°31.0'	53.0'	150.2°	40°38.8'	53.3'	150.7°	39°46.4'	53.6'	151.1°	18
19	44°05.8'	51.8'	149.0°	43°14.2'	52.2'	149.5°	42°22.4'	52.5'	150.0°	41°30.3'	52.8'	150.4°	40°38.0'	53.2'	150.9°	39°45.5'	53.5'	151.3°	38°52.8'	53.7'	151.7°	19
20	43°14.0'	52.1'	149.7°	42°22.0'	52.4'	150.2°	41°29.9'	52.7'	150.6°	40°37.5'	53.0'	151.1°	39°44.8'	53.3'	151.5°	38°52.0'	53.6'	151.9°	37°59.0'	53.9'	152.2°	20
21	42°21.9'	52.3'	150.4°	41°29.6'	52.6'	150.9°	40°37.1'	52.9'	151.3°	39°44.4'	53.2'	151.7°	38°51.5'	53.5'	152.1°	37°58.4'	53.8'	152.4°	37°05.1'	54.1'	152.8°	21

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°, 21, 22, 23, 24, 25, 26, 27, and Dec°. Each column contains three sub-columns for Hc°, d', and Z°. The table lists 24 rows of data.

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°, 21, 22, 23, 24, 25, 26, 27, and Dec°. Each column contains three sub-columns for Hc°, d', and Z°. The table lists 24 rows of data.

21° 339° LHA

Latitude CONTRARY to DECLINATION

21° 339° LHA

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

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

20° 340° LHA

Latitude CONTRARY to Declination

20° 340° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	61°18.9'	-45.2'	134.6°	60°36.4'	-46.2'	135.8°	59°52.9'	-47.1'	137.0°	59°08.6'	-47.9'	138.2°	58°23.5'	-48.7'	139.3°	57°37.7'	-49.4'	140.3°	56°51.2'	-50.1'	141.3°	0
1	60°33.7'	-46.0'	135.9°	59°50.2'	-46.9'	137.1°	59°05.8'	-47.7'	138.3°	58°20.7'	-48.5'	139.3°	57°34.8'	-49.2'	140.4°	56°48.3'	-49.9'	141.3°	56°01.1'	-50.5'	142.3°	1
2	59°47.7'	-46.7'	137.2°	59°03.3'	-47.6'	138.3°	58°18.1'	-48.3'	139.4°	57°32.2'	-49.1'	140.4°	56°45.6'	-49.7'	141.4°	55°58.4'	-50.4'	142.3°	55°10.6'	-51.0'	143.2°	2
3	59°01.0'	-47.4'	138.4°	58°15.8'	-48.2'	139.5°	57°29.8'	-48.9'	140.5°	56°43.1'	-49.6'	141.5°	55°55.9'	-50.2'	142.4°	55°08.0'	-50.8'	143.3°	54°19.7'	-51.3'	144.1°	3
4	58°13.6'	-48.0'	139.6°	57°27.6'	-48.7'	140.6°	56°40.9'	-49.4'	141.6°	55°53.6'	-50.1'	142.5°	55°05.7'	-50.6'	143.4°	54°17.2'	-51.2'	144.2°	53°28.3'	-51.7'	145.0°	4
5	57°25.6'	-48.6'	140.7°	56°38.8'	-49.3'	141.7°	55°51.5'	-49.9'	142.6°	55°03.5'	-50.5'	143.5°	54°15.0'	-51.1'	144.3°	53°26.0'	-51.6'	145.1°	52°36.6'	-52.1'	145.9°	5
6	56°37.0'	-49.1'	141.8°	55°49.6'	-49.8'	142.7°	55°01.6'	-50.4'	143.6°	54°13.0'	-50.9'	144.4°	53°24.0'	-51.4'	145.2°	52°34.5'	-51.9'	146.0°	51°44.5'	-52.4'	146.7°	6
7	55°47.9'	-49.6'	142.8°	54°59.8'	-50.2'	143.7°	54°11.2'	-50.8'	144.5°	53°22.1'	-51.3'	145.3°	52°32.5'	-51.8'	146.1°	51°42.5'	-52.3'	146.8°	50°52.1'	-52.7'	147.5°	7
8	54°58.3'	-50.1'	143.8°	54°09.6'	-50.6'	144.7°	53°20.4'	-51.2'	145.4°	52°30.8'	-51.7'	146.2°	51°40.7'	-52.1'	146.9°	50°50.3'	-52.6'	147.6°	49°59.4'	-53.0'	148.2°	8
9	54°08.2'	-50.5'	144.8°	53°18.9'	-51.0'	145.6°	52°29.2'	-51.5'	146.3°	51°39.1'	-52.0'	147.0°	50°48.6'	-52.4'	147.7°	49°57.7'	-52.8'	148.3°	49°06.5'	-53.2'	148.9°	9
10	53°17.7'	-50.9'	145.7°	52°27.9'	-51.4'	146.4°	51°37.7'	-51.9'	147.1°	50°47.1'	-52.3'	147.8°	49°56.2'	-52.7'	148.4°	49°04.9'	-53.1'	149.1°	48°13.2'	-53.5'	149.6°	10
11	52°26.8'	-51.3'	146.6°	51°36.5'	-51.8'	147.3°	50°45.8'	-52.2'	147.9°	49°54.8'	-52.6'	148.6°	49°03.4'	-53.0'	149.2°	48°11.7'	-53.4'	149.8°	47°19.8'	-53.7'	150.3°	11
12	51°35.5'	-51.6'	147.4°	50°44.7'	-52.1'	148.1°	49°53.6'	-52.5'	148.7°	49°02.2'	-52.9'	149.3°	48°10.4'	-53.2'	149.9°	47°18.4'	-53.6'	150.4°	46°26.1'	-53.9'	151.0°	12
13	50°43.8'	-52.0'	148.2°	49°52.7'	-52.4'	148.9°	49°01.1'	-52.8'	149.5°	48°09.3'	-53.1'	150.0°	47°17.2'	-53.5'	150.6°	46°24.8'	-53.8'	151.1°	45°32.1'	-54.1'	151.6°	13
14	49°51.9'	-52.3'	149.0°	49°00.3'	-52.7'	149.6°	48°08.4'	-53.0'	150.2°	47°16.2'	-53.4'	150.7°	46°23.7'	-53.7'	151.2°	45°31.0'	-54.0'	151.7°	44°38.0'	-54.3'	152.2°	14
15	48°59.6'	-52.6'	149.8°	48°07.6'	-52.9'	150.3°	47°15.3'	-53.3'	150.9°	46°22.8'	-53.6'	151.4°	45°30.0'	-53.9'	151.9°	44°37.0'	-54.2'	152.3°	43°43.7'	-54.5'	152.8°	15
16	48°07.0'	-52.8'	150.5°	47°14.7'	-53.2'	151.0°	46°22.1'	-53.5'	151.5°	45°29.2'	-53.8'	152.0°	44°36.1'	-54.1'	152.5°	43°42.8'	-54.4'	152.9°	42°49.2'	-54.7'	153.4°	16
17	47°14.2'	-53.1'	151.2°	46°21.5'	-53.4'	151.7°	45°28.6'	-53.7'	152.2°	44°35.4'	-54.0'	152.7°	43°42.0'	-54.3'	153.1°	42°48.4'	-54.6'	153.5°	41°54.6'	-54.8'	153.9°	17
18	46°21.1'	-53.3'	151.9°	45°28.1'	-53.6'	152.4°	44°34.8'	-53.9'	152.8°	43°41.4'	-54.2'	153.3°	42°47.7'	-54.5'	153.7°	41°53.8'	-54.7'	154.1°	40°59.7'	-55.0'	154.5°	18
19	45°27.8'	-53.5'	152.5°	44°34.5'	-53.8'	153.0°	43°40.9'	-54.1'	153.4°	42°47.2'	-54.4'	153.9°	41°53.2'	-54.6'	154.3°	40°59.1'	-54.9'	154.6°	40°04.8'	-55.1'	155.0°	19
20	44°34.3'	-53.7'	153.2°	43°40.7'	-54.0'	153.6°	42°46.8'	-54.3'	154.0°	41°52.8'	-54.5'	154.4°	40°58.6'	-54.8'	154.8°	40°04.2'	-55.0'	155.2°	39°09.7'	-55.2'	155.5°	20
21	43°40.6'	-53.9'	153.8°	42°46.6'	-54.2'	154.2°	41°52.5'	-54.5'	154.6°	40°58.2'	-54.7'	155.0°	40°03.8'	-54.9'	155.3°	39°09.2'	-55.1'	155.7°	38°14.1'	-55.4'	156.0°	21
22	42°46.6'	-54.1'	154.4°	41°52.4'	-54.4'	154.8°	40°58.1'	-54.6'	155.2°	40°03.5'	-54.8'	155.5°	39°08.9'	-55.1'	155.9°	38°14.0'	-55.3'	156.2°	37°19.1'	-55.5'	156.5°	22
23	41°52.5'	-54.3'	155.0°	40°58.1'	-54.5'	155.4°	40°03.5'	-54.8'	155.7°	39°08.7'	-55.0'	156.0°	38°13.8'	-55.2'	156.4°	37°18.8'	-55.4'	156.7°	36°23.6'	-55.6'	157.0°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27			

20° 340° LHA

Latitude CONTRARY to DECLINATION

20° 340° LHA

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

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

19° 341° LHA

Latitude CONTRARY to Declination

19° 341° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	61°58.3'	-46.2'	136.1°	61°14.6'	-47.1'	137.4°	60°30.0'	-47.9'	138.6°	59°44.6'	-48.7'	139.8°	58°58.4'	-49.5'	140.8°	58°11.6'	-50.2'	141.9°	57°24.1'	-50.8'	142.8°	0
1	61°12.1'	-46.9'	137.5°	60°27.5'	-47.8'	138.7°	59°42.0'	-48.6'	139.8°	58°55.8'	-49.3'	140.9°	58°08.9'	-50.0'	141.9°	57°21.4'	-50.6'	142.9°	56°33.3'	-51.2'	143.8°	1
2	60°25.2'	-47.6'	138.8°	59°39.7'	-48.4'	139.9°	58°53.5'	-49.2'	141.0°	58°06.5'	-49.8'	142.0°	57°18.9'	-50.5'	142.9°	56°30.8'	-51.1'	143.9°	55°42.0'	-51.6'	144.7°	2
3	59°37.6'	-48.3'	140.0°	58°51.3'	-49.0'	141.1°	58°04.3'	-49.7'	142.1°	57°16.7'	-50.3'	143.0°	56°28.5'	-50.9'	143.9°	55°39.7'	-51.5'	144.8°	54°50.4'	-52.0'	145.6°	3
4	58°49.4'	-48.9'	141.1°	58°02.3'	-49.6'	142.2°	57°14.6'	-50.2'	143.1°	56°26.3'	-50.8'	144.0°	55°37.5'	-51.4'	144.9°	54°48.2'	-51.9'	145.7°	53°58.4'	-52.4'	146.5°	4
5	58°00.5'	-49.4'	142.3°	57°12.7'	-50.1'	143.2°	56°24.4'	-50.7'	144.1°	55°35.5'	-51.2'	145.0°	54°46.2'	-51.7'	145.8°	53°56.3'	-52.2'	146.6°	53°06.0'	-52.7'	147.3°	5
6	57°11.1'	-49.9'	143.3°	56°22.7'	-50.5'	144.2°	55°33.8'	-51.1'	145.1°	54°44.3'	-51.6'	145.9°	53°54.4'	-52.1'	146.7°	53°04.1'	-52.6'	147.4°	52°13.3'	-53.0'	148.1°	6
7	56°21.2'	-50.4'	144.3°	55°32.2'	-51.0'	145.2°	54°42.7'	-51.5'	146.0°	53°52.7'	-52.0'	146.8°	53°02.3'	-52.4'	147.5°	52°11.5'	-52.9'	148.2°	51°20.3'	-53.3'	148.9°	7
8	55°30.8'	-50.8'	145.3°	54°41.2'	-51.4'	146.1°	53°51.2'	-51.9'	146.9°	53°00.7'	-52.3'	147.6°	52°09.9'	-52.8'	148.3°	51°18.6'	-53.2'	149.0°	50°27.1'	-53.5'	149.6°	8
9	54°39.9'	-51.2'	146.2°	53°49.8'	-51.7'	147.0°	52°59.3'	-52.2'	147.7°	52°08.4'	-52.6'	148.4°	51°17.1'	-53.0'	149.1°	50°25.5'	-53.4'	149.7°	49°33.5'	-53.8'	150.3°	9
10	53°48.7'	-51.6'	147.1°	52°58.1'	-52.1'	147.8°	52°07.1'	-52.5'	148.5°	51°15.8'	-52.9'	149.2°	50°24.1'	-53.3'	149.8°	49°32.1'	-53.7'	150.4°	48°39.7'	-54.0'	151.0°	10
11	52°57.1'	-52.0'	148.0°	52°06.0'	-52.4'	148.7°	51°14.6'	-52.8'	149.3°	50°22.8'	-53.2'	149.9°	49°30.7'	-53.6'	150.5°	48°38.4'	-53.9'	151.1°	47°45.7'	-54.2'	151.6°	11
12	52°05.1'	-52.3'	148.8°	51°13.6'	-52.7'	149.4°	50°21.8'	-53.1'	150.1°	49°29.6'	-53.5'	150.6°	48°37.2'	-53.8'	151.2°	47°44.5'	-54.1'	151.7°	46°51.5'	-54.4'	152.2°	12
13	51°12.8'	-52.6'	149.6°	50°20.9'	-53.0'	150.2°	49°28.7'	-53.4'	150.8°	48°36.1'	-53.7'	151.3°	47°43.4'	-54.0'	151.9°	46°50.3'	-54.3'	152.4°	45°57.1'	-54.6'	152.9°	13
14	50°20.2'	-52.9'	150.3°	49°27.9'	-53.3'	150.9°	48°35.3'	-53.6'	151.5°	47°42.4'	-53.9'	152.0°	46°49.3'	-54.2'	152.5°	45°56.0'	-54.5'	153.0°	45°02.4'	-54.8'	153.4°	14
15	49°27.3'	-53.2'	151.1°	48°34.6'	-53.5'	151.6°	47°41.7'	-53.8'	152.1°	46°48.5'	-54.1'	152.6°	45°55.1'	-54.4'	153.1°	45°01.5'	-54.7'	153.6°	44°07.6'	-55.0'	154.0°	15
16	48°34.1'	-53.4'	151.8°	47°41.1'	-53.7'	152.3°	46°47.8'	-54.0'	152.8°	45°54.4'	-54.3'	153.3°	45°00.7'	-54.6'	153.7°	44°06.8'	-54.9'	154.2°	43°12.7'	-55.1'	154.6°	16
17	47°40.7'	-53.7'	152.5°	46°47.3'	-54.0'	153.0°	45°53.8'	-54.3'	153.4°	45°00.0'	-54.5'	153.9°	44°06.1'	-54.8'	154.3°	43°11.9'	-55.0'	154.7°	42°17.6'	-55.3'	155.1°	17
18	46°47.0'	-53.9'	153.1°	45°53.4'	-54.2'	153.6°	44°59.5'	-54.4'	154.0°	44°05.5'	-54.7'	154.5°	43°11.3'	-54.9'	154.9°	42°16.9'	-55.2'	155.3°	41°22.3'	-55.4'	155.6°	18
19	45°53.1'	-54.1'	153.8°	44°59.2'	-54.4'	154.2°	44°05.1'	-54.6'	154.6°	43°10.8'	-54.9'	155.0°	42°16.3'	-55.1'	155.4°	40°26.9'	-55.5'	155.8°	40°26.9'	-55.5'	156.1°	19
20	44°59.1'	-54.3'	154.4°	44°04.9'	-54.5'	154.8°	43°10.5'	-54.8'	155.2°	42°15.7'	-55.0'	155.6°	41°21.2'	-55.2'	155.9°</							

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

18° 342° LHA

Latitude CONTRARY to Declination

18° 342° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	62°36.5'	47.1'	137.8°	61°51.6'	48.0'	139.1°	61°05.9'	48.8'	140.3°	60°19.4'	49.6'	141.4°	59°32.2'	50.3'	142.4°	58°44.3'	50.9'	143.5°	57°55.8'	51.5'	144.4°	0
1	61°49.4'	47.9'	139.1°	61°03.6'	48.7'	140.3°	60°17.1'	49.4'	141.4°	59°29.8'	50.1'	142.5°	58°41.9'	50.8'	143.5°	57°53.4'	51.4'	144.5°	57°04.3'	51.9'	145.4°	1
2	61°01.5'	48.5'	140.4°	60°15.0'	49.3'	141.5°	59°27.7'	50.0'	142.6°	58°39.7'	50.6'	143.6°	57°51.1'	51.2'	144.5°	57°02.0'	51.8'	145.4°	56°12.3'	52.3'	146.3°	2
3	60°13.0'	49.1'	141.6°	59°25.7'	49.8'	142.6°	58°37.7'	50.5'	143.6°	57°49.0'	51.1'	144.6°	56°59.9'	51.7'	145.5°	56°10.2'	52.2'	146.3°	55°20.0'	52.7'	147.1°	3
4	59°23.9'	49.7'	142.7°	58°35.8'	50.4'	143.7°	57°47.2'	51.0'	144.7°	56°57.9'	51.5'	145.6°	56°08.2'	52.1'	146.4°	55°18.0'	52.6'	147.2°	54°27.3'	53.0'	148.0°	4
5	58°34.2'	50.2'	143.8°	57°45.5'	50.8'	144.8°	56°56.2'	51.4'	145.6°	56°06.4'	51.9'	146.5°	55°16.1'	52.4'	147.3°	54°25.4'	52.9'	148.1°	53°34.3'	53.3'	148.8°	5
6	57°43.9'	50.7'	144.9°	56°54.6'	51.3'	145.7°	56°04.8'	51.8'	146.6°	55°14.5'	52.3'	147.4°	54°23.7'	52.8'	148.1°	53°32.6'	53.2'	148.9°	52°41.0'	53.6'	149.5°	6
7	56°53.2'	51.2'	145.8°	56°03.3'	51.7'	146.7°	55°13.0'	52.2'	147.5°	54°22.2'	52.7'	148.2°	53°30.9'	53.1'	148.9°	52°39.4'	53.5'	149.6°	51°47.4'	53.9'	150.3°	7
8	56°02.1'	51.6'	146.8°	55°11.6'	52.1'	147.6°	54°20.8'	52.5'	148.3°	53°29.5'	53.0'	149.0°	52°37.9'	53.4'	149.7°	51°45.9'	53.7'	150.4°	50°53.6'	54.1'	151.0°	8
9	55°10.5'	52.0'	147.7°	54°19.5'	52.4'	148.4°	53°28.2'	52.9'	149.2°	52°36.5'	53.3'	149.8°	51°44.5'	53.6'	150.5°	50°52.1'	54.0'	151.1°	49°59.5'	54.3'	151.7°	9
10	54°18.5'	52.3'	148.6°	53°27.1'	52.8'	149.3°	52°35.4'	53.2'	149.9°	51°43.3'	53.5'	150.6°	50°50.8'	53.9'	151.2°	49°58.1'	54.2'	151.8°	49°05.1'	54.5'	152.3°	10
11	53°26.2'	52.7'	149.4°	52°34.4'	53.1'	150.1°	51°42.2'	53.4'	150.7°	50°49.7'	53.8'	151.3°	49°57.0'	54.1'	151.9°	49°03.9'	54.4'	152.4°	48°10.6'	54.7'	152.9°	11
12	52°33.5'	53.0'	150.2°	51°41.3'	53.3'	150.8°	50°48.8'	53.7'	151.4°	49°55.9'	54.0'	152.0°	49°02.8'	54.4'	152.5°	48°09.5'	54.7'	153.1°	47°15.8'	54.9'	153.6°	12
13	51°40.6'	53.3'	151.0°	50°48.0'	53.6'	151.6°	49°55.1'	53.9'	152.1°	49°01.9'	54.3'	152.7°	48°08.5'	54.6'	153.2°	47°14.8'	54.8'	153.7°	46°20.9'	55.1'	154.1°	13
14	50°47.3'	53.5'	151.7°	49°54.3'	53.9'	152.3°	49°01.1'	54.2'	152.8°	48°07.6'	54.5'	153.3°	47°13.9'	54.8'	153.8°	46°20.0'	55.0'	154.3°	45°25.8'	55.3'	154.7°	14
15	49°53.8'	53.8'	152.4°	49°00.5'	54.1'	152.9°	48°06.9'	54.4'	153.4°	47°13.2'	54.7'	153.9°	46°19.1'	54.9'	154.4°	45°24.9'	55.2'	154.8°	44°30.5'	55.4'	155.3°	15
16	49°00.0'	54.0'	153.1°	48°06.4'	54.3'	153.6°	47°12.5'	54.6'	154.1°	46°18.5'	54.9'	154.5°	45°24.2'	55.1'	155.0°	44°29.8'	55.3'	155.4°	43°35.1'	55.6'	155.8°	16
17	48°06.0'	54.2'	153.7°	47°12.1'	54.5'	154.2°	46°18.0'	54.8'	154.7°	45°23.6'	55.0'	155.1°	44°29.1'	55.3'	155.5°	43°34.4'	55.5'	155.9°	42°39.6'	55.7'	156.3°	17
18	47°11.8'	54.4'	154.4°	46°17.6'	54.7'	154.8°	45°23.2'	54.9'	155.3°	44°28.6'	55.2'	155.7°	43°33.9'	55.4'	156.1°	42°38.9'	55.6'	156.4°	41°43.9'	55.8'	156.8°	18
19	46°17.4'	54.6'	155.0°	45°22.9'	54.9'	155.4°	44°28.3'	55.1'	155.8°	43°33.4'	55.3'	156.2°	42°38.4'	55.5'	156.6°	41°43.3'	55.8'	157.0°	40°48.0'	55.9'	157.3°	19
20	45°22.8'	54.8'	155.6°	44°28.0'	55.0'	156.0°	43°33.1'	55.3'	156.4°	42°38.1'	55.5'	156.8°	41°42.9'	55.7'	157.1°	40°47.5'	55.9'	157.4°	39°52.1'	56.1'	157.8°	20
21	44°28.0'	55.0'	156.2°	43°33.0'	55.2'	156.5°	42°37.9'	55.4'	156.9°	41°42.6'	55.6'	157.3°	40°47.2'	55.8'	157.6°	39°51.4'	55.9'	158.1°	38°56.9'	56.2'	158.5°	21
22	43°33.0'	55.1'	156.7°	42°37.8'	55.3'	157.1°	41°42.5'	55.5'	157.4°	40°47.0'	55.7'	157.8°	39°51.4'	55.9'	158.1°	38°55.5'	56.1'	158.4°	37°59.8'	56.3'	158.7°	22
23	42°37.9'	55.3'	157.3°	41°42.5'	55.5'	157.6°	40°46.9'	55.7'	157.9°	39°51.3'	55.9'	158.3°	38°55.5'	56.0'	158.6°	37°59.6'	56.2'	158.8°	37°03.6'	56.4'	159.1°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27			

18° 342° LHA

Latitude CONTRARY to DECLINATION

18° 342° LHA

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

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

17° 343° LHA

Latitude CONTRARY to Declination

17° 343° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	63°13.5'	48.1'	139.5°	62°27.5'	48.9'	140.8°	61°40.6'	49.7'	142.0°	60°53.0'	50.4'	143.1°	60°04.7'	51.1'	144.1°	59°15.8'	51.7'	145.1°	58°26.3'	52.2'	146.0°	0
1	62°25.4'	48.8'	140.8°	61°38.5'	49.6'	142.0°	60°50.9'	50.3'	143.1°	60°02.6'	50.9'	144.2°	59°13.6'	51.6'	145.2°	58°24.1'	52.1'	146.1°	57°34.0'	52.6'	147.0°	1
2	61°36.6'	49.4'	142.1°	60°48.9'	50.2'	143.2°	60°00.6'	50.8'	144.2°	59°11.6'	51.4'	145.2°	58°22.0'	52.0'	146.1°	57°32.0'	52.5'	147.0°	56°41.4'	53.0'	147.9°	2
3	60°47.2'	50.0'	143.3°	59°58.8'	50.7'	144.3°	59°09.8'	51.3'	145.3°	58°20.2'	51.9'	146.2°	57°30.1'	52.4'	147.1°	56°39.5'	52.9'	147.9°	55°48.4'	53.3'	148.7°	3
4	59°57.2'	50.6'	144.4°	59°08.1'	51.2'	145.4°	58°18.5'	51.7'	146.3°	57°28.3'	52.3'	147.2°	56°37.7'	52.8'	148.0°	55°46.6'	53.2'	148.8°	54°55.1'	53.6'	149.5°	4
5	59°06.6'	51.1'	145.4°	58°16.9'	51.6'	146.4°	57°26.7'	52.2'	147.2°	56°36.0'	52.6'	148.1°	55°44.9'	53.1'	148.8°	54°53.4'	53.5'	149.6°	54°01.4'	53.9'	150.3°	5
6	58°15.6'	51.5'	146.4°	57°25.3'	52.0'	147.3°	56°34.6'	52.5'	148.1°	55°43.4'	53.0'	148.9°	54°51.8'	53.4'	149.7°	53°59.8'	53.8'	150.4°	53°07.5'	54.2'	151.0°	6
7	57°24.0'	51.9'	147.4°	56°33.3'	52.4'	148.2°	55°42.0'	52.9'	149.0°	54°50.4'	53.3'	149.7°	53°58.4'	53.7'	150.4°	53°06.0'	54.1'	151.1°	52°13.3'	54.4'	151.7°	7
8	56°32.1'	52.3'	148.3°	55°40.8'	52.8'	149.1°	54°49.1'	53.2'	149.8°	53°57.1'	53.6'	150.5°	53°04.7'	54.0'	151.2°	52°12.0'	54.3'	151.8°	51°18.9'	54.7'	152.4°	8
9	55°39.8'	52.7'	149.2°	54°48.0'	53.1'	149.9°	53°55.9'	53.5'	150.6°	53°03.5'	53.9'	151.3°	52°10.7'	54.2'	151.9°	51°17.6'	54.6'	152.5°	50°24.3'	54.9'	153.1°	9
10	54°47.1'	53.0'	150.0°	53°54.9'	53.4'	150.7°	53°02.4'	53.8'	151.4°	52°09.6'	54.1'	152.0°	51°16.5'	54.5'	152.6°	50°23.1'	54.8'	153.2°	49°29.4'	55.1'	153.7°	10
11	53°54.1'	53.3'	150.8°	53°01.5'	53.7'	151.5°	52°08.6'	54.0'	152.1°	51°15.5'	54.4'	152.7°	50°22.0'	54.7'	153.3°	49°28.3'	55.0'	153.8°	48°34.3'	55.2'	154.3°	11
12	53°00.8'	53.6'	151.6°	52°07.8'	54.0'	152.2°	51°14.6'	54.3'	152.8°	50°21.1'	54.6'	153.4°	49°27.3'	54.9'	153.9°	48°33.3'	55.2'	154.4°	47°39.1'	55.4'	154.9°	12
13	52°07.2'	53.9'	152.4°	51°13.9'	54.2'	152.9°	50°20.3'	54.5'	153.5°	49°26.5'	54.8'	154.0°	48°32.4'	55.1'	154.5°	47°38.2'	55.3'	155.0°	46°43.7'	55.6'	155.4°	13
14	51°13.3'	54.1'	153.1°	50°19.7'	54.4'	153.6°	49°25.8'	54.7'	154.1°	48°31.7'	55.0'	154.6°	47°37.4'	55.3'	155.1°	46°42.8'	55.5'	155.6°	45°48.1'	55.7'	156.0°	14
15	50°19.2'	54.4'	153.7°	49°25.2'	54.6'	154.3°	48°31.1'	54.9'	154.8°	47°36.7'	55.2'	155.2°	46°42.1'	55.4'	155.7°	45°47.3'	55.7'	156.1°	44°52.4'	55.9'	156.5°	15
16	49°24.8'	54.6'	154.4°	48°30.6'	54.8'	154.9°	47°36.1'	55.1'	155.4°	46°41.5'	55.3'	155.8°	45°46.7'	55.6'	156.2°	44°51.7'	55.8'	156.6°	43°56.5'	56.0'	157.0°	16
17	48°30.2'	54.8'	155.0°	47°35.7'	55.0'	155.5°	46°41.0'	55.3'	155.9°	45°46.2'	55.5'	156.4°	44°51.1'	55.7'	156.8°	43°55.9'	55.9'	157.2°	43°00.5'	56.1'	157.5°	17
18	47°35.5'	55.0'	155.7°	46°40.7'	55.2'	156.1°	45°45.8'	55.4'	156.5°	44°50.6'	55.7'	156.9°	43°55.4'	55.9'	157.3°	42°60.0'	56.1'	157.7°	42°04.2'	56.2'	158.0°	18
19	46°40.5'	55.1'	156.2°	45°45.5'	55.4'	156.7°	44°50.3'	55.6'	157.1°	43°55.0'	55.8'	157.4°	42°59.5'	56.0'	157.8°	42°03.9'	56.2'	158.1°	41°08.2'	56.4'	158.5°	19
20	45°45.4'	55.3'	156.8°	44°50.1'	55.5'	157.2°	43°54.7'	55.7'	157.6°	42°59.2'	55.9'	157.9°	42°03.5'	56.1'	158.3°							

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

16° 344° LHA

Latitude CONTRARY to Declination

16° 344° LHA

Table with 9 columns (Dec, 21, 22, 23, 24, 25, 26, 27, Dec) and 24 rows of astronomical data including Hc, d, and Z values.

16° 344° LHA

Latitude CONTRARY to DECLINATION

16° 344° LHA

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

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

15° 345° LHA

Latitude CONTRARY to Declination

15° 345° LHA

Table with 9 columns (Dec, 21, 22, 23, 24, 25, 26, 27, Dec) and 24 rows of astronomical data including Hc, d, and Z values.

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°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	64°56.2'	-51.1'	145.2°	64°06.7'	-51.8'	146.4°	63°16.4'	-52.4'	147.5°	62°25.5'	-52.9'	148.5°	61°34.1'	-53.5'	149.5°	60°42.2'	-53.9'	150.4°	59°49.8'	-54.4'	151.2°	0
1	64°05.2'	-51.6'	146.4°	63°14.9'	-52.3'	147.5°	62°24.0'	-52.8'	148.5°	61°32.6'	-53.4'	149.5°	60°40.6'	-53.8'	150.4°	59°48.3'	-54.3'	151.3°	58°55.5'	-54.7'	152.1°	1
2	63°13.5'	-52.2'	147.5°	62°22.6'	-52.7'	148.6°	61°31.2'	-53.3'	149.5°	60°39.2'	-53.7'	150.4°	59°46.8'	-54.2'	151.3°	58°54.0'	-54.6'	152.1°	58°00.8'	-54.9'	152.8°	2
3	62°21.4'	-52.6'	148.6°	61°29.9'	-53.2'	149.6°	60°37.9'	-53.6'	150.5°	59°45.5'	-54.1'	151.3°	58°52.6'	-54.5'	152.1°	57°59.4'	-54.9'	152.9°	57°05.8'	-55.2'	153.6°	3
4	61°28.8'	-53.1'	149.6°	60°36.7'	-53.6'	150.5°	59°44.3'	-54.0'	151.4°	58°51.4'	-54.4'	152.2°	57°58.2'	-54.8'	152.9°	57°04.6'	-55.1'	153.6°	56°10.6'	-55.4'	154.3°	4
5	60°35.7'	-53.5'	150.6°	59°43.2'	-53.9'	151.4°	58°50.3'	-54.3'	152.2°	57°57.0'	-54.7'	153.0°	57°03.4'	-55.0'	153.7°	56°09.4'	-55.4'	154.4°	55°15.2'	-55.6'	155.0°	5
6	59°42.2'	-53.8'	151.5°	58°49.3'	-54.2'	152.3°	57°56.0'	-54.6'	153.1°	57°02.3'	-55.0'	153.8°	56°08.4'	-55.3'	154.4°	55°14.1'	-55.6'	155.0°	54°19.6'	-55.8'	155.6°	6
7	58°48.4'	-54.2'	152.4°	57°55.0'	-54.5'	153.1°	57°01.4'	-54.9'	153.8°	56°07.4'	-55.2'	154.5°	55°13.1'	-55.5'	155.1°	54°18.5'	-55.8'	155.7°	53°23.7'	-56.0'	156.3°	7
8	57°54.2'	-54.5'	153.2°	57°00.5'	-54.8'	153.9°	56°06.5'	-55.1'	154.6°	55°12.2'	-55.4'	155.2°	54°17.6'	-55.7'	155.8°	53°22.7'	-56.0'	156.3°	52°27.7'	-56.2'	156.8°	8
9	56°59.8'	-54.7'	154.0°	56°05.7'	-55.1'	154.6°	55°11.4'	-55.4'	155.3°	54°16.7'	-55.6'	155.9°	53°21.1'	-55.8'	156.5°	52°26.8'	-56.1'	156.9°	51°31.5'	-56.4'	157.4°	9
10	56°05.0'	-55.0'	154.7°	55°10.7'	-55.3'	155.3°	54°16.0'	-55.6'	155.9°	53°21.1'	-55.8'	156.5°	52°26.0'	-56.1'	157.0°	51°30.6'	-56.3'	157.5°	50°35.1'	-56.5'	158.0°	10
11	55°10.1'	-55.2'	155.4°	54°15.4'	-55.5'	156.0°	53°20.4'	-55.8'	156.6°	52°25.3'	-56.0'	157.1°	51°29.9'	-56.2'	157.6°	50°34.3'	-56.4'	158.0°	49°38.6'	-56.6'	158.5°	11
12	54°14.8'	-55.4'	156.1°	53°19.9'	-55.7'	156.7°	52°24.7'	-55.9'	157.2°	51°29.3'	-56.2'	157.7°	50°33.7'	-56.4'	158.1°	49°37.9'	-56.6'	158.6°	48°42.0'	-56.8'	159.0°	12
13	53°19.4'	-55.6'	156.8°	52°24.2'	-55.9'	157.3°	51°28.7'	-56.1'	157.8°	50°33.1'	-56.3'	158.2°	49°37.3'	-56.5'	158.7°	48°41.3'	-56.7'	159.1°	47°45.2'	-56.9'	159.5°	13
14	52°23.7'	-55.8'	157.4°	51°28.3'	-56.1'	157.9°	50°32.6'	-56.3'	158.3°	49°36.8'	-56.5'	158.8°	48°40.8'	-56.7'	159.2°	47°44.6'	-56.8'	159.6°	46°48.3'	-57.0'	159.9°	14
15	51°27.9'	-56.0'	158.0°	50°32.2'	-56.2'	158.4°	49°36.3'	-56.4'	158.9°	48°40.3'	-56.6'	159.3°	47°44.1'	-56.8'	159.7°	46°47.8'	-56.9'	160.0°	45°51.3'	-57.1'	160.4°	15
16	50°31.9'	-56.2'	158.5°	49°36.0'	-56.4'	159.0°	48°39.9'	-56.6'	159.4°	47°43.7'	-56.7'	159.8°	46°47.3'	-56.9'	160.1°	45°50.8'	-57.1'	160.5°	44°54.2'	-57.2'	160.8°	16
17	49°35.7'	-56.3'	159.1°	48°39.6'	-56.5'	159.5°	47°43.4'	-56.7'	159.9°	46°46.9'	-56.8'	160.3°	45°50.4'	-57.0'	160.6°	44°53.8'	-57.2'	160.9°	43°57.0'	-57.3'	161.3°	17
18	48°39.4'	-56.5'	159.6°	47°43.1'	-56.6'	160.0°	46°46.7'	-56.8'	160.4°	45°50.1'	-57.0'	160.7°	44°53.4'	-57.1'	161.0°	43°56.6'	-57.2'	161.4°	42°59.7'	-57.4'	161.7°	18
19	47°43.0'	-56.6'	160.1°	46°46.5'	-56.7'	160.5°	45°49.9'	-56.9'	160.8°	44°53.1'	-57.1'	161.2°	43°56.3'	-57.2'	161.5°	42°59.4'	-57.3'	161.8°	42°02.3'	-57.5'	162.1°	19
20	46°46.4'	-56.7'	160.6°	45°49.7'	-56.9'	161.0°	44°53.0'	-57.0'	161.3°	43°56.1'	-57.2'	161.6°	42°59.1'	-57.3'	161.9°	42°02.0'	-57.4'	162.2°	41°04.9'	-57.5'	162.4°	20
21	45°49.7'	-56.8'	161.1°	44°52.9'	-57.0'	161.4°	43°56.0'	-57.1'	161.7°	42°58.9'	-57.2'	162.0°	42°01.8'	-57.4'	162.3°	41°04.6'	-57.5'	162.6°	39°09.7'	-57.7'	162.8°	21
22	44°52.9'	-56.9'	161.5°	43°55.9'	-57.1'	161.9°	42°58.9'	-57.2'	162.1°	42°01.7'	-57.3'	162.4°	41°04.5'	-57.4'	162.7°	40°07.1'	-57.6'	162.9°	39°09.7'	-57.7'	163.2°	22
23	43°56.0'	-57.0'	162.0°	42°58.9'	-57.2'	162.3°	42°01.7'	-57.3'	162.6°	41°04.4'	-57.4'	162.8°	40°07.0'	-57.5'	163.1°	39°09.6'	-57.6'	163.3°	38°12.1'	-57.7'	163.5°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27			

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°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	65°27.4'	-52.0'	147.2°	64°36.7'	-52.7'	148.4°	63°45.3'	-53.2'	149.4°	62°53.4'	-53.8'	150.4°	62°01.0'	-54.2'	151.4°	61°08.1'	-54.6'	152.2°	60°14.8'	-55.0'	153.0°	0
1	64°35.3'	-52.6'	148.4°	63°44.0'	-53.1'	149.5°	62°52.1'	-53.7'	150.4°	61°59.6'	-54.1'	151.4°	61°06.7'	-54.6'	152.3°	60°13.4'	-54.9'	153.1°	59°19.8'	-55.3'	153.8°	1
2	63°42.8'	-53.1'	149.5°	62°50.9'	-53.6'	150.5°	61°58.4'	-54.0'	151.4°	61°05.5'	-54.5'	152.3°	60°12.2'	-54.9'	153.1°	59°18.5'	-55.2'	153.9°	58°24.5'	-55.6'	154.6°	2
3	62°49.8'	-53.5'	150.5°	61°57.3'	-54.0'	151.5°	61°04.4'	-54.4'	152.3°	60°11.0'	-54.8'	153.1°	59°17.3'	-55.1'	153.9°	58°23.3'	-55.5'	154.6°	57°28.9'	-55.8'	155.3°	3
4	61°56.3'	-53.9'	151.5°	61°03.3'	-54.3'	152.4°	60°10.0'	-54.7'	153.2°	59°16.2'	-55.1'	153.9°	58°22.2'	-55.4'	154.7°	57°27.8'	-55.7'	155.3°	56°33.1'	-56.0'	156.0°	4
5	61°02.4'	-54.2'	152.4°	60°09.0'	-54.6'	153.2°	59°15.3'	-55.0'	154.0°	58°21.2'	-55.3'	154.7°	57°26.8'	-55.6'	155.4°	56°32.1'	-55.9'	156.0°	55°37.1'	-56.2'	156.6°	5
6	60°08.2'	-54.6'	153.3°	59°14.4'	-54.9'	154.1°	58°20.3'	-55.3'	154.8°	57°25.8'	-55.6'	155.4°	56°31.1'	-55.9'	156.1°	55°36.2'	-56.1'	156.7°	54°40.9'	-56.4'	157.2°	6
7	59°13.6'	-54.9'	154.1°	58°19.5'	-55.2'	154.8°	57°25.0'	-55.5'	155.5°	56°30.3'	-55.8'	156.1°	55°35.3'	-56.1'	156.7°	54°40.0'	-56.3'	157.3°	53°44.6'	-56.5'	157.8°	7
8	58°18.7'	-55.1'	154.9°	57°24.3'	-55.4'	155.6°	56°29.5'	-55.7'	156.2°	55°34.5'	-56.0'	156.8°	54°39.2'	-56.2'	157.4°	53°43.7'	-56.5'	157.9°	52°48.0'	-56.7'	158.4°	8
9	57°23.6'	-55.4'	155.6°	56°28.8'	-55.7'	156.3°	55°33.8'	-55.9'	156.9°	54°38.5'	-56.2'	157.4°	53°43.0'	-56.4'	157.9°	52°47.3'	-56.6'	158.4°	51°51.4'	-56.8'	158.9°	9
10	56°28.2'	-55.6'	156.4°	55°33.2'	-55.9'	156.9°	54°37.8'	-56.1'	157.5°	53°42.3'	-56.4'	158.0°	52°46.6'	-56.6'	158.5°	51°50.6'	-56.8'	159.0°	50°54.5'	-57.0'	159.4°	10
11	55°32.6'	-55.8'	157.0°	54°37.3'	-56.1'	157.6°	53°41.7'	-56.3'	158.1°	52°45.9'	-56.5'	158.6°	51°50.0'	-56.7'	159.1°	50°53.9'	-56.9'	159.5°	49°57.6'	-57.1'	159.9°	11
12	54°36.8'	-56.0'	157.7°	53°41.2'	-56.2'	158.2°	52°45.4'	-56.5'	158.7°	51°49.4'	-56.7'	159.1°	50°53.3'	-56.8'	159.6°	49°57.0'	-57.0'	160.0°	49°00.5'	-57.2'	160.4°	12
13	53°40.8'	-56.2'	158.3°	52°45.0'	-56.4'	158.8°	51°49.0'	-56.6'	159.2°	50°52.8'	-56.8'	159.7°	49°56.4'	-57.0'	160.1°	48°60.0'	-57.1'	160.5°	48°03.3'	-57.3'	160.9°	13
14	52°44.6'	-56.4'	158.9°	51°48.6'	-56.6'	159.3°	50°52.4'	-56.7'	159.8°	49°56.0'	-56.9'	160.2°	48°59.5'	-57.1'	160.6°	48°02.8'	-57.2'	160.9°	47°06.0'	-57.4'	161.3°	14
15	51°48.3'	-56.5'	159.4°	50°52.0'	-56.7'	159.9°	49°55.6'	-56.9'	160.3°	48°59.1'	-57.0'	160.7°	48°02.4'	-57.2'	161.0°	47°05.6'	-57.3'	161.4°	46°08.7'	-57.5'	161.7°	15
16	50°51.8'	-56.7'	160.0°	49°55.3'	-56.8'	160.4°	48°58.7'	-57.0'	160.8°	48°02.0'	-57.2'	161.1°	47°05.2'	-57.3'	161.5°	46°08.2'	-57.4'	161.8°	45°11.2'	-57.6'	162.1°	16
17	49°55.1'	-56.8'	160.5°	48°58.5'	-56.9'	160.9°	48°01.7'	-57.1'	161.2°	47°04.9'	-57.3'	161.6°	46°07.9'	-57.4'	161.9°	45°10.8'	-57.5'	162.2°	44°13.6'	-57.6'	162.5°	17
18	48°58.3'	-56.9'	161.0°	48°01.5'	-57.1'	161.3°	47°04.6'	-57.2'	161.7°	46°07.6'	-57.3'	162.0°	45°10.5'	-57.5'	162.3°	44°13.3'	-57.6'	162.6°	43°16.0'	-57.7'	162.9°	18
19	48°01.4'	-57.1'	161.5°	47°04.5'	-57.2'	161.8°	46°07.4'	-57.3'	162.1°	45°10.3'	-57.4'	162.4°	44°13.0'	-57.6'	162.7°	43°15.7'	-57.7'	163.0°	42°18.2'	-57.8'	163.3°	19
20	47°04.4'	-57.1'	161.9°	46°07.3'	-57.3'	162.2°	45°10.1'	-57.4'	162.6°	44°12.8'	-57.5'	162.8°	43°15.5'	-57.6'	163.1°	42°18.0'</						

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

12° 348° LHA

Latitude CONTRARY to Declination

12° 348° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	65°56.9'	-53.0'	149.3°	65°05.0'	-53.6'	150.4°	64°12.6'	-54.1'	151.5°	63°19.6'	-54.5'	152.4°	62°26.2'	-55.0'	153.3°	61°32.4'	-55.3'	154.1°	60°38.3'	-55.7'	154.9°	0
1	65°03.8'	-53.5'	150.5°	64°11.4'	-54.0'	151.5°	63°18.5'	-54.5'	152.4°	62°25.1'	-54.9'	153.3°	61°31.3'	-55.3'	154.2°	60°37.1'	-55.6'	154.9°	59°42.6'	-55.9'	155.7°	1
2	64°10.4'	-53.9'	151.5°	63°17.4'	-54.4'	152.5°	62°24.0'	-54.8'	153.4°	61°30.2'	-55.2'	154.2°	60°36.0'	-55.5'	155.0°	59°41.5'	-55.9'	155.7°	58°46.7'	-56.1'	156.4°	2
3	63°16.5'	-54.3'	152.5°	62°23.0'	-54.7'	153.4°	61°29.2'	-55.1'	154.2°	60°35.0'	-55.5'	155.0°	59°40.5'	-55.8'	155.7°	58°45.6'	-56.1'	156.4°	57°50.5'	-56.3'	157.0°	3
4	62°22.2'	-54.7'	153.4°	61°28.3'	-55.0'	154.3°	60°34.1'	-55.4'	155.0°	59°39.5'	-55.7'	155.8°	58°44.7'	-56.0'	156.4°	57°49.5'	-56.3'	157.1°	56°54.2'	-56.5'	157.7°	4
5	61°27.5'	-55.0'	154.3°	60°33.3'	-55.3'	155.1°	59°38.7'	-55.7'	155.8°	58°43.8'	-56.0'	156.5°	57°48.7'	-56.2'	157.1°	56°53.3'	-56.5'	157.7°	55°57.6'	-56.7'	158.3°	5
6	60°32.5'	-55.3'	155.1°	59°37.9'	-55.6'	155.9°	58°43.0'	-55.9'	156.5°	57°47.9'	-56.2'	157.2°	56°52.4'	-56.4'	157.8°	55°56.8'	-56.6'	158.3°	55°00.9'	-56.9'	158.9°	6
7	59°37.3'	-55.5'	155.9°	58°42.3'	-55.8'	156.6°	57°47.1'	-56.1'	157.2°	56°51.7'	-56.4'	157.8°	55°56.0'	-56.6'	158.4°	55°00.1'	-56.8'	158.9°	54°04.1'	-57.0'	159.4°	7
8	58°41.7'	-55.8'	156.7°	57°46.5'	-56.0'	157.3°	56°51.0'	-56.3'	157.9°	55°55.3'	-56.5'	158.4°	54°59.4'	-56.7'	159.0°	54°03.3'	-56.9'	159.5°	53°07.1'	-57.1'	159.9°	8
9	57°46.0'	-56.0'	157.4°	56°50.5'	-56.2'	157.9°	55°54.7'	-56.5'	158.5°	54°58.8'	-56.7'	159.0°	54°02.7'	-56.9'	159.5°	53°06.4'	-57.1'	160.0°	52°09.9'	-57.3'	160.4°	9
10	56°50.0'	-56.2'	158.0°	55°54.2'	-56.4'	158.6°	54°58.3'	-56.6'	159.1°	54°02.1'	-56.8'	159.6°	53°05.8'	-57.0'	160.1°	52°09.3'	-57.2'	160.5°	51°12.7'	-57.4'	160.9°	10
11	55°53.8'	-56.4'	158.7°	54°57.8'	-56.6'	159.2°	54°01.6'	-56.8'	159.7°	53°05.3'	-57.0'	160.1°	52°08.8'	-57.2'	160.6°	51°12.1'	-57.3'	161.0°	50°15.3'	-57.5'	161.4°	11
12	54°57.4'	-56.6'	159.3°	54°01.2'	-56.8'	159.7°	53°04.8'	-56.9'	160.2°	52°08.3'	-57.1'	160.6°	51°11.6'	-57.3'	161.1°	50°14.8'	-57.4'	161.5°	49°17.8'	-57.6'	161.8°	12
13	54°00.8'	-56.7'	159.8°	53°04.4'	-56.9'	160.3°	52°07.9'	-57.1'	160.7°	51°11.2'	-57.2'	161.1°	50°14.3'	-57.4'	161.5°	49°17.3'	-57.5'	161.9°	48°20.2'	-57.7'	162.3°	13
14	53°04.1'	-56.9'	160.4°	52°07.5'	-57.0'	160.8°	51°10.8'	-57.2'	161.2°	50°13.9'	-57.3'	161.6°	49°16.9'	-57.5'	162.0°	48°19.8'	-57.6'	162.3°	47°22.6'	-57.8'	162.7°	14
15	52°07.3'	-57.0'	160.9°	51°10.5'	-57.2'	161.3°	50°13.6'	-57.3'	161.7°	49°16.6'	-57.5'	162.1°	48°19.4'	-57.6'	162.4°	47°22.2'	-57.7'	162.8°	46°24.8'	-57.8'	163.1°	15
16	51°10.3'	-57.1'	161.4°	50°13.3'	-57.3'	161.8°	49°16.3'	-57.4'	162.2°	48°19.1'	-57.5'	162.5°	47°21.8'	-57.7'	162.8°	46°24.5'	-57.8'	163.2°	45°27.0'	-57.9'	163.4°	16
17	50°13.2'	-57.2'	161.9°	49°16.1'	-57.4'	162.3°	48°18.9'	-57.5'	162.6°	47°21.6'	-57.6'	162.9°	46°24.2'	-57.8'	163.2°	45°26.7'	-57.9'	163.5°	44°29.1'	-58.0'	163.8°	17
18	49°15.9'	-57.3'	162.4°	48°18.7'	-57.5'	162.7°	47°21.4'	-57.6'	163.0°	46°23.9'	-57.7'	163.3°	45°26.4'	-57.8'	163.6°	44°28.8'	-57.9'	163.9°	43°31.1'	-58.0'	164.2°	18
19	48°18.6'	-57.4'	162.8°	47°21.2'	-57.6'	163.1°	46°23.8'	-57.7'	163.4°	45°26.2'	-57.8'	163.7°	44°28.6'	-57.9'	164.0°	43°30.9'	-58.0'	164.3°	42°33.1'	-58.1'	164.5°	19
20	47°21.2'	-57.5'	163.2°	46°23.7'	-57.7'	163.5°	45°26.1'	-57.8'	163.8°	44°28.4'	-57.9'	164.1°	43°30.7'	-58.0'	164.4°	42°32.9'	-58.1'	164.6°	41°35.0'	-58.2'	164.9°	20
21	46°23.6'	-57.6'	163.7°	45°26.0'	-57.7'	163.9°	44°28.3'	-57.8'	164.2°	43°30.5'	-57.9'	164.5°	42°32.7'	-58.0'	164.7°	41°34.8'	-58.1'	165.0°	40°36.8'	-58.2'	165.2°	21
22	45°26.0'	-57.7'	164.1°	44°28.3'	-57.8'	164.3°	43°30.5'	-57.9'	164.6°	42°32.6'	-58.0'	164.8°	41°34.7'	-58.1'	165.1°	40°36.7'	-58.2'	165.3°	39°38.6'	-58.3'	165.5°	22
23	44°28.3'	-57.8'	164.4°	43°30.5'	-57.9'	164.7°	42°32.6'	-58.0'	164.9°	41°34.6'	-58.1'	165.2°	40°36.6'	-58.1'	165.4°	39°38.5'	-58.2'	165.6°	38°40.3'	-58.3'	165.8°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27			

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°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	66°24.5'	-54.0'	151.5°	65°31.6'	-54.5'	152.6°	64°38.1'	-54.9'	153.6°	63°44.1'	-55.3'	154.5°	62°49.8'	-55.7'	155.3°	61°55.1'	-56.0'	156.1°	61°00.1'	-56.3'	156.8°	0
1	65°30.6'	-54.4'	152.6°	64°37.1'	-54.8'	153.6°	63°43.2'	-55.2'	154.5°	62°48.8'	-55.6'	155.3°	61°54.1'	-55.9'	156.1°	60°59.1'	-56.2'	156.8°	60°03.8'	-56.5'	157.5°	1
2	64°36.2'	-54.8'	153.6°	63°42.3'	-55.2'	154.5°	62°47.9'	-55.5'	155.3°	61°53.2'	-55.9'	156.1°	60°58.2'	-56.2'	156.9°	60°02.9'	-56.5'	157.5°	59°07.3'	-56.7'	158.2°	2
3	63°41.5'	-55.1'	154.5°	62°47.1'	-55.5'	155.4°	61°52.4'	-55.8'	156.2°	60°57.3'	-56.1'	156.9°	60°02.0'	-56.4'	157.6°	59°06.4'	-56.6'	158.2°	58°10.6'	-56.9'	158.8°	3
4	62°46.4'	-55.4'	155.4°	61°51.6'	-55.8'	156.2°	60°56.6'	-56.1'	156.9°	60°01.2'	-56.3'	157.6°	59°05.6'	-56.6'	158.2°	58°09.8'	-56.8'	158.8°	57°13.7'	-57.0'	159.4°	4
5	61°50.9'	-55.7'	156.2°	60°55.9'	-56.0'	157.0°	60°00.5'	-56.3'	157.6°	59°04.9'	-56.5'	158.3°	58°09.0'	-56.8'	158.9°	57°13.0'	-57.0'	159.4°	56°16.7'	-57.2'	160.0°	5
6	60°55.2'	-55.9'	157.0°	59°59.9'	-56.2'	157.7°	59°04.2'	-56.5'	158.3°	58°08.4'	-56.7'	158.9°	57°12.3'	-56.9'	159.5°	56°16.0'	-57.1'	160.0°	55°19.5'	-57.3'	160.5°	6
7	59°59.3'	-56.2'	157.8°	59°03.6'	-56.4'	158.4°	58°07.7'	-56.7'	159.0°	57°11.6'	-56.9'	159.5°	56°15.3'	-57.1'	160.1°	55°18.8'	-57.3'	160.6°	54°22.2'	-57.4'	161.0°	7
8	59°03.1'	-56.4'	158.4°	58°07.2'	-56.6'	159.0°	57°11.1'	-56.8'	159.6°	56°14.7'	-57.0'	160.1°	55°18.2'	-57.2'	160.6°	54°21.5'	-57.4'	161.1°	53°24.7'	-57.6'	161.5°	8
9	58°06.7'	-56.6'	159.1°	57°10.6'	-56.8'	159.7°	56°14.2'	-57.0'	160.2°	55°17.7'	-57.2'	160.7°	54°21.0'	-57.4'	161.1°	53°24.1'	-57.5'	161.6°	52°27.1'	-57.7'	162.0°	9
10	57°10.2'	-56.8'	159.7°	56°13.8'	-57.0'	160.2°	55°17.2'	-57.1'	160.7°	54°20.5'	-57.3'	161.2°	53°23.6'	-57.5'	161.6°	52°26.6'	-57.6'	162.0°	51°29.5'	-57.8'	162.4°	10
11	56°13.4'	-56.9'	160.3°	55°16.8'	-57.1'	160.8°	54°20.1'	-57.3'	161.3°	53°23.2'	-57.4'	161.7°	52°26.2'	-57.6'	162.1°	51°29.0'	-57.7'	162.5°	50°31.7'	-57.9'	162.9°	11
12	55°16.5'	-57.1'	160.9°	54°19.7'	-57.2'	161.3°	53°22.8'	-57.4'	161.8°	52°25.7'	-57.6'	162.2°	51°28.6'	-57.7'	162.6°	50°31.3'	-57.8'	162.9°	49°33.9'	-57.9'	163.3°	12
13	54°19.4'	-57.2'	161.4°	53°22.5'	-57.4'	161.8°	52°25.4'	-57.5'	162.2°	51°28.2'	-57.7'	162.6°	50°30.9'	-57.8'	163.0°	49°33.4'	-57.9'	163.3°	48°35.9'	-58.0'	163.7°	13
14	53°22.2'	-57.3'	161.9°	52°25.1'	-57.5'	162.3°	51°27.9'	-57.6'	162.7°	50°30.5'	-57.7'	163.1°	49°33.1'	-57.9'	163.4°	48°35.5'	-58.0'	163.7°	47°37.9'	-58.1'	164.1°	14
15	52°24.9'	-57.4'	162.4°	51°27.6'	-57.6'	162.8°	50°30.3'	-57.7'	163.2°	49°32.8'	-57.8'	163.5°	48°35.2'	-58.0'	163.8°	47°37.5'	-58.1'	164.1°	46°39.8'	-58.2'	164.4°	15
16	51°27.5'	-57.5'	162.9°	50°30.1'	-57.7'	163.2°	49°32.6'	-57.8'	163.6°	48°35.0'	-57.9'	163.9°	47°37.3'	-58.0'	164.2°	46°39.5'	-58.1'	164.5°	45°41.6'	-58.2'	164.8°	16
17	50°29.9'	-57.6'	163.3°	49°32.4'	-57.8'	163.7°	48°34.8'	-57.9'	164.0°	47°37.0'	-58.0'	164.3°	46°39.2'	-58.1'	164.6°	45°41.4'	-58.2'	164.9°	44°43.4'	-58.3'	165.1°	17
18	49°32.3'	-57.7'	163.8°	48°34.6'	-57.9'	164.1°	47°36.9'	-58.0'	164.4°	46°39.0'	-58.1'	164.7°	45°41.1'	-58.2'	164.9°	44°43.2'	-58.3'	165.2°	43°45.1'	-58.3'	165.4°	18
19	48°34.5'	-57.8'	164.2°	47°36.8'	-57.9'	164.5°	46°38.9'	-58.0'	164.8°	45°41.0'	-58.1'	165.0°	44°43.0'	-58.2'	165.3°	43°44.9'	-58.3'	165.5°	42°46.8'	-58.4'	165.8°	19
20	47°36.7'	-57.9'	164.6°	46°38.8'	-58.0'	164.9°	45°40.9'	-58.1'	165.1°	44°42.8'	-58.2'	165.4°	43°44.7'	-58.3'	165.6°							

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

10° 350° LHA

Latitude CONTRARY to Declination

10° 350° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	66°50.2'	-54.9'	153.8°	65°56.2'	-55.3'	154.8°	65°01.7'	-55.7'	155.7°	64°06.9'	-56.0'	156.6°	63°11.6'	-56.3'	157.4°	62°16.1'	-56.6'	158.1°	61°20.3'	-56.9'	158.8°	0
1	65°55.4'	-55.2'	154.8°	65°00.9'	-55.6'	155.7°	64°06.0'	-56.0'	156.6°	63°10.8'	-56.3'	157.4°	62°15.3'	-56.6'	158.1°	61°19.5'	-56.8'	158.8°	60°23.4'	-57.1'	159.4°	1
2	65°00.1'	-55.6'	155.8°	64°05.3'	-55.9'	156.6°	63°10.1'	-56.2'	157.4°	62°14.5'	-56.5'	158.1°	61°18.7'	-56.8'	158.8°	60°22.7'	-57.0'	159.4°	59°26.4'	-57.2'	160.0°	2
3	64°04.6'	-55.9'	156.6°	63°09.4'	-56.2'	157.4°	62°13.8'	-56.5'	158.1°	61°18.0'	-56.7'	158.8°	60°21.9'	-57.0'	159.5°	59°25.6'	-57.2'	160.1°	58°29.1'	-57.4'	160.6°	3
4	63°08.7'	-56.1'	157.5°	62°13.2'	-56.4'	158.2°	61°17.4'	-56.7'	158.9°	60°21.3'	-56.9'	159.5°	59°25.0'	-57.1'	160.1°	58°28.4'	-57.3'	160.7°	57°31.7'	-57.5'	161.2°	4
5	62°12.6'	-56.4'	158.2°	61°16.8'	-56.6'	158.9°	60°20.7'	-56.9'	159.5°	59°24.3'	-57.1'	160.1°	58°27.8'	-57.3'	160.7°	57°31.1'	-57.5'	161.2°	56°34.2'	-57.6'	161.7°	5
6	61°16.2'	-56.6'	158.9°	60°20.1'	-56.8'	159.6°	59°23.8'	-57.1'	160.2°	58°27.3'	-57.3'	160.7°	57°30.5'	-57.4'	161.2°	56°33.6'	-57.6'	161.7°	55°36.6'	-57.8'	162.2°	6
7	60°19.7'	-56.8'	159.6°	59°23.3'	-57.0'	160.2°	58°26.7'	-57.2'	160.8°	57°30.0'	-57.4'	161.3°	56°33.1'	-57.6'	161.8°	55°36.0'	-57.7'	162.2°	54°38.8'	-57.9'	162.7°	7
8	59°22.9'	-57.0'	160.3°	58°26.3'	-57.2'	160.8°	57°29.5'	-57.4'	161.3°	56°32.6'	-57.5'	161.8°	55°35.5'	-57.7'	162.3°	54°38.3'	-57.8'	162.7°	53°40.9'	-58.0'	163.1°	8
9	58°25.9'	-57.1'	160.9°	57°29.1'	-57.3'	161.4°	56°32.2'	-57.5'	161.9°	55°35.1'	-57.6'	162.3°	54°37.8'	-57.8'	162.8°	53°40.5'	-57.9'	163.2°	52°43.0'	-58.1'	163.6°	9
10	57°28.8'	-57.3'	161.5°	56°31.8'	-57.5'	161.9°	55°34.7'	-57.6'	162.4°	54°37.4'	-57.8'	162.8°	53°40.1'	-57.9'	163.2°	52°42.5'	-58.0'	163.6°	51°44.9'	-58.1'	164.0°	10
11	56°31.5'	-57.4'	162.0°	55°34.4'	-57.6'	162.5°	54°37.1'	-57.7'	162.9°	53°39.7'	-57.9'	163.3°	52°42.2'	-58.0'	163.7°	51°44.5'	-58.1'	164.0°	50°46.8'	-58.2'	164.4°	11
12	55°34.1'	-57.5'	162.5°	54°36.8'	-57.7'	162.9°	53°39.4'	-57.8'	163.3°	52°41.8'	-58.0'	163.7°	51°44.2'	-58.1'	164.1°	50°46.4'	-58.2'	164.4°	49°48.6'	-58.3'	164.7°	12
13	54°36.5'	-57.7'	163.0°	53°39.1'	-57.8'	163.4°	52°41.5'	-57.9'	163.8°	51°43.9'	-58.0'	164.1°	50°46.1'	-58.2'	164.5°	49°48.2'	-58.3'	164.8°	48°50.3'	-58.4'	165.1°	13
14	53°38.9'	-57.8'	163.5°	52°41.3'	-57.9'	163.9°	51°43.6'	-58.0'	164.2°	50°45.8'	-58.1'	164.6°	49°47.9'	-58.2'	164.9°	48°50.0'	-58.3'	165.2°	47°51.9'	-58.4'	165.5°	14
15	52°41.1'	-57.9'	163.9°	51°43.4'	-58.0'	164.3°	50°45.6'	-58.1'	164.6°	49°47.7'	-58.2'	164.9°	48°49.7'	-58.3'	165.2°	47°51.7'	-58.4'	165.5°	46°53.5'	-58.5'	165.8°	15
16	51°43.3'	-58.0'	164.4°	50°45.4'	-58.1'	164.7°	49°47.5'	-58.2'	165.0°	48°49.5'	-58.3'	165.3°	47°51.4'	-58.4'	165.6°	46°53.3'	-58.4'	165.9°	45°55.1'	-58.5'	166.1°	16
17	50°45.3'	-58.0'	164.8°	49°47.4'	-58.1'	165.1°	48°49.3'	-58.2'	165.4°	47°51.2'	-58.3'	165.7°	46°53.1'	-58.4'	166.0°	45°54.8'	-58.5'	166.2°	44°56.5'	-58.6'	166.4°	17
18	49°47.3'	-58.1'	165.2°	48°49.2'	-58.2'	165.5°	47°51.1'	-58.3'	165.8°	46°52.9'	-58.4'	166.0°	45°54.7'	-58.5'	166.3°	44°56.3'	-58.5'	166.5°	43°58.0'	-58.6'	166.7°	18
19	48°49.1'	-58.2'	165.6°	47°51.0'	-58.3'	165.8°	46°52.8'	-58.4'	166.1°	45°54.5'	-58.4'	166.4°	44°56.2'	-58.5'	166.6°	43°57.8'	-58.6'	166.8°	42°59.3'	-58.7'	167.0°	19
20	47°51.0'	-58.3'	165.9°	46°52.7'	-58.3'	166.2°	45°54.4'	-58.4'	166.4°	44°56.1'	-58.5'	166.7°	43°57.7'	-58.6'	166.9°	42°59.2'	-58.6'	167.1°	42°00.7'	-58.7'	167.3°	20
21	46°52.7'	-58.3'	166.3°	45°54.4'	-58.4'	166.5°	44°56.0'	-58.5'	166.8°	43°57.6'	-58.5'	167.0°	42°59.1'	-58.6'	167.2°	42°00.6'	-58.7'	167.4°	41°02.0'	-58.7'	167.6°	21
22	45°54.4'	-58.4'	166.6°	44°56.0'	-58.5'	166.9°	43°57.5'	-58.5'	167.1°	42°59.0'	-58.6'	167.3°	42°00.5'	-58.7'	167.5°	41°01.9'	-58.7'	167.7°	40°03.2'	-58.8'	167.9°	22
23	44°56.0'	-58.4'	167.0°	43°57.5'	-58.5'	167.2°	42°59.0'	-58.6'	167.4°	42°00.4'	-58.6'	167.6°	41°01.8'	-58.7'	167.8°	40°03.2'	-58.8'	167.9°	39°04.5'	-58.8'	168.1°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27			

10° 350° LHA

Latitude CONTRARY to DECLINATION

10° 350° LHA

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

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

9° 351° LHA

Latitude CONTRARY to Declination

9° 351° LHA

Dec°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	67°13.9'	-55.7'	156.2°	66°18.9'	-56.1'	157.1°	65°23.5'	-56.4'	157.9°	64°27.7'	-56.7'	158.7°	63°31.7'	-57.0'	159.5°	62°35.4'	-57.2'	160.1°	61°38.8'	-57.4'	160.8°	0
1	66°18.2'	-56.0'	157.1°	65°22.8'	-56.4'	157.9°	64°27.0'	-56.7'	158.7°	63°31.0'	-56.9'	159.5°	62°34.7'	-57.2'	160.1°	61°38.1'	-57.4'	160.8°	60°41.4'	-57.6'	161.4°	1
2	65°22.1'	-56.3'	158.0°	64°26.4'	-56.6'	158.8°	63°30.4'	-56.9'	159.5°	62°34.0'	-57.1'	160.2°	61°37.5'	-57.4'	160.8°	60°40.7'	-57.5'	161.4°	59°43.8'	-57.7'	161.9°	2
3	64°25.9'	-56.6'	158.8°	63°29.8'	-56.8'	159.5°	62°33.5'	-57.1'	160.2°	61°36.9'	-57.3'	160.8°	60°40.1'	-57.5'	161.4°	59°43.2'	-57.7'	162.0°	58°46.1'	-57.9'	162.5°	3
4	63°29.3'	-56.8'	159.5°	62°32.9'	-57.0'	160.2°	61°36.4'	-57.3'	161.8°	60°39.6'	-57.5'	161.4°	59°42.6'	-57.6'	162.0°	58°45.5'	-57.8'	162.5°	57°48.2'	-58.0'	163.0°	4
5	62°32.5'	-57.0'	160.2°	61°35.9'	-57.2'	160.9°	60°39.1'	-57.4'	161.5°	59°41.7'	-57.6'	162.0°	58°44.5'	-57.7'	162.6°	57°47.2'	-57.9'	163.0°	56°49.8'	-58.0'	163.5°	5
6	61°35.5'	-57.2'	160.9°	60°38.7'	-57.4'	161.5°	59°41.7'	-57.6'	162.0°	58°44.5'	-57.7'	162.6°	57°47.2'	-57.9'	163.0°	56°49.8'	-58.0'	163.5°	55°52.2'	-58.2'	163.9°	6
7	60°38.3'	-57.4'	161.5°	59°41.3'	-57.5'	162.1°	58°44.1'	-57.7'	162.6°	57°46.8'	-57.9'	163.1°	56°49.3'	-58.0'	163.5°	55°51.7'	-58.1'	163.9°	54°54.0'	-58.3'	164.3°	7
8	59°40.9'	-57.5'	162.1°	58°43.7'	-57.7'	162.6°	57°46.4'	-57.8'	163.1°	56°48.9'	-58.0'	163.6°	55°51.3'	-58.1'	164.0°	54°53.6'	-58.2'	164.4°	53°55.7'	-58.3'	164.7°	8
9	58°43.4'	-57.6'	162.7°	57°46.1'	-57.8'	163.2°	56°48.6'	-57.9'	163.6°	55°50.9'	-58.1'	164.0°	54°53.2'	-58.2'	164.4°	53°55.4'	-58.3'	164.8°	52°57.4'	-58.4'	165.1°	9
10	57°45.8'	-57.8'	163.2°	56°48.3'	-57.9'	163.7°	55°50.6'	-58.0'	164.1°	54°52.9'	-58.2'	164.5°	53°55.0'	-58.3'	164.8°	52°57.1'	-58.4'	165.2°	51°59.0'	-58.5'	165.5°	10
11	56°48.0'	-57.9'	163.7°	55°50.4'	-58.0'	164.1°	54°52.6'	-58.1'	164.5°	53°54.7'	-58.2'	164.9°	52°56.7'	-58.4'	165.2°	51°58.7'	-58.4'	165.6°	51°00.5'	-58.5'	165.9°	11
12	55°50.1'	-58.0'	164.2°	54°52.3'	-58.1'	164.6°	53°54.4'	-58.2'	164.9°	52°56.5'	-58.3'	165.3°	51°58.4'	-58.4'	165.6°	51°00.2'	-58.5'	165.9°	50°02.0'	-58.6'	166.2°	12
13	54°52.1'	-58.1'	164.6°	53°54.2'	-58.2'	165.0°	52°56.2'	-58.3'	165.4°	51°58.1'	-58.4'	165.7°	50°60.0'	-58.5'	166.0°	50°01.7'	-58.6'	166.3°	49°03.4'	-58.7'	166.5°	13
14	53°54.1'	-58.2'	165.1°	52°56.0'	-58.3'	165.4°	51°57.9'	-58.4'	165.7°	50°59.7'	-58.5'	166.0°	50°01.5'	-58.6'	166.3°	49°03.1'	-58.6'	166.6°	48°04.7'	-58.7'	166.9°	14
15	52°55.9'	-58.3'	165.5°	51°57.8'	-58.4'	165.8°	50°59.6'	-58.4'	166.1°	50°01.3'	-58.5'	166.4°	49°02.9'	-58.6'	166.7°	48°04.5'	-58.7'	166.9°	47°06.0'	-58.8'	167.2°	15
16	51°57.6'	-58.3'	165.9°	50°59.4'	-58.4'	166.2°	50°01.1'	-58.5'	166.5°	49°02.7'	-58.6'	166.7°	48°04.3'	-58.7'	167.0°	47°05.8'	-58.7'	167.2°	46°07.3'	-58.8'	167.5°	16
17	50°59.3'	-58.4'	166.3°	50°01.0'	-58.5'	166.5°	49°02.6'	-58.6'	166.8°	48°04.2'	-58.6'	167.1°	47°05.7'	-58.7'	167.3°	46°07.1'	-58.8'	167.5°	45°08.5'	-58.8'	167.8°	17
18	50°00.9'	-58.5'	166.6°	49°02.5'	-58.5'	166.9°	48°04.0'	-58.6'	167.1°	47°05.5'	-58.7'	167.4°	46°06.9'	-58.8'	167.6°	45°08.3'	-58.8'	167.8°	44°09.6'	-58.9'	168.0°	18
19	49°02.4'	-58.6'	167.0°	48°04.0'	-58.6'	167.2°	47°05.4'	-58.7'	167.5°	46°06.8'	-58.7'	167.7°	45°08.2'	-58.8'	167.9°	44°09.5'	-58.9'	168.1°	43°11.8'	-58.9'	168.3°	19
20	48°03.9'	-58.6'	167.3°	47°05.4'	-58.6'	167.5°	46°06.8'	-58.7'	167.8°	45°08.1'	-58.8'	168.0°	44°09.4'	-58.8'	168.2°	43						

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

8° 352° LHA			Latitude CONTRARY to Declination							8° 352° LHA															
Dec°	21			22			23			24			25			26			27			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	67°35.5'	-56.5'	158.6°	66°39.5'	-56.9'	159.4°	65°43.2'	-57.1'	160.2°	64°46.6'	-57.4'	160.9°	63°49.8'	-57.6'	161.6°	62°52.7'	-57.8'	162.2°	61°55.5'	-57.9'	162.8°	0			
1	66°38.9'	-56.8'	159.4°	65°42.7'	-57.1'	160.2°	64°46.1'	-57.3'	160.9°	63°49.2'	-57.5'	161.6°	62°52.2'	-57.7'	162.2°	61°55.0'	-57.9'	162.8°	60°57.6'	-58.1'	163.3°	1			
2	65°42.1'	-57.0'	160.2°	64°45.6'	-57.3'	161.0°	63°48.8'	-57.5'	161.6°	62°51.7'	-57.7'	162.2°	61°54.5'	-57.9'	162.8°	60°57.1'	-58.0'	163.4°	59°59.5'	-58.2'	163.9°	2			
3	64°45.1'	-57.2'	161.0°	63°48.3'	-57.5'	161.6°	62°51.2'	-57.7'	162.3°	61°54.0'	-57.8'	162.8°	60°56.6'	-58.0'	163.4°	59°59.0'	-58.1'	163.9°	59°01.3'	-58.3'	164.3°	3			
4	63°47.9'	-57.4'	161.7°	62°50.8'	-57.6'	162.3°	61°53.6'	-57.8'	162.9°	60°56.2'	-58.0'	163.4°	59°58.6'	-58.1'	163.9°	59°00.9'	-58.3'	164.4°	58°03.0'	-58.4'	164.8°	4			
5	62°50.5'	-57.6'	162.3°	61°53.2'	-57.8'	162.9°	60°55.8'	-57.9'	163.4°	59°58.2'	-58.1'	163.9°	59°00.5'	-58.2'	164.4°	58°02.6'	-58.3'	164.8°	57°04.7'	-58.5'	165.2°	5			
6	61°52.9'	-57.7'	162.9°	60°55.4'	-57.9'	163.5°	59°57.8'	-58.1'	164.4°	58°59.8'	-58.2'	164.9°	58°02.3'	-58.3'	164.8°	57°04.3'	-58.4'	165.2°	56°06.2'	-58.5'	165.6°	6			
7	60°55.1'	-57.9'	163.5°	59°57.5'	-58.0'	164.0°	58°59.8'	-58.2'	164.4°	58°01.9'	-58.3'	164.9°	57°03.9'	-58.4'	165.3°	56°05.9'	-58.5'	165.7°	55°07.7'	-58.6'	166.0°	7			
8	59°57.2'	-58.0'	164.0°	58°59.5'	-58.1'	164.5°	58°01.6'	-58.3'	164.9°	57°03.6'	-58.4'	165.3°	56°05.5'	-58.5'	165.7°	55°07.3'	-58.6'	166.1°	54°09.1'	-58.7'	166.4°	8			
9	58°59.2'	-58.1'	164.5°	58°01.3'	-58.2'	165.0°	57°03.3'	-58.4'	165.4°	56°05.2'	-58.5'	165.7°	55°07.0'	-58.6'	166.1°	54°08.8'	-58.6'	166.4°	53°10.4'	-58.7'	166.7°	9			
10	58°01.1'	-58.2'	165.0°	57°03.1'	-58.3'	165.4°	56°05.0'	-58.4'	165.8°	55°06.8'	-58.5'	166.1°	54°08.5'	-58.6'	166.5°	53°10.1'	-58.7'	166.8°	52°11.7'	-58.8'	167.1°	10			
11	57°02.9'	-58.3'	165.5°	56°04.8'	-58.4'	165.8°	55°06.6'	-58.5'	166.2°	54°08.2'	-58.6'	166.5°	53°09.9'	-58.7'	166.8°	52°11.4'	-58.8'	167.1°	51°12.9'	-58.8'	167.4°	11			
12	56°04.6'	-58.4'	165.9°	55°06.4'	-58.5'	166.2°	54°08.0'	-58.6'	166.6°	53°09.6'	-58.7'	166.9°	52°11.2'	-58.7'	167.2°	51°12.6'	-58.8'	167.4°	50°14.0'	-58.9'	167.7°	12			
13	55°06.2'	-58.5'	166.3°	54°07.9'	-58.6'	166.6°	53°09.5'	-58.6'	166.9°	52°11.0'	-58.7'	167.2°	51°12.4'	-58.8'	167.5°	50°13.8'	-58.9'	167.8°	49°15.2'	-58.9'	168.0°	13			
14	54°07.7'	-58.5'	166.7°	53°09.3'	-58.6'	167.0°	52°10.8'	-58.7'	167.3°	51°12.3'	-58.8'	167.6°	50°13.6'	-58.8'	167.8°	49°15.0'	-58.9'	168.1°	48°16.2'	-59.0'	168.3°	14			
15	53°09.2'	-58.6'	167.0°	52°10.7'	-58.7'	167.3°	51°12.1'	-58.8'	167.6°	50°13.5'	-58.8'	167.9°	49°14.8'	-58.9'	168.1°	48°16.0'	-59.0'	168.3°	47°17.3'	-59.0'	168.6°	15			
16	52°10.6'	-58.7'	167.4°	51°12.0'	-58.7'	167.7°	50°13.3'	-58.8'	167.9°	49°14.6'	-58.9'	168.2°	48°15.9'	-58.9'	168.4°	47°17.1'	-59.0'	168.6°	46°18.3'	-59.0'	168.8°	16			
17	51°11.9'	-58.7'	167.7°	50°13.3'	-58.8'	168.0°	49°14.5'	-58.9'	168.2°	48°15.8'	-58.9'	168.5°	47°17.0'	-59.0'	168.7°	46°18.1'	-59.0'	168.9°	45°19.2'	-59.1'	169.1°	17			
18	50°13.2'	-58.8'	168.1°	49°14.5'	-58.8'	168.3°	48°15.7'	-58.9'	168.5°	47°16.9'	-59.0'	168.7°	46°18.0'	-59.0'	169.0°	45°19.1'	-59.1'	169.2°	44°20.1'	-59.1'	169.3°	18			
19	49°14.4'	-58.8'	168.4°	48°15.6'	-58.9'	168.6°	47°16.8'	-58.9'	168.8°	46°17.9'	-59.0'	169.0°	45°19.0'	-59.0'	169.2°	44°20.0'	-59.1'	169.4°	43°21.0'	-59.1'	169.6°	19			
20	48°15.6'	-58.9'	168.7°	47°16.7'	-58.9'	168.9°	46°17.8'	-59.0'	169.1°	45°18.9'	-59.0'	169.3°	44°19.9'	-59.1'	169.5°	43°20.9'	-59.1'	169.6°	42°21.9'	-59.2'	169.8°	20			
21	47°16.7'	-58.9'	169.0°	46°17.8'	-59.0'	169.2°	45°18.9'	-59.0'	169.4°	44°19.9'	-59.1'	169.5°	43°20.9'	-59.1'	169.7°	42°21.8'	-59.1'	169.9°	41°22.7'	-59.2'	170.0°	21			
22	46°17.8'	-58.9'	169.2°	45°18.9'	-59.0'	169.4°	44°19.9'	-59.0'	169.6°	43°20.8'	-59.1'	169.8°	42°21.8'	-59.1'	169.9°	41°22.7'	-59.2'	170.1°	40°23.5'	-59.2'	170.2°	22			
23	45°18.9'	-59.0'	169.5°	44°19.9'	-59.0'	169.7°	43°20.8'	-59.1'	169.9°	42°21.7'	-59.1'	170.0°	41°22.6'	-59.2'	170.2°	40°23.5'	-59.2'	170.3°	39°24.3'	-59.2'	170.5°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27						

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°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	67°54.8'	-57.3'	161.1°	66°58.0'	-57.5'	161.9°	66°00.8'	-57.8'	162.6°	65°03.5'	-57.9'	163.2°	64°06.0'	-58.1'	163.8°	63°08.3'	-58.3'	164.4°	62°10.4'	-58.4'	164.9°	0
1	66°57.5'	-57.5'	161.9°	66°00.4'	-57.7'	162.6°	65°03.1'	-57.9'	163.2°	64°05.5'	-58.1'	163.8°	63°07.8'	-58.2'	164.4°	62°10.0'	-58.4'	164.9°	61°12.0'	-58.5'	165.3°	1
2	66°00.0'	-57.7'	162.6°	65°02.7'	-57.9'	163.2°	64°05.2'	-58.1'	163.8°	63°07.5'	-58.2'	164.4°	62°09.6'	-58.4'	164.9°	61°11.6'	-58.5'	165.4°	60°13.5'	-58.6'	165.8°	2
3	65°02.3'	-57.9'	163.2°	64°04.8'	-58.0'	163.8°	63°07.1'	-58.2'	164.4°	62°09.2'	-58.3'	164.9°	61°11.2'	-58.5'	165.4°	60°13.1'	-58.6'	165.8°	59°14.9'	-58.7'	166.2°	3
4	64°04.5'	-58.0'	163.9°	63°06.8'	-58.2'	164.4°	62°08.9'	-58.3'	164.9°	61°10.9'	-58.4'	165.4°	60°12.8'	-58.5'	165.9°	59°14.3'	-58.6'	166.3°	58°16.2'	-58.7'	166.6°	4
5	63°06.5'	-58.1'	164.4°	62°08.6'	-58.3'	164.9°	61°10.6'	-58.4'	165.4°	60°12.5'	-58.5'	165.9°	59°14.3'	-58.6'	166.3°	58°15.9'	-58.7'	166.7°	57°17.2'	-58.8'	167.0°	5
6	62°08.4'	-58.3'	165.0°	61°10.3'	-58.4'	165.4°	60°12.2'	-58.5'	165.9°	59°14.0'	-58.6'	166.3°	58°15.6'	-58.7'	166.7°	57°17.2'	-58.8'	167.0°	56°18.7'	-58.9'	167.4°	6
7	61°10.1'	-58.4'	165.5°	60°12.0'	-58.5'	165.9°	59°13.7'	-58.6'	166.3°	58°15.4'	-58.7'	166.7°	57°16.9'	-58.8'	167.1°	56°18.4'	-58.8'	167.4°	55°19.8'	-58.9'	167.7°	7
8	60°11.7'	-58.5'	165.9°	59°13.5'	-58.6'	166.4°	58°15.1'	-58.7'	166.7°	57°16.7'	-58.7'	167.1°	56°18.2'	-58.8'	167.4°	55°19.6'	-58.9'	167.8°	54°20.9'	-59.0'	168.1°	8
9	59°13.3'	-58.5'	166.4°	58°14.9'	-58.6'	166.8°	57°16.5'	-58.7'	167.1°	56°17.9'	-58.8'	167.5°	55°19.3'	-58.9'	167.8°	54°20.7'	-59.0'	168.1°	53°21.9'	-59.0'	168.4°	9
10	58°14.8'	-58.6'	166.8°	57°16.3'	-58.7'	167.2°	56°17.7'	-58.8'	167.5°	55°19.1'	-58.9'	167.8°	54°20.4'	-58.9'	168.1°	53°21.7'	-59.0'	168.4°	52°22.9'	-59.1'	168.7°	10
11	57°16.1'	-58.7'	167.2°	56°17.6'	-58.8'	167.6°	55°19.0'	-58.9'	167.9°	54°20.3'	-58.9'	168.2°	53°21.5'	-59.0'	168.4°	52°22.7'	-59.0'	168.7°	51°23.8'	-59.1'	168.9°	11
12	56°17.4'	-58.8'	167.6°	55°18.8'	-58.8'	167.9°	54°20.1'	-58.9'	168.2°	53°21.3'	-59.0'	168.5°	52°22.5'	-59.0'	168.7°	51°23.7'	-59.1'	169.0°	50°24.7'	-59.1'	169.2°	12
13	55°18.7'	-58.8'	168.0°	54°20.0'	-58.9'	168.2°	53°21.2'	-59.0'	168.5°	52°22.4'	-59.0'	168.8°	51°23.5'	-59.1'	169.0°	50°24.6'	-59.1'	169.3°	49°25.6'	-59.2'	169.5°	13
14	54°19.9'	-58.9'	168.3°	53°21.1'	-58.9'	168.6°	52°22.2'	-59.0'	168.8°	51°23.4'	-59.1'	169.1°	50°24.4'	-59.1'	169.3°	49°25.4'	-59.2'	169.5°	48°26.4'	-59.2'	169.7°	14
15	53°21.0'	-58.9'	168.6°	52°22.1'	-59.0'	168.9°	51°23.2'	-59.0'	169.1°	50°24.3'	-59.1'	169.4°	49°25.3'	-59.1'	169.6°	48°26.3'	-59.2'	169.8°	47°27.2'	-59.2'	170.0°	15
16	52°22.1'	-59.0'	168.9°	51°23.2'	-59.0'	169.2°	50°24.2'	-59.1'	169.4°	49°25.2'	-59.1'	169.6°	48°26.2'	-59.2'	169.8°	47°27.1'	-59.2'	170.0°	46°28.0'	-59.3'	170.2°	16
17	51°23.1'	-59.0'	169.2°	50°24.1'	-59.1'	169.5°	49°25.1'	-59.1'	169.7°	48°26.1'	-59.2'	169.9°	47°27.0'	-59.2'	170.1°	46°27.9'	-59.3'	170.3°	45°28.7'	-59.3'	170.4°	17
18	50°24.1'	-59.1'	169.5°	49°25.1'	-59.1'	169.7°	48°26.0'	-59.2'	169.9°	47°26.9'	-59.2'	170.1°	46°27.8'	-59.2'	170.3°	45°28.6'	-59.3'	170.5°	44°29.4'	-59.3'	170.6°	18
19	49°25.0'	-59.1'	169.8°	48°26.0'	-59.1'	170.0°	47°26.8'	-59.2'	170.2°	46°27.7'	-59.2'	170.4°	45°28.5'	-59.3'	170.5°	44°29.3'	-59.3'	170.7°	43°30.1'	-59.3'	170.9°	19
20	48°25.9'	-59.1'	170.1°	47°26.8'	-59.2'	170.3°	46°27.7'	-59.2'	170.4°	45°28.5'	-59.3'	170.6°	44°29.3'	-59.3'	170.8°	43°30.0'	-59.3'	170.9°	42°30.8'	-59.4'	171.1°	20
21	47°26.8'	-59.2'	170.3°	46°27.6'	-59.2'	170.5°	45°28.4'	-59.2'	170.7°	44°29.2'	-59.3'	170.8°	43°30.0'	-59.3'	171.0°	42°30.7'	-59.3'	171.1°	41°31.4'	-		

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

6° 354° LHA			Latitude CONTRARY to Declination							6° 354° LHA															
Dec°	21			22			23			24			25			26			27			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	68°11.8'	-58.0'	163.7°	67°14.1'	-58.2'	164.3°	66°16.3'	-58.3'	164.9°	65°18.3'	-58.5'	165.5°	64°20.1'	-58.6'	166.0°	63°21.8'	-58.7'	166.5°	62°23.4'	-58.8'	167.0°	0			
1	67°13.8'	-58.1'	164.3°	66°16.0'	-58.3'	164.9°	65°18.0'	-58.4'	165.5°	64°19.8'	-58.6'	166.0°	63°21.5'	-58.7'	166.5°	62°23.1'	-58.8'	167.0°	61°24.6'	-58.9'	167.4°	1			
2	66°15.7'	-58.3'	165.0°	65°17.7'	-58.4'	165.5°	64°19.5'	-58.6'	166.0°	63°21.2'	-58.7'	166.5°	62°22.8'	-58.8'	167.0°	61°24.3'	-58.9'	167.4°	60°25.7'	-59.0'	167.8°	2			
3	65°17.4'	-58.4'	165.5°	64°19.3'	-58.5'	166.1°	63°21.0'	-58.6'	166.5°	62°22.6'	-58.8'	167.0°	61°24.0'	-58.8'	167.4°	60°25.4'	-58.9'	167.8°	59°26.8'	-59.0'	168.2°	3			
4	64°19.0'	-58.5'	166.1°	63°20.7'	-58.6'	166.6°	62°22.3'	-58.7'	167.0°	61°23.8'	-58.8'	167.4°	60°25.2'	-58.9'	167.8°	59°26.5'	-59.0'	168.2°	58°27.8'	-59.1'	168.5°	4			
5	63°20.5'	-58.6'	166.6°	62°22.1'	-58.7'	167.0°	61°23.6'	-58.8'	167.4°	60°25.0'	-58.9'	167.8°	59°26.3'	-59.0'	168.2°	58°27.5'	-59.1'	168.5°	57°28.7'	-59.1'	168.8°	5			
6	62°21.9'	-58.7'	167.0°	61°23.4'	-58.8'	167.5°	60°24.8'	-58.9'	167.8°	59°26.1'	-59.0'	168.2°	58°27.3'	-59.0'	168.5°	57°28.5'	-59.1'	168.9°	56°29.6'	-59.2'	169.1°	6			
7	61°23.2'	-58.8'	167.5°	60°24.6'	-58.9'	167.9°	59°25.9'	-58.9'	168.2°	58°27.1'	-59.0'	168.6°	57°28.3'	-59.1'	168.9°	56°29.4'	-59.1'	169.2°	55°30.4'	-59.2'	169.4°	7			
8	60°24.4'	-58.9'	167.9°	59°25.7'	-58.9'	168.3°	58°26.9'	-59.0'	168.6°	57°28.1'	-59.1'	168.9°	56°29.2'	-59.1'	169.2°	55°30.2'	-59.2'	169.5°	54°31.2'	-59.2'	169.7°	8			
9	59°25.6'	-58.9'	168.3°	58°26.8'	-59.0'	168.6°	57°27.9'	-59.1'	168.9°	56°29.0'	-59.1'	169.2°	55°30.0'	-59.2'	169.5°	54°31.0'	-59.2'	169.8°	53°32.0'	-59.3'	170.0°	9			
10	58°26.7'	-59.0'	168.7°	57°27.8'	-59.0'	169.0°	56°28.9'	-59.1'	169.3°	55°29.9'	-59.2'	169.5°	54°30.9'	-59.2'	169.8°	53°31.8'	-59.3'	170.0°	52°32.7'	-59.3'	170.3°	10			
11	57°27.7'	-59.0'	169.0°	56°28.7'	-59.1'	169.3°	55°29.8'	-59.1'	169.6°	54°30.7'	-59.2'	169.8°	53°31.7'	-59.3'	170.1°	52°32.5'	-59.3'	170.3°	51°33.4'	-59.3'	170.5°	11			
12	56°28.6'	-59.1'	169.3°	55°29.7'	-59.1'	169.6°	54°30.6'	-59.2'	169.9°	53°31.5'	-59.2'	170.1°	52°32.4'	-59.3'	170.3°	51°33.2'	-59.3'	170.5°	50°34.0'	-59.4'	170.7°	12			
13	55°29.6'	-59.1'	169.6°	54°30.5'	-59.2'	169.9°	53°31.4'	-59.2'	170.1°	52°32.3'	-59.3'	170.4°	51°33.1'	-59.3'	170.6°	50°33.9'	-59.4'	170.8°	49°34.7'	-59.4'	171.0°	13			
14	54°30.4'	-59.2'	169.9°	53°31.3'	-59.2'	170.2°	52°32.2'	-59.3'	170.4°	51°33.0'	-59.3'	170.6°	50°33.8'	-59.3'	170.8°	49°34.6'	-59.4'	171.0°	48°35.3'	-59.4'	171.2°	14			
15	53°31.3'	-59.2'	170.2°	52°32.1'	-59.3'	170.4°	51°32.9'	-59.3'	170.7°	50°33.7'	-59.3'	170.9°	49°34.5'	-59.4'	171.0°	48°35.2'	-59.4'	171.2°	47°35.9'	-59.4'	171.4°	15			
16	52°32.1'	-59.2'	170.5°	51°32.9'	-59.3'	170.7°	50°33.6'	-59.3'	170.9°	49°34.4'	-59.3'	171.1°	48°35.1'	-59.4'	171.3°	47°35.8'	-59.4'	171.4°	46°36.4'	-59.5'	171.6°	16			
17	51°32.8'	-59.3'	170.8°	50°33.6'	-59.3'	170.9°	49°34.3'	-59.3'	171.1°	48°35.0'	-59.4'	171.3°	47°35.7'	-59.4'	171.5°	46°36.4'	-59.4'	171.6°	45°37.0'	-59.5'	171.8°	17			
18	50°33.6'	-59.3'	171.0°	49°34.3'	-59.3'	171.2°	48°35.0'	-59.4'	171.4°	47°35.6'	-59.4'	171.5°	46°36.3'	-59.4'	171.7°	45°36.9'	-59.5'	171.8°	44°37.5'	-59.5'	172.0°	18			
19	49°34.3'	-59.3'	171.2°	48°34.9'	-59.4'	171.4°	47°35.6'	-59.4'	171.6°	46°36.2'	-59.4'	171.7°	45°36.8'	-59.5'	171.9°	44°37.4'	-59.5'	172.0°	43°38.0'	-59.5'	172.2°	19			
20	48°34.9'	-59.4'	171.5°	47°35.6'	-59.4'	171.6°	46°36.2'	-59.4'	171.8°	45°36.8'	-59.4'	171.9°	44°37.4'	-59.5'	172.1°	43°38.0'	-59.5'	172.2°	42°38.5'	-59.5'	172.3°	20			
21	47°35.6'	-59.4'	171.7°	46°36.2'	-59.4'	171.8°	45°36.8'	-59.4'	172.0°	44°37.3'	-59.5'	172.2°	43°37.9'	-59.5'	172.3°	42°38.5'	-59.5'	172.4°	41°39.0'	-59.5'	172.5°	21			
22	46°36.2'	-59.4'	171.9°	45°36.8'	-59.4'	172.0°	44°37.3'	-59.5'	172.2°	43°37.9'	-59.5'	172.3°	42°38.4'	-59.5'	172.4°	41°38.9'	-59.5'	172.5°	40°39.4'	-59.6'	172.7°	22			
23	45°36.8'	-59.4'	172.1°	44°37.3'	-59.5'	172.2°	43°37.9'	-59.5'	172.4°	42°38.4'	-59.5'	172.5°	41°38.9'	-59.5'	172.6°	40°39.4'	-59.5'	172.7°	39°39.9'	-59.6'	172.8°	23			
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	21			22			23			24			25			26			27					Dec°	

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°	21			22			23			24			25			26			27			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	68°26.3'	-58.6'	166.3°	67°28.0'	-58.7'	166.9°	66°29.5'	-58.8'	167.4°	65°30.9'	-58.9'	167.9°	64°32.2'	-59.0'	168.3°	63°33.4'	-59.1'	168.7°	62°34.5'	-59.2'	169.1°	0
1	67°27.7'	-58.7'	166.9°	66°29.3'	-58.8'	167.4°	65°30.7'	-58.9'	167.9°	64°32.0'	-59.0'	168.3°	63°33.2'	-59.1'	168.7°	62°34.3'	-59.2'	169.1°	61°35.3'	-59.2'	169.4°	1
2	66°29.0'	-58.8'	167.4°	65°30.5'	-58.9'	167.9°	64°31.8'	-59.0'	168.3°	63°33.0'	-59.1'	168.7°	62°34.1'	-59.1'	169.1°	61°35.1'	-59.2'	169.5°	60°36.1'	-59.3'	169.8°	2
3	65°30.3'	-58.9'	167.9°	64°31.6'	-59.0'	168.3°	63°32.8'	-59.1'	168.7°	62°33.9'	-59.1'	169.1°	61°35.0'	-59.2'	169.5°	60°35.9'	-59.3'	169.8°	59°36.9'	-59.3'	170.1°	3
4	64°31.4'	-59.0'	168.3°	63°32.6'	-59.0'	168.7°	62°33.7'	-59.1'	169.1°	61°34.8'	-59.2'	169.5°	60°35.8'	-59.2'	169.8°	59°36.7'	-59.3'	170.1°	58°37.5'	-59.3'	170.4°	4
5	63°32.5'	-59.0'	168.8°	62°33.6'	-59.1'	169.1°	61°34.6'	-59.2'	169.5°	60°35.6'	-59.2'	169.8°	59°36.5'	-59.3'	170.1°	58°37.4'	-59.3'	170.4°	57°38.2'	-59.4'	170.7°	5
6	62°33.4'	-59.1'	169.2°	61°34.5'	-59.2'	169.5°	60°35.5'	-59.2'	169.8°	59°36.4'	-59.3'	170.1°	58°37.2'	-59.3'	170.4°	57°38.0'	-59.4'	170.7°	56°38.8'	-59.4'	170.9°	6
7	61°34.4'	-59.1'	169.5°	60°35.3'	-59.2'	169.9°	59°36.2'	-59.3'	170.2°	58°37.1'	-59.3'	170.4°	57°37.9'	-59.4'	170.7°	56°38.7'	-59.4'	170.9°	55°39.4'	-59.4'	171.2°	7
8	60°35.2'	-59.2'	169.9°	59°36.1'	-59.3'	170.2°	58°37.0'	-59.3'	170.5°	57°37.8'	-59.4'	170.7°	56°38.5'	-59.4'	171.0°	55°39.3'	-59.4'	171.2°	54°40.0'	-59.5'	171.4°	8
9	59°36.0'	-59.2'	170.2°	58°36.9'	-59.3'	170.5°	57°37.7'	-59.3'	170.7°	56°38.4'	-59.4'	171.0°	55°39.2'	-59.4'	171.2°	54°39.8'	-59.5'	171.4°	53°40.5'	-59.5'	171.6°	9
10	58°36.8'	-59.3'	170.5°	57°37.6'	-59.3'	170.8°	56°38.3'	-59.4'	171.0°	55°39.0'	-59.4'	171.3°	54°39.7'	-59.5'	171.5°	53°40.4'	-59.5'	171.7°	52°41.0'	-59.5'	171.9°	10
11	57°37.5'	-59.3'	170.8°	56°38.2'	-59.4'	171.1°	55°39.0'	-59.4'	171.3°	54°39.6'	-59.4'	171.5°	53°40.3'	-59.5'	171.7°	52°40.9'	-59.5'	171.9°	51°41.5'	-59.5'	172.1°	11
12	56°38.2'	-59.4'	171.1°	55°38.9'	-59.4'	171.3°	54°39.6'	-59.4'	171.5°	53°40.2'	-59.5'	171.7°	52°40.8'	-59.5'	171.9°	51°41.4'	-59.5'	172.1°	50°41.9'	-59.6'	172.3°	12
13	55°38.8'	-59.4'	171.3°	54°39.5'	-59.4'	171.6°	53°40.1'	-59.5'	171.8°	52°40.7'	-59.5'	171.9°	51°41.3'	-59.5'	172.1°	50°41.9'	-59.5'	172.3°	49°42.4'	-59.6'	172.5°	13
14	54°39.4'	-59.4'	171.6°	53°40.1'	-59.5'	171.8°	52°40.7'	-59.5'	172.0°	51°41.2'	-59.5'	172.2°	50°41.8'	-59.5'	172.3°	49°42.3'	-59.6'	172.5°	48°42.8'	-59.6'	172.6°	14
15	53°40.0'	-59.4'	171.8°	52°40.6'	-59.5'	172.0°	51°41.2'	-59.5'	172.2°	50°41.7'	-59.5'	172.4°	49°42.2'	-59.6'	172.5°	48°42.7'	-59.6'	172.7°	47°43.2'	-59.6'	172.8°	15
16	52°40.6'	-59.5'	172.1°	51°41.1'	-59.5'	172.2°	50°41.7'	-59.5'	172.4°	49°42.2'	-59.6'	172.6°	48°42.7'	-59.6'	172.7°	47°43.2'	-59.6'	172.8°	46°43.6'	-59.6'	173.0°	16
17	51°41.1'	-59.5'	172.3°	50°41.6'	-59.5'	172.4°	49°42.1'	-59.5'	172.6°	48°42.6'	-59.6'	172.7°	47°43.1'	-59.6'	172.9°	46°43.6'	-59.6'	173.0°	45°44.0'	-59.6'	173.1°	17
18	50°41.6'	-59.5'	172.5°	49°42.1'	-59.5'	172.6°	48°42.6'	-59.6'	172.8°	47°43.1'	-59.6'	172.9°	46°43.5'	-59.6'	173.1°	45°43.9'	-59.6'	173.2°	44°44.4'	-59.6'	173.3°	18
19	49°42.1'	-59.5'	172.7°	48°42.6'	-59.6'	172.8°	47°43.0'	-59.6'	173.0°	46°43.5'	-59.6'	173.1°	45°43.9'	-59.6'	173.2°	44°44.3'	-59.6'	173.3°	43°44.7'	-59.7'	173.4°	19
20	48°42.6'	-59.6'	172.9°	47°43.0'	-59.6'	173.0°	46°43.5'	-59.6'	173.1°	45°43.9'	-59.6'	173.3°	44°44.3'	-59.6'	173.4°	43°44.7'	-59.7'	173.5°	42°45.1'	-59.7'	173.6°	20
21	47°43.0'	-59.6'	173.1°	46°43.4'	-59.6'	173.2°	45°43.9'	-59.6'	173.3°	44°44.3'	-59.6'	173.4°	43°44.6'	-								

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

4° 356° LHA		Latitude CONTRARY to Declination										4° 356° LHA													
Dec°	21			22			23			24			25			26			27			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	68°38.3'	-59.1'	169.0°	67°39.4'	-59.2'	169.4°	66°40.4'	-59.2'	169.9°	65°41.3'	-59.3'	170.2°	64°42.1'	-59.4'	170.6°	63°42.9'	-59.4'	170.9°	62°43.6'	-59.5'	171.2°	61°44.2'	-59.5'	171.5°	0
1	67°39.2'	-59.1'	169.4°	66°40.3'	-59.2'	169.9°	65°41.2'	-59.3'	170.2°	64°42.0'	-59.4'	170.6°	63°42.8'	-59.4'	170.9°	62°43.5'	-59.5'	171.2°	61°44.2'	-59.5'	171.5°	60°44.7'	-59.5'	171.8°	1
2	66°40.1'	-59.2'	169.9°	65°41.0'	-59.3'	170.3°	64°41.9'	-59.3'	170.6°	63°42.6'	-59.4'	170.9°	62°43.4'	-59.4'	171.3°	61°44.0'	-59.5'	171.5°	60°44.7'	-59.5'	171.8°	59°45.2'	-59.6'	172.1°	2
3	65°40.9'	-59.3'	170.3°	64°41.8'	-59.3'	170.6°	63°42.5'	-59.4'	171.0°	62°43.3'	-59.4'	171.3°	61°43.9'	-59.5'	171.5°	60°44.6'	-59.5'	171.8°	59°45.2'	-59.6'	172.1°	58°45.6'	-59.6'	172.4°	3
4	64°41.7'	-59.3'	170.6°	63°42.4'	-59.4'	171.0°	62°43.1'	-59.4'	171.3°	61°43.7'	-59.5'	171.6°	60°44.3'	-59.5'	171.8°	59°44.9'	-59.5'	172.1°	58°45.5'	-59.6'	172.3°	57°46.0'	-59.6'	172.5°	4
5	63°42.3'	-59.4'	171.0°	62°43.0'	-59.4'	171.3°	61°43.6'	-59.5'	171.6°	60°44.3'	-59.5'	171.8°	59°44.8'	-59.5'	172.1°	58°45.4'	-59.6'	172.3°	57°45.9'	-59.6'	172.5°	56°46.4'	-59.6'	172.7°	5
6	62°43.0'	-59.4'	171.3°	61°43.6'	-59.5'	171.6°	60°44.2'	-59.5'	171.9°	59°44.8'	-59.5'	172.1°	58°45.3'	-59.6'	172.3°	57°45.8'	-59.6'	172.5°	56°46.3'	-59.6'	172.7°	55°46.8'	-59.6'	172.9°	6
7	61°43.5'	-59.4'	171.6°	60°44.2'	-59.5'	171.9°	59°44.8'	-59.5'	172.1°	58°45.2'	-59.6'	172.3°	57°45.8'	-59.6'	172.5°	56°46.2'	-59.6'	172.8°	55°46.7'	-59.6'	172.9°	54°47.2'	-59.7'	173.1°	7
8	60°44.1'	-59.5'	171.9°	59°44.7'	-59.5'	172.1°	58°45.2'	-59.6'	172.3°	57°45.7'	-59.6'	172.6°	56°46.2'	-59.6'	172.8°	55°46.6'	-59.6'	173.0°	54°47.1'	-59.7'	173.1°	53°47.5'	-59.7'	173.3°	8
9	59°44.6'	-59.5'	172.1°	58°45.2'	-59.5'	172.4°	57°45.7'	-59.6'	172.6°	56°46.1'	-59.6'	172.8°	55°46.6'	-59.6'	173.0°	54°47.0'	-59.6'	173.2°	53°47.4'	-59.7'	173.3°	52°47.8'	-59.7'	173.5°	9
10	58°45.1'	-59.5'	172.4°	57°45.6'	-59.6'	172.6°	56°46.1'	-59.6'	172.8°	55°46.5'	-59.6'	173.0°	54°46.9'	-59.6'	173.2°	53°47.4'	-59.7'	173.3°	52°47.8'	-59.7'	173.5°	51°48.1'	-59.7'	173.6°	10
11	57°45.6'	-59.6'	172.6°	56°46.0'	-59.6'	172.8°	55°46.5'	-59.6'	173.0°	54°46.9'	-59.6'	173.2°	53°47.3'	-59.7'	173.4°	52°47.7'	-59.7'	173.5°	51°48.1'	-59.7'	173.7°	50°48.4'	-59.7'	173.8°	11
12	56°46.0'	-59.6'	172.8°	55°46.5'	-59.6'	173.0°	54°46.9'	-59.6'	173.2°	53°47.3'	-59.7'	173.4°	52°47.6'	-59.7'	173.5°	51°48.0'	-59.7'	173.7°	50°48.3'	-59.7'	173.9°	49°48.6'	-59.7'	174.0°	12
13	55°46.4'	-59.6'	173.1°	54°46.8'	-59.6'	173.2°	53°47.3'	-59.7'	173.4°	52°47.6'	-59.7'	173.6°	51°48.0'	-59.7'	173.7°	50°48.3'	-59.7'	173.9°	49°48.7'	-59.7'	174.0°	48°48.9'	-59.7'	174.1°	13
14	54°46.8'	-59.6'	173.3°	53°47.2'	-59.6'	173.4°	52°47.6'	-59.7'	173.6°	51°47.9'	-59.7'	173.7°	50°48.3'	-59.7'	173.9°	49°48.6'	-59.7'	174.0°	48°48.9'	-59.7'	174.1°	47°49.2'	-59.7'	174.2°	14
15	53°47.2'	-59.6'	173.5°	52°47.6'	-59.7'	173.6°	51°47.9'	-59.7'	173.7°	50°48.3'	-59.7'	173.9°	49°48.6'	-59.7'	174.0°	48°48.9'	-59.7'	174.1°	47°49.2'	-59.7'	174.2°	46°49.5'	-59.8'	174.4°	15
16	52°47.5'	-59.7'	173.6°	51°47.9'	-59.7'	173.8°	50°48.3'	-59.7'	173.9°	49°48.6'	-59.7'	174.1°	48°48.9'	-59.7'	174.2°	47°49.2'	-59.7'	174.3°	46°49.5'	-59.8'	174.4°	45°49.7'	-59.8'	174.5°	16
17	51°47.9'	-59.7'	173.8°	50°48.2'	-59.7'	173.9°	49°48.6'	-59.7'	174.1°	48°48.9'	-59.7'	174.2°	47°49.1'	-59.7'	174.3°	46°49.4'	-59.7'	174.4°	45°49.7'	-59.8'	174.5°	44°50.0'	-59.8'	174.6°	17
18	50°48.2'	-59.7'	174.0°	49°48.5'	-59.7'	174.1°	48°48.8'	-59.7'	174.2°	47°49.1'	-59.7'	174.3°	46°49.4'	-59.7'	174.4°	45°49.7'	-59.8'	174.5°	44°50.0'	-59.8'	174.6°	43°50.2'	-59.8'	174.7°	18
19	49°48.5'	-59.7'	174.1°	48°48.8'	-59.7'	174.3°	47°49.1'	-59.7'	174.4°	46°49.4'	-59.7'	174.5°	45°49.7'	-59.8'	174.6°	44°50.0'	-59.8'	174.7°	43°50.2'	-59.8'	174.8°	42°50.4'	-59.8'	174.9°	19
20	48°48.8'	-59.7'	174.3°	47°49.1'	-59.7'	174.4°	46°49.4'	-59.7'	174.5°	45°49.7'	-59.8'	174.6°	44°49.9'	-59.8'	174.7°	43°50.2'	-59.8'	174.8°	42°50.4'	-59.8'	174.9°	41°50.6'	-59.8'	175.0°	20
21	47°49.1'	-59.7'	174.4°	46°49.4'	-59.7'	174.5°	45°49.7'	-59.7'	174.6°	44°49.9'	-59.8'	174.7°	43°50.2'	-59.8'	174.8°	42°50.4'	-59.8'	174.9°	41°50.6'	-59.8'	175.0°	40°50.8'	-59.8'	175.1°	21
22	46°49.4'	-59.7'	174.6°	45°49.7'	-59.7'	174.7°	44°49.9'	-59.8'	174.8°	43°50.2'	-59.8'	174.9°	42°50.4'	-59.8'	175.0°	41°50.6'	-59.8'	175.1°	40°50.8'	-59.8'	175.1°	39°51.0'	-59.8'	175.2°	22
23	45°49.7'	-59.7'	174.7°	44°49.9'	-59.8'	174.8°	43°50.1'	-59.8'	174.9°	42°50.4'	-59.8'	175.0°	41°50.6'	-59.8'	175.1°	40°50.8'	-59.8'	175.1°	39°51.0'	-59.8'	175.2°	38°51.2'	-59.8'	175.2°	23

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

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

3° 357° LHA		Latitude CONTRARY to Declination										3° 357° LHA													
Dec°	21			22			23			24			25			26			27			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	68°47.7'	-59.5'	171.7°	67°48.4'	-59.5'	172.0°	66°48.9'	-59.6'	172.4°	65°49.5'	-59.6'	172.7°	64°49.9'	-59.6'	172.9°	63°50.4'	-59.7'	173.2°	62°50.8'	-59.7'	173.4°	61°51.1'	-59.7'	173.6°	0
1	67°48.3'	-59.5'	172.0°	66°48.9'	-59.6'	172.4°	65°49.4'	-59.6'	172.7°	64°49.8'	-59.6'	172.9°	63°50.2'	-59.7'	173.2°	62°50.6'	-59.7'	173.4°	61°51.0'	-59.7'	173.6°	60°51.4'	-59.7'	173.8°	1
2	66°48.7'	-59.6'	172.4°	65°49.3'	-59.6'	172.7°	64°49.8'	-59.6'	172.9°	63°50.1'	-59.7'	173.2°	62°50.6'	-59.7'	173.4°	61°50.9'	-59.7'	173.6°	60°51.3'	-59.7'	173.8°	59°51.6'	-59.7'	174.0°	2
3	65°49.2'	-59.6'	172.7°	64°49.7'	-59.6'	172.9°	63°50.1'	-59.7'	173.2°	62°50.6'	-59.7'	173.4°	61°50.9'	-59.7'	173.6°	60°51.3'	-59.7'	173.8°	59°51.6'	-59.7'	174.0°	58°51.9'	-59.8'	174.2°	3
4	64°49.7'	-59.6'	172.9°	63°50.1'	-59.6'	173.2°	62°50.5'	-59.7'	173.4°	61°50.8'	-59.7'	173.7°	60°51.2'	-59.7'	173.8°	59°51.6'	-59.7'	174.0°	58°51.8'	-59.8'	174.2°	57°52.1'	-59.8'	174.4°	4
5	63°50.0'	-59.6'	173.2°	62°50.4'	-59.7'	173.4°	61°50.8'	-59.7'	173.7°	60°51.1'	-59.7'	173.9°	59°51.5'	-59.7'	174.1°	58°51.8'	-59.8'	174.2°	57°52.1'	-59.8'	174.4°	56°52.3'	-59.8'	174.5°	5
6	62°50.4'	-59.7'	173.5°	61°50.8'	-59.7'	173.7°	60°51.1'	-59.7'	173.9°	59°51.4'	-59.7'	174.1°	58°51.7'	-59.8'	174.2°	57°52.0'	-59.8'	174.4°	56°52.3'	-59.8'	174.5°	55°52.6'	-59.8'	174.6°	6
7	61°50.7'	-59.7'	173.7°	60°51.1'	-59.7'	173.9°	59°51.4'	-59.7'	174.1°	58°51.7'	-59.8'	174.2°	57°52.0'	-59.8'	174.4°	56°52.3'	-59.8'	174.5°	55°52.6'	-59.8'	174.6°	54°52.8'	-59.8'	174.7°	7
8	60°51.0'	-59.7'	173.9°	59°51.4'	-59.7'	174.1°	58°51.7'	-59.7'	174.2°	57°52.0'	-59.8'	174.4°	56°52.2'	-59.8'	174.6°	55°52.5'	-59.8'	174.7°	54°52.8'	-59.8'	174.8°	53°53.0'	-59.8'	174.9°	8
9	59°51.3'	-59.7'	174.1°	58°51.6'	-59.7'	174.3°	57°51.9'	-59.8'	174.4°	56°52.2'	-59.8'	174.6°	55°52.4'	-59.8'	174.7°	54°52.7'	-59.8'	174.8°	53°53.0'	-59.8'	175.0°	52°53.1'	-59.8'	175.1°	9
10	58°51.6'	-59.7'	174.3°	57°51.9'	-59.8'	174.4°	56°52.2'	-59.8'	174.6°	55°52.4'	-59.8'	174.7°	54°52.7'	-59.8'	174.9°	53°52.9'	-59.8'	175.0°	52°53.1'	-59.8'	175.1°	51°53.3'	-59.8'	175.2°	10
11	57°51.9'	-59.8'	174.5°	56°52.1'	-59.8'	174.6°	55°52.4'	-59.8'	174.7°	54°52.6'	-59.8'	174.9°	53°52.9'	-59.8'	175.0°	52°53.1'	-59.8'	175.1°	51°53.3'	-59.8'	175.2°	50°53.5'	-59.8'	175.3°	11
12	56°52.1'	-59.8'	174.6°	55°52.4'	-59.8'	174.8°	54°52.6'	-59.8'	174.9°	53°52.8'	-59.8'	175.0°	52°53.0'	-59.8'	175.1°	51°53.3'	-59.8'	175.2°	50°53.5'	-59.8'	175.3°	49°53.6'	-59.8'	175.4°	12
13	55°52.3'	-59.8'	174.8°	54°52.6'	-59.8'	174.9°	53°52.8'	-59.8'	175.0°	52°53.0'	-59.8'	175.1°	51°53.3'	-59.8'	175.3°	50°53.4'	-59.8'	175.4°	49°53.6'	-59.8'	175.5°	48°53.8'	-59.9'	175.6°	13
14	54°52.6'	-59.8'	174.9°	53°52.8'	-59.8'	175.1°	52°53.0'	-59.8'	175.2°	51°53.2'	-59.8'	175.3°	50°53.4'	-59.8'	175.4°	49°53.6'	-59.8'	175.5°	48°53.8'	-59.9'	175.6°	47°53.9'	-59.9'	175.7°	14
15	53°52.8'	-59.8'	175.1°	52°53.0'	-59.8'	175.2°	51°53.2'	-59.8'	175.3°	50°53.4'	-59.8'	175.4°	49°53.6'	-59.8'	175.5°	48°53.8'	-59.8'	175.6°	47°53.9'	-59.9'	175.7°	46°54.1'	-59.9'	175.8°	15
16	52°53.0'	-59.8'	175.2°	51°53.2'	-59.8'	175.3°	50°53.4'	-59.8'	175.4°	49°53.6'	-59.8'	175.5°	48°53.8'	-59.8'	175.6°	47°53.9'	-59.9'	175.7°	46°54.1'	-59.9'	175.8°	45°54.2'	-59.9'	175.9°	16
17	51°53.2'	-59.8'	175.3°	50°53.4'	-59.8'	175.4°	49°53.6'	-59.8'	175.5°	48°53.7'	-59.8'	175.6°	47°53.9'	-59.9'											

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

2° 358° LHA

Latitude CONTRARY to Declination

2° 358° LHA

Table with 10 columns (Dec, 21-27, Dec) and 24 rows of latitude/longitude data for 2° 358° LHA.

2° 358° LHA

Latitude CONTRARY to DECLINATION

2° 358° LHA

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

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

1° 359° LHA

Latitude CONTRARY to Declination

1° 359° LHA

Table with 10 columns (Dec, 21-27, Dec) and 24 rows of latitude/longitude data for 1° 359° LHA.

1° 359° LHA

Latitude CONTRARY to DECLINATION

1° 359° LHA

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

SEMI DIAMETER (SD)

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

Lower Limb, ADD.

Upper Limb, SUBTRACT

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

Always SUBTRACT

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

Always ADD

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

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

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

Always SUBTRACT

