

# Sight Reduction Tables

Latitude  $35^{\circ}$  to  $41^{\circ}$

## **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

Table with columns: 0° 360° LHA, Latitude SAME as Declination, 0° 360° LHA. Rows: Dec° 0 to 23. Columns: 35, 36, 37, 38, 39, 40, 41, Dec°. Each cell contains three values (Hc°, d', Z°).

0° 360° LHA

Latitude SAME as Declination

0° 360° LHA

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

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

Table with columns: 1° 359° LHA, Latitude SAME as Declination, 1° 359° LHA. Rows: Dec° 0 to 23. Columns: 35, 36, 37, 38, 39, 40, 41, Dec°. Each cell contains three values (Hc°, d', Z°).

1° 359° LHA

Latitude SAME as Declination

1° 359° LHA

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



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

4° 356° LHA

Latitude SAME as Declination

4° 356° LHA

Table with 10 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of latitude/longitude data.

4° 356° LHA

Latitude SAME as Declination

4° 356° LHA

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

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

5° 355° LHA

Latitude SAME as Declination

5° 355° LHA

Table with 10 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of latitude/longitude data.

5° 355° LHA

Latitude SAME as Declination

5° 355° LHA

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



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

8° 352° LHA

Latitude SAME as Declination

8° 352° LHA

Table with 12 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of astronomical data for 8° 352° LHA.

8° 352° LHA

Latitude SAME as Declination

8° 352° LHA

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

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

9° 351° LHA

Latitude SAME as Declination

9° 351° LHA

Table with 12 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of astronomical data for 9° 351° LHA.

9° 351° LHA

Latitude SAME as Declination

9° 351° LHA

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

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

10° 350° LHA

Latitude SAME as Declination

10° 350° LHA

Table with 11 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 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 11 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 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°, 35, 36, 37, 38, 39, 40, 41, Dec°. Each column contains 10 rows of coordinate data (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°, 35, 36, 37, 38, 39, 40, 41, Dec°. Each column contains 10 rows of coordinate data (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

24° 336° LHA

Latitude SAME as Declination

24° 336° LHA

Table with columns for Dec°, 35, 36, 37, 38, 39, 40, 41, and Dec°. Each column contains latitude coordinates in Hc°, d', Z° format.

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°, 35, 36, 37, 38, 39, 40, 41, and Dec°. Each column contains latitude coordinates in Hc°, d', Z° format.

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 columns for Dec°, 35, 36, 37, 38, 39, 40, 41, and Dec°. Each column contains three sub-columns for Hc°, d', and Z°. Rows 0-23 show values for various declinations.

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 columns for Dec°, 35, 36, 37, 38, 39, 40, 41, and Dec°. Each column contains three sub-columns for Hc°, d', and Z°. Rows 0-23 show values for various declinations.

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, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of declination data for the 30° 330° LHA range.

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, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of declination data for the 31° 329° LHA range.

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

34° 326° LHA

Latitude SAME as Declination

34° 326° LHA

Table with 12 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of celestial coordinates.

34° 326° LHA

Latitude SAME as Declination

34° 326° LHA

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

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

35° 325° LHA

Latitude SAME as Declination

35° 325° LHA

Table with 12 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of celestial coordinates.

35° 325° LHA

Latitude SAME as Declination

35° 325° LHA

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

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

36° 324° LHA

Latitude SAME as Declination

36° 324° LHA

Table with 10 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of latitude data. Each cell contains three values: Hc°, d', and Z°.

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, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of latitude data. Each cell contains three values: Hc°, d', and Z°.

37° 323° LHA

Latitude SAME as Declination

37° 323° LHA

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

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

**38° 322° LHA**

**Latitude SAME as Declination**

**38° 322° LHA**

Table with 12 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of coordinate data for latitude 38° 322° LHA.

**38° 322° LHA**

**Latitude SAME as Declination**

**38° 322° LHA**

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

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

**39° 321° LHA**

**Latitude SAME as Declination**

**39° 321° LHA**

Table with 12 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of coordinate data for latitude 39° 321° LHA.

**39° 321° LHA**

**Latitude SAME as Declination**

**39° 321° LHA**

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

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

40° 320° LHA

Latitude SAME as Declination

40° 320° LHA

Table with 9 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of latitude/longitude data for 40° 320° LHA.

40° 320° LHA

Latitude SAME as Declination

40° 320° LHA

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

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

41° 319° LHA

Latitude SAME as Declination

41° 319° LHA

Table with 9 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of latitude/longitude data for 41° 319° LHA.

41° 319° LHA

Latitude SAME as Declination

41° 319° LHA

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

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

42° 318° LHA

Latitude SAME as Declination

42° 318° LHA

Table with 12 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of latitude/longitude data.

42° 318° LHA

Latitude SAME as Declination

42° 318° LHA

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

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

43° 317° LHA

Latitude SAME as Declination

43° 317° LHA

Table with 12 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of latitude/longitude data.

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 12 columns: Dec°, 35 (Hc°, d', Z°), 36 (Hc°, d', Z°), 37 (Hc°, d', Z°), 38 (Hc°, d', Z°), 39 (Hc°, d', Z°), 40 (Hc°, d', Z°), 41 (Hc°, d', Z°), Dec°. Rows 0-23. Includes a footer row for Dec°.

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 12 columns: Dec°, 35 (Hc°, d', Z°), 36 (Hc°, d', Z°), 37 (Hc°, d', Z°), 38 (Hc°, d', Z°), 39 (Hc°, d', Z°), 40 (Hc°, d', Z°), 41 (Hc°, d', Z°), Dec°. Rows 0-23. Includes a footer row for Dec°.

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 12 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of coordinate data.

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 12 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of coordinate data.

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

52° 308° LHA

Latitude SAME as Declination

52° 308° LHA

Table with 12 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of astronomical data for 52° 308° LHA.

52° 308° LHA

Latitude SAME as Declination

52° 308° LHA

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

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

53° 307° LHA

Latitude SAME as Declination

53° 307° LHA

Table with 12 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of astronomical data for 53° 307° LHA.

53° 307° LHA

Latitude SAME as Declination

53° 307° LHA

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





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

58° 302° LHA

Latitude SAME as Declination

58° 302° LHA

Table with 12 columns (Dec°, 35, 36, 37, 38, 39, 40, 41, Dec°) and 24 rows (0-23). Each cell contains three coordinate values (Hc°, d', Z°).

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 12 columns (Dec°, 35, 36, 37, 38, 39, 40, 41, Dec°) and 24 rows (0-23). Each cell contains three coordinate values (Hc°, d', Z°).

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

**60° 300° LHA**

**Latitude SAME as Declination**

**60° 300° LHA**

Table with 11 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 23 rows (0-23) showing astronomical data for 60° 300° LHA.

**60° 300° LHA**

**Latitude SAME as Declination**

**60° 300° LHA**

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

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

**61° 299° LHA**

**Latitude SAME as Declination**

**61° 299° LHA**

Table with 11 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 23 rows (0-23) showing astronomical data for 61° 299° LHA.

**61° 299° LHA**

**Latitude SAME as Declination**

**61° 299° LHA**

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

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

62° 298° LHA

Latitude SAME as Declination

62° 298° LHA

Table with 10 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of data for 62° 298° LHA. Each cell contains three values (Hc, d, 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 10 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of data for 63° 297° LHA. Each cell contains three values (Hc, d, 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

64° 296° LHA

Latitude SAME as Declination

64° 296° LHA

Table with 10 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of astronomical data for 64° LHA.

64° 296° LHA

Latitude SAME as Declination

64° 296° LHA

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

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

65° 295° LHA

Latitude SAME as Declination

65° 295° LHA

Table with 10 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of astronomical data for 65° LHA.

65° 295° LHA

Latitude SAME as Declination

65° 295° LHA

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

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

66° 294° LHA

Latitude SAME as Declination

66° 294° LHA

Table with 10 columns (Dec°, 35, 36, 37, 38, 39, 40, 41, Dec°) and 23 rows of celestial coordinates (Hc°, d', Z°).

66° 294° LHA

Latitude SAME as Declination

66° 294° LHA

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

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

67° 293° LHA

Latitude SAME as Declination

67° 293° LHA

Table with 10 columns (Dec°, 35, 36, 37, 38, 39, 40, 41, Dec°) and 23 rows of celestial coordinates (Hc°, d', Z°).

67° 293° LHA

Latitude SAME as Declination

67° 293° LHA

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

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

68° 292° LHA				Latitude SAME as Declination								68° 292° LHA													
Dec°	35			36			37			38			39			40			41			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	17°52.2'	+36.1'	103.0°	17°38.5'	+36.9'	103.4°	17°24.5'	+37.7'	103.7°	17°10.2'	+38.6'	104.0°	16°55.5'	+39.4'	104.3°	16°40.6'	+40.2'	104.6°	16°25.4'	+41.0'	104.8°	0			
1	18°28.3'	+35.8'	102.2°	18°15.4'	+36.7'	102.5°	18°02.2'	+37.5'	102.9°	17°48.7'	+38.4'	103.2°	17°34.9'	+39.2'	103.5°	17°20.8'	+40.0'	103.8°	17°06.3'	+40.8'	104.1°	1			
2	19°04.1'	+35.6'	101.4°	18°52.1'	+36.5'	101.7°	18°39.8'	+37.3'	102.0°	18°27.1'	+38.2'	102.4°	18°14.1'	+39.0'	102.7°	18°00.7'	+39.8'	103.0°	17°47.1'	+40.6'	103.3°	2			
3	19°39.7'	+35.3'	100.5°	19°28.6'	+36.2'	100.9°	19°17.1'	+37.1'	101.2°	19°05.2'	+37.9'	101.5°	18°53.1'	+38.8'	101.9°	18°40.5'	+39.6'	102.2°	18°27.7'	+40.4'	102.5°	3			
4	20°15.0'	+35.1'	99.6°	20°04.8'	+36.0'	100.0°	19°54.2'	+36.9'	100.4°	19°43.2'	+37.7'	100.7°	19°31.8'	+38.6'	101.1°	19°20.2'	+39.4'	101.4°	19°08.1'	+40.2'	101.8°	4			
5	20°50.1'	+34.8'	98.8°	20°40.8'	+35.7'	99.2°	20°31.0'	+36.6'	99.5°	20°20.9'	+37.5'	99.9°	20°10.4'	+38.3'	100.3°	19°59.5'	+39.2'	100.6°	19°48.3'	+40.0'	101.0°	5			
6	21°24.9'	+34.6'	97.9°	21°16.5'	+35.5'	98.3°	21°07.6'	+36.4'	98.7°	20°58.4'	+37.2'	99.1°	20°48.8'	+38.1'	99.4°	20°38.7'	+38.9'	99.8°	20°28.3'	+39.8'	100.2°	6			
7	21°59.5'	+34.3'	97.0°	21°52.0'	+35.2'	97.4°	21°44.0'	+36.1'	97.8°	21°35.6'	+37.0'	98.2°	21°26.9'	+37.9'	98.6°	21°17.7'	+38.7'	99.0°	21°08.1'	+39.6'	99.4°	7			
8	22°33.8'	+34.0'	96.1°	22°27.2'	+34.9'	96.6°	22°20.1'	+35.8'	97.0°	22°12.6'	+36.7'	97.4°	22°04.7'	+37.6'	97.8°	21°56.4'	+38.5'	98.2°	21°47.7'	+39.3'	98.6°	8			
9	23°07.8'	+33.7'	95.2°	23°02.1'	+34.6'	95.7°	22°55.9'	+35.5'	96.1°	22°49.3'	+36.4'	96.5°	22°42.3'	+37.3'	96.9°	22°34.8'	+38.2'	97.3°	22°27.0'	+39.1'	97.8°	9			
10	23°41.4'	+33.4'	94.3°	23°36.7'	+34.3'	94.8°	23°31.4'	+35.2'	95.2°	23°25.8'	+36.1'	95.6°	23°19.6'	+37.1'	96.1°	23°13.1'	+37.9'	96.5°	23°06.0'	+38.8'	96.9°	10			
11	24°14.8'	+33.0'	93.4°	24°11.0'	+34.0'	93.9°	24°06.7'	+34.9'	94.3°	24°01.9'	+35.9'	94.8°	23°56.7'	+36.8'	95.2°	23°51.0'	+37.7'	95.7°	23°44.9'	+38.5'	96.1°	11			
12	24°47.8'	+32.7'	92.5°	24°45.0'	+33.7'	93.0°	24°41.6'	+34.6'	93.4°	24°37.8'	+35.5'	93.9°	24°33.4'	+36.5'	94.4°	24°28.7'	+37.4'	94.8°	24°23.4'	+38.3'	95.3°	12			
13	25°20.5'	+32.3'	91.6°	25°18.6'	+33.3'	92.1°	25°16.2'	+34.3'	92.5°	25°13.3'	+35.2'	93.0°	25°09.9'	+36.2'	93.5°	25°06.0'	+37.1'	93.9°	25°01.7'	+38.0'	94.4°	13			
14	25°52.9'	+32.0'	90.7°	25°51.9'	+33.0'	91.1°	25°50.5'	+33.9'	91.6°	25°48.5'	+34.9'	92.1°	25°46.1'	+35.8'	92.6°	25°43.1'	+36.8'	93.1°	25°39.6'	+37.7'	93.6°	14			
15	26°24.8'	+31.6'	89.7°	26°24.9'	+32.6'	90.2°	26°24.4'	+33.6'	90.7°	26°23.4'	+34.5'	91.2°	26°21.9'	+35.5'	91.7°	26°19.8'	+36.4'	92.2°	26°17.3'	+37.4'	92.7°	15			
16	26°56.5'	+31.2'	88.8°	26°57.5'	+32.2'	89.3°	26°58.0'	+33.2'	89.8°	26°57.9'	+34.2'	90.3°	26°57.4'	+35.1'	90.8°	26°56.3'	+36.1'	91.3°	26°54.6'	+37.0'	91.8°	16			
17	27°27.7'	+30.8'	87.8°	27°29.7'	+31.8'	88.3°	27°31.2'	+32.8'	88.8°	27°32.1'	+33.8'	89.4°	27°32.5'	+34.8'	89.9°	27°32.4'	+35.7'	90.4°	27°31.7'	+36.7'	90.9°	17			
18	27°58.5'	+30.4'	86.8°	28°01.5'	+31.4'	87.4°	28°04.0'	+32.4'	87.9°	28°05.9'	+33.4'	88.4°	28°07.3'	+34.4'	89.0°	28°08.1'	+35.4'	89.5°	28°08.4'	+36.3'	90.0°	18			
19	28°28.9'	+30.0'	85.9°	28°33.0'	+31.0'	86.4°	28°36.4'	+32.0'	86.9°	28°39.4'	+33.0'	87.5°	28°41.7'	+34.0'	88.0°	28°43.5'	+35.0'	88.6°	28°44.7'	+36.0'	89.1°	19			
20	28°58.9'	+29.5'	84.9°	29°04.0'	+30.6'	85.4°	29°08.5'	+31.6'	86.0°	29°12.4'	+32.6'	86.5°	29°15.7'	+33.6'	87.1°	29°18.5'	+34.6'	87.7°	29°20.6'	+35.6'	88.2°	20			
21	29°28.4'	+29.1'	83.9°	29°34.6'	+30.1'	84.4°	29°40.1'	+31.2'	85.0°	29°45.0'	+32.2'	85.6°	29°49.4'	+33.2'	86.1°	29°53.1'	+34.2'	86.7°	29°56.2'	+35.2'	87.3°	21			
22	29°57.5'	+28.6'	82.9°	30°04.7'	+29.7'	83.4°	30°11.3'	+30.7'	84.0°	30°17.2'	+31.8'	84.6°	30°22.6'	+32.8'	85.2°	30°27.3'	+33.8'	85.8°	30°31.4'	+34.8'	86.3°	22			
23	30°26.2'	+28.2'	81.8°	30°34.4'	+29.2'	82.4°	30°42.0'	+30.3'	83.0°	30°49.0'	+31.3'	83.6°	30°55.3'	+32.3'	84.2°	31°01.1'	+33.4'	84.8°	31°06.2'	+34.4'	85.4°	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°
	35			36			37			38			39			40			41						

68° 292° LHA Latitude SAME as Declination 68° 292° LHA

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

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

69° 291° LHA				Latitude SAME as Declination								69° 291° LHA										
Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	17°04.3'	+35.9'	102.4°	16°51.2'	+36.7'	102.7°	16°37.9'	+37.6'	103.0°	16°24.2'	+38.4'	103.3°	16°10.3'	+39.2'	103.6°	15°56.0'	+40.0'	103.9°	15°41.5'	+40.8'	104.1°	0
1	17°40.2'	+35.7'	101.6°	17°28.0'	+36.5'	101.9°	17°15.4'	+37.4'	102.2°	17°02.6'	+38.2'	102.5°	16°49.5'	+39.0'	102.8°	16°36.0'	+39.9'	103.1°	16°22.3'	+40.6'	103.4°	1
2	18°15.8'	+35.5'	100.7°	18°04.5'	+36.3'	101.1°	17°52.8'	+37.2'	101.4°	17°40.8'	+38.0'	101.7°	17°28.5'	+38.9'	102.0°	17°15.9'	+39.7'	102.3°	17°03.0'	+40.5'	102.6°	2
3	18°51.3'	+35.2'	99.9°	18°40.8'	+36.1'	100.2°	18°30.0'	+37.0'	100.5°	18°18.9'	+37.8'	100.9°	18°07.4'	+38.7'	101.2°	17°55.6'	+39.5'	101.5°	17°43.4'	+40.3'	101.8°	3
4	19°26.5'	+35.0'	99.0°	19°16.9'	+35.9'	99.4°	19°07.0'	+36.7'	99.7°	18°56.7'	+37.6'	100.1°	18°46.0'	+38.4'	100.4°	18°35.0'	+39.3'	100.7°	18°23.7'	+40.1'	101.1°	4
5	20°01.5'	+34.7'	98.2°	19°52.8'	+35.6'	98.5°	19°43.7'	+36.5'	98.9°	19°34.3'	+37.4'	99.2°	19°24.5'	+38.2'	99.6°	19°14.3'	+39.1'	99.9°	19°03.8'	+39.9'	100.3°	5
6	20°36.2'	+34.5'	97.3°	20°36.2'	+35.4'	97.7°	20°20.2'	+36.3'	98.0°	20°11.7'	+37.1'	98.4°	20°02.7'	+38.0'	98.8°	19°53.4'	+38.8'	99.1°	19°43.7'	+39.7'	99.5°	6
7	21°10.7'	+34.2'	96.4°	21°03.8'	+35.1'	96.8°	20°56.5'	+36.0'	97.2°	20°48.8'	+36.9'	97.6°	20°40.7'	+37.8'	97.9°	20°32.2'	+38.6'	98.3°	20°23.4'	+39.5'	98.7°	7
8	21°44.9'	+33.9'	95.5°	21°38.9'	+34.8'	95.9°	21°32.5'	+35.7'	96.3°	21°25.7'	+36.6'	96.7°	21°18.5'	+37.5'	97.1°	21°10.9'	+38.4'	97.5°	21°02.8'	+39.2'	97.9°	8
9	22°18.8'	+33.6'	94.6°	22°13.7'	+34.5'	95.1°	22°08.2'	+35.5'	95.5°	22°02.3'	+36.4'	95.9°	21°56.0'	+37.3'	96.3°	21°49.2'	+38.1'	96.7°	21°42.1'	+39.0'	97.1°	9
10	22°52.4'	+33.3'	93.7°	22°48.3'	+34.2'	94.2°	22°43.7'	+35.2'	94.6°	22°38.7'	+36.1'	95.0°	22°33.2'	+37.0'	95.4°	22°27.4'	+37.9'	95.8°	22°21.1'	+38.7'	96.2°	10
11	23°25.7'	+33.0'	92.8°	23°22.5'	+33.9'	93.3°	23°18.9'	+34.9'	93.7°	23°14.8'	+35.8'	94.1°	23°10.2'	+36.7'	94.6°	23°05.2'	+37.6'	95.0°	22°59.8'	+38.5'	95.4°	11
12	23°58.7'	+32.7'	91.9°	23°56.5'	+33.6'	92.4°	23°53.8'	+34.6'	92.8°	23°50.6'	+35.5'	93.3°	23°46.9'	+36.4'	93.7°	23°42.8'	+37.3'	94.1°	23°38.3'	+38.2'	94.6°	12
13	24°31.4'	+32.3'	91.0°	24°30.1'	+33.3'	91.5°	24°28.3'	+34.3'	91.9°	24°26.1'	+35.2'	92.4°	24°23.4'	+36.1'	92.8°	24°20.2'	+37.0'	93.3°	24°16.5'	+37.9'	93.7°	13
14	25°03.7'	+32.0'	90.1°	25°03.4'	+33.0'	90.5°	25°02.6'	+33.9'	91.0°	25°01.3'	+34.9'	91.5°	24°59.5'	+35.8'	91.9°	24°57.2'	+36.7'	92.4°	24°54.4'	+37.6'	92.9°	14
15	25°35.7'	+31.6'	89.1°	25°36.3'	+32.6'	89.6°	25°36.5'	+33.6'	90.1°	25°36.1'	+34.5'	90.6°	25°35.3'	+35.5'	91.1°	25°33.9'	+36.4'	91.5°	25°32.0'	+37.3'	92.0°	15
16	26°07.3'	+31.2'	88.2°	26°09.0'	+32.2'	88.7°	26°10.1'	+33.2'	89.2°	26°10.7'	+34.2'	89.7°	26°10.8'	+35.1'	90.2°	26°10.3'	+36.1'	90.7°	26°09.4'	+37.0'	91.1°	16
17	26°38.6'	+30.8'	87.2°	26°41.2'	+31.9'	87.7°	26°43.3'	+32.9'	88.3°	26°44.9'	+33.8'	88.8°	26°45.9'	+34.8'	89.3°	26°46.4'	+35.7'	89.8°	26°46.4'	+36.7'	90.3°	17
18	27°09.4'	+30.5'	86.3°	27°13.1'	+31.5'	86.8°	27°16.1'	+32.5'	87.3°	27°18.7'	+33.5'	87.8°	27°20.7'	+34.4'	88.3°	27°22.1'	+35.4'	88.9°	27°23.1'	+36.3'	89.4°	18
19	27°39.9'	+30.1'	85.3°	27°44.5'	+31.1'	85.8°	27°48.6'	+32.1'	86.4°	27°52.1'	+33.1'	86.9°	27°55.1'	+34.1'	87.4°	27°57.5'	+35.0'	88.0°	27°59.4'	+36.0'	88.5°	19
20	28°10.0'	+29.6'	84.3°	28°15.6'	+30.7'	84.9°	28°20.7'	+31.7'	85.4°	28°25.2'	+32.7'	85.9°	28°29.2'	+33.7'	86.5°	28°32.6'	+34.7'	87.0°	28°35.4'	+35.6'	87.6°	20
21	28°39.6'	+29.2'	83.3°	28°46.3'	+30.2'	83.9°	28°52.4'	+31.3'	84.4°	28°57.9'	+32.3'	85.0°	29°02.8'	+33.3'	85.5°	29°07.2'	+34.3'	86.1°	29°11.0'	+35.2'	86.7°	21
22	29°08.8'	+28.8'	82.3°	29°16.5'	+29.8'	82.9°	29°23.6'	+30.8'	83.5°	29°30.2'	+31.8'	84.0°	29°36.1'	+32.9'	84.6°	29°41.5'	+33.9'					

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

70° 290° LHA

Latitude SAME as Declination

70° 290° LHA

Table with 12 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°.

70° 290° LHA

Latitude SAME as Declination

70° 290° LHA

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

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

71° 289° LHA

Latitude SAME as Declination

71° 289° LHA

Table with 12 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows (0-23). Each cell contains three values: Hc°, d', Z°.

71° 289° LHA

Latitude SAME as Declination

71° 289° LHA

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

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

72° 288° LHA

Latitude SAME as Declination

72° 288° LHA

Table with columns for Dec°, Hc°, d', Z° and rows for declinations 0 to 23. Columns are grouped by LHA values 35, 36, 37, 38, 39, 40, 41.

72° 288° LHA

Latitude SAME as Declination

72° 288° LHA

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

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

73° 287° LHA

Latitude SAME as Declination

73° 287° LHA

Table with columns for Dec°, Hc°, d', Z° and rows for declinations 0 to 23. Columns are grouped by LHA values 35, 36, 37, 38, 39, 40, 41.

73° 287° LHA

Latitude SAME as Declination

73° 287° LHA

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

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

74° 286° LHA

**Latitude SAME as Declination**

74° 286° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	13°03.0'	+35.2'	99.3°	12°53.1'	+36.1'	99.6°	12°43.0'	+36.9'	99.8°	12°32.7'	+37.8'	100.0°	12°22.2'	+38.6'	100.2°	12°11.4'	+39.4'	100.4°	12°00.4'	+40.2'	100.7°	0
1	13°38.2'	+35.1'	98.5°	13°29.2'	+35.9'	98.7°	13°20.0'	+36.8'	99.0°	13°10.5'	+37.6'	99.2°	13°00.7'	+38.4'	99.4°	12°50.8'	+39.3'	99.7°	12°40.6'	+40.1'	99.9°	1
2	14°13.3'	+34.9'	97.7°	14°05.1'	+35.8'	97.9°	13°56.7'	+36.6'	98.2°	13°48.1'	+37.5'	98.4°	13°39.2'	+38.3'	98.7°	13°30.0'	+39.1'	98.9°	13°20.6'	+39.9'	99.1°	2
3	14°48.2'	+34.7'	96.8°	14°40.9'	+35.6'	97.1°	14°33.4'	+36.5'	97.4°	14°25.6'	+37.3'	97.6°	14°17.5'	+38.1'	97.9°	14°09.1'	+39.0'	98.1°	14°00.5'	+39.8'	98.4°	3
4	15°22.9'	+34.5'	96.0°	15°16.5'	+35.4'	96.3°	15°09.8'	+36.3'	96.5°	15°02.9'	+37.1'	96.8°	14°55.6'	+38.0'	97.1°	14°48.1'	+38.8'	97.3°	14°40.3'	+39.6'	97.6°	4
5	15°57.4'	+34.3'	95.1°	15°51.9'	+35.2'	95.4°	15°46.1'	+36.1'	95.7°	15°40.0'	+36.9'	96.0°	15°33.6'	+37.8'	96.3°	15°26.9'	+38.6'	96.5°	15°19.9'	+39.5'	96.8°	5
6	16°31.8'	+34.1'	94.3°	16°27.1'	+35.0'	94.6°	16°22.2'	+35.9'	94.9°	16°16.9'	+36.8'	95.2°	16°11.4'	+37.6'	95.5°	16°05.5'	+38.5'	95.7°	15°59.4'	+39.3'	96.0°	6
7	17°05.9'	+33.9'	93.4°	17°02.1'	+34.8'	93.7°	16°58.1'	+35.7'	94.0°	16°53.7'	+36.6'	94.3°	16°49.0'	+37.4'	94.6°	16°44.0'	+38.3'	94.9°	16°38.7'	+39.1'	95.2°	7
8	17°39.8'	+33.7'	92.6°	17°36.9'	+34.6'	92.9°	17°33.8'	+35.5'	93.2°	17°30.2'	+36.3'	93.5°	17°26.4'	+37.2'	93.8°	17°22.2'	+38.1'	94.1°	17°17.8'	+38.9'	94.4°	8
9	18°13.5'	+33.4'	91.7°	18°11.5'	+34.3'	92.0°	18°09.2'	+35.2'	92.3°	18°06.6'	+36.1'	92.7°	18°03.6'	+37.0'	93.0°	18°00.3'	+37.9'	93.3°	17°56.7'	+38.7'	93.6°	9
10	18°46.9'	+33.2'	90.8°	18°45.9'	+34.1'	91.2°	18°44.5'	+35.0'	91.5°	18°42.7'	+35.9'	91.8°	18°40.6'	+36.8'	92.2°	18°38.2'	+37.7'	92.5°	18°35.4'	+38.5'	92.8°	10
11	19°20.1'	+32.9'	89.9°	19°20.0'	+33.9'	90.3°	19°19.5'	+34.8'	90.6°	19°18.6'	+35.7'	91.0°	19°17.4'	+36.6'	91.3°	19°15.8'	+37.4'	91.7°	19°13.9'	+38.3'	92.0°	11
12	19°53.0'	+32.7'	89.0°	19°53.8'	+33.6'	89.4°	19°54.2'	+34.5'	89.8°	19°54.3'	+35.4'	90.1°	19°54.0'	+36.3'	90.5°	19°53.3'	+37.2'	90.9°	19°52.2'	+38.1'	91.2°	12
13	20°25.7'	+32.4'	88.2°	20°27.4'	+33.3'	88.5°	20°28.8'	+34.3'	88.9°	20°29.7'	+35.2'	89.3°	20°30.3'	+36.1'	89.6°	20°30.5'	+37.0'	90.0°	20°30.3'	+37.8'	90.4°	13
14	20°58.1'	+32.1'	87.3°	21°00.7'	+33.0'	87.6°	21°03.0'	+34.0'	88.0°	21°04.9'	+34.9'	88.4°	21°06.4'	+35.8'	88.8°	21°07.4'	+36.7'	89.2°	21°08.1'	+37.6'	89.6°	14
15	21°30.2'	+31.8'	86.3°	21°33.8'	+32.8'	86.7°	21°37.0'	+33.7'	87.1°	21°39.8'	+34.6'	87.5°	21°42.2'	+35.5'	87.9°	21°44.1'	+36.4'	88.3°	21°45.7'	+37.3'	88.7°	15
16	22°02.0'	+31.5'	85.4°	22°06.5'	+32.5'	85.8°	22°10.7'	+33.4'	86.2°	22°14.4'	+34.3'	86.7°	22°17.7'	+35.3'	87.1°	22°20.6'	+36.2'	87.5°	22°23.0'	+37.1'	87.9°	16
17	22°33.5'	+31.2'	84.5°	22°39.0'	+32.1'	84.9°	22°44.1'	+33.1'	85.3°	22°48.7'	+34.0'	85.8°	22°53.0'	+35.0'	86.2°	22°56.7'	+35.9'	86.6°	23°00.1'	+36.8'	87.0°	17
18	23°04.7'	+30.9'	83.6°	23°11.2'	+31.8'	84.0°	23°17.2'	+32.8'	84.4°	23°22.8'	+33.7'	84.9°	23°27.9'	+34.7'	85.3°	23°32.6'	+35.6'	85.7°	23°36.9'	+36.5'	86.2°	18
19	23°35.5'	+30.5'	82.7°	23°43.0'	+31.5'	83.1°	23°50.0'	+32.5'	83.5°	23°56.5'	+33.4'	84.0°	24°02.6'	+34.4'	84.4°	24°08.2'	+35.3'	84.9°	24°13.4'	+36.2'	85.3°	19
20	24°06.1'	+30.2'	81.7°	24°14.5'	+31.2'	82.2°	24°22.4'	+32.1'	82.6°	24°29.9'	+33.1'	83.1°	24°37.0'	+34.0'	83.5°	24°43.5'	+35.0'	84.0°	24°49.6'	+35.9'	84.4°	20
21	24°36.2'	+29.8'	80.8°	24°45.6'	+30.8'	81.2°	24°54.6'	+31.8'	81.7°	25°03.0'	+32.7'	82.1°	25°11.0'	+33.7'	82.6°	25°18.5'	+34.6'	83.1°	25°25.5'	+35.6'	83.5°	21
22	25°06.1'	+29.4'	79.8°	25°16.4'	+30.4'	80.3°	25°26.3'	+31.4'	80.7°	25°35.7'	+32.4'	81.2°	25°44.7'	+33.3'	81.7°	25°53.1'	+34.3'	82.2°	26°01.0'	+35.2'	82.6°	22
23	25°35.5'	+29.1'	78.8°	25°46.9'	+30.1'	79.3°	25°57.7'	+31.0'	79.8°	26°08.1'	+32.0'	80.3°	26°18.0'	+33.0'	80.8°	26°27.4'	+33.9'	81.2°	26°36.3'	+34.9'	81.7°	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

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	12°14.4'	+35.1'	98.7°	12°05.2'	+36.0'	99.0°	11°55.7'	+36.8'	99.2°	11°46.1'	+37.7'	99.4°	11°36.2'	+38.5'	99.6°	11°26.1'	+39.3'	99.8°	11°15.9'	+40.1'	100.0°	0
1	12°49.6'	+35.0'	97.9°	12°41.2'	+35.8'	98.1°	12°32.6'	+36.7'	98.4°	12°23.8'	+37.5'	98.6°	12°14.7'	+38.3'	98.8°	12°05.4'	+39.2'	99.0°	11°55.9'	+40.0'	99.2°	1
2	13°24.5'	+34.8'	97.1°	13°17.0'	+35.7'	97.3°	13°09.3'	+36.5'	97.5°	13°01.3'	+37.4'	97.8°	12°53.0'	+38.2'	98.0°	12°44.6'	+39.0'	98.2°	12°35.9'	+39.8'	98.4°	2
3	13°59.4'	+34.6'	96.2°	13°52.7'	+35.5'	96.5°	13°45.8'	+36.4'	96.7°	13°38.7'	+37.2'	97.0°	13°31.3'	+38.1'	97.2°	13°23.6'	+38.9'	97.4°	13°15.7'	+39.7'	97.7°	3
4	14°34.0'	+34.5'	95.4°	14°28.2'	+35.3'	95.6°	14°22.2'	+36.2'	95.9°	14°15.9'	+37.1'	96.2°	14°09.3'	+37.9'	96.4°	14°02.5'	+38.7'	96.7°	13°55.4'	+39.5'	96.9°	4
5	15°08.5'	+34.3'	94.5°	15°03.6'	+35.2'	94.8°	14°58.4'	+36.0'	95.1°	14°52.9'	+36.9'	95.3°	14°47.2'	+37.7'	95.6°	14°41.2'	+38.6'	95.9°	14°34.9'	+39.4'	96.1°	5
6	15°42.7'	+34.1'	93.7°	15°38.7'	+35.0'	94.0°	15°34.4'	+35.8'	94.3°	15°29.8'	+36.7'	94.5°	15°24.9'	+37.6'	94.8°	15°19.8'	+38.4'	95.1°	15°14.3'	+39.2'	95.4°	6
7	16°16.8'	+33.9'	92.8°	16°13.7'	+34.8'	93.1°	16°10.3'	+35.6'	93.4°	16°06.5'	+36.5'	93.7°	16°02.5'	+37.4'	94.0°	15°58.2'	+38.2'	94.3°	15°53.5'	+39.1'	94.6°	7
8	16°50.7'	+33.6'	92.0°	16°48.4'	+34.5'	92.3°	16°45.9'	+35.4'	92.6°	16°43.0'	+36.3'	92.9°	16°39.9'	+37.2'	93.2°	16°36.4'	+38.0'	93.5°	16°32.6'	+38.9'	93.8°	8
9	17°24.3'	+33.4'	91.1°	17°23.0'	+34.3'	91.4°	17°21.3'	+35.2'	91.7°	17°19.4'	+36.1'	92.0°	17°17.1'	+37.0'	92.4°	17°14.4'	+37.8'	92.7°	17°11.5'	+38.7'	93.0°	9
10	17°57.7'	+33.2'	90.2°	17°57.3'	+34.1'	90.6°	17°56.6'	+35.0'	90.9°	17°55.5'	+35.9'	91.2°	17°54.0'	+36.8'	91.5°	17°52.3'	+37.6'	91.9°	17°50.1'	+38.5'	92.2°	10
11	18°30.9'	+32.9'	89.4°	18°31.4'	+33.9'	89.7°	18°31.6'	+34.8'	90.0°	18°31.4'	+35.7'	90.4°	18°30.8'	+36.5'	90.7°	18°29.9'	+37.4'	91.0°	18°28.6'	+38.3'	91.4°	11
12	19°03.9'	+32.7'	88.5°	19°05.3'	+33.6'	88.8°	19°06.3'	+34.5'	89.2°	19°07.0'	+35.4'	89.5°	19°07.3'	+36.3'	89.9°	19°07.3'	+37.2'	90.2°	19°06.9'	+38.1'	90.6°	12
13	19°36.6'	+32.4'	87.6°	19°38.9'	+33.4'	87.9°	19°40.9'	+34.3'	88.3°	19°42.5'	+35.2'	88.7°	19°43.7'	+36.1'	89.0°	19°44.5'	+37.0'	89.4°	19°45.0'	+37.8'	89.7°	13
14	20°09.0'	+32.2'	86.7°	20°12.3'	+33.1'	87.1°	20°15.1'	+34.0'	87.4°	20°17.6'	+34.9'	87.8°	20°19.7'	+35.8'	88.2°	20°21.5'	+36.7'	88.5°	20°22.8'	+37.6'	88.9°	14
15	20°41.1'	+31.9'	85.8°	20°45.3'	+32.8'	86.2°	20°49.2'	+33.7'	86.5°	20°52.6'	+34.7'	86.9°	20°55.6'	+35.6'	87.3°	20°58.2'	+36.5'	87.7°	21°00.4'	+37.4'	88.1°	15
16	21°13.0'	+31.6'	84.9°	21°18.2'	+32.5'	85.3°	21°22.9'	+33.5'	85.7°	21°27.2'	+34.4'	86.1°	21°31.2'	+35.3'	86.4°	21°34.7'	+36.2'	86.8°	21°37.8'	+37.1'	87.2°	16
17	21°44.6'	+31.3'	84.0°	21°50.7'	+32.2'	84.4°	21°56.4'	+33.2'	84.8°	22°01.6'	+34.1'	85.2°	22°06.5'	+35.0'	85.6°	22°10.9'	+35.9'	86.0°	22°14.9'	+36.8'	86.4°	17
18	22°15.9'	+31.0'	83.1°	22°22.9'	+31.9'	83.5°	22°29.5'	+32.9'	83.9°	22°35.7'	+33.8'	84.3°	22°41.5'	+34.7'	84.7°	22°46.8'	+35.7'	85.1°	22°51.7'	+36.6'	85.5°	18
19	22°46.8'	+30.6'	82.1°	22°54.8'	+31.6'	82.5°	23°02.4'	+32.6'	83.0°	23°09.5'	+33.5'	83.4°	23°16.2'	+34.4'	83.8°	23°22.5'	+35.4'	84.2°	23°28.3'	+36.3'	84.7°	19
20	23°17.5'	+30.3'	81.2°	23°26.4'	+31.3'	81.6°	23°35.0'	+32.2'	82.0°	23°43.0'	+33.2'	82.5°	23°50.6'	+34.1'	82.9°	23°57.8'	+35.1'	83.4°	24°04.5'	+36.0'	83.8°	20
21	23°47.8'	+30.0'	80.2°	23°57.7'	+30.9'	80.7°	24°07.2'	+31.9'	81.1°	24°16.2'	+32.9'	81.6°	24°24.8'	+33.8'	82.0°	24°32.9'	+34.7'	82.5°	24°40.5'	+35.7'	82.9°	21
22	24°17.7'	+29.6'	79.3°	24°28.6'	+30.6'	79.7°	24°39.1'	+31.5'	80.2°	24°49.1'	+32.5'	80.7°	24°58.6'	+33.5'	81.1°	25°07.6'	+34.4'	81.6°	25°16.2'	+35.3'	82.0°	22
23	24°47.3'	+29.2'	78.3°	24°59.2'	+30.2'	78.8°	25°10.6'	+31.2'	79.3													



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

76° 284° LHA

Latitude SAME as Declination

76° 284° LHA

Dec°	35			36			37			38			39			40			41			Dec°																														
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°																															
0	11°25.8'	+35.0'	98.1°	11°17.2'	+35.9'	98.3°	11°08.4'	+36.7'	98.5°	10°59.4'	+37.6'	98.7°	10°50.2'	+38.4'	98.9°	10°40.8'	+39.2'	99.1°	10°31.2'	+40.0'	99.3°	0																														
1	12°00.8'	+34.9'	97.3°	11°53.1'	+35.8'	97.5°	11°45.1'	+36.6'	97.7°	11°37.0'	+37.4'	97.9°	11°28.6'	+38.3'	98.1°	11°20.0'	+39.1'	98.3°	11°11.2'	+39.9'	98.5°	1																														
2	12°35.7'	+34.7'	96.5°	12°28.9'	+35.6'	96.7°	12°21.7'	+36.5'	96.9°	12°14.4'	+37.3'	97.1°	12°06.8'	+38.1'	97.3°	11°59.1'	+38.9'	97.6°	11°51.1'	+39.7'	97.8°	2																														
3	13°10.5'	+34.6'	95.6°	13°04.5'	+35.4'	95.9°	12°58.2'	+36.3'	96.1°	12°51.7'	+37.1'	96.3°	12°45.0'	+38.0'	96.6°	12°38.0'	+38.8'	96.8°	12°30.8'	+39.6'	97.0°	3																														
4	13°45.0'	+34.4'	94.8°	13°39.9'	+35.3'	95.0°	13°34.5'	+36.1'	95.3°	13°28.8'	+37.0'	95.5°	13°22.9'	+37.8'	95.8°	13°16.8'	+38.7'	96.0°	13°10.4'	+39.5'	96.2°	4																														
5	14°19.4'	+34.2'	94.0°	14°15.2'	+35.1'	94.2°	14°10.6'	+36.0'	94.5°	14°05.8'	+36.8'	94.7°	14°00.8'	+37.7'	95.0°	13°55.5'	+38.5'	95.2°	13°49.9'	+39.3'	95.5°	5																														
6	14°53.7'	+34.0'	93.1°	14°50.3'	+34.9'	93.4°	14°46.6'	+35.8'	93.6°	14°42.7'	+36.7'	93.9°	14°38.5'	+37.5'	94.2°	14°34.0'	+38.3'	94.4°	14°29.2'	+39.2'	94.7°	6																														
7	15°27.7'	+33.8'	92.3°	15°25.2'	+34.7'	92.5°	15°22.4'	+35.6'	92.8°	15°19.3'	+36.5'	93.1°	15°16.0'	+37.3'	93.4°	15°12.3'	+38.2'	93.6°	15°08.4'	+39.0'	93.9°	7																														
8	16°01.5'	+33.6'	91.4°	16°00.0'	+34.5'	91.7°	15°58.0'	+35.4'	92.0°	15°55.8'	+36.3'	92.3°	15°53.3'	+37.2'	92.5°	15°50.5'	+38.0'	92.8°	15°47.4'	+38.8'	93.1°	8																														
9	16°35.2'	+33.4'	90.5°	16°34.5'	+34.3'	90.8°	16°33.4'	+35.2'	91.1°	16°32.1'	+36.1'	91.4°	16°30.5'	+37.0'	91.7°	16°28.5'	+37.8'	92.0°	16°26.2'	+38.7'	92.3°	9																														
10	17°08.6'	+33.2'	89.7°	17°08.8'	+34.1'	90.0°	17°08.6'	+35.0'	90.3°	17°08.2'	+35.9'	90.6°	17°07.4'	+36.8'	90.9°	17°06.3'	+37.6'	91.2°	17°04.9'	+38.5'	91.5°	10																														
11	17°41.8'	+33.0'	88.8°	17°42.9'	+33.9'	89.1°	17°43.6'	+34.8'	89.4°	17°44.1'	+35.7'	89.8°	17°44.2'	+36.5'	90.1°	17°43.9'	+37.4'	90.4°	17°43.4'	+38.3'	90.7°	11																														
12	18°14.7'	+32.7'	87.9°	18°16.8'	+33.6'	88.2°	18°18.4'	+34.5'	88.6°	18°19.7'	+35.4'	88.9°	18°20.7'	+36.3'	89.2°	18°21.3'	+37.2'	89.6°	18°21.6'	+38.1'	89.9°	12																														
13	18°47.5'	+32.5'	87.0°	18°50.4'	+33.4'	87.4°	18°53.0'	+34.3'	87.7°	18°55.2'	+35.2'	88.1°	18°57.0'	+36.1'	88.4°	18°58.5'	+37.0'	88.7°	18°59.7'	+37.8'	89.1°	13																														
14	19°19.9'	+32.2'	86.1°	19°23.8'	+33.1'	86.5°	19°27.3'	+34.1'	86.8°	19°30.4'	+35.0'	87.2°	19°33.1'	+35.9'	87.5°	19°35.5'	+36.7'	87.9°	19°37.5'	+37.6'	88.3°	14																														
15	19°52.1'	+31.9'	85.2°	19°56.9'	+32.9'	85.6°	20°01.3'	+33.8'	86.0°	20°05.4'	+34.7'	86.3°	20°09.0'	+35.6'	86.7°	20°12.3'	+36.5'	87.1°	20°15.2'	+37.4'	87.4°	15																														
16	20°24.1'	+31.7'	84.3°	20°29.8'	+32.6'	84.7°	20°35.1'	+33.5'	85.1°	20°40.1'	+34.4'	85.5°	20°44.6'	+35.4'	85.8°	20°48.8'	+36.3'	86.2°	20°52.5'	+37.1'	86.6°	16																														
17	20°55.7'	+31.4'	83.4°	21°02.4'	+32.3'	83.8°	21°08.7'	+33.2'	84.2°	21°14.5'	+34.2'	84.6°	21°20.0'	+35.1'	85.0°	21°25.0'	+36.0'	85.4°	21°29.7'	+36.9'	85.8°	17																														
18	21°27.1'	+31.1'	82.5°	21°34.7'	+32.0'	82.9°	21°41.9'	+33.0'	83.3°	21°48.7'	+33.9'	83.7°	21°55.1'	+34.8'	84.1°	22°01.0'	+35.7'	84.5°	22°06.6'	+36.6'	84.9°	18																														
19	21°58.2'	+30.8'	81.6°	22°06.7'	+31.7'	82.0°	22°14.9'	+32.7'	82.4°	22°22.6'	+33.6'	82.8°	22°29.9'	+34.5'	83.2°	22°36.8'	+35.4'	83.6°	22°43.2'	+36.3'	84.0°	19																														
20	22°28.9'	+30.4'	80.7°	22°38.4'	+31.4'	81.1°	22°47.5'	+32.3'	81.5°	22°56.2'	+33.3'	81.9°	23°04.4'	+34.2'	82.3°	23°12.2'	+35.1'	82.8°	23°19.5'	+36.1'	83.2°	20																														
21	22°59.4'	+30.1'	79.7°	23°09.8'	+31.1'	80.2°	23°19.9'	+32.0'	80.6°	23°29.5'	+33.0'	81.0°	23°38.6'	+33.9'	81.4°	23°47.3'	+34.8'	81.9°	23°55.6'	+35.8'	82.3°	21																														
22	23°29.5'	+29.8'	78.8°	23°40.9'	+30.7'	79.2°	23°51.9'	+31.7'	79.7°	24°02.4'	+32.6'	80.1°	24°12.5'	+33.6'	80.5°	24°22.2'	+34.5'	81.0°	24°31.3'	+35.4'	81.4°	22																														
23	23°59.2'	+29.4'	77.8°	24°11.6'	+30.4'	78.3°	24°23.6'	+31.3'	78.7°	24°35.1'	+32.3'	79.2°	24°46.1'	+33.3'	79.6°	24°56.7'	+34.2'	80.1°	25°06.8'	+35.1'	80.5°	23																														
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°																														
																							35	36	37	38	39	40	41																							

76° 284° LHA

Latitude SAME as Declination

76° 284° LHA

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

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

77° 283° LHA

Latitude SAME as Declination

77° 283° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	10°37.1'	+34.9'	97.5°	10°29.1'	+35.8'	97.7°	10°21.0'	+36.6'	97.9°	10°12.6'	+37.5'	98.1°	10°04.1'	+38.3'	98.3°	9°55.4'	+39.1'	98.4°	9°46.5'	+39.9'	98.6°	0
1	11°12.1'	+34.8'	96.7°	11°04.9'	+35.7'	96.9°	10°57.6'	+36.5'	97.1°	10°50.1'	+37.4'	97.3°	10°42.4'	+38.2'	97.5°	10°34.5'	+39.0'	97.7°	10°26.4'	+39.8'	97.9°	1
2	11°46.9'	+34.7'	95.9°	11°40.6'	+35.5'	96.1°	11°34.1'	+36.4'	96.3°	11°27.5'	+37.2'	96.5°	11°20.6'	+38.1'	96.7°	11°13.5'	+38.9'	96.9°	11°06.2'	+39.7'	97.1°	2
3	12°21.5'	+34.5'	95.0°	12°16.1'	+35.4'	95.3°	12°10.5'	+36.2'	95.5°	12°04.7'	+37.1'	95.7°	11°58.6'	+37.9'	95.9°	11°52.3'	+38.7'	96.1°	11°45.8'	+39.5'	96.3°	3
4	12°56.0'	+34.4'	94.2°	12°51.5'	+35.2'	94.4°	12°46.8'	+36.1'	94.7°	12°41.8'	+36.9'	94.9°	12°36.5'	+37.8'	95.1°	12°31.1'	+38.6'	95.3°	12°25.4'	+39.4'	95.6°	4
5	13°30.4'	+34.2'	93.4°	13°26.7'	+35.1'	93.6°	13°22.8'	+35.9'	93.8°	13°18.7'	+36.8'	94.1°	13°14.3'	+37.6'	94.3°	13°09.7'	+38.5'	94.6°	13°04.8'	+39.3'	94.8°	5
6	14°04.6'	+34.0'	92.5°	14°01.8'	+34.9'	92.8°	13°58.8'	+35.8'	93.0°	13°55.5'	+36.6'	93.3°	13°51.9'	+37.5'	93.5°	13°48.1'	+38.3'	93.8°	13°44.1'	+39.1'	94.0°	6
7	14°38.6'	+33.8'	91.7°	14°36.7'	+34.7'	91.9°	14°34.5'	+35.6'	92.2°	14°32.1'	+36.5'	92.5°	14°29.4'	+37.3'	92.7°	14°26.4'	+38.1'	93.0°	14°23.2'	+39.0'	93.2°	7
8	15°12.4'	+33.6'	90.8°	15°11.4'	+34.5'	91.1°	15°10.1'	+35.4'	91.4°	15°08.6'	+36.3'	91.6°	15°06.7'	+37.1'	91.9°	15°04.6'	+38.0'	92.2°	15°02.2'	+38.8'	92.4°	8
9	15°46.0'	+33.4'	90.0°	15°45.9'	+34.3'	90.2°	15°45.5'	+35.2'	90.5°	15°44.8'	+36.1'	90.8°	15°43.8'	+36.9'	91.1°	15°42.6'	+37.8'	91.4°	15°41.0'	+38.6'	91.6°	9
10	16°19.4'	+33.2'	89.1°	16°20.2'	+34.1'	89.4°	16°20.7'	+35.0'	89.7°	16°20.9'	+35.9'	90.0°	16°20.8'	+36.8'	90.3°	16°20.4'	+37.6'	90.6°	16°19.6'	+38.5'	90.9°	10
11	16°52.7'	+33.0'	88.2°	16°54.4'	+33.9'	88.5°	16°55.7'	+34.8'	88.8°	16°56.8'	+35.7'	89.1°	16°57.5'	+36.6'	89.4°	16°58.0'	+37.4'	89.7°	16°58.1'	+38.3'	90.1°	11
12	17°25.6'	+32.8'	87.4°	17°28.2'	+33.7'	87.7°	17°30.5'	+34.6'	88.0°	17°32.5'	+35.5'	88.3°	17°34.1'	+36.3'	88.6°	17°35.4'	+37.2'	88.9°	17°36.3'	+38.1'	89.2°	12
13	17°58.4'	+32.5'	86.5°	18°01.9'	+33.4'	86.8°	18°05.1'	+34.3'	87.1°	18°07.9'	+35.2'	87.4°	18°10.4'	+36.1'	87.8°	18°12.6'	+37.0'	88.1°	18°14.4'	+37.9'	88.4°	13
14	18°30.9'	+32.3'	85.6°	18°35.4'	+33.2'	85.9°	18°39.4'	+34.1'	86.3°	18°43.2'	+35.0'	86.6°	18°46.6'	+35.9'	86.9°	18°49.6'	+36.8'	87.3°	18°52.3'	+37.7'	87.6°	14
15	19°03.2'	+32.0'	84.7°	19°08.5'	+32.9'	85.0°	19°13.6'	+33.9'	85.4°	19°18.2'	+34.8'	85.7°	19°22.5'	+35.7'	86.1°	19°26.4'	+36.6'	86.4°	19°29.9'	+37.4'	86.8°	15
16	19°35.2'	+31.7'	83.8°	19°41.5'	+32.7'	84.2°	19°47.4'	+33.6'	84.5°	19°53.0'	+34.5'	84.9°	19°58.1'	+35.4'	85.2°	20°02.9'	+36.3'	85.6°	20°07.4'	+37.2'	86.0°	16
17	20°06.9'	+31.5'	82.9°	20°14.2'	+32.4'	83.3°	20°21.0'	+33.3'	83.6°	20°27.5'	+34.3'	84.0°	20°33.6'	+35.2'	84.4°	20°39.2'	+36.1'	84.7°	20°44.5'	+36.9'	85.1°	17
18	20°38.4'	+31.2'	82.0°	20°46.6'	+32.1'	82.4°	20°54.3'	+33.1'	82.7°	21°01.7'	+34.0'	83.1°	21°08.7'	+34.9'	83.5°	21°15.3'	+35.8'	83.9°	21°21.5'	+36.7'	84.3°	18
19	21°09.6'	+30.9'	81.1°	21°18.7'	+31.8'	81.5°	21°27.4'	+32.8'	81.8°	21°35.7'	+33.7'	82.2°	21°43.6'	+34.6'	82.6°	21°51.1'	+35.5'	83.0°	21°58.2'	+36.4'	83.4°	19
20	21°40.5'	+30.6'	80.2°	21°50.5'	+31.5'	80.5°	22°00.2'	+32.5'	80.9°	22°09.4'	+33.4'	81.3°	22°18.2'	+34.3'	81.7°	22°26.6'	+35.2'	82.2°	22°34.6'	+36.1'	82.6°	20
21	22°11.0'	+30.3'	79.2°	22°22.0'	+31.2'	79.6°	22°32.6'	+32.2'	80.0°	22°42.8'	+33.1'	80.4°	22°52.6'	+34.0'	80.9°	23°01.9'	+34.9'	81.3°	23°10.7'	+35.9'	81.7°	21
22	22°41.3'	+29.9'	78.3°	22°53.3'	+30.9'	78.7°	23°04.8'															

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

78° 282° LHA

Latitude SAME as Declination

78° 282° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	9°48.4'	+34.9'	97.0°	9°41.0'	+35.7'	97.1°	9°33.5'	+36.6'	97.3°	9°25.8'	+37.4'	97.5°	9°17.9'	+38.2'	97.6°	9°09.9'	+39.0'	97.8°	9°01.7'	+39.8'	97.9°	0
1	10°23.2'	+34.7'	96.1°	10°16.7'	+35.6'	96.3°	10°10.0'	+36.4'	96.5°	10°03.2'	+37.3'	96.7°	9°56.1'	+38.1'	96.8°	9°48.9'	+38.9'	97.0°	9°41.5'	+39.7'	97.2°	1
2	10°58.0'	+34.6'	95.3°	10°52.3'	+35.5'	95.5°	10°46.5'	+36.3'	95.7°	10°40.4'	+37.2'	95.9°	10°34.2'	+38.0'	96.1°	10°27.8'	+38.8'	96.2°	10°21.2'	+39.6'	96.4°	2
3	11°32.6'	+34.5'	94.5°	11°27.8'	+35.3'	94.7°	11°22.8'	+36.2'	94.9°	11°17.6'	+37.0'	95.1°	11°12.2'	+37.9'	95.3°	11°06.6'	+38.7'	95.5°	11°00.8'	+39.5'	95.7°	3
4	12°07.0'	+34.3'	93.6°	12°03.1'	+35.2'	93.8°	11°59.0'	+36.0'	94.1°	11°54.6'	+36.9'	94.3°	11°50.1'	+37.7'	94.5°	11°45.3'	+38.6'	94.7°	11°40.3'	+39.4'	94.9°	4
5	12°41.3'	+34.1'	92.8°	12°38.3'	+35.0'	93.0°	12°35.0'	+35.9'	93.2°	12°31.5'	+36.7'	93.5°	12°27.8'	+37.6'	93.7°	12°23.8'	+38.4'	93.9°	12°19.6'	+39.2'	94.1°	5
6	13°15.5'	+34.0'	91.9°	13°13.3'	+34.9'	92.2°	13°10.9'	+35.7'	92.4°	13°08.3'	+36.6'	92.6°	13°05.4'	+37.4'	92.9°	13°02.2'	+38.3'	93.1°	12°58.9'	+39.1'	93.3°	6
7	13°49.5'	+33.8'	91.1°	13°48.2'	+34.7'	91.3°	13°46.6'	+35.6'	91.6°	13°44.9'	+36.4'	91.8°	13°42.8'	+37.3'	92.1°	13°40.5'	+38.1'	92.3°	13°38.0'	+38.9'	92.6°	7
8	14°23.3'	+33.6'	90.2°	14°22.9'	+34.5'	90.5°	14°22.2'	+35.4'	90.8°	14°21.3'	+36.3'	91.0°	14°20.1'	+37.1'	91.3°	14°18.6'	+38.0'	91.5°	14°16.9'	+38.8'	91.8°	8
9	14°56.9'	+33.4'	89.4°	14°57.4'	+34.3'	89.7°	14°57.6'	+35.2'	89.9°	14°57.5'	+36.1'	90.2°	14°57.2'	+36.9'	90.5°	14°56.6'	+37.8'	90.7°	14°55.7'	+38.6'	91.0°	9
10	15°30.3'	+33.2'	88.5°	15°31.7'	+34.1'	88.8°	15°32.8'	+35.0'	89.1°	15°33.6'	+35.9'	89.4°	15°34.2'	+36.8'	89.6°	15°34.4'	+37.6'	89.9°	15°34.3'	+38.5'	90.2°	10
11	16°03.5'	+33.0'	87.7°	16°05.8'	+33.9'	87.9°	16°07.8'	+34.8'	88.2°	16°09.5'	+35.7'	88.5°	16°10.9'	+36.6'	88.8°	16°12.0'	+37.4'	89.1°	16°12.8'	+38.3'	89.4°	11
12	16°36.6'	+32.8'	86.8°	16°39.8'	+33.7'	87.1°	16°42.6'	+34.6'	87.4°	16°45.2'	+35.5'	87.7°	16°47.5'	+36.4'	88.0°	16°49.4'	+37.2'	88.3°	16°51.1'	+38.1'	88.6°	12
13	17°09.4'	+32.6'	85.9°	17°13.5'	+33.5'	86.2°	17°17.3'	+34.4'	86.5°	17°20.7'	+35.3'	86.8°	17°23.9'	+36.2'	87.2°	17°26.7'	+37.0'	87.5°	17°29.2'	+37.9'	87.8°	13
14	17°41.9'	+32.3'	85.0°	17°47.0'	+33.3'	85.4°	17°51.6'	+34.2'	85.7°	17°56.0'	+35.1'	86.0°	18°00.0'	+35.9'	86.3°	18°03.7'	+36.8'	86.6°	18°07.1'	+37.7'	87.0°	14
15	18°14.3'	+32.1'	84.1°	18°20.2'	+33.0'	84.5°	18°25.8'	+33.9'	84.8°	18°31.1'	+34.8'	85.1°	18°36.0'	+35.7'	85.5°	18°40.5'	+36.6'	85.8°	18°44.7'	+37.5'	86.2°	15
16	18°46.4'	+31.8'	83.3°	18°53.2'	+32.8'	83.6°	18°59.7'	+33.7'	83.9°	19°05.9'	+34.6'	84.3°	19°11.7'	+35.5'	84.6°	19°17.1'	+36.4'	85.0°	19°22.2'	+37.2'	85.3°	16
17	19°18.2'	+31.6'	82.4°	19°26.0'	+32.5'	82.7°	19°33.4'	+33.4'	83.1°	19°40.5'	+34.3'	83.4°	19°47.2'	+35.2'	83.8°	19°53.5'	+36.1'	84.1°	19°59.4'	+37.0'	84.5°	17
18	19°49.8'	+31.3'	81.5°	19°58.5'	+32.2'	81.8°	20°06.8'	+33.2'	82.2°	20°14.8'	+34.1'	82.5°	20°22.4'	+35.0'	82.9°	20°29.6'	+35.9'	83.3°	20°36.5'	+36.8'	83.7°	18
19	20°21.1'	+31.0'	80.6°	20°30.7'	+32.0'	80.9°	20°40.0'	+32.9'	81.3°	20°48.9'	+33.8'	81.7°	20°57.4'	+34.7'	82.0°	21°05.5'	+35.6'	82.4°	21°13.2'	+36.5'	82.8°	19
20	20°52.1'	+30.7'	79.6°	21°02.7'	+31.7'	80.0°	21°12.9'	+32.6'	80.4°	21°22.7'	+33.5'	80.8°	21°32.1'	+34.4'	81.2°	21°41.1'	+35.3'	81.6°	21°49.7'	+36.2'	82.0°	20
21	21°22.8'	+30.4'	78.7°	21°34.3'	+31.4'	79.1°	21°45.5'	+32.3'	79.5°	21°56.2'	+33.2'	79.9°	22°06.6'	+34.2'	80.3°	22°16.5'	+35.1'	80.7°	22°26.0'	+36.0'	81.1°	21
22	21°53.2'	+30.1'	77.8°	22°05.7'	+31.1'	78.2°	22°17.8'	+32.0'	78.6°	22°29.5'	+32.9'	79.0°	22°40.7'	+33.9'	79.4°	22°51.5'	+34.8'	79.8°	23°01.9'	+35.7'	80.2°	22
23	22°23.3'	+29.8'	76.9°	22°36.8'	+30.7'	77.3°	22°49.8'	+31.7'	77.7°	23°02.4'	+32.6'	78.1°	23°14.6'	+33.5'	78.5°	23°26.3'	+34.5'	78.9°	23°37.6'	+35.4'	79.3°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	<b>35</b>			<b>36</b>			<b>37</b>			<b>38</b>			<b>39</b>			<b>40</b>			<b>41</b>			

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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	8°59.5'	+34.8'	96.4°	8°52.8'	+35.6'	96.5°	8°45.9'	+36.5'	96.7°	8°38.9'	+37.3'	96.8°	8°31.7'	+38.1'	97.0°	8°24.3'	+38.9'	97.1°	8°16.8'	+39.7'	97.3°	0
1	9°34.3'	+34.7'	95.5°	9°28.4'	+35.5'	95.7°	9°22.4'	+36.4'	95.9°	9°16.2'	+37.2'	96.0°	9°09.8'	+38.0'	96.2°	9°03.2'	+38.8'	96.4°	8°56.5'	+39.6'	96.5°	1
2	10°09.0'	+34.5'	94.7°	10°04.0'	+35.4'	94.9°	9°58.8'	+36.3'	95.1°	9°53.4'	+37.1'	95.2°	9°47.8'	+37.9'	95.4°	9°42.1'	+38.7'	95.6°	9°36.2'	+39.5'	95.7°	2
3	10°43.5'	+34.4'	93.9°	10°39.4'	+35.3'	94.1°	10°35.0'	+36.1'	94.3°	10°30.5'	+37.0'	94.4°	10°25.7'	+37.8'	94.6°	10°20.8'	+38.6'	94.8°	10°15.7'	+39.4'	95.0°	3
4	11°17.9'	+34.3'	93.0°	11°14.7'	+35.1'	93.2°	11°11.2'	+36.0'	93.4°	11°07.5'	+36.8'	93.6°	11°03.6'	+37.7'	93.8°	10°59.4'	+38.5'	94.0°	10°55.1'	+39.3'	94.2°	4
5	11°52.2'	+34.1'	92.2°	11°49.8'	+35.0'	92.4°	11°47.2'	+35.9'	92.6°	11°44.3'	+36.7'	92.8°	11°41.2'	+37.6'	93.0°	11°38.0'	+38.4'	93.2°	11°34.5'	+39.2'	93.4°	5
6	12°26.3'	+34.0'	91.4°	12°24.8'	+34.8'	91.6°	12°23.0'	+35.7'	91.8°	12°21.0'	+36.6'	92.0°	12°18.8'	+37.4'	92.2°	12°16.3'	+38.2'	92.5°	12°13.6'	+39.1'	92.7°	6
7	13°00.3'	+33.8'	90.5°	12°59.6'	+34.7'	90.7°	12°58.7'	+35.6'	91.0°	12°57.6'	+36.4'	91.2°	12°56.2'	+37.3'	91.4°	12°54.6'	+38.1'	91.7°	12°52.7'	+38.9'	91.9°	7
8	13°34.1'	+33.6'	89.7°	13°34.3'	+34.5'	89.9°	13°34.3'	+35.4'	90.2°	13°34.0'	+36.3'	90.4°	13°33.5'	+37.1'	90.6°	13°32.7'	+38.0'	90.9°	13°31.6'	+38.8'	91.1°	8
9	14°07.7'	+33.4'	88.8°	14°08.8'	+34.3'	89.1°	14°09.7'	+35.2'	89.3°	14°10.3'	+36.1'	89.6°	14°10.6'	+36.9'	89.8°	14°10.6'	+37.8'	90.1°	14°10.4'	+38.6'	90.3°	9
10	14°41.2'	+33.3'	88.0°	14°43.2'	+34.2'	88.2°	14°44.9'	+35.0'	88.5°	14°46.4'	+35.9'	88.7°	14°47.5'	+36.8'	89.0°	14°48.4'	+37.6'	89.3°	14°49.1'	+38.5'	89.5°	10
11	15°14.4'	+33.1'	87.1°	15°17.3'	+34.0'	87.4°	15°19.9'	+34.8'	87.6°	15°22.3'	+35.7'	87.9°	15°24.3'	+36.6'	88.2°	15°26.1'	+37.4'	88.5°	15°27.5'	+38.3'	88.7°	11
12	15°47.5'	+32.9'	86.2°	15°51.3'	+33.8'	86.5°	15°54.8'	+34.6'	86.8°	15°58.0'	+35.5'	87.1°	16°00.9'	+36.4'	87.4°	16°03.5'	+37.3'	87.7°	16°05.8'	+38.1'	87.9°	12
13	16°20.3'	+32.6'	85.4°	16°25.0'	+33.5'	85.7°	16°29.4'	+34.4'	85.9°	16°33.5'	+35.3'	86.2°	16°37.3'	+36.2'	86.5°	16°40.8'	+37.1'	86.8°	16°43.9'	+37.9'	87.1°	13
14	16°53.0'	+32.4'	84.5°	16°58.6'	+33.3'	84.8°	17°03.9'	+34.2'	85.1°	17°08.9'	+35.1'	85.4°	17°13.5'	+36.0'	85.7°	17°17.8'	+36.9'	86.0°	17°21.8'	+37.7'	86.3°	14
15	17°25.4'	+32.2'	83.6°	17°31.9'	+33.1'	83.9°	17°38.1'	+34.0'	84.2°	17°44.0'	+34.9'	84.5°	17°49.5'	+35.8'	84.9°	17°54.7'	+36.7'	85.2°	17°59.6'	+37.5'	85.5°	15
16	17°57.6'	+31.9'	82.7°	18°05.0'	+32.9'	83.0°	18°12.1'	+33.8'	83.4°	18°18.9'	+34.7'	83.7°	18°25.3'	+35.6'	84.0°	18°31.4'	+36.4'	84.4°	18°37.1'	+37.3'	84.7°	16
17	18°29.5'	+31.7'	81.8°	18°37.9'	+32.6'	82.2°	18°45.9'	+33.5'	82.5°	18°53.5'	+34.4'	82.8°	19°00.9'	+35.3'	83.2°	19°07.8'	+36.2'	83.5°	19°14.4'	+37.1'	83.9°	17
18	19°01.2'	+31.4'	80.9°	19°10.5'	+32.4'	81.3°	19°19.4'	+33.3'	81.6°	19°28.0'	+34.2'	82.0°	19°36.2'	+35.1'	82.3°	19°44.0'	+36.0'	82.7°	19°51.5'	+36.8'	83.0°	18
19	19°32.6'	+31.2'	80.0°	19°42.8'	+32.1'	80.4°	19°52.7'	+33.0'	80.7°	20°02.1'	+33.9'	81.1°	20°11.3'	+34.8'	81.5°	20°20.0'	+35.7'	81.8°	20°28.3'	+36.6'	82.2°	19
20	20°03.8'	+30.9'	79.1°	20°14.9'	+31.8'	79.5°	20°25.7'	+32.7'	79.8°	20°36.1'	+33.7'	80.2°	20°46.1'	+34.6'	80.6°	20°55.7'	+35.5'	81.0°	21°04.9'	+36.3'	81.3°	20
21	20°34.6'	+30.6'	78.2°	20°46.7'	+31.5'	78.6°	20°58.4'	+32.5'	78.9°	21°09.7'	+33.4'	79.3°	21°20.6'	+34.3'	79.7°	21°31.2'	+35.2'	80.1°	21°41.3'	+36.1'	80.5°	21

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

80° 280° LHA

Latitude SAME as Declination

80° 280° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	8°10.7'	+34.7'	95.8°	8°04.6'	+35.6'	95.9°	7°58.3'	+36.4'	96.1°	7°51.9'	+37.2'	96.2°	7°45.3'	+38.1'	96.3°	7°38.7'	+38.9'	96.5°	7°31.8'	+39.7'	96.6°	0
1	8°45.4'	+34.6'	95.0°	8°40.1'	+35.5'	95.1°	8°34.7'	+36.3'	95.3°	8°29.1'	+37.1'	95.4°	8°23.4'	+38.0'	95.6°	8°17.5'	+38.8'	95.7°	8°11.5'	+39.6'	95.8°	1
2	9°20.0'	+34.5'	94.1°	9°15.6'	+35.4'	94.3°	9°11.0'	+36.2'	94.4°	9°06.3'	+37.0'	94.6°	9°01.4'	+37.9'	94.8°	8°56.3'	+38.7'	94.9°	8°51.1'	+39.5'	95.1°	2
3	9°54.5'	+34.4'	93.3°	9°50.9'	+35.2'	93.5°	9°47.2'	+36.1'	93.6°	9°43.3'	+36.9'	93.8°	9°39.3'	+37.8'	94.0°	9°35.0'	+38.6'	94.2°	9°30.6'	+39.4'	94.3°	3
4	10°28.9'	+34.2'	92.5°	10°26.2'	+35.1'	92.6°	10°23.3'	+36.0'	92.8°	10°20.3'	+36.8'	93.0°	10°17.0'	+37.6'	93.2°	10°13.6'	+38.5'	93.4°	10°10.0'	+39.3'	93.6°	4
5	11°03.1'	+34.1'	91.6°	11°01.3'	+35.0'	91.8°	10°59.3'	+35.8'	92.0°	10°57.1'	+36.7'	92.2°	10°54.7'	+37.5'	92.4°	10°52.1'	+38.4'	92.6°	10°49.2'	+39.2'	92.8°	5
6	11°37.2'	+34.0'	90.8°	11°36.3'	+34.8'	91.0°	11°35.1'	+35.7'	91.2°	11°33.8'	+36.6'	91.4°	11°32.2'	+37.4'	91.6°	11°30.4'	+38.2'	91.8°	11°28.4'	+39.0'	92.0°	6
7	12°11.2'	+33.8'	89.9°	12°11.1'	+34.7'	90.2°	12°10.8'	+35.6'	90.4°	12°10.3'	+36.4'	90.6°	12°09.6'	+37.3'	90.8°	12°08.6'	+38.1'	91.0°	12°07.4'	+38.9'	91.2°	7
8	12°45.0'	+33.6'	89.1°	12°45.8'	+34.5'	89.3°	12°46.4'	+35.4'	89.5°	12°46.7'	+36.3'	89.8°	12°46.8'	+37.1'	90.0°	12°46.7'	+38.0'	90.2°	12°46.4'	+38.8'	90.5°	8
9	13°18.6'	+33.5'	88.2°	13°20.3'	+34.4'	88.5°	13°21.8'	+35.2'	88.7°	13°23.0'	+36.1'	89.0°	13°24.0'	+37.0'	89.2°	13°24.7'	+37.8'	89.4°	13°25.1'	+38.6'	89.7°	9
10	13°52.1'	+33.3'	87.4°	13°54.7'	+34.2'	87.6°	13°57.0'	+35.1'	87.9°	13°59.1'	+35.9'	88.1°	14°00.9'	+36.8'	88.4°	14°02.5'	+37.6'	88.6°	14°03.8'	+38.5'	88.9°	10
11	14°25.4'	+33.1'	86.5°	14°28.9'	+34.0'	86.8°	14°32.1'	+34.9'	87.1°	14°35.0'	+35.8'	87.3°	14°37.7'	+36.6'	87.6°	14°40.1'	+37.5'	87.8°	14°42.2'	+38.3'	88.1°	11
12	14°58.5'	+32.9'	85.7°	15°02.9'	+33.8'	85.9°	15°07.0'	+34.7'	86.2°	15°10.8'	+35.6'	86.5°	15°14.3'	+36.4'	86.8°	15°17.6'	+37.3'	87.0°	15°20.6'	+38.1'	87.3°	12
13	15°31.4'	+32.7'	84.8°	15°36.7'	+33.6'	85.1°	15°41.7'	+34.5'	85.4°	15°46.4'	+35.4'	85.6°	15°50.8'	+36.3'	85.9°	15°54.9'	+37.1'	86.2°	15°58.7'	+38.0'	86.5°	13
14	16°04.1'	+32.5'	83.9°	16°10.3'	+33.4'	84.2°	16°16.2'	+34.3'	84.5°	16°21.8'	+35.2'	84.8°	16°27.0'	+36.1'	85.1°	16°32.0'	+36.9'	85.4°	16°36.7'	+37.8'	85.7°	14
15	16°36.6'	+32.3'	83.1°	16°43.7'	+33.2'	83.4°	16°50.5'	+34.1'	83.7°	16°56.9'	+35.0'	84.0°	17°03.1'	+35.9'	84.3°	17°08.9'	+36.7'	84.6°	17°14.5'	+37.6'	84.9°	15
16	17°08.9'	+32.0'	82.2°	17°16.9'	+33.0'	82.5°	17°24.5'	+33.9'	82.8°	17°31.9'	+34.8'	83.1°	17°38.9'	+35.6'	83.4°	17°45.7'	+36.5'	83.7°	17°52.0'	+37.4'	84.1°	16
17	17°40.9'	+31.8'	81.3°	17°49.8'	+32.7'	81.6°	17°58.4'	+33.6'	81.9°	18°06.7'	+34.5'	82.3°	18°14.6'	+35.4'	82.6°	18°22.2'	+36.3'	82.9°	18°29.4'	+37.2'	83.2°	17
18	18°12.7'	+31.6'	80.4°	18°22.5'	+32.5'	80.7°	18°32.0'	+33.4'	81.1°	18°41.2'	+34.3'	81.4°	18°50.0'	+35.2'	81.7°	18°58.5'	+36.1'	82.1°	19°06.6'	+36.9'	82.4°	18
19	18°44.2'	+31.3'	79.5°	18°55.0'	+32.2'	79.8°	19°05.4'	+33.1'	80.2°	19°15.5'	+34.0'	80.5°	19°25.2'	+34.9'	80.9°	19°34.5'	+35.8'	81.2°	19°43.5'	+36.7'	81.6°	19
20	19°15.5'	+31.0'	78.6°	19°27.2'	+32.0'	78.9°	19°38.6'	+32.9'	79.3°	19°49.5'	+33.8'	79.6°	20°00.1'	+34.7'	80.0°	20°10.3'	+35.6'	80.4°	20°20.2'	+36.5'	80.7°	20
21	19°46.6'	+30.8'	77.7°	19°59.2'	+31.7'	78.0°	20°11.4'	+32.6'	78.4°	20°23.3'	+33.5'	78.8°	20°34.8'	+34.4'	79.1°	20°45.9'	+35.3'	79.5°	20°56.7'	+36.2'	79.9°	21
22	20°17.3'	+30.5'	76.8°	20°30.9'	+31.4'	77.1°	20°44.0'	+32.3'	77.5°	20°56.8'	+33.2'	77.9°	21°09.2'	+34.1'	78.3°	21°21.2'	+35.0'	78.6°	21°32.9'	+35.9'	79.0°	22
23	20°47.8'	+30.2'	75.9°	21°02.3'	+31.1'	76.2°	21°16.4'	+32.0'	76.6°	21°30.1'	+33.0'	77.0°	21°43.4'	+33.9'	77.4°	21°56.3'	+34.8'	77.8°	22°08.8'	+35.7'	78.2°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

80° 280° LHA

Latitude SAME as Declination

80° 280° LHA

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

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

81° 279° LHA

Latitude SAME as Declination

81° 279° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	7°21.7'	+34.7'	95.2°	7°16.2'	+35.5'	95.3°	7°10.6'	+36.4'	95.4°	7°04.9'	+37.2'	95.6°	6°59.0'	+38.0'	95.7°	6°53.0'	+38.8'	95.8°	6°46.8'	+39.6'	95.9°	0
1	7°56.4'	+34.6'	94.4°	7°51.8'	+35.4'	94.5°	7°47.0'	+36.3'	94.6°	7°42.0'	+37.1'	94.8°	7°37.0'	+37.9'	94.9°	7°31.8'	+38.7'	95.0°	7°26.4'	+39.5'	95.2°	1
2	8°31.0'	+34.5'	93.5°	8°27.2'	+35.3'	93.7°	8°23.2'	+36.2'	93.8°	8°19.1'	+37.0'	94.0°	8°14.9'	+37.8'	94.1°	8°10.5'	+38.6'	94.3°	8°05.9'	+39.4'	94.4°	2
3	9°05.4'	+34.3'	92.7°	9°02.5'	+35.2'	92.9°	8°59.4'	+36.1'	93.0°	8°56.1'	+36.9'	93.2°	8°52.7'	+37.7'	93.3°	8°49.1'	+38.5'	93.5°	8°45.4'	+39.4'	93.7°	3
4	9°39.7'	+34.2'	91.9°	9°37.7'	+35.1'	92.1°	9°35.4'	+35.9'	92.2°	9°33.0'	+36.8'	92.4°	9°30.4'	+37.6'	92.6°	9°27.7'	+38.4'	92.7°	9°24.7'	+39.3'	92.9°	4
5	10°14.0'	+34.1'	91.0°	10°12.8'	+35.0'	91.2°	10°11.4'	+35.8'	91.4°	10°09.8'	+36.7'	91.6°	10°08.1'	+37.5'	91.8°	10°06.1'	+38.3'	91.9°	10°04.0'	+39.1'	92.1°	5
6	10°48.1'	+34.0'	90.2°	10°47.7'	+34.8'	90.4°	10°47.2'	+35.7'	90.6°	10°46.5'	+36.5'	90.8°	10°45.6'	+37.4'	91.0°	10°44.5'	+38.2'	91.2°	10°43.1'	+39.0'	91.4°	6
7	11°22.0'	+33.8'	89.4°	11°22.6'	+34.7'	89.6°	11°22.9'	+35.6'	89.8°	11°23.0'	+36.4'	90.0°	11°23.0'	+37.3'	90.2°	11°22.7'	+38.1'	90.4°	11°22.2'	+38.9'	90.6°	7
8	11°55.8'	+33.7'	88.5°	11°57.3'	+34.5'	88.7°	11°58.5'	+35.4'	89.0°	11°59.5'	+36.3'	89.2°	12°00.2'	+37.1'	89.4°	12°00.8'	+38.0'	89.6°	12°01.1'	+38.8'	89.8°	8
9	12°29.5'	+33.5'	87.7°	12°31.8'	+34.4'	87.9°	12°33.9'	+35.3'	88.1°	12°35.7'	+36.1'	88.3°	12°37.3'	+37.0'	88.6°	12°38.7'	+37.8'	88.8°	12°39.9'	+38.6'	89.0°	9
10	13°03.0'	+33.3'	86.8°	13°06.2'	+34.2'	87.1°	13°09.1'	+35.1'	87.3°	13°11.8'	+36.0'	87.5°	13°14.3'	+36.8'	87.8°	13°16.5'	+37.7'	88.0°	13°18.5'	+38.5'	88.2°	10
11	13°36.3'	+33.2'	86.0°	13°40.4'	+34.1'	86.2°	13°44.2'	+34.9'	86.5°	13°47.8'	+35.8'	86.7°	13°51.1'	+36.7'	87.0°	13°54.2'	+37.5'	87.2°	13°57.0'	+38.3'	87.4°	11
12	14°09.5'	+33.0'	85.1°	14°14.5'	+33.9'	85.4°	14°19.2'	+34.8'	85.6°	14°23.6'	+35.6'	85.9°	14°27.8'	+36.5'	86.1°	14°31.7'	+37.3'	86.4°	14°35.3'	+38.2'	86.7°	12
13	14°42.5'	+32.8'	84.3°	14°48.3'	+33.7'	84.5°	14°53.9'	+34.6'	84.8°	14°59.2'	+35.4'	85.0°	15°04.3'	+36.3'	85.3°	15°09.0'	+37.2'	85.6°	15°13.5'	+38.0'	85.9°	13
14	15°15.2'	+32.6'	83.4°	15°22.0'	+33.5'	83.7°	15°28.5'	+34.4'	83.9°	15°34.7'	+35.3'	84.2°	15°40.6'	+36.1'	84.5°	15°46.2'	+37.0'	84.8°	15°51.5'	+37.8'	85.1°	14
15	15°47.8'	+32.4'	82.5°	15°55.5'	+33.3'	82.8°	16°02.9'	+34.2'	83.1°	16°09.9'	+35.1'	83.4°	16°16.7'	+35.9'	83.7°	16°23.2'	+36.8'	83.9°	16°29.4'	+37.6'	84.2°	15
16	16°20.2'	+32.2'	81.6°	16°28.8'	+33.1'	81.9°	16°37.0'	+34.0'	82.2°	16°45.0'	+34.8'	82.5°	16°52.7'	+35.7'	82.8°	17°00.0'	+36.6'	83.1°	17°07.0'	+37.4'	83.4°	16
17	16°52.3'	+31.9'	80.8°	17°01.8'	+32.8'	81.1°	17°11.0'	+33.7'	81.4°	17°19.8'	+34.6'	81.7°	17°28.4'	+35.5'	82.0°	17°36.6'	+36.4'	82.3°	17°44.5'	+37.2'	82.6°	17
18	17°24.3'	+31.7'	79.9°	17°34.7'	+32.6'	80.2°	17°44.7'	+33.5'	80.5°	17°54.5'	+34.4'	80.8°	18°03.9'	+35.3'	81.1°	18°13.0'	+36.2'	81.5°	18°21.7'	+37.0'	81.8°	18
19	17°56.0'	+31.4'	79.0°	18°07.3'	+32.4'	79.3°	18°18.2'	+33.3'	79.6°	18°28.9'	+34.2'	80.0°	18°39.2'	+35.1'	80.3°	18°49.1'	+35.9'	80.6°	18°58.7'	+36.8'	81.0°	19
20	18°27.4'	+31.2'	78.1°	18°39.6'	+32.1'	78.4°	18°51.5'	+33.0'	78.7°	19°03.0'	+33.9'	79.1°	19°14.2'	+34.8'	79.4°	19°25.1'	+35.7'	79.8°	19°35.5'	+36.6'	80.1°	20
21	18°58.6'	+30.9'	77.2°	19°11.7'	+31.8'	77.5°	19°24.5'	+32.8'	77.9°	19°37.0'	+33.7'	78.2°	19°49.1'	+34.6'	78.6°	20°00.8'	+35.5'	78.9°	20°12.1'	+36.3'	79.3°	21
22	19°29.5'	+30.7'	76.3°	19°43.6'	+31.6'	76.6°	19°57.3'	+32.5'	77.0°	20°10.6'	+33.4'											

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

82° 278° LHA

Latitude SAME as Declination

82° 278° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	6°32.8'	+34.6'	94.6°	6°27.9'	+35.5'	94.7°	6°22.9'	+36.3'	94.8°	6°17.8'	+37.1'	94.9°	6°12.5'	+37.9'	95.1°	6°07.2'	+38.8'	95.2°	6°01.8'	+39.6'	95.3°	0
1	7°07.4'	+34.5'	93.8°	7°03.3'	+35.4'	93.9°	6°59.2'	+36.2'	94.0°	6°54.9'	+37.0'	94.2°	6°50.5'	+37.9'	94.3°	6°46.0'	+38.7'	94.4°	6°41.3'	+39.5'	94.5°	1
2	7°41.9'	+34.4'	93.0°	7°38.7'	+35.3'	93.1°	7°35.4'	+36.1'	93.2°	7°32.0'	+37.0'	93.4°	7°28.4'	+37.8'	93.5°	7°24.6'	+38.6'	93.6°	7°20.8'	+39.4'	93.8°	2
3	8°16.3'	+34.3'	92.1°	8°14.0'	+35.2'	92.3°	8°11.5'	+36.0'	92.4°	8°08.9'	+36.9'	92.6°	8°06.2'	+37.7'	92.7°	8°03.2'	+38.5'	92.9°	8°00.2'	+39.3'	93.0°	3
4	8°50.6'	+34.2'	91.3°	8°49.2'	+35.1'	91.5°	8°47.6'	+35.9'	91.6°	8°45.8'	+36.8'	91.8°	8°43.9'	+37.6'	91.9°	8°41.8'	+38.4'	92.1°	8°39.5'	+39.2'	92.2°	4
5	9°24.8'	+34.1'	90.5°	9°24.2'	+35.0'	90.6°	9°23.5'	+35.8'	90.8°	9°22.6'	+36.7'	91.0°	9°21.5'	+37.5'	91.1°	9°20.2'	+38.3'	91.3°	9°18.7'	+39.1'	91.5°	5
6	9°58.9'	+34.0'	89.6°	9°59.2'	+34.8'	89.8°	9°59.3'	+35.7'	90.0°	9°59.2'	+36.5'	90.2°	9°58.9'	+37.4'	90.3°	9°58.5'	+38.2'	90.5°	9°57.9'	+39.0'	90.7°	6
7	10°32.9'	+33.8'	88.8°	10°34.0'	+34.7'	89.0°	10°35.0'	+35.6'	89.2°	10°35.8'	+36.4'	89.4°	10°36.3'	+37.3'	89.5°	10°36.7'	+38.1'	89.7°	10°36.9'	+38.9'	89.9°	7
8	11°06.7'	+33.7'	88.0°	11°08.7'	+34.6'	88.2°	11°10.6'	+35.4'	88.4°	11°12.2'	+36.3'	88.6°	11°13.6'	+37.1'	88.7°	11°14.8'	+38.0'	88.9°	11°15.8'	+38.8'	89.1°	8
9	11°40.4'	+33.5'	87.1°	11°43.3'	+34.4'	87.3°	11°46.0'	+35.3'	87.5°	11°48.5'	+36.2'	87.7°	11°50.7'	+37.0'	87.9°	11°52.8'	+37.8'	88.2°	11°54.6'	+38.7'	88.4°	9
10	12°13.9'	+33.4'	86.3°	12°17.7'	+34.3'	86.5°	12°21.3'	+35.1'	86.7°	12°24.6'	+36.0'	86.9°	12°27.7'	+36.9'	87.1°	12°30.6'	+37.7'	87.4°	12°33.3'	+38.5'	87.6°	10
11	12°47.3'	+33.2'	85.4°	12°52.0'	+34.1'	85.6°	12°56.4'	+35.0'	85.9°	13°00.6'	+35.8'	86.1°	13°04.6'	+36.7'	86.3°	13°08.3'	+37.5'	86.6°	13°11.8'	+38.4'	86.8°	11
12	13°20.5'	+33.0'	84.6°	13°26.1'	+33.9'	84.8°	13°31.4'	+34.8'	85.0°	13°36.5'	+35.7'	85.3°	13°41.3'	+36.5'	85.5°	13°45.9'	+37.4'	85.8°	13°50.2'	+38.2'	86.0°	12
13	13°53.6'	+32.9'	83.7°	14°00.0'	+33.8'	83.9°	14°06.2'	+34.6'	84.2°	14°12.2'	+35.5'	84.4°	14°17.8'	+36.4'	84.7°	14°23.2'	+37.2'	85.0°	14°28.4'	+38.1'	85.2°	13
14	14°26.4'	+32.7'	82.8°	14°33.8'	+33.6'	83.1°	14°40.9'	+34.5'	83.4°	14°47.7'	+35.3'	83.6°	14°54.2'	+36.2'	83.9°	15°00.5'	+37.1'	84.1°	15°06.4'	+37.9'	84.4°	14
15	14°59.1'	+32.5'	82.0°	15°07.4'	+33.4'	82.2°	15°15.3'	+34.3'	82.5°	15°23.0'	+35.1'	82.8°	15°30.4'	+36.0'	83.1°	15°37.5'	+36.9'	83.3°	15°44.3'	+37.7'	83.6°	15
16	15°31.6'	+32.3'	81.1°	15°40.7'	+33.2'	81.4°	15°49.6'	+34.1'	81.7°	15°58.2'	+34.9'	81.9°	16°06.4'	+35.8'	82.2°	16°14.4'	+36.7'	82.5°	16°22.1'	+37.5'	82.8°	16
17	16°03.9'	+32.1'	80.2°	16°13.9'	+33.0'	80.5°	16°23.7'	+33.9'	80.8°	16°33.1'	+34.7'	81.1°	16°42.2'	+35.6'	81.4°	16°51.1'	+36.5'	81.7°	16°59.6'	+37.3'	82.0°	17
18	16°35.9'	+31.8'	79.3°	16°46.9'	+32.7'	79.6°	16°57.5'	+33.6'	79.9°	17°07.8'	+34.5'	80.2°	17°17.9'	+35.4'	80.5°	17°27.6'	+36.3'	80.9°	17°36.9'	+37.1'	81.2°	18
19	17°07.8'	+31.6'	78.5°	17°19.6'	+32.5'	78.8°	17°31.2'	+33.4'	79.1°	17°42.4'	+34.3'	79.4°	17°53.3'	+35.2'	79.7°	18°03.8'	+36.1'	80.0°	18°14.1'	+36.9'	80.3°	19
20	17°39.4'	+31.4'	77.6°	17°52.1'	+32.3'	77.9°	18°04.6'	+33.2'	78.2°	18°16.7'	+34.1'	78.5°	18°28.4'	+35.0'	78.8°	18°39.9'	+35.8'	79.2°	18°51.0'	+36.7'	79.5°	20
21	18°10.7'	+31.1'	76.7°	18°24.4'	+32.0'	77.0°	18°37.7'	+32.9'	77.3°	18°50.7'	+33.8'	77.7°	19°03.4'	+34.7'	78.0°	19°15.7'	+35.6'	78.3°	19°27.7'	+36.5'	78.7°	21
22	18°41.8'	+30.8'	75.8°	18°56.4'	+31.8'	76.1°	19°10.7'	+32.7'	76.4°	19°24.6'	+33.6'	76.8°	19°38.1'	+34.5'	77.1°	19°51.3'	+35.3'	77.5°	20°04.1'	+36.2'	77.8°	22
23	19°12.7'	+30.6'	74.9°	19°28.2'	+31.5'	75.2°	19°43.3'	+32.4'	75.5°	19°58.1'	+33.3'	75.9°	20°12.6'	+34.2'	76.3°	20°26.7'	+35.1'	76.6°	20°40.4'	+36.0'	77.0°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	5°43.8'	+34.6'	94.0°	5°39.5'	+35.4'	94.1°	5°35.1'	+36.2'	94.2°	5°30.7'	+37.1'	94.3°	5°26.1'	+37.9'	94.4°	5°21.4'	+38.7'	94.5°	5°16.6'	+39.5'	94.6°	0
1	6°18.3'	+34.5'	93.2°	6°14.9'	+35.3'	93.3°	6°11.4'	+36.2'	93.4°	6°07.7'	+37.0'	93.5°	6°04.0'	+37.8'	93.6°	6°00.1'	+38.6'	93.7°	5°56.1'	+39.4'	93.8°	1
2	6°52.8'	+34.4'	92.4°	6°50.2'	+35.2'	92.5°	6°47.5'	+36.1'	92.6°	6°44.7'	+36.9'	92.7°	6°41.8'	+37.8'	92.9°	6°38.8'	+38.6'	93.0°	6°35.6'	+39.4'	93.1°	2
3	7°27.2'	+34.3'	91.6°	7°25.5'	+35.2'	91.7°	7°23.6'	+36.0'	91.8°	7°21.7'	+36.8'	91.9°	7°19.6'	+37.7'	92.1°	7°17.3'	+38.5'	92.2°	7°15.0'	+39.3'	92.3°	3
4	8°01.5'	+34.2'	90.7°	8°00.6'	+35.1'	90.9°	7°59.7'	+35.9'	91.0°	7°58.5'	+36.8'	91.2°	7°57.2'	+37.6'	91.3°	7°55.8'	+38.4'	91.4°	7°54.2'	+39.2'	91.6°	4
5	8°35.7'	+34.1'	89.9°	8°35.7'	+35.0'	90.0°	8°35.6'	+35.8'	90.2°	8°35.3'	+36.7'	90.4°	8°34.8'	+37.5'	90.5°	8°34.2'	+38.3'	90.7°	8°33.5'	+39.1'	90.8°	5
6	9°09.8'	+34.0'	89.1°	9°10.7'	+34.8'	89.2°	9°11.4'	+35.7'	89.4°	9°11.9'	+36.6'	89.6°	9°12.3'	+37.4'	89.7°	9°12.5'	+38.2'	89.9°	9°12.6'	+39.0'	90.0°	6
7	9°43.7'	+33.9'	88.2°	9°45.5'	+34.7'	88.4°	9°47.1'	+35.6'	88.6°	9°48.5'	+36.4'	88.7°	9°49.7'	+37.3'	88.9°	9°50.7'	+38.1'	89.1°	9°51.6'	+38.9'	89.3°	7
8	10°17.6'	+33.7'	87.4°	10°20.2'	+34.6'	87.6°	10°22.7'	+35.5'	87.8°	10°24.9'	+36.3'	87.9°	10°27.0'	+37.2'	88.1°	10°28.9'	+38.0'	88.3°	10°30.5'	+38.8'	88.5°	8
9	10°51.3'	+33.6'	86.5°	10°54.8'	+34.5'	86.7°	10°58.1'	+35.3'	86.9°	11°01.2'	+36.2'	87.1°	11°04.1'	+37.0'	87.3°	11°06.8'	+37.9'	87.5°	11°09.3'	+38.7'	87.7°	9
10	11°24.9'	+33.4'	85.7°	11°29.3'	+34.3'	85.9°	11°33.5'	+35.2'	86.1°	11°37.4'	+36.0'	86.3°	11°41.2'	+36.9'	86.5°	11°44.7'	+37.7'	86.7°	11°48.0'	+38.6'	86.9°	10
11	11°58.3'	+33.3'	84.9°	12°03.6'	+34.2'	85.1°	12°08.7'	+35.0'	85.3°	12°13.5'	+35.9'	85.5°	12°18.1'	+36.8'	85.7°	12°22.4'	+37.6'	85.9°	12°26.6'	+38.4'	86.2°	11
12	12°31.6'	+33.1'	84.0°	12°37.8'	+34.0'	84.2°	12°43.7'	+34.9'	84.5°	12°49.4'	+35.7'	84.7°	12°54.8'	+36.6'	84.9°	13°00.0'	+37.4'	85.1°	13°05.0'	+38.3'	85.4°	12
13	13°04.8'	+33.0'	83.2°	13°11.8'	+33.8'	83.4°	13°18.6'	+34.7'	83.6°	13°25.1'	+35.6'	83.9°	13°31.4'	+36.4'	84.1°	13°37.5'	+37.3'	84.3°	13°43.3'	+38.1'	84.6°	13
14	13°37.7'	+32.8'	82.3°	13°45.6'	+33.7'	82.5°	13°53.3'	+34.5'	82.8°	14°00.7'	+35.4'	83.0°	14°07.9'	+36.3'	83.3°	14°14.8'	+37.1'	83.5°	14°21.4'	+38.0'	83.8°	14
15	14°10.5'	+32.6'	81.4°	14°19.3'	+33.5'	81.7°	14°27.8'	+34.4'	81.9°	14°36.1'	+35.2'	82.2°	14°44.2'	+36.1'	82.5°	14°51.9'	+37.0'	82.7°	14°59.4'	+37.8'	83.0°	15
16	14°43.1'	+32.4'	80.6°	14°52.8'	+33.3'	80.8°	15°02.2'	+34.2'	81.1°	15°11.4'	+35.1'	81.4°	15°20.3'	+35.9'	81.6°	15°28.9'	+36.8'	81.9°	15°37.2'	+37.6'	82.2°	16
17	15°15.5'	+32.2'	79.7°	15°26.1'	+33.1'	80.0°	15°36.4'	+34.0'	80.2°	15°46.4'	+34.9'	80.5°	15°56.2'	+35.7'	80.8°	16°05.6'	+36.6'	81.1°	16°14.8'	+37.4'	81.4°	17
18	15°47.7'	+32.0'	78.8°	15°59.2'	+32.9'	79.1°	16°10.4'	+33.8'	79.4°	16°21.3'	+34.7'	79.7°	16°31.9'	+35.5'	80.0°	16°42.2'	+36.4'	80.2°	16°52.2'	+37.2'	80.5°	18
19	16°19.7'	+31.8'	77.9°	16°32.0'	+32.7'	78.2°	16°44.1'	+33.6'	78.5°	16°55.9'	+34.4'	78.8°	17°07.4'	+35.3'	79.1°	17°18.6'	+36.2'	79.4°	17°29.5'	+37.0'	79.7°	19
20	16°51.4'	+31.5'	77.0°	17°04.7'	+32.4'	77.3°	17°17.7'	+33.3'	77.6°	17°30.4'	+34.2'	78.0°	17°42.7'	+35.1'	78.3°	17°54.8'	+36.0'	78.6°	18°06.5'	+36.8'	78.9°	20
21	17°23.0'	+31.3'	76.2°	17°37.2'	+32.2'	76.5°	17°51.0'	+33.1'	76.8°	18°04.6'	+34.0'	77.1°	18°17.8'	+34.9'	77.4°	18°30.7'	+35.7'	77.7°	18°43.3'	+36.6'	78.1°	21
22	17°54.3'	+31.0'	75.3°	18°09.4'	+32.0'	75.6°	18°24.1'	+32.9'	75.9°	18°38.6'	+33.7'	76.2°	18°52.7'	+34.6'	76.6°							

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°, Hc°, d', Z° for values 35-41) and 23 rows of data. Includes header and footer information for this section.

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°, Hc°, d', Z° for values 35-41) and 23 rows of data. Includes header and footer information for this section.

85° 275° LHA

Latitude SAME as Declination

85° 275° LHA

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

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

86° 274° LHA

Latitude SAME as Declination

86° 274° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	3°16.5'	+34.4'	92.3°	3°14.1'	+35.3'	92.4°	3°11.6'	+36.1'	92.4°	3°09.1'	+37.0'	92.5°	3°06.5'	+37.8'	92.5°	3°03.8'	+38.6'	92.6°	3°01.1'	+39.4'	92.6°	0
1	3°51.0'	+34.4'	91.5°	3°49.4'	+35.3'	91.5°	3°47.8'	+36.1'	91.6°	3°46.0'	+36.9'	91.7°	3°44.3'	+37.8'	91.7°	3°42.4'	+38.6'	91.8°	3°40.5'	+39.4'	91.9°	1
2	4°25.4'	+34.3'	90.7°	4°24.7'	+35.2'	90.7°	4°23.9'	+36.0'	90.8°	4°23.0'	+36.9'	90.9°	4°22.0'	+37.7'	91.0°	4°21.0'	+38.5'	91.0°	4°19.8'	+39.3'	91.1°	2
3	4°59.7'	+34.3'	89.8°	4°59.9'	+35.1'	89.9°	5°00.0'	+36.0'	90.0°	4°59.9'	+36.8'	90.1°	4°59.7'	+37.7'	90.2°	4°59.5'	+38.5'	90.3°	4°59.1'	+39.3'	90.4°	3
4	5°34.0'	+34.2'	89.0°	5°35.0'	+35.1'	89.1°	5°35.9'	+35.9'	89.2°	5°36.7'	+36.8'	89.3°	5°37.4'	+37.6'	89.4°	5°37.9'	+38.4'	89.5°	5°38.4'	+39.2'	89.6°	4
5	6°08.2'	+34.1'	88.2°	6°10.1'	+35.0'	88.3°	6°11.8'	+35.9'	88.4°	6°13.4'	+36.7'	88.5°	6°15.0'	+37.5'	88.6°	6°16.3'	+38.3'	88.7°	6°17.6'	+39.1'	88.8°	5
6	6°42.4'	+34.1'	87.4°	6°45.1'	+34.9'	87.5°	6°47.7'	+35.8'	87.6°	6°50.1'	+36.6'	87.7°	6°52.5'	+37.4'	87.8°	6°54.7'	+38.3'	88.0°	6°56.8'	+39.1'	88.1°	6
7	7°16.4'	+34.0'	86.5°	7°20.0'	+34.8'	86.7°	7°23.5'	+35.7'	86.8°	7°26.8'	+36.5'	86.9°	7°29.9'	+37.4'	87.0°	7°32.9'	+38.2'	87.2°	7°35.8'	+39.0'	87.3°	7
8	7°50.4'	+33.9'	85.7°	7°54.8'	+34.7'	85.8°	7°59.1'	+35.6'	86.0°	8°03.3'	+36.4'	86.1°	8°07.3'	+37.3'	86.3°	8°11.1'	+38.1'	86.4°	8°14.8'	+38.9'	86.5°	8
9	8°24.3'	+33.8'	84.9°	8°29.6'	+34.6'	85.0°	8°34.7'	+35.5'	85.2°	8°39.7'	+36.3'	85.3°	8°44.5'	+37.2'	85.5°	8°49.2'	+38.0'	85.6°	8°53.7'	+38.8'	85.8°	9
10	8°58.0'	+33.7'	84.0°	9°04.2'	+34.5'	84.2°	9°10.2'	+35.4'	84.3°	9°16.0'	+36.2'	84.5°	9°21.7'	+37.1'	84.7°	9°27.2'	+37.9'	84.8°	9°32.5'	+38.7'	85.0°	10
11	9°31.7'	+33.5'	83.2°	9°38.7'	+34.4'	83.4°	9°45.6'	+35.3'	83.5°	9°52.3'	+36.1'	83.7°	9°58.8'	+36.9'	83.9°	10°05.1'	+37.8'	84.0°	10°11.2'	+38.6'	84.2°	11
12	10°05.2'	+33.4'	82.3°	10°13.1'	+34.3'	82.5°	10°20.8'	+35.1'	82.7°	10°28.4'	+36.0'	82.9°	10°35.7'	+36.8'	83.1°	10°42.9'	+37.7'	83.3°	10°49.8'	+38.5'	83.4°	12
13	10°38.6'	+33.3'	81.5°	10°47.4'	+34.1'	81.7°	10°56.0'	+35.0'	81.9°	11°04.4'	+35.9'	82.1°	11°12.5'	+36.7'	82.3°	11°20.5'	+37.5'	82.5°	11°28.3'	+38.3'	82.7°	13
14	11°11.9'	+33.1'	80.7°	11°21.5'	+34.0'	80.8°	11°31.0'	+34.9'	81.0°	11°40.2'	+35.7'	81.3°	11°49.2'	+36.6'	81.5°	11°58.0'	+37.4'	81.7°	12°06.6'	+38.2'	81.9°	14
15	11°45.0'	+33.0'	79.8°	11°55.5'	+33.8'	80.0°	12°05.8'	+34.7'	80.2°	12°15.9'	+35.6'	80.4°	12°25.8'	+36.4'	80.6°	12°35.4'	+37.2'	80.9°	12°44.8'	+38.1'	81.1°	15
16	12°18.0'	+32.8'	78.9°	12°29.4'	+33.7'	79.2°	12°40.5'	+34.6'	79.4°	12°51.5'	+35.4'	79.6°	13°02.2'	+36.3'	79.8°	13°12.7'	+37.1'	80.1°	13°22.9'	+37.9'	80.3°	16
17	12°50.8'	+32.6'	78.1°	13°03.1'	+33.5'	78.3°	13°15.1'	+34.4'	78.5°	13°26.9'	+35.2'	78.8°	13°38.5'	+36.1'	79.0°	13°49.8'	+36.9'	79.3°	14°00.8'	+37.8'	79.5°	17
18	13°23.4'	+32.5'	77.2°	13°36.6'	+33.3'	77.5°	13°49.5'	+34.2'	77.7°	14°02.1'	+35.1'	77.9°	14°14.6'	+35.9'	78.2°	14°26.7'	+36.8'	78.4°	14°38.6'	+37.6'	78.7°	18
19	13°55.9'	+32.3'	76.4°	14°09.9'	+33.2'	76.6°	14°23.7'	+34.0'	76.9°	14°37.2'	+34.9'	77.1°	14°50.5'	+35.7'	77.4°	15°03.5'	+36.6'	77.6°	15°16.2'	+37.4'	77.9°	19
20	14°28.2'	+32.1'	75.5°	14°43.1'	+33.0'	75.7°	14°57.7'	+33.8'	76.0°	15°12.1'	+34.7'	76.3°	15°26.2'	+35.6'	76.5°	15°40.1'	+36.4'	76.8°	15°53.6'	+37.2'	77.1°	20
21	15°00.3'	+31.9'	74.6°	15°16.1'	+32.8'	74.9°	15°31.6'	+33.6'	75.1°	15°46.8'	+34.5'	75.4°	16°01.8'	+35.4'	75.7°	16°16.5'	+36.2'	76.0°	16°30.9'	+37.1'	76.3°	21
22	15°32.2'	+31.7'	73.7°	15°48.8'	+32.6'	74.0°	16°05.2'	+33.4'	74.3°	16°21.3'	+34.3'	74.6°	16°37.2'	+35.2'	74.9°	16°52.7'	+36.0'	75.1°	17°07.9'	+36.9'	75.4°	22
23	16°03.8'	+31.5'	72.9°	16°21.4'	+32.3'	73.1°	16°38.7'	+33.2'	73.4°	16°55.6'	+34.1'	73.7°	17°12.3'	+34.9'	74.0°	17°28.7'	+35.8'	74.3°	17°44.8'	+36.6'	74.6°	23

86° 274° LHA

Latitude SAME as Declination

86° 274° LHA

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

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

87° 273° LHA

Latitude SAME as Declination

87° 273° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	2°27.4'	+34.4'	91.7°	2°25.6'	+35.3'	91.8°	2°23.7'	+36.1'	91.8°	2°21.8'	+37.0'	91.8°	2°19.9'	+37.8'	91.9°	2°17.9'	+38.6'	91.9°	2°15.8'	+39.4'	92.0°	0
1	3°01.9'	+34.4'	90.9°	3°00.9'	+35.2'	91.0°	2°59.9'	+36.1'	91.0°	2°58.8'	+36.9'	91.1°	2°57.6'	+37.7'	91.1°	2°56.4'	+38.6'	91.2°	2°55.2'	+39.4'	91.2°	1
2	3°36.2'	+34.3'	90.1°	3°36.1'	+35.2'	90.1°	3°35.9'	+36.0'	90.2°	3°35.7'	+36.9'	90.3°	3°35.4'	+37.7'	90.3°	3°35.0'	+38.5'	90.4°	3°34.6'	+39.3'	90.5°	2
3	4°10.6'	+34.3'	89.3°	4°11.3'	+35.2'	89.3°	4°12.0'	+36.0'	89.4°	4°12.6'	+36.8'	89.5°	4°13.1'	+37.7'	89.6°	4°13.5'	+38.5'	89.6°	4°13.9'	+39.3'	89.7°	3
4	4°44.9'	+34.2'	88.4°	4°46.5'	+35.1'	88.5°	4°48.0'	+35.9'	88.6°	4°49.4'	+36.8'	88.7°	4°50.7'	+37.6'	88.8°	4°52.0'	+38.4'	88.9°	4°53.1'	+39.2'	88.9°	4
5	5°19.1'	+34.2'	87.6°	5°21.6'	+35.0'	87.7°	5°23.9'	+35.9'	87.8°	5°26.2'	+36.7'	87.9°	5°28.3'	+37.5'	88.0°	5°30.4'	+38.4'	88.1°	5°32.4'	+39.2'	88.2°	5
6	5°53.3'	+34.1'	86.8°	5°56.6'	+35.0'	86.9°	5°59.8'	+35.8'	87.0°	6°02.9'	+36.6'	87.1°	6°05.9'	+37.5'	87.2°	6°08.8'	+38.3'	87.3°	6°11.5'	+39.1'	87.4°	6
7	6°27.4'	+34.0'	86.0°	6°31.6'	+34.9'	86.1°	6°35.6'	+35.7'	86.2°	6°39.6'	+36.6'	86.3°	6°43.4'	+37.4'	86.4°	6°47.0'	+38.2'	86.5°	6°50.6'	+39.0'	86.7°	7
8	7°01.4'	+33.9'	85.1°	7°06.5'	+34.8'	85.3°	7°11.4'	+35.6'	85.4°	7°16.1'	+36.5'	85.5°	7°20.8'	+37.3'	85.6°	7°25.3'	+38.1'	85.8°	7°29.6'	+38.9'	85.9°	8
9	7°35.4'	+33.8'	84.3°	7°41.2'	+34.7'	84.4°	7°47.0'	+35.6'	84.6°	7°52.6'	+36.4'	84.7°	7°58.1'	+37.2'	84.8°	8°03.4'	+38.0'	85.0°	8°08.6'	+38.9'	85.1°	9
10	8°09.2'	+33.7'	83.5°	8°15.9'	+34.6'	83.6°	8°22.6'	+35.5'	83.8°	8°29.0'	+36.3'	83.9°	8°35.3'	+37.1'	84.0°	8°41.4'	+38.0'	84.2°	8°47.4'	+38.8'	84.4°	10
11	8°42.9'	+33.6'	82.6°	8°50.5'	+34.5'	82.8°	8°58.0'	+35.3'	82.9°	9°05.3'	+36.2'	83.1°	9°12.4'	+37.0'	83.3°	9°19.4'	+37.8'	83.4°	9°26.2'	+38.7'	83.6°	11
12	9°16.5'	+33.5'	81.8°	9°25.0'	+34.4'	82.0°	9°33.3'	+35.2'	82.1°	9°41.5'	+36.1'	82.3°	9°49.5'	+36.9'	82.5°	9°57.2'	+37.7'	82.6°	10°04.9'	+38.6'	82.8°	12
13	9°50.1'	+33.4'	80.9°	9°59.4'	+34.2'	81.1°	10°08.6'	+35.1'	81.3°	10°17.6'	+36.0'	81.5°	10°26.4'	+36.8'	81.7°	10°35.0'	+37.6'	81.8°	10°43.4'	+38.4'	82.0°	13
14	10°23.4'	+33.2'	80.1°	10°33.7'	+34.1'	80.3°	10°43.7'	+35.0'	80.5°	10°53.5'	+35.8'	80.7°	11°03.2'	+36.7'	80.9°	11°12.6'	+37.5'	81.0°	11°21.8'	+38.3'	81.2°	14
15	10°56.7'	+33.1'	79.3°	11°07.8'	+34.0'	79.4°	11°18.7'	+34.8'	79.6°	11°29.3'	+35.7'	79.8°	11°39.8'	+36.6'	80.0°	11°50.1'	+37.4'	80.2°	12°00.1'	+38.2'	80.5°	15
16	11°29.8'	+33.0'	78.4°	11°41.7'	+33.8'	78.6°	11°53.5'	+34.7'	78.8°	12°05.0'	+35.5'	79.0°	12°16.3'	+36.4'	79.2°	12°27.4'	+37.2'	79.4°	12°38.3'	+38.0'	79.7°	16
17	12°02.8'	+32.8'	77.6°	12°15.6'	+33.7'	77.8°	12°28.2'	+34.5'	78.0°	12°40.6'	+35.4'	78.2°	12°52.7'	+36.2'	78.4°	13°04.7'	+37.1'	78.6°	13°16.4'	+37.9'	78.9°	17
18	12°35.6'	+32.6'	76.7°	12°49.3'	+33.5'	76.9°	13°02.7'	+34.4'	77.1°	13°16.0'	+35.2'	77.4°	13°29.0'	+36.1'	77.6°	13°41.7'	+36.9'	77.8°	13°54.3'	+37.7'	78.1°	18
19	13°08.2'	+32.5'	75.8°	13°22.8'	+33.3'	76.1°	13°37.1'	+34.2'	76.3°	13°51.2'	+35.1'	76.5°	14°05.0'	+35.9'	76.8°	14°18.6'	+36.7'	77.0°	14°32.0'	+37.6'	77.3°	19
20	13°40.7'	+32.3'	75.0°	13°56.1'	+33.2'	75.2°	14°11.3'	+34.0'	75.5°	14°26.2'	+34.9'	75.7°	14°40.9'	+35.7'	75.9°	14°55.4'	+36.6'	76.2°	15°09.6'	+37.4'	76.5°	20
21	14°12.9'	+32.1'	74.1°	14°29.3'	+33.0'	74.3°	14°45.3'	+33.8'	74.6°	15°01.1'	+34.7'	74.9°	15°16.7'	+35.5'	75.1°	15°31.9'	+36.4'	75.4°	15°46.9'	+37.2'	75.7°	21
22	14°45.0'	+31.9'	73.2°	15°02.2'	+32.8'	73.5°	15°19.2'	+33.6'	73.7°	15°35.8'	+34.5'	74.0°	15°52.2'	+35.3'	74.3°	16°08.3'	+36.2'	74.6°	16°24.2'	+37.0'	74.8°	22
23	15°16.9'	+31.7'	72.4°	15°35.0'	+32.6'	72.6°	15°52.8'	+33.4'	72.9°	16°10.3'	+34.3'	73.2°	16°27.6'	+35.1'	73.4°	16°44.5'	+36.0'	73.7°	17°01.2'	+36.8'	74.0°	23

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

88° 272° LHA

Latitude SAME as Declination

88° 272° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	1°38.3'	+34.4'	91.1°	1°37.1'	+35.3'	91.2°	1°35.8'	+36.1'	91.2°	1°34.6'	+36.9'	91.2°	1°33.3'	+37.8'	91.3°	1°31.9'	+38.6'	91.3°	1°30.6'	+39.4'	91.3°	0
1	2°12.7'	+34.4'	90.3°	2°12.3'	+35.2'	90.4°	2°11.9'	+36.1'	90.4°	2°11.5'	+36.9'	90.4°	2°11.0'	+37.7'	90.5°	2°10.5'	+38.5'	90.5°	2°09.9'	+39.3'	90.6°	1
2	2°47.1'	+34.4'	89.5°	2°47.6'	+35.2'	89.6°	2°48.0'	+36.1'	89.6°	2°48.4'	+36.9'	89.7°	2°48.8'	+37.7'	89.7°	2°49.0'	+38.5'	89.8°	2°49.3'	+39.3'	89.8°	2
3	3°21.5'	+34.3'	88.7°	3°22.8'	+35.2'	88.7°	3°24.1'	+36.0'	88.8°	3°25.3'	+36.8'	88.9°	3°26.5'	+37.7'	88.9°	3°27.6'	+38.5'	89.0°	3°28.6'	+39.3'	89.0°	3
4	3°55.8'	+34.3'	87.9°	3°58.0'	+35.1'	87.9°	4°00.1'	+36.0'	88.0°	4°02.2'	+36.8'	88.1°	4°04.1'	+37.6'	88.1°	4°06.0'	+38.4'	88.2°	4°07.9'	+39.2'	88.3°	4
5	4°30.0'	+34.2'	87.0°	4°33.1'	+35.1'	87.1°	4°36.1'	+35.9'	87.2°	4°39.0'	+36.7'	87.3°	4°41.8'	+37.6'	87.4°	4°44.5'	+38.4'	87.4°	4°47.1'	+39.2'	87.5°	5
6	5°04.2'	+34.1'	86.2°	5°08.2'	+35.0'	86.3°	5°12.0'	+35.9'	86.4°	5°15.7'	+36.7'	86.5°	5°19.3'	+37.5'	86.6°	5°22.9'	+38.3'	86.7°	5°26.3'	+39.1'	86.8°	6
7	5°38.4'	+34.1'	85.4°	5°43.2'	+34.9'	85.5°	5°47.8'	+35.8'	85.6°	5°52.4'	+36.6'	85.7°	5°56.8'	+37.4'	85.8°	6°01.2'	+38.3'	85.9°	6°05.4'	+39.1'	86.0°	7
8	6°12.5'	+34.0'	84.6°	6°18.1'	+34.9'	84.7°	6°23.6'	+35.7'	84.8°	6°29.0'	+36.5'	84.9°	6°34.3'	+37.4'	85.0°	6°39.4'	+38.2'	85.1°	6°44.5'	+39.0'	85.2°	8
9	6°46.5'	+33.9'	83.7°	6°53.0'	+34.8'	83.9°	6°59.3'	+35.6'	84.0°	7°05.6'	+36.5'	84.1°	7°11.7'	+37.3'	84.2°	7°17.6'	+38.1'	84.3°	7°23.5'	+38.9'	84.5°	9
10	7°20.4'	+33.8'	82.9°	7°27.7'	+34.7'	83.0°	7°34.9'	+35.5'	83.2°	7°42.0'	+36.4'	83.3°	7°49.0'	+37.2'	83.4°	7°55.7'	+38.0'	83.6°	8°02.4'	+38.8'	83.7°	10
11	7°54.2'	+33.7'	82.1°	8°02.4'	+34.6'	82.2°	8°10.5'	+35.4'	82.3°	8°18.4'	+36.3'	82.5°	8°26.2'	+37.1'	82.6°	8°33.8'	+37.9'	82.8°	8°41.2'	+38.7'	82.9°	11
12	8°27.9'	+33.6'	81.2°	8°37.0'	+34.5'	81.4°	8°45.9'	+35.3'	81.5°	8°54.7'	+36.2'	81.7°	9°03.3'	+37.0'	81.8°	9°11.7'	+37.8'	82.0°	9°20.0'	+38.6'	82.2°	12
13	9°01.6'	+33.5'	80.4°	9°11.5'	+34.4'	80.6°	9°21.2'	+35.2'	80.7°	9°30.8'	+36.1'	80.9°	9°40.3'	+36.9'	81.0°	9°49.5'	+37.7'	81.2°	9°58.6'	+38.5'	81.4°	13
14	9°35.1'	+33.4'	79.6°	9°45.9'	+34.2'	79.7°	9°56.5'	+35.1'	79.9°	10°06.9'	+35.9'	80.1°	10°17.2'	+36.8'	80.2°	10°27.2'	+37.6'	80.4°	10°37.1'	+38.4'	80.6°	14
15	10°08.4'	+33.3'	78.7°	10°20.1'	+34.1'	78.9°	10°31.6'	+35.0'	79.1°	10°42.8'	+35.8'	79.3°	10°53.9'	+36.6'	79.4°	11°04.8'	+37.5'	79.6°	11°15.5'	+38.3'	79.8°	15
16	10°41.7'	+33.1'	77.9°	10°54.2'	+34.0'	78.1°	11°06.5'	+34.8'	78.2°	11°18.7'	+35.7'	78.4°	11°30.6'	+36.5'	78.6°	11°42.3'	+37.3'	78.8°	11°53.8'	+38.2'	79.0°	16
17	11°14.8'	+33.0'	77.0°	11°28.2'	+33.8'	77.2°	11°41.4'	+34.7'	77.4°	11°54.3'	+35.5'	77.6°	12°07.1'	+36.4'	77.8°	12°19.6'	+37.2'	78.0°	12°32.0'	+38.0'	78.3°	17
18	11°47.8'	+32.8'	76.2°	12°02.0'	+33.7'	76.4°	12°16.1'	+34.5'	76.6°	12°29.9'	+35.4'	76.8°	12°43.5'	+36.2'	77.0°	12°56.9'	+37.1'	77.2°	13°10.0'	+37.9'	77.5°	18
19	12°20.6'	+32.7'	75.3°	12°35.7'	+33.5'	75.5°	12°50.6'	+34.4'	75.7°	13°05.3'	+35.2'	76.0°	13°19.7'	+36.1'	76.2°	13°33.9'	+36.9'	76.4°	13°47.9'	+37.7'	76.7°	19
20	12°53.3'	+32.5'	74.4°	13°09.2'	+33.4'	74.7°	13°25.0'	+34.2'	74.9°	13°40.5'	+35.1'	75.1°	13°55.8'	+35.9'	75.4°	14°10.8'	+36.7'	75.6°	14°25.6'	+37.6'	75.9°	20
21	13°25.7'	+32.3'	73.6°	13°42.6'	+33.2'	73.8°	13°59.2'	+34.0'	74.1°	14°15.5'	+34.9'	74.3°	14°31.7'	+35.7'	74.5°	14°47.5'	+36.6'	74.8°	15°03.1'	+37.4'	75.1°	21
22	13°58.1'	+32.1'	72.7°	14°15.8'	+33.0'	73.0°	14°33.2'	+33.8'	73.2°	14°50.4'	+34.7'	73.5°	15°07.4'	+35.5'	73.7°	15°24.1'	+36.4'	74.0°	15°40.5'	+37.2'	74.2°	22
23	14°30.2'	+31.9'	71.8°	14°48.7'	+32.8'	72.1°	15°07.1'	+33.7'	72.3°	15°25.1'	+34.5'	72.6°	15°42.9'	+35.3'	72.9°	16°00.5'	+36.2'	73.1°	16°17.7'	+37.0'	73.4°	23

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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°49.1'	+34.4'	90.6°	0°48.5'	+35.3'	90.6°	0°47.9'	+36.1'	90.6°	0°47.3'	+36.9'	90.6°	0°46.6'	+37.8'	90.6°	0°46.0'	+38.6'	90.6°	0°45.3'	+39.4'	90.7°	0
1	1°23.6'	+34.4'	89.8°	1°23.8'	+35.2'	89.8°	1°24.0'	+36.1'	89.8°	1°24.2'	+36.9'	89.8°	1°24.4'	+37.7'	89.9°	1°24.5'	+38.6'	89.9°	1°24.6'	+39.3'	89.9°	1
2	1°58.0'	+34.4'	88.9°	1°59.1'	+35.2'	89.0°	2°00.1'	+36.1'	89.0°	2°01.1'	+36.9'	89.0°	2°02.1'	+37.7'	89.1°	2°03.1'	+38.5'	89.1°	2°04.0'	+39.3'	89.1°	2
3	2°32.3'	+34.3'	88.1°	2°34.3'	+35.2'	88.2°	2°36.2'	+36.0'	88.2°	2°38.0'	+36.9'	88.2°	2°39.8'	+37.7'	88.3°	2°41.6'	+38.5'	88.3°	2°43.3'	+39.3'	88.4°	3
4	3°06.7'	+34.3'	87.3°	3°09.5'	+35.2'	87.3°	3°12.2'	+36.0'	87.4°	3°14.9'	+36.8'	87.5°	3°17.5'	+37.7'	87.5°	3°20.1'	+38.5'	87.6°	3°22.6'	+39.3'	87.6°	4
5	3°41.0'	+34.3'	86.5°	3°44.6'	+35.1'	86.5°	3°48.2'	+36.0'	86.6°	3°51.7'	+36.8'	86.7°	3°55.2'	+37.6'	86.7°	3°58.6'	+38.4'	86.8°	4°01.9'	+39.2'	86.9°	5
6	4°15.2'	+34.2'	85.6°	4°19.7'	+35.1'	85.7°	4°24.2'	+35.9'	85.8°	4°28.5'	+36.7'	85.9°	4°32.8'	+37.6'	86.0°	4°37.0'	+38.4'	86.0°	4°41.1'	+39.2'	86.1°	6
7	4°49.4'	+34.1'	84.8°	4°54.8'	+35.0'	84.9°	5°00.1'	+35.8'	85.0°	5°05.3'	+36.7'	85.1°	5°10.4'	+37.5'	85.2°	5°15.4'	+38.3'	85.3°	5°20.3'	+39.1'	85.4°	7
8	5°23.6'	+34.1'	84.0°	5°29.8'	+34.9'	84.1°	5°35.9'	+35.8'	84.2°	5°41.9'	+36.6'	84.3°	5°47.9'	+37.4'	84.4°	5°53.7'	+38.2'	84.5°	5°59.4'	+39.1'	84.6°	8
9	5°57.6'	+34.0'	83.2°	6°04.7'	+34.9'	83.3°	6°11.7'	+35.7'	83.4°	6°18.6'	+36.5'	83.5°	6°25.3'	+37.4'	83.6°	6°31.9'	+38.2'	83.7°	6°38.4'	+39.0'	83.8°	9
10	6°31.6'	+33.9'	82.3°	6°39.6'	+34.8'	82.5°	6°47.4'	+35.6'	82.6°	6°55.1'	+36.5'	82.7°	7°02.7'	+37.3'	82.8°	7°10.1'	+38.1'	82.9°	7°17.4'	+38.9'	83.1°	10
11	7°05.6'	+33.8'	81.5°	7°14.4'	+34.7'	81.6°	7°23.0'	+35.5'	81.8°	7°31.6'	+36.4'	81.9°	7°39.9'	+37.2'	82.0°	7°48.2'	+38.0'	82.2°	7°56.3'	+38.8'	82.3°	11
12	7°39.4'	+33.7'	80.7°	7°49.1'	+34.6'	80.8°	7°58.6'	+35.4'	81.0°	8°07.9'	+36.3'	81.1°	8°17.1'	+37.1'	81.2°	8°26.2'	+37.9'	81.4°	8°35.1'	+38.7'	81.5°	12
13	8°13.1'	+33.6'	79.8°	8°23.6'	+34.5'	80.0°	8°34.0'	+35.3'	80.1°	8°44.2'	+36.2'	80.3°	8°54.2'	+37.0'	80.4°	9°04.1'	+37.8'	80.6°	9°13.9'	+38.6'	80.8°	13
14	8°46.8'	+33.5'	79.0°	8°58.1'	+34.4'	79.2°	9°09.3'	+35.2'	79.3°	9°20.4'	+36.1'	79.5°	9°31.3'	+36.9'	79.6°	9°42.0'	+37.7'	79.8°	9°52.5'	+38.5'	80.0°	14
15	9°20.3'	+33.4'	78.2°	9°32.5'	+34.3'	78.3°	9°44.6'	+35.1'	78.5°	9°56.4'	+35.9'	78.7°	10°08.1'	+36.8'	78.8°	10°19.7'	+37.6'	79.0°	10°31.0'	+38.4'	79.2°	15
16	9°53.7'	+33.3'	77.3°	10°06.8'	+34.1'	77.5°	10°19.7'	+35.0'	77.7°	10°32.4'	+35.8'	77.9°	10°44.9'	+36.7'	78.0°	10°57.3'	+37.5'	78.2°	11°09.4'	+38.3'	78.4°	16
17	10°27.0'	+33.1'	76.5°	10°40.9'	+34.0'	76.7°	10°54.7'	+34.8'	76.8°	11°08.2'	+35.7'	77.0°	11°21.6'	+36.5'	77.2°	11°34.7'	+37.3'	77.4°	11°47.7'	+38.2'	77.6°	17
18	11°00.1'	+33.0'	75.6°	11°14.9'	+33.9'	75.8°	11°29.5'	+34.7'	76.0°	11°43.9'	+35.5'	76.2°	11°58.1'	+36.4'	76.4°	12°12.1'	+37.2'	76.6°	12°25.8'	+38.0'	76.8°	18
19	11°33.1'	+32.9'	74.8°	11°48.8'	+33.7'	75.0°	12°04.2'	+34.6'	75.2°	12°19.5'	+35.4'	75.4°	12°34.5'	+36.2'	75.6°	12°49.3'	+37.1'	75.8°	13°03.9'	+37.9'	76.0°	19
20	12°06.0'	+32.7'	73.9°	12°22.5'	+33.6'	74.1°	12°38.8'	+34.4'	74.3°	12°54.9'	+35.2'	74.6°	13°10.7'	+36.1'	74.8°	13°26.3'	+36.9'	75.0°	13°41.7'	+37.7'	75.2°	20
21	12°38.7'	+32.5'	73.1°	12°56.0'	+33.4'	73.3°	13°13.2'	+34.2'	73.5°	13°30.1'	+35.1'	73.7°	13°46.8'	+35.9'	74.0°	14°03.2'	+36.7'	74.2°	14°19.4'	+37.6'	74.4°	21
22	13°11.2'	+32.4'	72.2°	13°29.4'	+33.2'	72.4°	13°47.4'	+34.1'	72.7°	14°05.2'	+34.9'	72.9°	14°22.7'	+35.7'	73.1°	14°40.0'	+36.6'	73.4°	14°57.0'	+37.4'	73.6°	22
23	13°43.5'	+32.2'	71.3°	14°02.6'	+33.0'	71.6°	14°21.5'	+33.9'	71.8°	14°40.1'	+34.7'	72.1°	14°58.4'	+35.6'	72.3°	15°16.5'	+36.4'	72.6°	15°34.4'	+37.2'	72.8°	23

89° 271° LHA

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

90° 270° LHA

Latitude CONTRARY or SAME as Declination

90° 270° LHA

Dec°	35			36			37			38			39			40			41			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'	+34.4'	90.0°	0°00.0'	+35.3'	90.0°	0°00.0'	+36.1'	90.0°	0°00.0'	+36.9'	90.0°	0°00.0'	+37.8'	90.0°	0°00.0'	+38.6'	90.0°	0°00.0'	+39.4'	90.0°	0
1	0°34.4'	+34.4'	89.2°	0°35.3'	+35.3'	89.2°	0°36.1'	+36.1'	89.2°	0°36.9'	+36.9'	89.2°	0°37.8'	+37.8'	89.2°	0°38.6'	+38.6'	89.2°	0°39.4'	+39.4'	89.2°	1
2	1°08.8'	+34.4'	88.4°	1°10.5'	+35.2'	88.4°	1°12.2'	+36.1'	88.4°	1°13.9'	+36.9'	88.4°	1°15.5'	+37.7'	88.4°	1°17.1'	+38.5'	88.5°	1°18.7'	+39.3'	88.5°	2
3	1°43.2'	+34.4'	87.5°	1°45.8'	+35.2'	87.6°	1°48.3'	+36.1'	87.6°	1°50.8'	+36.9'	87.6°	1°53.2'	+37.7'	87.7°	1°55.7'	+38.5'	87.7°	1°58.1'	+39.3'	87.7°	3
4	2°17.6'	+34.3'	86.7°	2°21.0'	+35.2'	86.8°	2°24.4'	+36.0'	86.8°	2°27.7'	+36.9'	86.8°	2°31.0'	+37.7'	86.9°	2°34.2'	+38.5'	86.9°	2°37.4'	+39.3'	87.0°	4
5	2°51.9'	+34.3'	85.9°	2°56.2'	+35.2'	86.0°	3°00.4'	+36.0'	86.0°	3°04.6'	+36.8'	86.1°	3°08.7'	+37.7'	86.1°	3°12.7'	+38.5'	86.2°	3°16.7'	+39.3'	86.2°	5
6	3°26.2'	+34.3'	85.1°	3°31.3'	+35.1'	85.1°	3°36.4'	+36.0'	85.2°	3°41.4'	+36.8'	85.3°	3°46.3'	+37.6'	85.3°	3°51.2'	+38.4'	85.4°	3°55.9'	+39.2'	85.5°	6
7	4°00.5'	+34.2'	84.3°	4°06.5'	+35.1'	84.3°	4°12.4'	+35.9'	84.4°	4°18.2'	+36.7'	84.5°	4°23.9'	+37.6'	84.5°	4°29.6'	+38.4'	84.6°	4°35.2'	+39.2'	84.7°	7
8	4°34.7'	+34.2'	83.4°	4°41.5'	+35.0'	83.5°	4°48.3'	+35.9'	83.6°	4°54.9'	+36.7'	83.7°	5°01.5'	+37.5'	83.8°	5°07.9'	+38.3'	83.9°	5°14.3'	+39.1'	83.9°	8
9	5°08.9'	+34.1'	82.6°	5°16.5'	+34.9'	82.7°	5°24.1'	+35.8'	82.8°	5°31.6'	+36.6'	82.9°	5°39.0'	+37.4'	83.0°	5°46.3'	+38.3'	83.1°	5°53.4'	+39.1'	83.2°	9
10	5°43.0'	+34.0'	81.8°	5°51.5'	+34.9'	81.9°	6°00.0'	+35.7'	82.0°	6°08.2'	+36.6'	82.1°	6°16.4'	+37.4'	82.2°	6°24.5'	+38.2'	82.3°	6°32.5'	+39.0'	82.4°	10
11	6°17.0'	+33.9'	81.0°	6°26.4'	+34.8'	81.1°	6°35.6'	+35.6'	81.2°	6°44.8'	+36.5'	81.3°	6°53.8'	+37.3'	81.4°	7°02.7'	+38.1'	81.5°	7°11.5'	+38.9'	81.7°	11
12	6°50.9'	+33.9'	80.1°	7°01.2'	+34.7'	80.2°	7°11.3'	+35.6'	80.4°	7°21.3'	+36.4'	80.5°	7°31.1'	+37.2'	80.6°	7°40.8'	+38.0'	80.8°	7°50.4'	+38.8'	80.9°	12
13	7°24.8'	+33.8'	79.3°	7°35.9'	+34.6'	79.4°	7°46.8'	+35.5'	79.6°	7°57.6'	+36.3'	79.7°	8°08.3'	+37.1'	79.8°	8°18.8'	+37.9'	80.0°	8°29.2'	+38.7'	80.1°	13
14	7°58.6'	+33.7'	78.5°	8°10.5'	+34.5'	78.6°	8°22.3'	+35.4'	78.7°	8°33.9'	+36.2'	78.9°	8°45.4'	+37.0'	79.0°	8°56.8'	+37.8'	79.2°	9°07.9'	+38.6'	79.3°	14
15	8°32.2'	+33.6'	77.6°	8°45.0'	+34.4'	77.8°	8°57.7'	+35.3'	77.9°	9°10.1'	+36.1'	78.1°	9°22.4'	+36.9'	78.2°	9°34.6'	+37.7'	78.4°	9°46.6'	+38.5'	78.6°	15
16	9°05.8'	+33.4'	76.8°	9°19.4'	+34.3'	76.9°	9°32.9'	+35.1'	77.1°	9°46.2'	+36.0'	77.3°	9°59.4'	+36.8'	77.4°	10°12.3'	+37.6'	77.6°	10°25.1'	+38.4'	77.8°	16
17	9°39.2'	+33.3'	75.9°	9°53.7'	+34.2'	76.1°	10°08.0'	+35.0'	76.3°	10°22.2'	+35.8'	76.5°	10°36.2'	+36.7'	76.6°	10°49.9'	+37.5'	76.8°	11°03.5'	+38.3'	77.0°	17
18	10°12.6'	+33.2'	75.1°	10°27.9'	+34.0'	75.3°	10°43.1'	+34.9'	75.5°	10°58.0'	+35.7'	75.6°	11°12.8'	+36.5'	75.8°	11°27.4'	+37.4'	76.0°	11°41.8'	+38.2'	76.2°	18
19	10°45.7'	+33.1'	74.2°	11°01.9'	+33.9'	74.4°	11°17.9'	+34.7'	74.6°	11°33.8'	+35.6'	74.8°	11°49.4'	+36.4'	75.0°	12°04.8'	+37.2'	75.2°	12°20.0'	+38.0'	75.4°	19
20	11°18.8'	+32.9'	73.4°	11°35.8'	+33.8'	73.6°	11°52.7'	+34.6'	73.8°	12°09.3'	+35.4'	74.0°	12°25.8'	+36.3'	74.2°	12°42.0'	+37.1'	74.4°	12°58.0'	+37.9'	74.6°	20
21	11°51.7'	+32.8'	72.5°	12°09.6'	+33.6'	72.7°	12°27.3'	+34.4'	73.0°	12°44.8'	+35.3'	73.2°	13°02.0'	+36.1'	73.4°	13°19.1'	+36.9'	73.6°	13°35.9'	+37.7'	73.8°	21
22	12°24.5'	+32.6'	71.7°	12°43.2'	+33.4'	71.9°	13°01.7'	+34.3'	72.1°	13°20.1'	+35.1'	72.3°	13°38.1'	+35.9'	72.6°	13°56.0'	+36.8'	72.8°	14°13.6'	+37.6'	73.0°	22
23	12°57.0'	+32.4'	70.8°	13°16.6'	+33.3'	71.0°	13°36.0'	+34.1'	71.3°	13°55.2'	+34.9'	71.5°	14°14.1'	+35.8'	71.7°	14°32.8'	+36.6'	72.0°	14°51.2'	+37.4'	72.2°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	0°49.1'	-34.4'	90.6°	0°48.5'	-35.3'	90.6°	0°47.9'	-36.1'	90.6°	0°47.3'	-36.9'	90.6°	0°46.6'	-37.8'	90.6°	0°46.0'	-38.6'	90.6°	0°45.3'	-39.4'	90.7°	0
1	<u>0°14.7'</u>	-34.4'	<u>91.4°</u>	<u>0°13.3'</u>	-35.3'	<u>91.4°</u>	<u>0°11.8'</u>	-36.1'	<u>91.4°</u>	<u>0°10.3'</u>	-36.9'	<u>91.4°</u>	<u>0°08.9'</u>	-37.8'	<u>91.4°</u>	<u>0°07.4'</u>	-38.6'	<u>91.4°</u>	<u>0°05.9'</u>	-39.4'	<u>91.4°</u>	1
2	0°19.7'	+34.4'	87.8°	0°22.0'	+35.3'	87.8°	0°24.3'	+36.1'	87.8°	0°26.6'	+36.9'	87.8°	0°28.9'	+37.8'	87.8°	0°31.2'	+38.6'	87.8°	0°33.5'	+39.4'	87.8°	2
3	0°54.1'	+34.4'	87.0°	0°57.3'	+35.3'	87.0°	1°00.4'	+36.1'	87.0°	1°03.6'	+36.9'	87.0°	1°06.7'	+37.7'	87.0°	1°09.8'	+38.6'	87.1°	1°12.8'	+39.4'	87.1°	3
4	1°28.5'	+34.4'	86.1°	1°32.5'	+35.2'	86.2°	1°36.5'	+36.1'	86.2°	1°40.5'	+36.9'	86.2°	1°44.4'	+37.7'	86.3°	1°48.3'	+38.5'	86.3°	1°52.2'	+39.3'	86.3°	4
5	2°02.9'	+34.4'	85.3°	2°07.8'	+35.2'	85.4°	2°12.6'	+36.1'	85.4°	2°17.4'	+36.9'	85.4°	2°22.1'	+37.7'	85.5°	2°26.9'	+38.5'	85.5°	2°31.5'	+39.3'	85.6°	5
6	2°37.3'	+34.3'	84.5°	2°43.0'	+35.2'	84.6°	2°48.7'	+36.0'	84.6°	2°54.3'	+36.8'	84.7°	2°59.9'	+37.7'	84.7°	3°05.4'	+38.5'	84.8°	3°10.8'	+39.3'	84.8°	6
7	3°11.6'	+34.3'	83.7°	3°18.2'	+35.1'	83.7°	3°24.7'	+36.0'	83.8°	3°31.1'	+36.8'	83.9°	3°37.5'	+37.6'	83.9°	3°43.8'	+38.4'	84.0°	3°50.1'	+39.2'	84.1°	7
8	3°45.9'	+34.2'	82.9°	3°53.3'	+35.1'	82.9°	4°00.7'	+35.9'	83.0°	4°08.0'	+36.8'	83.1°	4°15.2'	+37.6'	83.1°	4°22.3'	+38.4'	83.2°	4°29.3'	+39.2'	83.3°	8
9	4°20.2'	+34.2'	82.0°	4°28.4'	+35.0'	82.1°	4°36.6'	+35.9'	82.2°	4°44.7'	+36.7'	82.3°	4°52.7'	+37.5'	82.4°	5°00.7'	+38.3'	82.4°	5°08.5'	+39.1'	82.5°	9
10	4°54.4'	+34.1'	81.2°	5°03.5'	+35.0'	81.3°	5°12.5'	+35.8'	81.4°	5°21.4'	+36.7'	81.5°	5°30.3'	+37.5'	81.6°	5°39.0'	+38.3'	81.7°	5°47.6'	+39.1'	81.8°	10
11	5°28.5'	+34.1'	80.4°	5°38.5'	+34.9'	80.5°	5°48.3'	+35.8'	80.6°	5°58.1'	+36.6'	80.7°	6°07.7'	+37.4'	80.8°	6°17.3'	+38.2'	80.9°	6°26.7'	+39.0'	81.0°	11
12	6°02.6'	+34.0'	79.6°	6°13.4'	+34.8'	79.7°	6°24.1'	+35.7'	79.8°	6°34.7'	+36.5'	79.9°	6°45.1'	+37.3'	80.0°	6°55.5'	+38.1'	80.1°	7°05.7'	+38.9'	80.2°	12
13	6°36.6'	+33.9'	78.7°	6°48.2'	+34.8'	78.9°	6°59.8'	+35.6'	79.0°	7°11.2'	+36.4'	79.1°	7°22.5'	+37.2'	79.2°	7°33.6'	+38.0'	79.3°	7°44.6'	+38.8'	79.5°	13
14	7°10.5'	+33.8'	77.9°	7°23.0'	+34.7'	78.0°	7°35.3'	+35.5'	78.2°	7°47.6'	+36.3'	78.3°	7°59.7'	+37.1'	78.4°	8°11.7'	+38.0'	78.6°	8°23.5'	+38.8'	78.7°	14
15	7°44.3'	+33.7'	77.1°	7°57.6'	+34.6'	77.2°	8°10.9'	+35.4'	77.3°	8°23.9'	+36.2'	77.5°	8°36.8'	+37.1'	77.6°	8°49.6'	+37.9'	77.8°	9°02.2'	+38.7'	77.9°	15
16	8°18.0'	+33.6'	76.2°	8°32.2'	+34.5'	76.4°	8°46.3'	+35.3'	76.5°	9°00.2'	+36.1'	76.7°	9°13.9'	+36.9'	76.8°	9°27.5'	+37.8'	77.0°	9°40.9'	+38.6'	77.2°	16
17	8°51.6'	+33.5'	75.4°	9°06.7'	+34.4'	75.6°	9°21.6'	+35.2'	75.7°	9°36.3'	+36.0'	75.9°	9°50.8'	+36.8'	76.0°	10°05.2'	+37.6'	76.2°	10°19.4'	+38.4'	76.4°	17
18	9°25.1'	+33.4'	74.6°	9°41.0'	+34.2'	74.7°	9°56.7'	+35.1'	74.9°	10°12.3'	+35.9'	75.1°	10°27.7'	+36.7'	75.2°	10°42.9'	+37.5'	75.4°	10°57.9'	+38.3'	75.6°	18
19	9°58.5'	+33.3'	73.7°	10°15.2'	+34.1'	73.9°	10°31.8'	+34.9'	74.1°	10°48.2'	+35.8'	74.2°	11°04.4'	+36.6'	74.4°	11°20.4'	+37.4'	74.6°	11°36.2'	+38.2'	74.8°	19
20	10°31.8'	+33.1'	72.9°	10°49.3'	+34.0'	73.1°	11°06.7'	+34.8'	73.2°	11°24.0'	+35.6'	73.4°	11°41.0'	+36.4'	73.6°	11°57.8'	+37.3'	73.8°	12°14.4'	+38.1'	74.0°	20
21	11°04.9'	+33.0'	72.0°	11°23.3'	+33.8'	72.2°	11°41.5'	+34.7'	72.4°	11°59.6'	+35.5'	72.6°	12°17.4'	+36.3'	72.8°	12°35.0'	+37.1'	73.0°	12°52.5'	+37.9'	73.2°	21
22	11°37.9'	+32.8'	71.2°	11°57.1'	+33.7'	71.4°	12°16.2'	+34.5'	71.6°	12°35.1'	+35.3'	71.8°	12°53.7'	+36.2'	72.0°	13°12.2'	+37.0'	72.2°	13°30.4'	+37.8'		



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

**88° 272° LHA**

**Latitude CONTRARY to Declination**

**88° 272° LHA**

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	1°38.2'	-34.4'	91.1°	1°37.1'	-35.3'	91.2°	1°35.8'	-36.1'	91.2°	1°34.6'	-37.0'	91.2°	1°33.3'	-37.8'	91.3°	1°31.9'	-38.6'	91.3°	1°30.6'	-39.4'	91.3°	0
1	1°03.8'	-34.5'	92.0°	1°01.8'	-35.3'	92.0°	0°59.7'	-36.1'	92.0°	0°57.6'	-37.0'	92.0°	0°55.5'	-37.8'	92.0°	0°53.3'	-38.6'	92.1°	0°51.2'	-39.4'	92.1°	1
2	0°29.4'	-34.5'	92.8°	0°26.5'	-35.3'	92.8°	0°23.6'	-36.1'	92.8°	0°20.6'	-37.0'	92.8°	0°17.7'	-37.8'	92.8°	0°14.7'	-38.6'	92.8°	0°11.8'	-39.4'	92.8°	2
3	0°05.1'	+34.5'	86.4°	0°08.8'	+35.3'	86.4°	0°12.6'	+36.1'	86.4°	0°16.4'	+37.0'	86.4°	0°20.1'	+37.8'	86.4°	0°23.9'	+38.6'	86.4°	0°27.6'	+39.4'	86.4°	3
4	0°39.5'	+34.4'	85.6°	0°44.1'	+35.3'	85.6°	0°48.7'	+36.1'	85.6°	0°53.3'	+37.0'	85.6°	0°57.9'	+37.8'	85.6°	1°02.5'	+38.6'	85.7°	1°07.0'	+39.4'	85.7°	4
5	1°14.0'	+34.4'	84.8°	1°19.4'	+35.3'	84.8°	1°24.9'	+36.1'	84.8°	1°30.3'	+36.9'	84.8°	1°35.7'	+37.8'	84.9°	1°41.0'	+38.6'	84.9°	1°46.4'	+39.4'	84.9°	5
6	1°48.4'	+34.4'	83.9°	1°54.7'	+35.3'	84.0°	2°01.0'	+36.1'	84.0°	2°07.2'	+36.9'	84.0°	2°13.4'	+37.7'	84.1°	2°19.6'	+38.5'	84.1°	2°25.7'	+39.3'	84.2°	6
7	2°22.8'	+34.4'	83.1°	2°30.0'	+35.2'	83.2°	2°37.1'	+36.1'	83.2°	2°44.2'	+36.9'	83.3°	2°51.2'	+37.7'	83.3°	2°58.2'	+38.5'	83.4°	3°05.1'	+39.3'	83.4°	7
8	2°57.2'	+34.3'	82.3°	3°05.2'	+35.2'	82.4°	3°13.2'	+36.0'	82.4°	3°21.1'	+36.9'	82.5°	3°28.9'	+37.7'	82.5°	3°36.7'	+38.5'	82.6°	3°44.4'	+39.3'	82.6°	8
9	3°31.5'	+34.3'	81.5°	3°40.4'	+35.1'	81.5°	3°49.2'	+36.0'	81.6°	3°57.9'	+36.8'	81.7°	4°06.6'	+37.6'	81.7°	4°15.1'	+38.4'	81.8°	4°23.6'	+39.2'	81.9°	9
10	4°05.8'	+34.3'	80.7°	4°15.5'	+35.1'	80.7°	4°25.2'	+35.9'	80.8°	4°34.7'	+36.8'	80.9°	4°44.2'	+37.6'	81.0°	4°53.6'	+38.4'	81.0°	5°02.9'	+39.2'	81.1°	10
11	4°40.1'	+34.2'	79.8°	4°50.6'	+35.0'	79.9°	5°01.1'	+35.9'	80.0°	5°11.5'	+36.7'	80.1°	5°21.7'	+37.5'	80.2°	5°31.9'	+38.3'	80.3°	5°42.0'	+39.1'	80.4°	11
12	5°14.3'	+34.1'	79.0°	5°25.7'	+35.0'	79.1°	5°37.0'	+35.8'	79.2°	5°48.2'	+36.6'	79.3°	5°59.3'	+37.4'	79.4°	6°10.2'	+38.2'	79.5°	6°21.1'	+39.0'	79.6°	12
13	5°48.4'	+34.1'	78.2°	6°00.6'	+34.9'	78.3°	6°12.8'	+35.7'	78.4°	6°24.8'	+36.6'	78.5°	6°36.7'	+37.4'	78.6°	6°48.5'	+38.2'	78.7°	7°00.2'	+39.0'	78.8°	13
14	6°22.5'	+34.0'	77.4°	6°35.5'	+34.8'	77.5°	6°48.5'	+35.7'	77.6°	7°01.3'	+36.5'	77.7°	7°14.1'	+37.3'	77.8°	7°26.7'	+38.1'	77.9°	7°39.1'	+38.9'	78.1°	14
15	6°56.4'	+33.9'	76.5°	7°10.4'	+34.7'	76.6°	7°24.2'	+35.6'	76.8°	7°37.8'	+36.4'	76.9°	7°51.4'	+37.2'	77.0°	8°04.8'	+38.0'	77.2°	8°18.0'	+38.8'	77.3°	15
16	7°30.3'	+33.8'	75.7°	7°45.1'	+34.6'	75.8°	7°59.7'	+35.5'	76.0°	8°14.2'	+36.3'	76.1°	8°28.6'	+37.1'	76.2°	8°42.8'	+37.9'	76.4°	8°56.8'	+38.7'	76.5°	16
17	8°04.1'	+33.7'	74.9°	8°19.7'	+34.5'	75.0°	8°35.2'	+35.4'	75.1°	8°50.5'	+36.2'	75.3°	9°05.7'	+37.0'	75.4°	9°20.7'	+37.8'	75.6°	9°35.5'	+38.6'	75.8°	17
18	8°37.8'	+33.6'	74.0°	8°54.3'	+34.4'	74.2°	9°10.5'	+35.3'	74.3°	9°26.7'	+36.1'	74.5°	9°42.7'	+36.9'	74.6°	9°58.5'	+37.7'	74.8°	10°14.1'	+38.5'	75.0°	18
19	9°11.4'	+33.5'	73.2°	9°28.7'	+34.3'	73.3°	9°45.8'	+35.1'	73.5°	10°02.8'	+36.0'	73.7°	10°19.5'	+36.8'	73.8°	10°36.1'	+37.6'	74.0°	10°52.6'	+38.4'	74.2°	19
20	9°44.9'	+33.3'	72.3°	10°03.0'	+34.2'	72.5°	10°20.9'	+35.0'	72.7°	10°38.7'	+35.8'	72.9°	10°56.3'	+36.6'	73.0°	11°13.7'	+37.4'	73.2°	11°30.9'	+38.2'	73.4°	20
21	10°18.2'	+33.2'	71.5°	10°37.2'	+34.0'	71.7°	10°55.9'	+34.9'	71.9°	11°14.5'	+35.7'	72.0°	11°32.9'	+36.5'	72.2°	11°51.2'	+37.3'	72.4°	12°09.2'	+38.1'	72.6°	21
22	10°51.4'	+33.1'	70.6°	11°11.2'	+33.9'	70.8°	11°30.8'	+34.7'	71.0°	11°50.2'	+35.6'	71.2°	12°09.5'	+36.4'	71.4°	12°28.5'	+37.2'	71.6°	12°47.3'	+38.0'	71.8°	22
23	11°24.5'	+32.9'	69.8°	11°45.1'	+33.8'	70.0°	12°05.6'	+34.6'	70.2°	12°25.8'	+35.4'	70.4°	12°45.8'	+36.2'	70.6°	13°05.6'	+37.0'	70.8°	13°25.2'	+37.8'	71.0°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
35			36			37			38			39			40			41				

**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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	2°27.4'	-34.5'	91.7°	2°25.6'	-35.3'	91.8°	2°23.7'	-36.2'	91.8°	2°21.8'	-37.0'	91.8°	2°19.9'	-37.8'	91.9°	2°17.9'	-38.6'	91.9°	2°15.8'	-39.4'	92.0°	0
1	1°52.9'	-34.5'	92.5°	1°50.3'	-35.3'	92.6°	1°47.6'	-36.2'	92.6°	1°44.8'	-37.0'	92.6°	1°42.1'	-37.8'	92.7°	1°39.3'	-38.6'	92.7°	1°36.4'	-39.4'	92.7°	1
2	1°18.4'	-34.5'	93.4°	1°15.0'	-35.3'	93.4°	1°11.4'	-36.2'	93.4°	1°07.8'	-37.0'	93.4°	1°04.2'	-37.8'	93.4°	1°00.6'	-38.6'	93.5°	0°57.0'	-39.4'	93.5°	2
3	0°44.0'	-34.5'	94.2°	0°39.6'	-35.4'	94.2°	0°35.2'	-36.2'	94.2°	0°30.8'	-37.0'	94.2°	0°26.4'	-37.8'	94.2°	0°22.0'	-38.6'	94.2°	0°17.6'	-39.4'	94.2°	3
4	0°09.5'	-34.5'	95.0°	0°04.2'	-35.4'	95.0°	0°01.0'	+36.2'	85.0°	0°06.2'	+37.0'	85.0°	0°11.4'	+37.8'	85.0°	0°16.7'	+38.6'	85.0°	0°21.9'	+39.4'	85.0°	4
5	0°25.0'	+34.5'	84.2°	0°31.1'	+35.4'	84.2°	0°37.2'	+36.2'	84.2°	0°43.2'	+37.0'	84.2°	0°49.3'	+37.8'	84.2°	0°55.3'	+38.6'	84.2°	1°01.3'	+39.4'	84.3°	5
6	0°59.5'	+34.5'	83.4°	1°06.5'	+35.3'	83.4°	1°13.4'	+36.2'	83.4°	1°20.2'	+37.0'	83.4°	1°27.1'	+37.8'	83.5°	1°33.9'	+38.6'	83.5°	1°40.7'	+39.4'	83.5°	6
7	1°34.0'	+34.5'	82.5°	1°41.8'	+35.3'	82.6°	1°49.5'	+36.2'	82.6°	1°57.2'	+37.0'	82.6°	2°04.9'	+37.8'	82.7°	2°12.5'	+38.6'	82.7°	2°20.1'	+39.4'	82.8°	7
8	2°08.5'	+34.4'	81.7°	2°17.1'	+35.3'	81.8°	2°25.7'	+36.1'	81.8°	2°34.2'	+36.9'	81.9°	2°42.7'	+37.8'	81.9°	2°51.1'	+38.6'	81.9°	2°59.5'	+39.3'	82.0°	8
9	2°43.0'	+34.4'	80.9°	2°52.4'	+35.3'	81.0°	3°01.8'	+36.1'	81.0°	3°11.2'	+36.9'	81.1°	3°20.4'	+37.7'	81.1°	3°29.7'	+38.5'	81.2°	3°38.9'	+39.3'	81.2°	9
10	3°17.4'	+34.4'	80.1°	3°27.7'	+35.2'	80.1°	3°37.9'	+36.0'	80.2°	3°48.1'	+36.9'	80.3°	3°58.2'	+37.7'	80.3°	4°08.2'	+38.5'	80.4°	4°18.2'	+39.3'	80.5°	10
11	3°51.7'	+34.3'	79.3°	4°02.9'	+35.2'	79.3°	4°13.9'	+36.0'	79.4°	4°24.9'	+36.8'	79.5°	4°35.8'	+37.6'	79.6°	4°46.7'	+38.4'	79.6°	4°57.4'	+39.2'	79.7°	11
12	4°26.1'	+34.3'	78.4°	4°38.0'	+35.1'	78.5°	4°49.9'	+35.9'	78.6°	5°01.8'	+36.8'	78.7°	5°13.5'	+37.6'	78.8°	5°25.1'	+38.4'	78.9°	5°36.6'	+39.2'	79.0°	12
13	5°00.3'	+34.2'	77.6°	5°13.2'	+35.0'	77.7°	5°25.9'	+35.9'	77.8°	5°38.5'	+36.7'	77.9°	5°51.0'	+37.5'	78.0°	6°03.5'	+38.3'	78.1°	6°15.8'	+39.1'	78.2°	13
14	5°34.5'	+34.1'	76.8°	5°48.2'	+35.0'	76.9°	6°01.8'	+35.8'	77.0°	6°15.2'	+36.6'	77.1°	6°28.5'	+37.4'	77.2°	6°41.8'	+38.2'	77.3°	6°54.9'	+39.0'	77.4°	14
15	6°08.7'	+34.1'	76.0°	6°23.2'	+34.9'	76.1°	6°37.6'	+35.7'	76.2°	6°51.8'	+36.5'	76.3°	7°06.0'	+37.3'	76.4°	7°20.0'	+38.1'	76.5°	7°33.9'	+38.9'	76.7°	15
16	6°42.8'	+34.0'	75.1°	6°58.1'	+34.8'	75.3°	7°13.3'	+35.6'	75.4°	7°28.4'	+36.5'	75.5°	7°43.3'	+37.3'	75.6°	7°58.1'	+38.1'	75.8°	8°12.8'	+38.8'	75.9°	16
17	7°16.7'	+33.9'	74.3°	7°32.9'	+34.7'	74.4°	7°48.9'	+35.5'	74.6°	8°04.8'	+36.4'	74.7°	8°20.6'	+37.2'	74.8°	8°36.2'	+38.0'	75.0°	8°51.7'	+38.8'	75.1°	17
18	7°50.6'	+33.8'	73.5°	8°07.6'	+34.6'	73.6°	8°24.5'	+35.4'	73.8°	8°41.2'	+36.3'	73.9°	8°57.8'	+37.1'	74.0°	9°14.2'	+37.9'	74.2°	9°30.4'	+38.6'	74.4°	18
19	8°24.4'	+33.7'	72.6°	8°42.2'	+34.5'	72.8°	8°59.9'	+35.3'	72.9°	9°17.4'	+36.2'	73.1°	9°34.8'	+37.0'	73.3°	9°52.0'	+37.8'	73.4°	10°09.1'	+38.5'	73.6°	19
20	8°58.1'	+33.6'	71.8°	9°16.8'	+34.4'	72.0°	9°35.3'	+35.2'	72.1°	9°53.6'	+36.0'	72.3°	10°11.8'	+36.8'	72.5°	10°29.8'	+37.6'	72.6°	10°47.6'	+38.4'	72.8°	20
21	9°31.7'	+33.5'	71.0°	9°51.2'	+34.3'	71.1°	10°10.5'	+35.1'	71.3°	10°29.6'	+35.9'	71.5°	10°48.6'	+36.7'	71.6°	11°07.4'	+37.5'	71.8°	11°26.0'	+38.3'	72.0°	21
22	10°05.1'	+33.3'	70.1°	10°25.4'	+34.1'	70.3°	10°45.6'	+35.0'	70.5°	11°05.5'	+35.8'	70.7°	11°25.3'	+36.6'	70.8°	11°44.9'	+37.4'	71.0°	12°04.3'	+38.2'	71.2°	22
23	10°38.4'	+33.2'	69.3°	10°59.6'	+34.0'	69.5°																

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

86° 274° LHA

Latitude CONTRARY to Declination

86° 274° LHA

Table with 10 columns (Dec°, 35, 36, 37, 38, 39, 40, 41, Dec°) and 24 rows of celestial coordinates.

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

Table with 10 columns (Dec°, 35, 36, 37, 38, 39, 40, 41, Dec°) and 24 rows of celestial coordinates.

95° 265° LHA

Latitude SAME as DECLINATION

95° 265° LHA

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

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

84° 276° LHA

Latitude CONTRARY to Declination

84° 276° LHA

Table with 10 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of data. Each cell contains three values (Hc, d, Z) for a specific declination and LHA combination.

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

Table with 10 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of data. Each cell contains three values (Hc, d, Z) for a specific declination and LHA combination.

97° 263° LHA

Latitude SAME as DECLINATION

97° 263° LHA

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

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

82° 278° LHA

Latitude CONTRARY to Declination

82° 278° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	6°32.7'	-34.7'	94.6°	6°27.9'	-35.5'	94.7°	6°22.9'	-36.4'	94.8°	6°17.8'	-37.2'	94.9°	6°12.5'	-38.0'	95.1°	6°07.2'	-38.8'	95.2°	6°01.8'	-39.6'	95.3°	0
1	5°58.0'	-34.8'	95.4°	5°52.4'	-35.6'	95.5°	5°46.5'	-36.4'	95.6°	5°40.6'	-37.3'	95.7°	5°34.5'	-38.1'	95.8°	5°28.4'	-38.9'	95.9°	5°22.1'	-39.7'	96.0°	1
2	5°23.3'	-34.8'	96.2°	5°16.8'	-35.7'	96.3°	5°10.1'	-36.5'	96.4°	5°03.3'	-37.3'	96.5°	4°56.5'	-38.1'	96.6°	4°49.5'	-38.9'	96.7°	4°42.5'	-39.7'	96.8°	2
3	4°48.5'	-34.9'	97.1°	4°41.1'	-35.7'	97.1°	4°33.6'	-36.5'	97.2°	4°26.0'	-37.4'	97.3°	4°18.3'	-38.2'	97.4°	4°10.6'	-39.0'	97.5°	4°02.8'	-39.8'	97.5°	3
4	4°13.6'	-34.9'	97.9°	4°05.4'	-35.8'	98.0°	3°57.0'	-36.6'	98.0°	3°48.6'	-37.4'	98.1°	3°40.1'	-38.2'	98.2°	3°31.6'	-39.0'	98.2°	3°23.0'	-39.8'	98.3°	4
5	3°38.7'	-35.0'	98.7°	3°29.6'	-35.8'	98.8°	3°20.4'	-36.6'	98.8°	3°11.2'	-37.4'	98.9°	3°01.9'	-38.2'	98.9°	2°52.6'	-39.0'	99.0°	2°43.2'	-39.8'	99.0°	5
6	3°03.7'	-35.0'	99.5°	2°53.8'	-35.8'	99.6°	2°43.8'	-36.7'	99.6°	2°33.8'	-37.5'	99.7°	2°23.7'	-38.3'	99.7°	2°13.6'	-39.1'	99.7°	2°03.4'	-39.8'	99.8°	6
7	2°28.7'	-35.0'	100.3°	2°18.0'	-35.9'	100.4°	2°07.1'	-36.7'	100.4°	1°56.3'	-37.5'	100.4°	1°45.4'	-38.3'	100.5°	1°34.5'	-39.1'	100.5°	1°23.5'	-39.9'	100.5°	7
8	1°53.7'	-35.1'	101.1°	1°42.1'	-35.9'	101.2°	1°30.5'	-36.7'	101.2°	1°18.8'	-37.5'	101.2°	1°07.1'	-38.3'	101.2°	0°55.4'	-39.1'	101.3°	0°43.7'	-39.9'	101.3°	8
9	1°18.6'	-35.1'	101.9°	1°06.2'	-35.9'	102.0°	0°53.8'	-36.7'	102.0°	0°41.3'	-37.5'	102.0°	0°28.8'	-38.3'	102.0°	0°16.3'	-39.1'	102.0°	0°03.8'	-39.9'	102.0°	9
10	0°43.6'	-35.1'	102.8°	0°30.3'	-35.9'	102.8°	0°17.0'	-36.7'	102.8°	0°03.8'	-37.5'	102.8°	0°09.5'	+38.3'	77.2°	0°22.8'	+39.1'	77.2°	0°36.0'	+39.9'	77.2°	10
11	0°08.5'	-35.1'	103.6°	0°05.6'	+35.9'	76.4°	0°19.7'	+36.7'	76.4°	0°33.8'	+37.5'	76.4°	0°47.8'	+38.3'	76.5°	1°01.9'	+39.1'	76.5°	1°15.9'	+39.8'	76.5°	11
12	0°26.6'	+35.1'	75.6°	0°41.5'	+35.9'	75.6°	0°56.4'	+36.7'	75.6°	1°11.3'	+37.5'	75.7°	1°26.1'	+38.3'	75.7°	1°40.9'	+39.1'	75.7°	1°55.7'	+39.8'	75.7°	12
13	1°01.7'	+35.1'	74.8°	1°17.4'	+35.9'	74.8°	1°33.1'	+36.7'	74.8°	1°48.8'	+37.5'	74.9°	2°04.4'	+38.3'	74.9°	2°20.0'	+39.0'	74.9°	2°35.6'	+39.8'	75.0°	13
14	1°36.8'	+35.1'	74.0°	1°53.3'	+35.9'	74.0°	2°09.8'	+36.7'	74.1°	2°26.3'	+37.5'	74.1°	2°42.7'	+38.2'	74.1°	2°59.0'	+39.0'	74.2°	3°15.4'	+39.8'	74.2°	14
15	2°11.8'	+35.0'	73.2°	2°29.2'	+35.8'	73.2°	2°46.5'	+36.6'	73.3°	3°03.7'	+37.4'	73.3°	3°20.9'	+38.2'	73.4°	3°38.0'	+39.0'	73.4°	3°55.1'	+39.7'	73.5°	15
16	2°46.8'	+35.0'	72.4°	3°05.0'	+35.8'	72.4°	3°23.1'	+36.6'	72.5°	3°41.1'	+37.4'	72.5°	3°59.1'	+38.2'	72.6°	4°17.0'	+38.9'	72.7°	4°34.9'	+39.7'	72.7°	16
17	3°21.8'	+34.9'	71.6°	3°40.8'	+35.8'	71.6°	3°59.7'	+36.5'	71.7°	4°18.5'	+37.3'	71.7°	4°37.3'	+38.1'	71.8°	4°55.9'	+38.9'	71.9°	5°14.5'	+39.6'	72.0°	17
18	3°56.8'	+34.9'	70.7°	4°16.5'	+35.7'	70.8°	4°36.2'	+36.5'	70.9°	4°55.8'	+37.3'	71.0°	5°15.4'	+38.0'	71.0°	5°34.8'	+38.8'	71.1°	5°54.2'	+39.6'	71.2°	18
19	4°31.7'	+34.8'	69.9°	4°52.2'	+35.6'	70.0°	5°12.7'	+36.4'	70.1°	5°33.1'	+37.2'	70.2°	5°53.4'	+38.0'	70.3°	6°13.6'	+38.7'	70.4°	6°33.7'	+39.5'	70.5°	19
20	5°06.5'	+34.8'	69.1°	5°27.9'	+35.6'	69.2°	5°49.1'	+36.4'	69.3°	6°10.3'	+37.1'	69.4°	6°31.4'	+37.9'	69.5°	6°52.4'	+38.7'	69.6°	7°13.2'	+39.4'	69.7°	20
21	5°41.3'	+34.7'	68.3°	6°03.5'	+35.5'	68.4°	6°25.5'	+36.3'	68.5°	6°47.5'	+37.1'	68.6°	7°09.3'	+37.8'	68.7°	7°31.0'	+38.6'	68.8°	7°52.6'	+39.3'	69.0°	21
22	6°16.0'	+34.6'	67.5°	6°39.0'	+35.4'	67.6°	7°01.8'	+36.2'	67.7°	7°24.5'	+37.0'	67.8°	7°47.1'	+37.7'	67.9°	8°09.6'	+38.5'	68.1°	8°32.0'	+39.2'	68.2°	22
23	6°50.7'	+34.6'	66.6°	7°14.4'	+35.3'	66.8°	7°38.0'	+36.1'	66.9°	8°01.5'	+36.9'	67.0°	8°24.9'	+37.7'	67.1°	8°48.1'	+38.4'	67.3°	9°11.2'	+39.1'	67.4°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	7°21.7'	-34.7'	95.2°	7°16.2'	-35.6'	95.3°	7°10.6'	-36.4'	95.4°	7°04.9'	-37.3'	95.6°	6°59.0'	-38.1'	95.7°	6°53.0'	-38.9'	95.8°	6°46.8'	-39.7'	95.9°	0
1	6°46.9'	-34.8'	96.0°	6°40.6'	-35.7'	96.1°	6°34.2'	-36.5'	96.2°	6°27.6'	-37.3'	96.4°	6°20.9'	-38.1'	96.5°	6°14.1'	-38.9'	96.6°	6°07.1'	-39.7'	96.7°	1
2	6°12.1'	-34.9'	96.8°	6°05.0'	-35.7'	96.9°	5°57.7'	-36.6'	97.0°	5°50.3'	-37.4'	97.1°	5°42.7'	-38.2'	97.2°	5°35.1'	-39.0'	97.3°	5°27.4'	-39.8'	97.4°	2
3	5°37.3'	-35.0'	97.6°	5°29.2'	-35.8'	97.7°	5°21.1'	-36.6'	97.8°	5°12.9'	-37.5'	97.9°	5°04.5'	-38.3'	98.0°	4°56.1'	-39.1'	98.1°	4°47.6'	-39.8'	98.2°	3
4	5°02.3'	-35.0'	98.5°	4°53.4'	-35.9'	98.6°	4°44.5'	-36.7'	98.6°	4°35.4'	-37.5'	98.7°	4°26.3'	-38.3'	98.8°	4°17.1'	-39.1'	98.9°	4°07.8'	-39.9'	98.9°	4
5	4°27.3'	-35.1'	99.3°	4°17.5'	-35.9'	99.4°	4°07.8'	-36.7'	99.4°	3°57.9'	-37.6'	99.5°	3°48.0'	-38.4'	99.6°	3°38.0'	-39.1'	99.6°	3°27.9'	-39.9'	99.7°	5
6	3°52.2'	-35.1'	100.1°	3°41.6'	-36.0'	100.2°	3°31.0'	-36.8'	100.2°	3°20.3'	-37.6'	100.3°	3°09.6'	-38.4'	100.3°	2°58.8'	-39.2'	100.4°	2°48.0'	-39.9'	100.4°	6
7	3°17.0'	-35.2'	100.9°	3°05.7'	-36.0'	101.0°	2°54.2'	-36.8'	101.0°	2°42.7'	-37.6'	101.1°	2°31.2'	-38.4'	101.1°	2°19.6'	-39.2'	101.1°	2°08.0'	-40.0'	101.2°	7
8	2°41.9'	-35.2'	101.7°	2°29.7'	-36.0'	101.8°	2°17.4'	-36.8'	101.8°	2°05.1'	-37.6'	101.8°	1°52.8'	-38.4'	101.9°	1°40.4'	-39.2'	101.9°	1°28.0'	-40.0'	101.9°	8
9	2°06.7'	-35.2'	102.5°	1°53.6'	-36.1'	102.6°	1°40.6'	-36.9'	102.6°	1°27.5'	-37.7'	102.6°	1°14.4'	-38.4'	102.6°	1°01.2'	-39.2'	102.7°	0°48.1'	-40.0'	102.7°	9
10	1°31.4'	-35.2'	103.3°	1°17.6'	-36.1'	103.4°	1°03.7'	-36.9'	103.4°	0°49.8'	-37.7'	103.4°	0°35.9'	-38.5'	103.4°	0°22.0'	-39.2'	103.4°	0°08.1'	-40.0'	103.4°	10
11	0°56.2'	-35.3'	104.1°	0°41.5'	-36.1'	104.2°	0°26.8'	-36.9'	104.2°	0°12.1'	-37.7'	104.2°	0°02.5'	+38.5'	75.8°	0°17.2'	+39.2'	75.8°	0°31.9'	+40.0'	75.8°	11
12	0°20.9'	-35.3'	105.0°	0°05.4'	-36.1'	105.0°	0°10.0'	+36.9'	75.0°	0°25.5'	+37.7'	75.0°	0°41.0'	+38.4'	75.1°	0°56.5'	+39.2'	75.1°	1°11.9'	+40.0'	75.1°	12
13	0°14.3'	+35.3'	74.2°	0°30.6'	+36.1'	74.2°	0°46.9'	+36.9'	74.3°	1°03.2'	+37.7'	74.3°	1°19.5'	+38.4'	74.3°	1°35.7'	+39.2'	74.3°	1°51.9'	+40.0'	74.3°	13
14	0°49.6'	+35.2'	73.4°	1°06.7'	+36.1'	73.4°	1°23.8'	+36.9'	73.5°	1°40.8'	+37.6'	73.5°	1°57.9'	+38.4'	73.5°	2°14.9'	+39.2'	73.6°	2°31.9'	+39.9'	73.6°	14
15	1°24.8'	+35.2'	72.6°	1°42.7'	+36.0'	72.6°	2°00.6'	+36.8'	72.7°	2°18.5'	+37.6'	72.7°	2°36.3'	+38.4'	72.8°	2°54.1'	+39.1'	72.8°	3°11.8'	+39.9'	72.8°	15
16	2°00.1'	+35.2'	71.8°	2°18.8'	+36.0'	71.8°	2°37.5'	+36.8'	71.9°	2°56.1'	+37.6'	71.9°	3°14.7'	+38.3'	72.0°	3°33.2'	+39.1'	72.0°	3°51.7'	+39.9'	72.1°	16
17	2°35.3'	+35.2'	71.0°	2°54.8'	+36.0'	71.0°	3°14.3'	+36.8'	71.1°	3°33.7'	+37.5'	71.1°	3°53.0'	+38.3'	71.2°	4°12.3'	+39.1'	71.3°	4°31.6'	+39.8'	71.3°	17
18	3°10.5'	+35.1'	70.2°	3°30.8'	+35.9'	70.2°	3°51.0'	+36.7'	70.3°	4°11.2'	+37.5'	70.4°	4°31.3'	+38.3'	70.4°	4°51.4'	+39.0'	70.5°	5°11.4'	+39.8'	70.6°	18
19	3°45.6'	+35.1'	69.4°	4°06.7'	+35.9'	69.4°	4°27.7'	+36.7'	69.5°	4°48.7'	+37.4'	69.6°	5°09.6'	+38.2'	69.7°	5°30.4'	+39.0'	69.8°	5°51.1'	+39.7'	69.8°	19
20	4°20.7'	+35.0'	68.6°	4°42.6'	+35.8'	68.6°	5°04.4'	+36.6'	68.7°	5°26.1'	+37.4'	68.8°	5°47.8'	+38.1'	68.9°	6°09.4'	+38.9'	69.0°	6°30.8'	+39.6'	69.1°	20
21	4°55.7'	+35.0'	67.7°	5°18.4'	+35.8'	67.8°	5°41.0'	+36.5'	67.9°	6°03.5'	+37.3'	68.0°	6°25.9'	+38.1'	68.1°	6°48.3'	+38.8'	68.2°	7°10.5'	+39.6'	68.3°	21
22	5°30.7'	+34.9'	66.9°	5°54.2'	+35.7'	67.0°	6°17.6'	+36.5'	67.1°	6°40.8'	+37.2'	67.2°	7°04.0'	+38.0'	67.3°	7°27.1'	+38.7'	67.5°	7°50.0'	+39.5'	67.6°	22
23	6°05.6'	+34.8'	66.1°	6°29.9'	+35.6'	66.2°	6°54.0'	+36.4'	6													

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

80° 280° LHA

Latitude CONTRARY to Declination

80° 280° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	8°10.6'	-34.8'	95.8°	8°04.6'	-35.7'	95.9°	7°58.3'	-36.5'	96.1°	7°51.9'	-37.3'	96.2°	7°45.3'	-38.1'	96.3°	7°38.7'	-39.0'	96.5°	7°31.8'	-39.7'	96.6°	0
1	7°35.8'	-34.9'	96.6°	7°28.9'	-35.8'	96.7°	7°21.8'	-36.6'	96.9°	7°14.6'	-37.4'	97.0°	7°07.2'	-38.2'	97.1°	6°59.7'	-39.0'	97.2°	6°52.1'	-39.8'	97.4°	1
2	7°00.9'	-35.0'	97.4°	6°53.1'	-35.8'	97.5°	6°45.2'	-36.7'	97.7°	6°37.1'	-37.5'	97.8°	6°29.0'	-38.3'	97.9°	6°20.7'	-39.1'	98.0°	6°12.3'	-39.9'	98.1°	2
3	6°25.9'	-35.1'	98.2°	6°17.3'	-35.9'	98.3°	6°08.5'	-36.7'	98.5°	5°59.7'	-37.6'	98.6°	5°50.7'	-38.4'	98.7°	5°41.6'	-39.2'	98.8°	5°32.4'	-39.9'	98.9°	3
4	5°50.9'	-35.1'	99.1°	5°41.4'	-36.0'	99.2°	5°31.8'	-36.8'	99.2°	5°22.1'	-37.6'	99.3°	5°12.3'	-38.4'	99.4°	5°02.4'	-39.2'	99.5°	4°52.5'	-40.0'	99.6°	4
5	5°15.7'	-35.2'	99.9°	5°05.4'	-36.0'	100.0°	4°55.0'	-36.9'	100.0°	4°44.5'	-37.7'	100.1°	4°33.9'	-38.5'	100.2°	4°23.2'	-39.3'	100.3°	4°12.5'	-40.0'	100.4°	5
6	4°40.5'	-35.3'	100.7°	4°29.4'	-36.1'	100.8°	4°18.1'	-36.9'	100.8°	4°06.8'	-37.7'	100.9°	3°55.4'	-38.5'	101.0°	3°44.0'	-39.3'	101.0°	3°32.4'	-40.1'	101.1°	6
7	4°05.3'	-35.3'	101.5°	3°53.3'	-36.1'	101.6°	3°41.2'	-37.0'	101.6°	3°29.1'	-37.8'	101.7°	3°16.9'	-38.5'	101.7°	3°04.7'	-39.3'	101.8°	2°52.4'	-40.1'	101.8°	7
8	3°29.9'	-35.4'	102.3°	3°17.1'	-36.2'	102.4°	3°04.3'	-37.0'	102.4°	2°51.3'	-37.8'	102.5°	2°38.4'	-38.6'	102.5°	2°25.4'	-39.3'	102.6°	2°12.3'	-40.1'	102.6°	8
9	2°54.6'	-35.4'	103.1°	2°41.0'	-36.2'	103.2°	2°27.3'	-37.0'	103.2°	2°13.6'	-37.8'	103.2°	1°59.8'	-38.6'	103.3°	1°46.0'	-39.4'	103.3°	1°32.2'	-40.1'	103.3°	9
10	2°19.2'	-35.4'	103.9°	2°04.8'	-36.2'	104.0°	1°50.3'	-37.0'	104.0°	1°35.8'	-37.8'	104.0°	1°21.2'	-38.6'	104.0°	1°06.6'	-39.4'	104.1°	0°52.0'	-40.1'	104.1°	10
11	1°43.8'	-35.4'	104.7°	1°28.5'	-36.2'	104.8°	1°13.2'	-37.0'	104.8°	0°57.9'	-37.8'	104.8°	0°42.6'	-38.6'	104.8°	<u>0°27.3' -39.4' 104.8°</u>	<u>0°11.9' -40.1' 104.8°</u>					11
12	1°08.4'	-35.4'	105.5°	0°52.3'	-36.3'	105.5°	<u>0°36.2' -37.1' 105.6°</u>	<u>0°20.1' -37.8' 105.6°</u>	<u>0°04.0' -38.6' 105.6°</u>	0°12.1'	+39.4'	74.4°	0°28.2'	+40.1'	74.4°							12
13	<u>0°32.9' -35.5' 106.3°</u>	<u>0°16.0' -36.3' 106.3°</u>	0°00.9'	+37.1'	73.7°	0°17.8'	+37.8'	73.7°	0°34.6'	+38.6'	73.7°	0°51.5'	+39.4'	73.7°	1°08.4'	+40.1'	73.7°					13
14	0°02.5'	+35.5'	72.9°	0°20.2'	+36.3'	72.9°	0°37.9'	+37.0'	72.9°	0°55.6'	+37.8'	72.9°	1°13.2'	+38.6'	72.9°	1°30.9'	+39.4'	72.9°	1°48.5'	+40.1'	72.9°	14
15	0°38.0'	+35.4'	72.0°	0°56.5'	+36.2'	72.1°	1°15.0'	+37.0'	72.1°	1°33.4'	+37.8'	72.1°	1°51.8'	+38.6'	72.1°	2°10.2'	+39.3'	72.2°	2°28.6'	+40.1'	72.2°	15
16	1°13.5'	+35.4'	71.2°	1°32.7'	+36.2'	71.3°	1°52.0'	+37.0'	71.3°	2°11.2'	+37.8'	71.3°	2°30.4'	+38.6'	71.4°	2°49.6'	+39.3'	71.4°	3°08.7'	+40.0'	71.5°	16
17	1°48.9'	+35.4'	70.4°	2°09.0'	+36.2'	70.5°	2°29.0'	+37.0'	70.5°	2°49.0'	+37.8'	70.5°	3°09.0'	+38.5'	70.6°	3°28.9'	+39.3'	70.7°	3°48.7'	+40.0'	70.7°	17
18	2°24.3'	+35.4'	69.6°	2°45.2'	+36.2'	69.7°	3°06.0'	+36.9'	69.7°	3°26.8'	+37.7'	69.8°	3°47.5'	+38.5'	69.8°	4°08.1'	+39.2'	69.9°	4°28.7'	+40.0'	70.0°	18
19	2°59.7'	+35.3'	68.8°	3°21.3'	+36.1'	68.9°	3°42.9'	+36.9'	68.9°	4°04.5'	+37.7'	69.0°	4°26.0'	+38.4'	69.1°	4°47.4'	+39.2'	69.1°	5°08.7'	+39.9'	69.2°	19
20	3°35.0'	+35.3'	68.0°	3°57.5'	+36.1'	68.1°	4°19.8'	+36.9'	68.1°	4°42.2'	+37.6'	68.2°	5°04.4'	+38.4'	68.3°	5°26.5'	+39.1'	68.4°	5°48.6'	+39.9'	68.5°	20
21	4°10.3'	+35.3'	67.2°	4°33.6'	+36.0'	67.3°	4°56.7'	+36.8'	67.3°	5°19.8'	+37.6'	67.4°	5°42.8'	+38.3'	67.5°	6°05.7'	+39.1'	67.6°	6°28.5'	+39.8'	67.7°	21
22	4°45.6'	+35.2'	66.4°	5°09.6'	+36.0'	66.5°	5°33.5'	+36.7'	66.6°	5°57.3'	+37.5'	66.6°	6°21.1'	+38.2'	66.7°	6°44.7'	+39.0'	66.8°	7°08.3'	+39.7'	67.0°	22
23	5°20.8'	+35.1'	65.6°	5°45.6'	+35.9'	65.7°	6°10.2'	+36.7'	65.8°	6°34.8'	+37.4'	65.9°	6°59.3'	+38.2'	66.0°	7°23.7'	+38.9'	66.1°	7°48.0'	+39.6'	66.2°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

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

Dec°	35			36			37			38			39			40			41			Dec°		
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°			
0	8°59.5'	-34.9'	96.4°	8°52.8'	-35.7'	96.5°	8°45.9'	-36.6'	96.7°	8°38.9'	-37.4'	96.8°	8°31.7'	-38.2'	97.0°	8°24.3'	-39.0'	97.1°	8°16.8'	-39.8'	97.3°	0		
1	8°24.6'	-35.0'	97.2°	8°17.1'	-35.8'	97.3°	8°09.3'	-36.7'	97.5°	8°01.5'	-37.5'	97.6°	7°53.4'	-38.3'	97.8°	7°45.3'	-39.1'	97.9°	7°37.0'	-39.9'	98.0°	1		
2	7°49.6'	-35.1'	98.0°	7°41.2'	-35.9'	98.1°	7°32.7'	-36.8'	98.3°	7°24.0'	-37.6'	98.4°	7°15.1'	-38.4'	98.5°	7°06.2'	-39.2'	98.7°	6°57.1'	-40.0'	98.8°	2		
3	7°14.5'	-35.2'	98.8°	7°05.3'	-36.0'	98.9°	6°55.9'	-36.8'	99.1°	6°46.4'	-37.7'	99.2°	6°36.7'	-38.5'	99.3°	6°27.0'	-39.3'	99.4°	6°17.1'	-40.0'	99.5°	3		
4	6°39.4'	-35.3'	99.6°	6°29.3'	-36.1'	99.8°	6°19.0'	-36.9'	99.9°	6°08.7'	-37.7'	100.0°	5°58.3'	-38.5'	100.1°	5°47.7'	-39.3'	100.2°	5°37.1'	-40.1'	100.3°	4		
5	6°04.1'	-35.3'	100.5°	5°53.2'	-36.2'	100.6°	5°42.1'	-37.0'	100.7°	5°31.1'	-37.8'	100.8°	5°19.7'	-38.6'	100.8°	5°08.4'	-39.4'	100.9°	4°57.0'	-40.1'	101.0°	5		
6	5°28.8'	-35.4'	101.3°	5°17.0'	-36.2'	101.4°	5°05.1'	-37.0'	101.4°	4°53.2'	-37.8'	101.5°	4°41.2'	-38.6'	101.6°	4°29.0'	-39.4'	101.7°	4°16.8'	-40.2'	101.8°	6		
7	4°53.4'	-35.5'	102.1°	4°40.8'	-36.3'	102.2°	4°28.1'	-37.1'	102.2°	4°15.3'	-37.9'	102.3°	4°02.5'	-38.7'	102.4°	3°49.6'	-39.5'	102.4°	3°36.6'	-40.2'	102.5°	7		
8	4°17.9'	-35.5'	102.9°	4°04.5'	-36.3'	103.0°	3°51.0'	-37.1'	103.0°	3°37.5'	-37.9'	103.1°	3°23.8'	-38.7'	103.1°	3°10.2'	-39.5'	103.2°	2°56.4'	-40.2'	103.3°	8		
9	3°42.4'	-35.6'	103.7°	3°28.2'	-36.4'	103.8°	3°13.9'	-37.2'	103.8°	2°59.5'	-38.0'	103.9°	2°45.1'	-38.7'	103.9°	2°30.7'	-39.5'	104.0°	2°16.2'	-40.3'	104.0°	9		
10	3°06.9'	-35.6'	104.5°	2°51.8'	-36.4'	104.6°	2°36.7'	-37.2'	104.6°	2°21.6'	-38.0'	104.6°	2°06.4'	-38.8'	104.7°	1°51.2'	-39.5'	104.7°	1°35.9'	-40.3'	104.7°	10		
11	2°31.3'	-35.6'	105.3°	2°15.4'	-36.4'	105.3°	1°59.5'	-37.2'	105.4°	1°43.6'	-38.0'	105.4°	1°27.6'	-38.8'	105.4°	1°11.6'	-39.5'	105.5°	0°55.6'	-40.3'	105.5°	11		
12	1°55.6'	-35.6'	106.1°	1°39.0'	-36.4'	106.1°	1°22.3'	-37.2'	106.2°	1°05.6'	-38.0'	106.2°	0°48.8'	-38.8'	106.2°	<u>0°32.1' -39.6' 106.2°</u>	<u>0°15.3' -40.3' 106.2°</u>					12		
13	1°20.0'	-35.7'	106.9°	1°02.5'	-36.5'	106.9°	0°45.0'	-37.2'	107.0°	<u>0°27.5' -38.0' 107.0°</u>	<u>0°10.5' +38.0' 72.3°</u>	<u>0°28.8' +38.8' 72.3°</u>	0°07.5'	+39.5'	73.0°	0°25.0'	+40.3'	73.0°				13		
14	0°44.3'	-35.7'	107.7°	<u>0°26.1' -36.5' 107.7°</u>	<u>0°07.8' -37.2' 107.7°</u>	0°10.5'	+38.0'	72.3°	0°48.5'	+38.0'	71.5°	1°07.5'	+38.8'	71.5°	1°26.6'	+39.5'	71.5°	1°05.3'	+40.3'	72.3°	1°05.3'	+40.3'	72.3°	14
15	<u>0°08.7' -35.7' 108.5°</u>	0°10.4'	+36.5'	71.5°	0°29.5'	+37.2'	71.5°	0°48.5'	+38.0'	71.5°	1°07.5'	+38.8'	71.5°	1°26.6'	+39.5'	71.5°	1°45.6'	+40.3'	71.6°				15	
16	0°27.0'	+35.7'	70.7°	0°46.9'	+36.5'	70.7°	1°06.7'	+37.2'	70.7°	1°26.5'	+38.0'	70.7°	1°46.3'	+38.8'	70.7°	2°06.1'	+39.5'	70.8°	2°25.8'	+40.2'	70.8°	16		
17	1°02.7'	+35.7'	69.9°	1°23.3'	+36.4'	69.9°	1°43.9'	+37.2'	69.9°	2°04.5'	+38.0'	69.9°	2°25.1'	+38.7'	70.0°	2°45.6'	+39.5'	70.0°	3°06.1'	+40.2'	70.1°	17		
18	1°38.3'	+35.6'	69.1°	1°59.7'	+36.4'	69.1°	2°21.1'	+37.2'	69.1°	2°42.5'	+37.9'	69.2°	3°03.8'	+38.7'	69.2°	3°25.1'	+39.4'	69.3°	3°46.3'	+40.2'	69.3°	18		
19	2°13.9'	+35.6'	68.3°	2°36.2'	+36.4'	68.3°	2°58.3'	+37.2'	68.3°	3°20.4'	+37.9'	68.4°	3°42.5'	+38.7'	68.4°	4°04.5'	+39.4'	68.5°	4°26.5'	+40.1'	68.6°	19		
20	2°49.5'	+35.6'	67.5°	3°12.5'	+36.3'	67.5°	3°35.5'	+37.1'	67.6°	3°58.3'	+37.9'	67.6°	4°21.2'	+38.6'	67.7°	4°43.9'	+39.3'	67.8°	5°06.6'	+40.1'	67.8°	20		
21	3°25.1'	+35.5'	66.6°	3°48.9'	+36.3'	66.7°	4°12.6'	+37.1'	66.8°	4°36.2'	+37.8'	66.8°	4°59.8'	+38.6'	66.9°	5°23.3'	+39.3'	67.0°	5°46.7'	+40.0'	67.1°	21		
22	4°00.7'	+35.5'	65.8°	4°25.2'																				

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

78° 282° LHA

Latitude CONTRARY to Declination

78° 282° LHA

Table with columns for Dec°, Hc°, d', Z° for LHA values 35-41. Includes data for Dec 0 to 23 and a final Dec° row.

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 columns for Dec°, Hc°, d', Z° for LHA values 35-41. Includes data for Dec 0 to 23 and a final Dec° row.

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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	11°25.8'	-35.2'	98.1°	11°17.2'	-36.0'	98.3°	11°08.4'	-36.9'	98.5°	10°59.4'	-37.7'	98.7°	10°50.2'	-38.5'	98.9°	10°40.8'	-39.3'	99.1°	10°31.2'	-40.1'	99.3°	0
1	10°50.6'	-35.3'	99.0°	10°41.2'	-36.2'	99.2°	10°31.5'	-37.0'	99.3°	10°21.7'	-37.8'	99.5°	10°11.7'	-38.6'	99.7°	10°01.5'	-39.4'	99.9°	9°51.1'	-40.2'	100.0°	1
2	10°15.3'	-35.4'	99.8°	10°05.0'	-36.3'	100.0°	9°54.5'	-37.1'	100.1°	9°43.9'	-37.9'	100.3°	9°33.1'	-38.7'	100.5°	9°22.1'	-39.5'	100.6°	9°10.9'	-40.3'	100.8°	2
3	9°39.9'	-35.6'	100.6°	9°28.7'	-36.4'	100.8°	9°17.5'	-37.2'	100.9°	9°06.0'	-38.0'	101.1°	8°54.4'	-38.8'	101.2°	8°42.6'	-39.6'	101.4°	8°30.6'	-40.4'	101.5°	3
4	9°04.3'	-35.7'	101.4°	8°52.4'	-36.5'	101.6°	8°40.2'	-37.3'	101.7°	8°28.0'	-38.1'	101.9°	8°15.6'	-38.9'	102.0°	8°03.0'	-39.7'	102.2°	7°50.3'	-40.4'	102.3°	4
5	8°28.7'	-35.8'	102.2°	8°15.9'	-36.6'	102.4°	8°02.9'	-37.4'	102.5°	7°49.9'	-38.2'	102.7°	7°36.7'	-39.0'	102.8°	7°23.3'	-39.8'	102.9°	7°09.8'	-40.5'	103.0°	5
6	7°52.9'	-35.9'	103.0°	7°39.3'	-36.7'	103.2°	7°25.5'	-37.5'	103.3°	7°11.7'	-38.3'	103.4°	6°57.7'	-39.1'	103.6°	6°43.5'	-39.8'	103.7°	6°29.3'	-40.6'	103.8°	6
7	7°17.1'	-35.9'	103.9°	7°02.6'	-36.8'	104.0°	6°48.1'	-37.6'	104.1°	6°33.4'	-38.3'	104.2°	6°18.6'	-39.1'	104.3°	6°03.7'	-39.9'	104.4°	5°48.7'	-40.6'	104.5°	7
8	6°41.1'	-36.0'	104.7°	6°25.9'	-36.8'	104.8°	6°10.5'	-37.6'	104.9°	5°55.1'	-38.4'	105.0°	5°39.5'	-39.2'	105.1°	5°23.8'	-39.9'	105.2°	5°08.1'	-40.7'	105.3°	8
9	6°05.1'	-36.1'	105.5°	5°49.0'	-36.9'	105.6°	5°32.9'	-37.7'	105.7°	5°16.6'	-38.5'	105.8°	5°00.3'	-39.2'	105.8°	4°43.9'	-40.0'	105.9°	4°27.4'	-40.7'	106.0°	9
10	5°29.0'	-36.2'	106.3°	5°12.2'	-37.0'	106.4°	4°55.2'	-37.7'	106.4°	4°38.2'	-38.5'	106.5°	4°21.1'	-39.3'	106.6°	4°03.9'	-40.0'	106.7°	3°46.7'	-40.8'	106.7°	10
11	4°52.9'	-36.2'	107.1°	4°35.2'	-37.0'	107.2°	4°17.5'	-37.8'	107.2°	3°59.7'	-38.6'	107.3°	3°41.8'	-39.3'	107.4°	3°23.9'	-40.1'	107.4°	3°05.9'	-40.8'	107.5°	11
12	4°16.6'	-36.3'	107.9°	3°58.2'	-37.0'	107.9°	3°39.7'	-37.8'	108.0°	3°21.1'	-38.6'	108.1°	3°02.5'	-39.3'	108.1°	2°43.8'	-40.1'	108.2°	2°25.1'	-40.8'	108.2°	12
13	3°40.4'	-36.3'	108.7°	3°21.2'	-37.1'	108.7°	3°01.9'	-37.9'	108.8°	2°42.5'	-38.6'	108.8°	2°23.1'	-39.4'	108.9°	2°03.7'	-40.1'	108.9°	1°44.2'	-40.8'	108.9°	13
14	3°04.1'	-36.3'	109.5°	2°44.1'	-37.1'	109.5°	2°24.0'	-37.9'	109.6°	2°03.9'	-38.6'	109.6°	1°43.8'	-39.4'	109.6°	1°23.6'	-40.1'	109.7°	1°03.4'	-40.9'	109.7°	14
15	2°27.8'	-36.4'	110.3°	2°07.0'	-37.1'	110.3°	1°46.1'	-37.9'	110.3°	1°25.3'	-38.7'	110.4°	1°04.4'	-39.4'	110.4°	0°43.5'	-40.1'	110.4°	0°22.5'	-40.9'	110.4°	15
16	1°51.4'	-36.4'	111.1°	1°29.8'	-37.2'	111.1°	1°08.2'	-37.9'	111.1°	0°46.6'	-38.7'	111.1°	0°25.0'	-39.4'	111.1°	0°03.3'	-40.1'	111.1°	0°18.3'	+40.9'	68.9°	16
17	1°15.0'	-36.4'	111.9°	0°52.7'	-37.2'	111.9°	0°30.3'	-37.9'	111.9°	0°07.9'	-38.7'	111.9°	0°14.4'	+39.4'	68.1°	0°36.8'	+40.1'	68.1°	0°59.2'	+40.8'	68.1°	17
18	0°38.6'	-36.4'	112.7°	0°15.5'	-37.2'	112.7°	0°07.6'	+37.9'	67.3°	0°30.7'	+38.7'	67.3°	0°53.9'	+39.4'	67.4°	1°16.9'	+40.1'	67.4°	1°40.0'	+40.8'	67.4°	18
19	0°02.2'	-36.4'	113.4°	0°21.7'	+37.2'	66.6°	0°45.6'	+37.9'	66.6°	1°09.4'	+38.7'	66.6°	1°33.2'	+39.4'	66.6°	1°57.1'	+40.1'	66.6°	2°20.8'	+40.8'	66.7°	19
20	0°34.2'	+36.4'	65.8°	0°58.9'	+37.2'	65.8°	1°23.5'	+37.9'	65.8°	1°48.1'	+38.6'	65.8°	2°12.6'	+39.4'	65.8°	2°37.2'	+40.1'	65.9°	3°01.7'	+40.8'	65.9°	20
21	1°10.6'	+36.4'	65.0°	1°36.0'	+37.1'	65.0°	2°01.4'	+37.9'	65.0°	2°26.7'	+38.6'	65.0°	2°52.0'	+39.3'	65.1°	3°17.2'	+40.0'	65.1°	3°42.4'	+40.7'	65.2°	21
22	1°47.0'	+36.4'	64.2°	2°13.1'	+37.1'	64.2°	2°39.2'	+37.8'	64.2°	3°05.3'	+38.6'	64.3°	3°31.3'	+39.3'	64.3°	3°57.3'	+40.0'	64.4°	4°23.2'	+40.7'	64.5°	22
23	2°23.4'	+36.3'	63.4°	2°50.3'	+37.1'	63.4°	3°17.1'	+37.8'	63.5°	3°43.9'	+38.5'	63.5°	4°10.6'	+39.2'	63.6°	4°37.3'	+40.0'	63.6°	5°03.9'	+40.6'	63.7°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

104° 256° LHA

Latitude SAME as DECLINATION

104° 256° 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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	12°14.4'	-35.3'	98.7°	12°05.2'	-36.1'	99.0°	11°55.7'	-37.0'	99.2°	11°46.1'	-37.8'	99.4°	11°36.2'	-38.6'	99.6°	11°26.1'	-39.4'	99.8°	11°15.9'	-40.2'	100.0°	0
1	11°39.1'	-35.4'	99.6°	11°29.1'	-36.3'	99.8°	11°18.8'	-37.1'	100.0°	11°08.3'	-37.9'	100.2°	10°57.6'	-38.7'	100.4°	10°46.7'	-39.5'	100.5°	10°35.7'	-40.3'	100.7°	1
2	11°03.7'	-35.6'	100.4°	10°52.8'	-36.4'	100.6°	10°41.7'	-37.2'	100.8°	10°30.4'	-38.0'	100.9°	10°18.9'	-38.8'	101.1°	10°07.2'	-39.6'	101.3°	9°55.4'	-40.4'	101.5°	2
3	10°28.1'	-35.7'	101.2°	10°16.4'	-36.5'	101.4°	10°04.4'	-37.3'	101.6°	9°52.3'	-38.1'	101.7°	9°40.0'	-38.9'	101.9°	9°27.6'	-39.7'	102.1°	9°15.0'	-40.5'	102.2°	3
4	9°52.5'	-35.8'	102.0°	9°39.9'	-36.6'	102.2°	9°27.1'	-37.4'	102.4°	9°14.2'	-38.2'	102.5°	9°01.1'	-39.0'	102.7°	8°47.9'	-39.8'	102.8°	8°34.5'	-40.6'	103.0°	4
5	9°16.6'	-35.9'	102.8°	9°03.2'	-36.7'	103.0°	8°49.7'	-37.5'	103.1°	8°35.9'	-38.3'	103.3°	8°22.1'	-39.1'	103.4°	8°08.0'	-39.9'	103.6°	7°53.9'	-40.7'	103.7°	5
6	8°40.7'	-36.0'	103.6°	8°26.5'	-36.8'	103.8°	8°12.1'	-37.6'	103.9°	7°57.6'	-38.4'	104.1°	7°42.9'	-39.2'	104.2°	7°28.1'	-40.0'	104.3°	7°13.2'	-40.7'	104.5°	6
7	8°04.7'	-36.1'	104.5°	7°49.7'	-36.9'	104.6°	7°34.5'	-37.7'	104.7°	7°19.2'	-38.5'	104.8°	7°03.7'	-39.3'	105.0°	6°48.2'	-40.0'	105.1°	6°32.5'	-40.8'	105.2°	7
8	7°28.6'	-36.2'	105.3°	7°12.7'	-37.0'	105.4°	6°56.8'	-37.8'	105.5°	6°40.7'	-38.6'	105.6°	6°24.4'	-39.3'	105.7°	6°08.1'	-40.1'	105.8°	5°51.7'	-40.9'	105.9°	8
9	6°52.4'	-36.3'	106.1°	6°35.7'	-37.1'	106.2°	6°19.0'	-37.9'	106.3°	6°02.1'	-38.6'	106.4°	5°45.1'	-39.4'	106.5°	5°28.0'	-40.2'	106.6°	5°10.8'	-40.9'	106.7°	9
10	6°16.1'	-36.4'	106.9°	5°58.7'	-37.1'	107.0°	5°41.1'	-37.9'	107.1°	5°23.4'	-38.7'	107.2°	5°05.7'	-39.5'	107.2°	4°47.9'	-40.2'	107.3°	4°29.9'	-40.9'	107.4°	10
11	5°39.8'	-36.4'	107.7°	5°21.5'	-37.2'	107.8°	5°03.2'	-38.0'	107.8°	4°44.7'	-38.8'	107.9°	4°26.2'	-39.5'	108.0°	4°07.6'	-40.3'	108.1°	3°49.0'	-41.0'	108.1°	11
12	5°03.3'	-36.5'	108.5°	4°44.3'	-37.3'	108.5°	4°25.2'	-38.0'	108.6°	4°06.0'	-38.8'	108.7°	3°46.7'	-39.5'	108.8°	3°27.4'	-40.3'	108.8°	3°08.0'	-41.0'	108.9°	12
13	4°26.9'	-36.5'	109.3°	4°07.0'	-37.3'	109.3°	3°47.1'	-38.1'	109.4°	3°27.2'	-38.8'	109.5°	3°07.2'	-39.6'	109.5°	2°47.1'	-40.3'	109.6°	2°27.0'	-41.0'	109.6°	13
14	3°50.3'	-36.6'	110.1°	3°29.7'	-37.3'	110.1°	3°09.1'	-38.1'	110.2°	2°48.4'	-38.9'	110.2°	2°27.6'	-39.6'	110.3°	2°06.8'	-40.3'	110.3°	1°46.0'	-41.1'	110.3°	14
15	3°13.8'	-36.6'	110.9°	2°52.4'	-37.4'	110.9°	2°31.0'	-38.1'	110.9°	2°09.5'	-38.9'	111.0°	1°48.0'	-39.6'	111.0°	1°26.5'	-40.4'	111.0°	1°04.9'	-41.1'	111.1°	15
16	2°37.2'	-36.6'	111.6°	2°15.0'	-37.4'	111.7°	1°52.8'	-38.2'	111.7°	1°30.6'	-38.9'	111.7°	1°08.4'	-39.6'	111.8°	0°46.1'	-40.4'	111.8°	0°23.8'	-41.1'	111.8°	16
17	2°00.5'	-36.7'	112.4°	1°37.6'	-37.4'	112.5°	1°14.7'	-38.2'	112.5°	0°51.7'	-38.9'	112.5°	0°28.7'	-39.6'	112.5°	0°05.7'	-40.4'	112.5°	0°17.2'	+41.1'	67.5°	17
18	1°23.9'	-36.7'	113.2°	1°00.2'	-37.4'	113.3°	0°36.5'	-38.2'	113.3°	0°12.8'	-38.9'	113.3°	0°10.9'	+39.6'	66.7°	0°34.6'	+40.4'	66.7°	0°58.3'	+41.1'	66.7°	18
19	0°47.2'	-36.7'	114.0°	0°22.7'	-37.4'	114.0°	0°01.7'	+38.2'	66.0°	0°26.1'	+38.9'	66.0°	0°50.6'	+39.6'	66.0°	1°15.0'	+40.3'	66.0°	1°39.4'	+41.0'	66.0°	19
20	0°10.5'	-36.7'	114.8°	0°14.7'	+37.4'	65.2°	0°39.9'	+38.2'	65.2°	1°05.0'	+38.9'	65.2°	1°30.2'	+39.6'	65.2°	1°55.3'	+40.3'	65.3°	2°20.4'	+41.0'	65.3°	20
21	0°26.2'	+36.7'	64.4°	0°52.1'	+37.4'	64.4°	1°18.0'	+38.2'	64.4°	1°43.9'	+38.9'	64.4°	2°09.8'	+39.6'	64.5°	2°35.6'	+40.3'	64.5°	3°01.4'	+41.0'	64.6°	21
22	1°02.9'	+36.7'	63.6°	1°29.6'	+37.4'	63.6°	1°56.2'	+38.1'	63.7°	2°22.8'	+38.9'	63.7°	2°49.4'									

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

74° 286° LHA

Latitude CONTRARY to Declination

74° 286° LHA

Dec°	35			36			37			38			39			40			41			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	13°02.9'	-35.4'	99.3°	12°53.1'	-36.3'	99.6°	12°43.0'	-37.1'	99.8°	12°32.7'	-37.9'	100.0°	12°22.2'	-38.7'	100.2°	12°11.4'	-39.5'	100.4°	12°00.4'	-40.3'	100.7°	0			
1	12°27.5'	-35.6'	100.2°	12°16.8'	-36.4'	100.4°	12°05.9'	-37.2'	100.6°	11°54.8'	-38.0'	100.8°	11°43.4'	-38.8'	101.0°	11°31.9'	-39.6'	101.2°	11°20.1'	-40.4'	101.4°	1			
2	11°51.9'	-35.7'	101.0°	11°40.5'	-36.5'	101.2°	11°28.7'	-37.4'	101.4°	11°16.7'	-38.2'	101.6°	11°04.6'	-39.0'	101.8°	10°52.2'	-39.8'	102.0°	10°39.7'	-40.5'	102.2°	2			
3	11°16.3'	-35.8'	101.8°	11°03.9'	-36.7'	102.0°	10°51.3'	-37.5'	102.2°	10°38.6'	-38.3'	102.4°	10°25.6'	-39.1'	102.6°	10°12.5'	-39.9'	102.7°	9°59.2'	-40.6'	102.9°	3			
4	10°40.5'	-36.0'	102.6°	10°27.3'	-36.8'	102.8°	10°13.9'	-37.6'	103.0°	10°00.3'	-38.4'	103.2°	9°46.5'	-39.2'	103.3°	9°32.6'	-40.0'	103.5°	9°18.5'	-40.7'	103.7°	4			
5	10°04.5'	-36.1'	103.4°	9°50.5'	-36.9'	103.6°	9°36.3'	-37.7'	103.8°	9°21.9'	-38.5'	103.9°	9°07.4'	-39.3'	104.1°	8°52.7'	-40.0'	104.3°	8°37.8'	-40.8'	104.4°	5			
6	9°28.4'	-36.2'	104.3°	9°13.6'	-37.0'	104.4°	8°58.6'	-37.8'	104.6°	8°43.4'	-38.6'	104.7°	8°28.1'	-39.4'	104.9°	8°12.6'	-40.1'	105.0°	7°57.0'	-40.9'	105.1°	6			
7	8°52.2'	-36.3'	105.1°	8°36.6'	-37.1'	105.2°	8°20.8'	-37.9'	105.4°	8°04.8'	-38.7'	105.5°	7°48.7'	-39.4'	105.6°	7°32.5'	-40.2'	105.8°	7°16.1'	-41.0'	105.9°	7			
8	8°15.9'	-36.4'	105.9°	7°59.5'	-37.2'	106.0°	7°42.9'	-38.0'	106.1°	7°26.1'	-38.8'	106.3°	7°09.3'	-39.5'	106.4°	6°52.3'	-40.3'	106.5°	6°35.2'	-41.0'	106.6°	8			
9	7°39.6'	-36.5'	106.7°	7°22.3'	-37.3'	106.8°	7°04.9'	-38.1'	106.9°	6°47.4'	-38.8'	107.0°	6°29.7'	-39.6'	107.1°	6°12.0'	-40.3'	107.3°	5°54.1'	-41.1'	107.4°	9			
10	7°03.1'	-36.6'	107.5°	6°45.0'	-37.4'	107.6°	6°26.8'	-38.1'	107.7°	6°08.5'	-38.9'	107.8°	5°50.1'	-39.7'	107.9°	5°31.7'	-40.4'	108.0°	5°13.1'	-41.1'	108.1°	10			
11	6°26.5'	-36.6'	108.3°	6°07.7'	-37.4'	108.4°	5°48.7'	-38.2'	108.5°	5°29.6'	-39.0'	108.6°	5°10.5'	-39.7'	108.7°	4°51.3'	-40.4'	108.7°	4°31.9'	-41.2'	108.8°	11			
12	5°49.9'	-36.7'	109.1°	5°30.2'	-37.5'	109.2°	5°10.5'	-38.2'	109.2°	4°50.7'	-39.0'	109.3°	4°30.8'	-39.8'	109.4°	4°10.8'	-40.5'	109.5°	3°50.8'	-41.2'	109.5°	12			
13	5°13.2'	-36.8'	109.9°	4°52.8'	-37.5'	109.9°	4°32.3'	-38.3'	110.0°	4°11.7'	-39.1'	110.1°	3°51.0'	-39.8'	110.2°	3°30.3'	-40.5'	110.2°	3°09.6'	-41.2'	110.3°	13			
14	4°36.4'	-36.8'	110.7°	4°15.2'	-37.6'	110.7°	3°54.0'	-38.3'	110.8°	3°32.6'	-39.1'	110.9°	3°11.2'	-39.8'	110.9°	2°49.8'	-40.5'	111.0°	2°28.3'	-41.3'	111.0°	14			
15	3°59.6'	-36.9'	111.4°	3°37.6'	-37.6'	111.5°	3°15.6'	-38.4'	111.6°	2°53.5'	-39.1'	111.6°	2°31.4'	-39.8'	111.7°	2°09.3'	-40.6'	111.7°	1°47.1'	-41.3'	111.7°	15			
16	3°22.7'	-36.9'	112.2°	3°00.0'	-37.7'	112.3°	2°37.2'	-38.4'	112.3°	2°14.4'	-39.1'	112.4°	1°51.6'	-39.9'	112.4°	1°28.7'	-40.6'	112.4°	1°05.8'	-41.3'	112.5°	16			
17	2°45.9'	-36.9'	113.0°	2°22.4'	-37.7'	113.1°	1°58.8'	-38.4'	113.1°	1°35.3'	-39.2'	113.1°	1°11.7'	-39.9'	113.2°	0°48.1'	-40.6'	113.2°	<u>0°24.5' -41.3' 113.2°</u>	0°16.8'	+41.3'	66.1°	17		
18	2°08.9'	-37.0'	113.8°	1°44.7'	-37.7'	113.8°	1°20.4'	-38.4'	113.9°	0°56.1'	-39.2'	113.9°	<u>0°31.8' -39.9' 113.9°</u>	<u>0°07.5' -40.6' 113.9°</u>	0°16.8'	+41.3'	66.1°	0°16.8'	+41.3'	66.1°	18				
19	1°32.0'	-37.0'	114.6°	1°07.0'	-37.7'	114.6°	0°42.0'	-38.4'	114.6°	<u>0°17.0' -39.2' 114.6°</u>	0°08.1'	+39.9'	65.4°	0°33.1'	+40.6'	65.4°	0°58.1'	+41.3'	65.4°	0°58.1'	+41.3'	65.4°	19		
20	0°55.0'	-37.0'	115.4°	<u>0°29.3' -37.7' 115.4°</u>	<u>0°03.5' -38.4' 115.4°</u>	0°22.2'	+39.2'	64.6°	0°48.0'	+39.9'	64.6°	1°13.7'	+40.6'	64.6°	1°39.4'	+41.3'	64.6°	1°39.4'	+41.3'	64.6°	1°39.4'	+41.3'	64.6°	20	
21	<u>0°18.0' +37.0' 116.2°</u>	0°08.5'	+37.7'	63.8°	0°34.9'	+38.4'	63.8°	1°01.4'	+39.2'	63.8°	1°27.8'	+39.9'	63.9°	1°54.3'	+40.6'	63.9°	2°20.6'	+41.2'	63.9°	2°20.6'	+41.2'	63.9°	21		
22	0°19.0'	+37.0'	63.0°	0°46.2'	+37.7'	63.0°	1°13.4'	+38.4'	63.1°	1°40.5'	+39.1'	63.1°	2°07.7'	+39.8'	63.1°	2°34.8'	+40.5'	63.1°	3°01.9'	+41.2'	63.2°	22			
23	0°55.9'	+37.0'	62.2°	1°23.9'	+37.7'	62.3°	1°51.8'	+38.4'	62.3°	2°19.7'	+39.1'	62.3°	2°47.5'	+39.8'	62.4°	3°15.3'	+40.5'	62.4°	3°43.1'	+41.2'	62.5°	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°
	35			36			37			38			39			40			41						

106° 254° LHA

Latitude SAME as DECLINATION

106° 254° 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°	35			36			37			38			39			40			41			Dec°		
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°			
0	13°51.4'	-35.5'	99.9°	13°40.9'	-36.4'	100.2°	13°30.2'	-37.2'	100.4°	13°19.2'	-38.0'	100.7°	13°08.0'	-38.8'	100.9°	12°56.5'	-39.6'	101.1°	12°44.9'	-40.4'	101.3°	0		
1	13°15.8'	-35.7'	100.8°	13°04.5'	-36.5'	101.0°	12°53.0'	-37.4'	101.2°	12°41.2'	-38.2'	101.5°	12°29.1'	-39.0'	101.7°	12°16.9'	-39.8'	101.9°	12°04.4'	-40.5'	102.1°	1		
2	12°40.1'	-35.8'	101.6°	12°28.0'	-36.7'	101.8°	12°15.6'	-37.5'	102.0°	12°03.0'	-38.3'	102.2°	11°50.2'	-39.1'	102.5°	11°37.1'	-39.9'	102.7°	11°23.9'	-40.7'	102.9°	2		
3	12°04.4'	-36.0'	102.4°	11°51.3'	-36.8'	102.6°	11°38.1'	-37.6'	102.8°	11°24.7'	-38.4'	103.0°	11°11.1'	-39.2'	103.2°	10°57.2'	-40.0'	103.4°	10°43.2'	-40.8'	103.6°	3		
4	11°28.4'	-36.1'	103.2°	11°14.5'	-36.9'	103.4°	11°00.5'	-37.8'	103.6°	10°46.3'	-38.5'	103.8°	10°31.8'	-39.3'	104.0°	10°17.2'	-40.1'	104.2°	10°02.5'	-40.9'	104.3°	4		
5	10°52.2'	-36.2'	104.1°	10°37.6'	-37.1'	104.2°	10°22.7'	-37.9'	104.4°	10°07.1'	-38.7'	104.6°	9°52.5'	-39.4'	104.8°	9°37.1'	-40.2'	104.8°	9°21.6'	-41.0'	105.1°	5		
6	10°16.0'	-36.4'	104.9°	10°00.5'	-37.2'	105.0°	9°44.9'	-38.0'	105.2°	9°29.4'	-38.8'	105.4°	9°13.1'	-39.5'	105.5°	8°56.9'	-40.3'	105.7°	8°40.6'	-41.0'	105.8°	6		
7	9°39.6'	-36.5'	105.7°	9°23.3'	-37.3'	105.8°	9°06.9'	-38.1'	106.0°	8°50.3'	-38.9'	106.1°	8°33.5'	-39.6'	106.3°	8°16.6'	-40.4'	106.4°	7°59.6'	-41.1'	106.6°	7		
8	9°03.2'	-36.6'	106.5°	8°46.1'	-37.4'	106.6°	8°28.8'	-38.2'	106.8°	8°11.4'	-38.9'	106.9°	7°53.9'	-39.7'	107.0°	7°36.3'	-40.5'	107.2°	7°18.5'	-41.2'	107.3°	8		
9	8°26.6'	-36.7'	107.3°	8°08.7'	-37.5'	107.4°	7°50.6'	-38.3'	107.6°	7°32.5'	-39.0'	107.7°	7°14.2'	-39.8'	107.8°	6°55.8'	-40.5'	107.9°	6°37.3'	-41.3'	108.0°	9		
10	7°49.9'	-36.8'	108.1°	7°31.2'	-37.6'	108.2°	7°12.4'	-38.3'	108.3°	6°53.5'	-39.1'	108.4°	6°34.4'	-39.8'	108.6°	6°15.3'	-40.6'	108.7°	5°56.0'	-41.3'	108.8°	10		
11	7°13.1'	-36.9'	108.9°	6°53.6'	-37.6'	109.0°	6°34.1'	-38.4'	109.1°	6°14.4'	-39.2'	109.2°	5°54.6'	-39.9'	109.3°	5°34.7'	-40.6'	109.4°	5°14.7'	-41.4'	109.5°	11		
12	6°36.3'	-36.9'	109.7°	6°16.0'	-37.7'	109.8°	5°55.7'	-38.5'	109.9°	5°35.2'	-39.2'	110.0°	5°14.7'	-40.0'	110.1°	4°54.1'	-40.7'	110.1°	4°33.4'	-41.4'	110.2°	12		
13	5°59.3'	-37.0'	110.5°	5°38.3'	-37.8'	110.6°	5°17.2'	-38.5'	110.6°	4°56.0'	-39.3'	110.7°	4°34.7'	-40.0'	110.8°	4°13.4'	-40.7'	110.9°	3°51.9'	-41.4'	110.9°	13		
14	5°22.3'	-37.1'	111.3°	5°00.5'	-37.8'	111.3°	4°38.7'	-38.6'	111.4°	4°16.7'	-39.3'	111.5°	3°54.7'	-40.0'	111.6°	3°32.6'	-40.8'	111.6°	3°10.5'	-41.5'	111.7°	14		
15	4°45.3'	-37.1'	112.0°	4°22.7'	-37.9'	112.1°	4°00.1'	-38.6'	112.2°	3°37.4'	-39.4'	112.2°	3°14.7'	-40.1'	112.3°	2°51.9'	-40.8'	112.4°	2°29.0'	-41.5'	112.4°	15		
16	4°08.1'	-37.2'	112.8°	3°44.8'	-37.9'	112.9°	3°21.5'	-38.7'	113.0°	2°58.0'	-39.4'	113.0°	2°34.6'	-40.1'	113.0°	2°11.1'	-40.8'	113.1°	1°47.5'	-41.5'	113.1°	16		
17	3°31.0'	-37.2'	113.6°	3°06.9'	-37.9'	113.7°	2°42.8'	-38.7'	113.7°	2°18.7'	-39.4'	113.8°	1°54.5'	-40.1'	113.8°	1°30.3'	-40.8'	113.8°	1°06.0'	-41.5'	113.8°	17		
18	2°53.8'	-37.2'	114.4°	2°29.0'	-38.0'	114.4°	2°04.1'	-38.7'	114.5°	1°39.2'	-39.4'	114.5°	1°14.3'	-40.1'	114.5°	0°49.4'	-40.8'	114.6°	<u>0°24.5' -41.5' 114.6°</u>	0°17.0'	+41.5'	64.7°	18	
19	2°16.6'	-37.3'	115.2°	1°51.0'	-38.0'	115.2°	1°25.4'	-38.7'	115.2°	0°59.8'	-39.4'	115.3°	<u>0°34.2' -40.1' 115.3°</u>	<u>0°08.6' -40.8' 115.3°</u>	0°17.0'	+41.5'	64.7°	0°17.0'	+41.5'	64.7°	0°17.0'	+41.5'	64.7°	19
20	1°39.3'	-37.3'	116.0°	1°13.0'	-38.0'	116.0°	0°46.7'	-38.7'	116.0°	<u>0°20.4' -39.4' 116.0°</u>	0°05.9'	+40.1'	64.0°	0°32.3'	+40.8'	64.0°	0°58.6'	+41.5'	64.					



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

72° 288° LHA

Latitude CONTRARY to Declination

72° 288° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	14°39.7'	-35.7'	100.6°	14°28.7'	-36.5'	100.8°	14°17.3'	-37.3'	101.1°	14°05.6'	-38.2'	101.3°	13°53.7'	-39.0'	101.6°	13°41.6'	-39.8'	101.8°	13°29.2'	-40.5'	102.0°	0
1	14°04.1'	-35.8'	101.4°	13°52.1'	-36.7'	101.6°	13°39.9'	-37.5'	101.9°	13°27.5'	-38.3'	102.1°	13°14.8'	-39.1'	102.3°	13°01.8'	-39.9'	102.6°	12°48.6'	-40.7'	102.8°	1
2	13°28.2'	-36.0'	102.2°	13°15.5'	-36.8'	102.4°	13°02.4'	-37.6'	102.7°	12°49.1'	-38.5'	102.9°	12°35.6'	-39.2'	103.1°	12°21.9'	-40.0'	103.3°	12°08.0'	-40.8'	103.5°	2
3	12°52.3'	-36.1'	103.0°	12°38.6'	-37.0'	103.3°	12°24.8'	-37.8'	103.5°	12°10.7'	-38.6'	103.7°	11°56.4'	-39.4'	103.9°	11°41.9'	-40.1'	104.1°	11°27.2'	-40.9'	104.3°	3
4	12°16.2'	-36.3'	103.9°	12°01.7'	-37.1'	104.1°	11°47.0'	-37.9'	104.3°	11°32.1'	-38.7'	104.5°	11°17.0'	-39.5'	104.7°	11°01.7'	-40.3'	104.9°	10°46.3'	-41.0'	105.0°	4
5	11°39.9'	-36.4'	104.7°	11°24.6'	-37.2'	104.9°	11°09.1'	-38.0'	105.1°	10°53.4'	-38.8'	105.2°	10°37.5'	-39.6'	105.4°	10°21.5'	-40.4'	105.6°	10°05.2'	-41.1'	105.8°	5
6	11°03.4'	-36.6'	105.5°	10°47.3'	-37.4'	105.7°	10°31.0'	-38.2'	105.8°	10°14.6'	-38.9'	106.0°	9°57.9'	-39.7'	106.2°	9°41.1'	-40.5'	106.4°	9°24.1'	-41.2'	106.5°	6
7	10°26.9'	-36.7'	106.3°	10°10.0'	-37.5'	106.5°	9°52.9'	-38.3'	106.6°	9°35.6'	-39.0'	106.8°	9°18.2'	-39.8'	107.0°	9°00.6'	-40.6'	107.1°	8°42.9'	-41.3'	107.3°	7
8	9°50.2'	-36.8'	107.1°	9°32.5'	-37.6'	107.3°	9°14.6'	-38.4'	107.4°	8°56.6'	-39.1'	107.6°	8°38.4'	-39.9'	107.7°	8°20.1'	-40.6'	107.9°	8°01.6'	-41.4'	108.0°	8
9	9°13.4'	-36.9'	107.9°	8°54.9'	-37.7'	108.0°	8°36.3'	-38.5'	108.2°	8°17.5'	-39.2'	108.3°	7°58.5'	-40.0'	108.5°	7°39.5'	-40.7'	108.6°	7°20.3'	-41.4'	108.7°	9
10	8°36.5'	-37.0'	108.7°	8°17.2'	-37.8'	108.8°	7°57.8'	-38.5'	109.0°	7°38.2'	-39.3'	109.1°	7°18.5'	-40.0'	109.2°	6°58.7'	-40.8'	109.3°	6°38.8'	-41.5'	109.4°	10
11	7°59.5'	-37.1'	109.5°	7°39.5'	-37.9'	109.6°	7°19.3'	-38.6'	109.7°	6°58.9'	-39.4'	109.9°	6°38.5'	-40.1'	110.0°	6°18.0'	-40.8'	110.1°	5°57.3'	-41.6'	110.2°	11
12	7°22.4'	-37.2'	110.3°	7°01.6'	-37.9'	110.4°	6°40.6'	-38.7'	110.5°	6°19.6'	-39.4'	110.6°	5°58.4'	-40.2'	110.7°	5°37.1'	-40.9'	110.8°	5°15.8'	-41.6'	110.9°	12
13	6°45.3'	-37.2'	111.1°	6°23.7'	-38.0'	111.2°	6°01.9'	-38.8'	111.3°	5°40.1'	-39.5'	111.4°	5°18.2'	-40.2'	111.5°	4°56.2'	-40.9'	111.5°	4°34.1'	-41.7'	111.6°	13
14	6°08.0'	-37.3'	111.9°	5°45.6'	-38.1'	112.0°	5°23.2'	-38.8'	112.0°	5°00.6'	-39.6'	112.1°	4°38.0'	-40.3'	112.2°	4°15.3'	-41.0'	112.3°	3°52.5'	-41.7'	112.3°	14
15	5°30.7'	-37.4'	112.6°	5°07.6'	-38.1'	112.7°	4°44.4'	-38.9'	112.8°	4°21.1'	-39.6'	112.9°	3°57.7'	-40.3'	112.9°	3°34.3'	-41.0'	113.0°	3°10.8'	-41.7'	113.1°	15
16	4°53.3'	-37.4'	113.4°	4°29.5'	-38.2'	113.5°	4°05.5'	-38.9'	113.6°	3°41.5'	-39.6'	113.6°	3°17.4'	-40.4'	113.7°	2°53.2'	-41.1'	113.7°	2°29.1'	-41.7'	113.8°	16
17	4°15.9'	-37.5'	114.2°	3°51.3'	-38.2'	114.3°	3°26.6'	-38.9'	114.3°	3°01.8'	-39.7'	114.4°	2°37.0'	-40.4'	114.4°	2°12.2'	-41.1'	114.5°	1°47.3'	-41.8'	114.5°	17
18	3°38.4'	-37.5'	115.0°	3°13.1'	-38.3'	115.1°	2°47.6'	-39.0'	115.1°	2°22.2'	-39.7'	115.1°	1°56.7'	-40.4'	115.2°	1°31.1'	-41.1'	115.2°	1°05.6'	-41.8'	115.2°	18
19	3°00.9'	-37.6'	115.8°	2°34.8'	-38.3'	115.8°	2°08.7'	-39.0'	115.9°	1°42.5'	-39.7'	115.9°	1°16.3'	-40.4'	115.9°	0°50.0'	-41.1'	115.9°	0°23.8'	-41.8'	115.9°	19
20	2°23.4'	-37.6'	116.6°	1°56.5'	-38.3'	116.6°	1°29.7'	-39.0'	116.6°	1°02.8'	-39.7'	116.6°	0°35.9'	-40.4'	116.7°	0°08.9'	-41.1'	116.7°	0°18.0'	+41.8'	63.3°	20
21	1°45.8'	-37.6'	117.3°	1°18.2'	-38.3'	117.4°	0°50.6'	-39.0'	117.4°	0°23.0'	-39.7'	117.4°	0°04.6'	+40.4'	62.6°	0°32.2'	+41.1'	62.6°	0°59.8'	+41.8'	62.6°	21
22	1°08.2'	-37.6'	118.1°	0°39.9'	-38.3'	118.1°	0°11.6'	-39.0'	118.1°	0°16.7'	+39.7'	61.9°	0°45.0'	+40.4'	61.9°	1°13.3'	+41.1'	61.9°	1°41.5'	+41.4'	61.9°	22
23	0°30.6'	-37.6'	118.9°	0°01.6'	-38.3'	118.9°	0°27.4'	+39.0'	61.1°	0°56.4'	+39.7'	61.1°	1°25.4'	+40.4'	61.1°	1°54.3'	+41.1'	61.2°	2°23.3'	+41.7'	61.2°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

108° 252° LHA

Latitude SAME as DECLINATION

108° 252° 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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	15°28.0'	-35.8'	101.2°	15°16.3'	-36.6'	101.4°	15°04.2'	-37.5'	101.7°	14°51.9'	-38.3'	102.0°	14°39.4'	-39.1'	102.2°	14°26.5'	-39.9'	102.5°	14°13.4'	-40.7'	102.7°	0
1	14°52.2'	-36.0'	102.0°	14°39.6'	-36.8'	102.3°	14°26.8'	-37.6'	102.5°	14°13.6'	-38.5'	102.8°	14°00.2'	-39.3'	103.0°	13°46.6'	-40.0'	103.3°	13°32.7'	-40.8'	103.5°	1
2	14°16.2'	-36.1'	102.8°	14°02.8'	-37.0'	103.1°	13°49.1'	-37.8'	103.3°	13°35.2'	-38.6'	103.6°	13°21.0'	-39.4'	103.8°	13°06.6'	-40.2'	104.0°	12°51.9'	-40.9'	104.2°	2
3	13°40.1'	-36.3'	103.7°	13°25.8'	-37.1'	103.9°	13°11.3'	-37.9'	104.1°	12°56.6'	-38.7'	104.3°	12°41.6'	-39.5'	104.6°	12°26.4'	-40.3'	104.8°	12°11.0'	-41.1'	105.0°	3
4	13°03.8'	-36.5'	104.5°	12°48.7'	-37.3'	104.7°	12°33.4'	-38.1'	104.9°	12°17.8'	-38.9'	105.1°	12°02.1'	-39.7'	105.3°	11°46.1'	-40.4'	105.5°	11°29.9'	-41.2'	105.7°	4
5	12°27.3'	-36.6'	105.3°	12°11.4'	-37.4'	105.5°	11°55.3'	-38.2'	105.7°	11°38.9'	-39.0'	105.9°	11°22.4'	-39.8'	106.1°	11°05.7'	-40.5'	106.3°	10°48.7'	-41.3'	106.5°	5
6	11°50.7'	-36.7'	106.1°	11°34.0'	-37.6'	106.3°	11°17.1'	-38.3'	106.5°	11°01.7'	-39.1'	106.7°	10°42.6'	-39.9'	106.9°	10°25.1'	-40.6'	107.0°	10°07.5'	-41.4'	107.2°	6
7	11°14.0'	-36.9'	106.9°	10°56.4'	-37.7'	107.1°	10°38.7'	-38.5'	107.3°	10°20.8'	-39.2'	107.4°	10°02.7'	-40.0'	107.6°	9°44.5'	-40.7'	107.8°	9°26.1'	-41.5'	107.9°	7
8	10°37.1'	-37.0'	107.7°	10°18.8'	-37.8'	107.9°	10°00.3'	-38.6'	108.1°	9°41.6'	-39.3'	108.2°	9°22.7'	-40.1'	108.4°	9°03.8'	-40.8'	108.5°	8°44.6'	-41.6'	108.7°	8
9	10°00.1'	-37.1'	108.5°	9°41.0'	-37.9'	108.7°	9°21.7'	-38.7'	108.8°	9°02.3'	-39.4'	109.0°	8°42.7'	-40.2'	109.1°	8°22.9'	-40.9'	109.3°	8°03.1'	-41.6'	109.4°	9
10	9°23.0'	-37.2'	109.3°	9°03.1'	-38.0'	109.5°	8°43.0'	-38.8'	109.6°	8°22.8'	-39.5'	109.7°	8°02.5'	-40.3'	109.9°	7°42.0'	-41.0'	110.0°	7°21.4'	-41.7'	110.1°	10
11	8°45.8'	-37.3'	110.1°	8°25.1'	-38.1'	110.2°	8°04.3'	-38.8'	110.4°	7°43.3'	-39.6'	110.5°	7°22.2'	-40.3'	110.6°	7°01.0'	-41.1'	110.7°	6°39.7'	-41.8'	110.9°	11
12	8°08.5'	-37.4'	110.9°	7°47.0'	-38.2'	111.0°	7°25.4'	-38.9'	111.1°	7°03.7'	-39.7'	111.3°	6°41.9'	-40.4'	111.4°	6°20.0'	-41.1'	111.5°	5°58.0'	-41.8'	111.6°	12
13	7°31.0'	-37.5'	111.7°	7°08.8'	-38.3'	111.8°	6°46.5'	-39.0'	111.9°	6°24.0'	-39.7'	112.0°	6°01.5'	-40.5'	112.1°	5°38.9'	-41.2'	112.2°	5°16.1'	-41.9'	112.3°	13
14	6°53.6'	-37.6'	112.5°	6°30.6'	-38.3'	112.6°	6°07.5'	-39.1'	112.7°	5°44.3'	-39.8'	112.8°	5°21.0'	-40.5'	112.9°	4°57.7'	-41.2'	112.9°	4°34.3'	-41.9'	113.0°	14
15	6°16.0'	-37.6'	113.3°	5°52.2'	-38.4'	113.3°	5°28.4'	-39.1'	113.4°	5°04.5'	-39.8'	113.5°	4°40.5'	-40.6'	113.6°	4°16.5'	-41.3'	113.7°	3°52.4'	-42.0'	113.7°	15
16	5°38.3'	-37.7'	114.0°	5°13.9'	-38.4'	114.1°	4°49.3'	-39.2'	114.2°	4°24.7'	-39.9'	114.3°	3°60.0'	-40.6'	114.3°	3°35.2'	-41.3'	114.4°	3°10.4'	-42.0'	114.5°	16
17	5°00.6'	-37.8'	114.8°	4°35.4'	-38.5'	114.9°	4°10.1'	-39.2'	115.0°	3°44.8'	-39.9'	115.0°	3°19.4'	-40.6'	115.1°	2°53.9'	-41.3'	115.1°	2°28.4'	-42.0'	115.2°	17
18	4°22.9'	-37.8'	115.6°	3°56.9'	-38.5'	115.7°	3°30.9'	-39.3'	115.7°	3°04.9'	-40.0'	115.8°	2°38.7'	-40.7'	115.8°	2°12.6'	-41.3'	115.9°	1°46.4'	-42.0'	115.9°	18
19	3°45.1'	-37.8'	116.4°	3°18.4'	-38.6'	116.4°	2°51.7'	-39.3'	116.5°	2°24.9'	-40.0'	116.5°	1°58.1'	-40.7'	116.6°	1°31.3'	-41.4'	116.6°	1°04.4'	-42.0'	116.6°	19
20	3°07.2'	-37.9'	117.1°	2°39.8'	-38.6'	117.2°	2°12.4'	-39.3'	117.2°	1°44.9'	-40.0'	117.3°	1°17.4'	-40.7'	117.3°	0°49.9'	-41.4'	117.3°	0°22.4'	-42.0'	117.3°	20
21	2°29.3'	-37.9'	117.9°	2°01.2'	-38.6'	118.0°	1°33.1'	-39.3'	118.0°	1°04.9'	-40.0'	118.0°	0°36.7'	-40.								

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

70° 290° LHA

Latitude CONTRARY to Declination

70° 290° LHA

Table with 10 columns (Dec°, 35, 36, 37, 38, 39, 40, 41, Dec°) and 24 rows of astronomical data. Each column contains three sub-columns for Hc°, d', and Z°.

110° 250° LHA

Latitude SAME as DECLINATION

110° 250° 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

Table with 10 columns (Dec°, 35, 36, 37, 38, 39, 40, 41, Dec°) and 24 rows of astronomical data. Each column contains three sub-columns for Hc°, d', and Z°.

111° 249° LHA

Latitude SAME as DECLINATION

111° 249° LHA

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

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

68° 292° LHA

Latitude CONTRARY to Declination

68° 292° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	17°52.2'	-36.3'	103.0°	17°38.5'	-37.1'	103.4°	17°24.5'	-37.9'	103.7°	17°10.2'	-38.8'	104.0°	16°55.5'	-39.6'	104.3°	16°40.6'	-40.3'	104.6°	16°25.4'	-41.1'	104.8°	0
1	17°15.9'	-36.5'	103.9°	17°01.4'	-37.3'	104.2°	16°46.5'	-38.1'	104.5°	16°31.4'	-38.9'	104.8°	16°16.0'	-39.7'	105.1°	16°00.2'	-40.5'	105.3°	15°44.2'	-41.3'	105.6°	1
2	16°39.4'	-36.7'	104.7°	16°24.1'	-37.5'	105.0°	16°08.4'	-38.3'	105.3°	15°52.5'	-39.1'	105.6°	15°36.2'	-39.9'	105.8°	15°19.7'	-40.7'	106.1°	15°03.0'	-41.4'	106.4°	2
3	16°02.8'	-36.9'	105.5°	15°46.6'	-37.7'	105.8°	15°30.1'	-38.5'	106.1°	15°13.4'	-39.3'	106.3°	14°56.3'	-40.0'	106.6°	14°39.1'	-40.8'	106.9°	14°21.5'	-41.6'	107.1°	3
4	15°25.9'	-37.0'	106.4°	15°08.9'	-37.8'	106.6°	14°51.6'	-38.6'	106.9°	14°34.1'	-39.4'	107.1°	14°16.3'	-40.2'	107.4°	13°58.2'	-41.0'	107.6°	13°40.0'	-41.7'	107.8°	4
5	14°48.9'	-37.2'	107.2°	14°31.1'	-38.0'	107.4°	14°13.0'	-38.8'	107.7°	13°54.7'	-39.6'	107.9°	13°36.1'	-40.3'	108.1°	13°17.3'	-41.1'	108.4°	12°58.3'	-41.8'	108.6°	5
6	14°11.7'	-37.4'	108.0°	13°53.1'	-38.2'	108.2°	13°34.2'	-38.9'	108.5°	13°15.1'	-39.7'	108.7°	12°55.8'	-40.5'	108.9°	12°36.2'	-41.2'	109.1°	12°16.5'	-41.9'	109.3°	6
7	13°34.3'	-37.5'	108.8°	13°14.9'	-38.3'	109.0°	12°55.2'	-39.1'	109.2°	12°35.4'	-39.8'	109.4°	12°15.3'	-40.6'	109.7°	11°55.0'	-41.3'	109.9°	11°34.5'	-42.0'	110.1°	7
8	12°56.8'	-37.7'	109.6°	12°36.6'	-38.4'	109.8°	12°16.2'	-39.2'	110.0°	11°55.5'	-40.0'	110.2°	11°34.7'	-40.7'	110.4°	11°13.7'	-41.4'	110.6°	10°52.5'	-42.1'	110.8°	8
9	12°19.1'	-37.8'	110.4°	11°58.1'	-38.6'	110.6°	11°36.9'	-39.3'	110.8°	11°15.6'	-40.1'	111.0°	10°54.0'	-40.8'	111.2°	10°32.2'	-41.5'	111.3°	10°10.3'	-42.2'	111.5°	9
10	11°41.3'	-37.9'	111.2°	11°19.6'	-38.7'	111.4°	10°57.6'	-39.5'	111.6°	10°35.5'	-40.2'	111.7°	10°13.2'	-40.9'	111.9°	9°50.7'	-41.6'	112.1°	9°28.1'	-42.3'	112.2°	10
11	11°03.4'	-38.1'	112.0°	10°40.9'	-38.8'	112.2°	10°18.2'	-39.6'	112.3°	9°55.3'	-40.3'	112.5°	9°32.3'	-41.0'	112.6°	9°09.1'	-41.7'	112.8°	8°45.8'	-42.4'	112.9°	11
12	10°25.3'	-38.2'	112.8°	10°02.0'	-38.9'	112.9°	9°38.6'	-39.7'	113.1°	9°15.0'	-40.4'	113.2°	8°51.2'	-41.1'	113.4°	8°27.4'	-41.8'	113.5°	8°03.4'	-42.5'	113.7°	12
13	9°47.2'	-38.3'	113.5°	9°23.1'	-39.0'	113.7°	8°58.9'	-39.8'	113.8°	8°34.6'	-40.5'	114.0°	8°10.1'	-41.2'	114.1°	7°45.6'	-41.9'	114.2°	7°20.9'	-42.6'	114.4°	13
14	9°08.9'	-38.4'	114.3°	8°44.1'	-39.1'	114.5°	8°19.2'	-39.8'	114.6°	7°54.1'	-40.6'	114.7°	7°29.0'	-41.2'	114.9°	7°03.7'	-41.9'	115.0°	6°38.3'	-42.6'	115.1°	14
15	8°30.5'	-38.5'	115.1°	8°05.0'	-39.2'	115.2°	7°39.3'	-39.9'	115.4°	7°13.6'	-40.6'	115.5°	6°47.7'	-41.3'	115.6°	6°21.8'	-42.0'	115.7°	5°55.7'	-42.7'	115.8°	15
16	7°52.0'	-38.6'	115.9°	7°25.8'	-39.3'	116.0°	6°59.4'	-40.0'	116.1°	6°33.0'	-40.7'	116.2°	6°06.4'	-41.4'	116.3°	5°39.8'	-42.0'	116.4°	5°13.0'	-42.7'	116.5°	16
17	7°13.5'	-38.6'	116.6°	6°46.5'	-39.4'	116.8°	6°19.4'	-40.1'	116.9°	5°52.3'	-40.7'	117.0°	5°25.0'	-41.4'	117.0°	4°57.7'	-42.1'	117.1°	4°30.3'	-42.8'	117.2°	17
18	6°34.8'	-38.7'	117.4°	6°07.1'	-39.4'	117.5°	5°39.4'	-40.1'	117.6°	5°11.5'	-40.8'	117.7°	4°43.6'	-41.5'	117.8°	4°15.6'	-42.1'	117.8°	3°47.6'	-42.8'	117.9°	18
19	5°56.1'	-38.8'	118.2°	5°27.7'	-39.5'	118.3°	4°59.3'	-40.2'	118.4°	4°30.7'	-40.8'	118.4°	4°02.1'	-41.5'	118.5°	3°33.5'	-42.2'	118.6°	3°04.8'	-42.8'	118.6°	19
20	5°17.3'	-38.8'	119.0°	4°48.3'	-39.5'	119.0°	4°19.1'	-40.2'	119.1°	3°49.9'	-40.9'	119.2°	3°20.6'	-41.5'	119.2°	2°51.3'	-42.2'	119.3°	2°22.0'	-42.8'	119.3°	20
21	4°38.5'	-38.9'	119.7°	4°08.7'	-39.6'	119.8°	3°38.9'	-40.2'	119.8°	3°09.0'	-40.9'	119.9°	2°39.1'	-41.6'	119.9°	2°09.1'	-42.2'	120.0°	1°39.1'	-42.9'	120.0°	21
22	3°59.6'	-38.9'	120.5°	3°29.2'	-39.6'	120.5°	2°58.7'	-40.3'	120.6°	2°28.1'	-40.9'	120.6°	1°57.5'	-41.6'	120.7°	1°26.9'	-42.2'	120.7°	0°56.3'	-42.9'	120.7°	22
23	3°20.7'	-39.0'	121.2°	2°49.6'	-39.6'	121.3°	2°18.4'	-40.3'	121.3°	1°47.2'	-41.0'	121.4°	1°15.9'	-41.6'	121.4°	0°44.7'	-42.2'	121.4°	0°13.4'	-42.9'	121.4°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

112° 248° LHA

Latitude SAME as DECLINATION

112° 248° LHA

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

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

67° 293° LHA

Latitude CONTRARY to Declination

67° 293° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	18°40.0'	-36.4'	103.7°	18°25.7'	-37.3'	104.0°	18°11.0'	-38.1'	104.3°	17°56.0'	-38.9'	104.6°	17°40.6'	-39.7'	105.0°	17°25.0'	-40.5'	105.3°	17°09.1'	-41.3'	105.6°	0
1	18°03.5'	-36.7'	104.5°	17°48.4'	-37.5'	104.8°	17°32.9'	-38.3'	105.1°	17°17.0'	-39.1'	105.4°	17°00.9'	-39.9'	105.7°	16°44.5'	-40.7'	106.0°	16°27.8'	-41.4'	106.3°	1
2	17°26.9'	-36.9'	105.4°	17°10.9'	-37.7'	105.7°	16°54.6'	-38.5'	105.9°	16°37.9'	-39.3'	106.2°	16°21.0'	-40.1'	106.5°	16°03.8'	-40.8'	106.8°	15°46.3'	-41.6'	107.1°	2
3	16°50.1'	-37.1'	106.2°	16°33.2'	-37.9'	106.5°	16°16.1'	-38.7'	106.7°	15°58.6'	-39.5'	107.0°	15°40.9'	-40.2'	107.3°	15°23.0'	-41.0'	107.6°	15°04.7'	-41.7'	107.8°	3
4	16°13.0'	-37.2'	107.0°	15°55.3'	-38.0'	107.3°	15°37.4'	-38.8'	107.5°	15°19.2'	-39.6'	107.8°	15°00.7'	-40.4'	108.1°	14°42.0'	-41.1'	108.3°	14°23.0'	-41.9'	108.6°	4
5	15°35.8'	-37.4'	107.8°	15°17.3'	-38.2'	108.1°	14°58.6'	-39.0'	108.3°	14°39.6'	-39.8'	108.6°	14°20.3'	-40.5'	108.8°	14°00.8'	-41.3'	109.1°	13°41.1'	-42.0'	109.3°	5
6	14°58.4'	-37.6'	108.6°	14°39.1'	-38.4'	108.9°	14°19.5'	-39.2'	109.1°	13°59.8'	-39.9'	109.4°	13°39.8'	-40.7'	109.6°	13°19.5'	-41.4'	109.8°	12°59.1'	-42.1'	110.0°	6
7	14°20.8'	-37.8'	109.4°	14°00.7'	-38.5'	109.7°	13°40.4'	-39.3'	109.9°	13°19.9'	-40.1'	110.1°	12°59.1'	-40.8'	110.3°	12°38.1'	-41.5'	110.6°	12°17.0'	-42.2'	110.8°	7
8	13°43.0'	-37.9'	110.2°	13°22.2'	-38.7'	110.5°	13°01.1'	-39.4'	110.7°	12°39.8'	-40.2'	110.9°	12°18.3'	-40.9'	111.1°	11°56.6'	-41.6'	111.3°	11°34.7'	-42.4'	111.5°	8
9	13°05.1'	-38.1'	111.0°	12°43.5'	-38.8'	111.2°	12°21.6'	-39.6'	111.4°	11°59.6'	-40.3'	111.6°	11°37.4'	-41.0'	111.8°	11°15.0'	-41.8'	112.0°	10°52.4'	-42.5'	112.2°	9
10	12°27.1'	-38.2'	111.8°	12°04.7'	-38.9'	112.0°	11°42.1'	-39.7'	112.2°	11°19.3'	-40.4'	112.4°	10°56.3'	-41.1'	112.6°	10°33.2'	-41.9'	112.8°	10°09.9'	-42.6'	112.9°	10
11	11°48.9'	-38.3'	112.6°	11°25.7'	-39.1'	112.8°	11°02.4'	-39.8'	113.0°	10°38.9'	-40.5'	113.2°	10°15.2'	-41.2'	113.3°	9°51.3'	-41.9'	113.5°	9°27.4'	-42.6'	113.6°	11
12	11°10.6'	-38.4'	113.4°	10°46.6'	-39.2'	113.6°	10°22.6'	-39.9'	113.7°	9°58.3'	-40.6'	113.9°	9°33.9'	-41.3'	114.1°	9°09.4'	-42.0'	114.2°	8°44.7'	-42.7'	114.4°	12
13	10°32.1'	-38.6'	114.2°	10°07.5'	-39.3'	114.3°	9°42.6'	-40.0'	114.5°	9°17.7'	-40.7'	114.7°	8°52.6'	-41.4'	114.8°	8°27.4'	-42.1'	114.9°	8°02.0'	-42.8'	115.1°	13
14	9°53.5'	-38.7'	115.0°	9°28.2'	-39.4'	115.1°	9°02.6'	-40.1'	115.3°	8°37.0'	-40.8'	115.4°	8°11.2'	-41.5'	115.5°	7°45.2'	-42.2'	115.7°	7°19.2'	-42.9'	115.8°	14
15	9°14.9'	-38.8'	115.7°	8°48.8'	-39.5'	115.9°	8°22.5'	-40.2'	116.0°	7°56.1'	-40.9'	116.1°	7°29.7'	-41.6'	116.3°	7°03.1'	-42.3'	116.4°	6°36.4'	-42.9'	116.5°	15
16	8°36.1'	-38.9'	116.5°	8°09.3'	-39.6'	116.6°	7°42.3'	-40.3'	116.8°	7°15.3'	-41.0'	116.9°	6°48.1'	-41.6'	117.0°	6°20.8'	-42.3'	117.1°	5°53.4'	-43.0'	117.2°	16
17	7°57.3'	-38.9'	117.3°	7°29.7'	-39.6'	117.4°	7°02.1'	-40.3'	117.5°	6°34.3'	-41.0'	117.6°	6°06.4'	-41.7'	117.7°	5°38.5'	-42.4'	117.8°	5°10.5'	-43.0'	117.9°	17
18	7°18.3'	-39.0'	118.0°	6°50.1'	-39.7'	118.1°	6°21.7'	-40.4'	118.3°	5°53.3'	-41.1'	118.3°	5°24.7'	-41.8'	118.4°	4°56.1'	-42.4'	118.5°	4°27.5'	-43.1'	118.6°	18
19	6°39.3'	-39.1'	118.8°	6°10.3'	-39.8'	118.9°	5°41.3'	-40.5'	119.0°	5°12.2'	-41.1'	119.1°	4°43.0'	-41.8'	119.2°	4°13.7'	-42.4'	119.2°	3°44.4'	-43.1'	119.3°	19
20	6°00.2'	-39.2'	119.6°	5°30.6'	-39.8'	119.7°	5°00.8'	-40.5'	119.7°	4°31.0'	-41.2'	119.8°	4°01.2'	-41.8'	119.9°	3°31.3'	-42.5'	119.9°	3°01.3'	-43.1'	120.0°	20
21	5°21.1'	-39.2'	120.3°	4°50.7'	-39.9'	120.4°	4°															

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

**66° 294° LHA**

**Latitude CONTRARY to Declination**

**66° 294° LHA**

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	19°27.7'	-36.6'	104.3°	19°12.7'	-37.5'	104.7°	18°57.3'	-38.3'	105.0°	18°41.6'	-39.1'	105.3°	18°25.6'	-39.9'	105.7°	18°09.3'	-40.7'	106.0°	17°52.6'	-41.4'	106.3°	0
1	18°51.0'	-36.8'	105.2°	18°35.2'	-37.7'	105.5°	18°19.0'	-38.5'	105.8°	18°02.5'	-39.3'	106.1°	17°45.7'	-40.1'	106.4°	17°28.6'	-40.9'	106.7°	17°11.1'	-41.6'	107.0°	1
2	18°14.2'	-37.1'	106.0°	17°57.6'	-37.9'	106.3°	17°40.6'	-38.7'	106.6°	17°23.2'	-39.5'	106.9°	17°05.6'	-40.3'	107.2°	16°47.7'	-41.0'	107.5°	16°29.5'	-41.8'	107.8°	2
3	17°37.2'	-37.3'	106.8°	17°19.7'	-38.1'	107.1°	17°01.9'	-38.9'	107.4°	16°43.8'	-39.7'	107.7°	16°25.4'	-40.4'	108.0°	16°06.7'	-41.2'	108.3°	15°47.8'	-41.9'	108.5°	3
4	16°59.9'	-37.5'	107.6°	16°41.6'	-38.3'	107.9°	16°23.0'	-39.1'	108.2°	16°04.1'	-39.8'	108.5°	15°44.9'	-40.6'	108.8°	15°25.5'	-41.3'	109.0°	15°05.8'	-42.1'	109.3°	4
5	16°22.5'	-37.6'	108.5°	16°03.4'	-38.4'	108.7°	15°44.0'	-39.2'	109.0°	15°24.3'	-40.0'	109.3°	15°04.4'	-40.7'	109.5°	14°44.2'	-41.5'	109.8°	14°23.8'	-42.2'	110.0°	5
6	15°44.9'	-37.8'	109.3°	15°24.9'	-38.6'	109.5°	15°04.7'	-39.4'	109.8°	14°44.3'	-40.1'	110.0°	14°23.6'	-40.9'	110.3°	14°02.7'	-41.6'	110.5°	13°41.5'	-42.3'	110.8°	6
7	15°07.0'	-38.0'	110.1°	14°46.3'	-38.8'	110.3°	14°25.4'	-39.5'	110.6°	14°04.2'	-40.3'	110.8°	13°42.7'	-41.0'	111.0°	13°21.1'	-41.7'	111.3°	12°59.2'	-42.5'	111.5°	7
8	14°29.0'	-38.2'	110.9°	14°07.5'	-38.9'	111.1°	13°45.8'	-39.7'	111.3°	13°23.9'	-40.4'	111.6°	13°01.7'	-41.2'	111.8°	12°39.3'	-41.9'	112.0°	12°16.7'	-42.6'	112.2°	8
9	13°50.9'	-38.3'	111.7°	13°28.6'	-39.1'	111.9°	13°06.1'	-39.8'	112.1°	12°43.4'	-40.6'	112.3°	12°20.5'	-41.3'	112.5°	11°57.5'	-42.0'	112.7°	11°34.2'	-42.7'	112.9°	9
10	13°12.6'	-38.4'	112.5°	12°49.6'	-39.2'	112.7°	12°26.3'	-39.9'	112.9°	12°02.9'	-40.7'	113.1°	11°39.3'	-41.4'	113.3°	11°15.5'	-42.1'	113.5°	10°51.5'	-42.8'	113.6°	10
11	12°34.1'	-38.6'	113.3°	12°10.4'	-39.3'	113.5°	11°46.4'	-40.1'	113.6°	11°22.2'	-40.8'	113.8°	10°57.9'	-41.5'	114.0°	10°33.4'	-42.2'	114.2°	10°08.7'	-42.9'	114.4°	11
12	11°55.5'	-38.7'	114.0°	11°31.0'	-39.5'	114.2°	11°06.3'	-40.2'	114.4°	10°41.4'	-40.9'	114.6°	10°16.4'	-41.6'	114.8°	9°51.2'	-42.3'	114.9°	9°25.9'	-43.0'	115.1°	12
13	11°16.8'	-38.8'	114.8°	10°51.6'	-39.6'	115.0°	10°26.1'	-40.3'	115.2°	10°00.5'	-41.0'	115.3°	9°34.8'	-41.7'	115.5°	9°08.9'	-42.4'	115.6°	8°42.9'	-43.0'	115.8°	13
14	10°38.0'	-39.0'	115.6°	10°12.0'	-39.7'	115.8°	9°45.8'	-40.4'	115.9°	9°19.6'	-41.1'	116.1°	8°53.1'	-41.8'	116.2°	8°26.6'	-42.4'	116.3°	7°59.9'	-43.1'	116.5°	14
15	9°59.0'	-39.1'	116.4°	9°32.3'	-39.8'	116.5°	9°05.5'	-40.5'	116.7°	8°38.5'	-41.2'	116.8°	8°11.4'	-41.8'	116.9°	7°44.1'	-42.5'	117.1°	7°16.8'	-43.2'	117.2°	15
16	9°20.0'	-39.2'	117.1°	8°52.6'	-39.9'	117.3°	8°25.0'	-40.6'	117.4°	7°57.3'	-41.2'	117.5°	7°29.5'	-41.9'	117.7°	7°01.6'	-42.6'	117.8°	6°33.6'	-43.2'	117.9°	16
17	8°40.8'	-39.2'	117.9°	8°12.7'	-39.9'	118.0°	7°44.4'	-40.6'	118.2°	7°16.1'	-41.3'	118.3°	6°47.6'	-42.0'	118.4°	6°19.0'	-42.6'	118.5°	5°50.4'	-43.3'	118.6°	17
18	8°01.6'	-39.3'	118.7°	7°32.7'	-40.0'	118.8°	7°03.8'	-40.7'	118.9°	6°34.8'	-41.4'	119.0°	6°05.6'	-42.0'	119.1°	5°36.4'	-42.7'	119.2°	5°07.1'	-43.3'	119.3°	18
19	7°22.2'	-39.4'	119.4°	6°52.7'	-40.1'	119.5°	6°23.1'	-40.8'	119.6°	5°53.4'	-41.4'	119.7°	5°23.6'	-42.1'	119.8°	4°53.7'	-42.7'	119.9°	4°23.8'	-43.4'	120.0°	19
20	6°42.8'	-39.5'	120.2°	6°12.6'	-40.2'	120.3°	5°42.3'	-40.8'	120.4°	5°11.9'	-41.5'	120.5°	4°41.5'	-42.1'	120.5°	4°11.0'	-42.8'	120.6°	3°40.4'	-43.4'	120.7°	20
21	6°03.4'	-39.5'	120.9°	5°32.5'	-40.2'	121.0°	5°01.5'	-40.9'	121.1°	4°30.5'	-41.5'	121.2°	3°59.4'	-42.2'	121.2°	3°28.2'	-42.8'	121.3°	2°57.0'	-43.4'	121.4°	21
22	5°23.8'	-39.6'	121.7°	4°52.2'	-40.3'	121.8°	4°20.6'	-41.6'	121.8°	3°48.9'	-41.6'	121.9°	3°17.2'	-42.2'	122.0°	2°45.4'	-42.8'	122.0°	2°13.6'	-43.2'	122.0°	22
23	4°44.2'	-39.6'	122.5°	4°12.0'	-40.3'	122.5°	3°39.7'	-41.0'	122.6°	3°07.4'	-41.6'	122.6°	2°35.0'	-42.2'	122.7°	2°02.6'	-42.8'	122.7°	1°30.2'	-43.5'	122.7°	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**

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	20°15.2'	-36.8'	105.0°	19°59.6'	-37.6'	105.3°	19°43.5'	-38.5'	105.7°	19°27.2'	-39.3'	106.0°	19°10.4'	-40.1'	106.4°	18°53.4'	-40.9'	106.7°	18°36.0'	-41.6'	107.0°	0
1	19°38.4'	-37.0'	105.8°	19°21.9'	-37.9'	106.2°	19°05.1'	-38.7'	106.5°	18°47.9'	-39.5'	106.8°	18°30.4'	-40.3'	107.1°	18°12.5'	-41.0'	107.5°	17°54.4'	-41.8'	107.8°	1
2	19°01.4'	-37.3'	106.6°	18°44.1'	-38.1'	107.0°	18°26.4'	-38.9'	107.3°	18°08.4'	-39.7'	107.6°	17°50.1'	-40.5'	107.9°	17°31.5'	-41.2'	108.2°	17°12.6'	-42.0'	108.5°	2
3	18°24.2'	-37.5'	107.5°	18°06.0'	-38.3'	107.8°	17°47.5'	-39.1'	108.1°	17°28.7'	-39.9'	108.4°	17°09.6'	-40.6'	108.7°	16°50.3'	-41.4'	109.0°	16°30.6'	-42.1'	109.3°	3
4	17°46.7'	-37.7'	108.3°	17°27.7'	-38.5'	108.6°	17°08.4'	-39.3'	108.9°	16°48.9'	-40.0'	109.2°	16°29.0'	-40.8'	109.5°	16°08.9'	-41.5'	109.7°	15°48.5'	-42.3'	110.0°	4
5	17°09.0'	-37.9'	109.1°	16°49.2'	-38.7'	109.4°	16°29.2'	-39.4'	109.7°	16°08.8'	-40.2'	110.0°	15°48.2'	-41.0'	110.2°	15°27.3'	-41.7'	110.5°	15°06.2'	-42.4'	110.7°	5
6	16°31.2'	-38.1'	109.9°	16°10.6'	-38.8'	110.2°	15°49.7'	-39.6'	110.5°	15°28.6'	-40.4'	110.7°	15°07.2'	-41.1'	111.0°	14°45.6'	-41.8'	111.2°	14°23.8'	-42.5'	111.5°	6
7	15°53.1'	-38.2'	110.7°	15°31.7'	-39.0'	111.0°	15°10.1'	-39.8'	111.2°	14°48.2'	-40.5'	111.5°	14°26.1'	-41.2'	111.7°	14°03.8'	-42.0'	112.0°	13°41.2'	-42.7'	112.2°	7
8	15°14.9'	-38.4'	111.5°	14°52.7'	-39.2'	111.8°	14°30.3'	-39.9'	112.0°	14°07.7'	-40.7'	112.3°	13°44.9'	-41.4'	112.5°	13°21.8'	-42.1'	112.7°	12°58.6'	-42.8'	112.9°	8
9	14°36.5'	-38.6'	112.3°	14°13.6'	-39.3'	112.6°	13°50.4'	-40.1'	112.8°	13°27.1'	-40.8'	113.0°	13°03.5'	-41.5'	113.2°	12°39.7'	-42.2'	113.4°	12°15.8'	-42.9'	113.6°	9
10	13°57.9'	-38.7'	113.1°	13°34.2'	-39.5'	113.3°	13°10.4'	-40.2'	113.6°	12°46.3'	-40.9'	113.8°	12°22.0'	-41.6'	114.0°	11°57.5'	-42.3'	114.2°	11°32.9'	-43.0'	114.4°	10
11	13°19.2'	-38.9'	113.9°	12°54.8'	-39.6'	114.1°	12°30.2'	-40.3'	114.3°	12°05.4'	-41.0'	114.5°	11°40.4'	-41.7'	114.7°	11°15.2'	-42.4'	114.9°	10°49.9'	-43.1'	115.1°	11
12	12°40.3'	-39.0'	114.7°	12°15.2'	-39.7'	114.9°	11°49.8'	-40.4'	115.1°	11°24.3'	-41.2'	115.3°	10°58.6'	-41.8'	115.4°	10°32.8'	-42.5'	115.6°	10°06.8'	-43.2'	115.8°	12
13	12°01.3'	-39.1'	115.5°	11°35.4'	-39.8'	115.6°	11°09.4'	-40.6'	115.8°	10°43.2'	-41.3'	116.0°	10°16.8'	-41.9'	116.2°	9°50.2'	-42.6'	116.3°	9°23.6'	-43.3'	116.5°	13
14	11°22.2'	-39.2'	116.2°	10°55.6'	-40.0'	116.4°	10°28.8'	-40.7'	116.6°	10°01.9'	-41.4'	116.7°	9°34.8'	-42.0'	116.9°	9°07.6'	-42.7'	117.0°	8°40.3'	-43.4'	117.2°	14
15	10°43.0'	-39.4'	117.0°	10°15.6'	-40.1'	117.2°	9°48.2'	-40.8'	117.3°	9°20.5'	-41.4'	117.5°	8°52.8'	-42.1'	117.6°	8°24.9'	-42.8'	117.8°	7°56.9'	-43.4'	117.9°	15
16	10°03.6'	-39.5'	117.8°	9°35.6'	-40.2'	117.9°	9°07.4'	-40.9'	118.1°	8°39.1'	-41.5'	118.2°	8°10.7'	-42.2'	118.3°	7°42.1'	-42.8'	118.5°	7°13.5'	-43.5'	118.6°	16
17	9°24.1'	-39.6'	118.5°	8°55.4'	-40.3'	118.7°	8°26.5'	-40.9'	118.8°	7°57.6'	-41.6'	118.9°	7°28.5'	-42.3'	119.1°	6°59.3'	-42.9'	119.2°	6°30.0'	-43.5'	119.3°	17
18	8°44.6'	-39.7'	119.3°	8°15.1'	-40.3'	119.4°	7°45.6'	-41.0'	119.6°	7°16.0'	-41.7'	119.7°	6°46.2'	-42.3'	119.8°	6°16.4'	-43.0'	119.9°	5°46.5'	-43.6'	120.0°	18
19	8°04.9'	-39.7'	120.1°	7°34.8'	-40.4'	120.2°	7°04.6'	-41.1'	120.3°	6°34.3'	-41.7'	120.4°	6°03.9'	-42.4'	120.5°	5°33.4'	-43.0'	120.6°	5°02.9'	-43.6'	120.7°	19
20	7°25.2'	-39.8'	120.8°	6°54.4'	-40.5'	120.9°	6°23.5'	-41.1'	121.0°	5°52.6'	-41.8'	121.1°	5°21.5'	-42.4'	121.2°	4°50.4'	-43.1'	121.3°	4°19.2'	-43.7'	121.3°	20
21	6°45.4'	-39.9'	121.6°	6°13.9'	-40.5'	121.7°	5°42.4'	-41.2'	121.8°	5°10.8'	-41.8'	121.8°	4°39.1'	-42.5'	121.9°	4°07.3'	-43.1'	122.0°	3°35.5'	-43.7'	122.0°	21
22	6°05.5'	-39.9'	122.3°	5°33.4'	-40.6'	122.4°	5°01.2'	-41														

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

64° 296° LHA

Latitude CONTRARY to Declination

64° 296° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	21°02.6'	-37.0'	105.6°	20°46.3'	-37.8'	106.0°	20°29.6'	-38.7'	106.4°	20°12.5'	-39.5'	106.7°	19°55.1'	-40.3'	107.1°	19°37.3'	-41.0'	107.4°	19°19.2'	-41.8'	107.7°	0
1	20°25.6'	-37.2'	106.5°	20°08.5'	-38.1'	106.8°	19°50.9'	-38.9'	107.2°	19°33.1'	-39.7'	107.5°	19°14.8'	-40.5'	107.9°	18°56.3'	-41.2'	108.2°	18°37.4'	-42.0'	108.5°	1
2	19°48.4'	-37.5'	107.3°	19°30.4'	-38.3'	107.6°	19°12.1'	-39.1'	108.0°	18°53.4'	-39.9'	108.3°	18°34.4'	-40.7'	108.6°	18°15.0'	-41.4'	108.9°	17°55.4'	-42.2'	109.3°	2
3	19°11.0'	-37.7'	108.1°	18°52.1'	-38.5'	108.5°	18°33.0'	-39.3'	108.8°	18°13.5'	-40.1'	109.1°	17°53.7'	-40.8'	109.4°	17°33.6'	-41.6'	109.7°	17°13.2'	-42.3'	110.0°	3
4	18°33.3'	-37.9'	109.0°	18°13.6'	-38.7'	109.3°	17°53.7'	-39.5'	109.6°	17°33.4'	-40.3'	109.9°	17°12.9'	-41.0'	110.2°	16°52.0'	-41.8'	110.5°	16°30.9'	-42.5'	110.7°	4
5	17°55.4'	-38.1'	109.8°	17°34.9'	-38.9'	110.1°	17°14.2'	-39.7'	110.4°	16°53.2'	-40.4'	110.7°	16°31.9'	-41.2'	110.9°	16°10.3'	-41.9'	111.2°	15°48.4'	-42.6'	111.5°	5
6	17°17.3'	-38.3'	110.6°	16°56.0'	-39.1'	110.9°	16°34.5'	-39.8'	111.2°	16°12.7'	-40.6'	111.4°	15°50.7'	-41.3'	111.7°	15°28.4'	-42.1'	112.0°	15°05.8'	-42.8'	112.2°	6
7	16°39.0'	-38.5'	111.4°	16°16.9'	-39.3'	111.7°	15°54.7'	-40.0'	111.9°	15°32.1'	-40.8'	112.2°	15°09.3'	-41.5'	112.4°	14°46.3'	-42.2'	112.7°	14°23.1'	-42.9'	112.9°	7
8	16°00.5'	-38.7'	112.2°	15°37.7'	-39.4'	112.4°	15°14.7'	-40.2'	112.7°	14°51.4'	-40.9'	113.0°	14°27.9'	-41.6'	113.2°	14°04.1'	-42.3'	113.4°	13°40.2'	-43.0'	113.7°	8
9	15°21.8'	-38.8'	113.0°	14°58.3'	-39.6'	113.2°	14°34.5'	-40.3'	113.5°	14°10.5'	-41.0'	113.7°	13°46.2'	-41.8'	113.9°	13°21.8'	-42.5'	114.2°	12°57.1'	-43.1'	114.4°	9
10	14°43.0'	-39.0'	113.8°	14°18.7'	-39.7'	114.0°	13°54.2'	-40.5'	114.2°	13°29.4'	-41.2'	114.5°	13°04.5'	-41.9'	114.7°	12°39.3'	-42.6'	114.9°	12°14.0'	-43.2'	115.1°	10
11	14°04.0'	-39.1'	114.6°	13°39.0'	-39.9'	114.8°	13°13.7'	-40.6'	115.0°	12°48.3'	-41.3'	115.2°	12°22.6'	-42.0'	115.4°	11°56.8'	-42.7'	115.6°	11°30.8'	-43.3'	115.8°	11
12	13°24.9'	-39.3'	115.3°	12°59.1'	-40.0'	115.5°	12°33.1'	-40.7'	115.8°	12°07.0'	-41.4'	115.9°	11°40.6'	-42.1'	116.1°	11°14.1'	-42.8'	116.3°	10°47.4'	-43.4'	116.5°	12
13	12°45.6'	-39.4'	116.1°	12°19.1'	-40.1'	116.3°	11°52.4'	-40.8'	116.5°	11°25.5'	-41.5'	116.7°	10°58.5'	-42.2'	116.9°	10°31.3'	-42.9'	117.0°	10°04.0'	-43.5'	117.2°	13
14	12°06.2'	-39.5'	116.9°	11°38.9'	-40.3'	117.1°	11°11.6'	-41.0'	117.3°	10°44.0'	-41.6'	117.4°	10°16.3'	-42.3'	117.6°	9°48.4'	-43.0'	117.7°	9°20.4'	-43.6'	117.9°	14
15	11°26.6'	-39.7'	117.7°	10°58.7'	-40.4'	117.8°	10°30.6'	-41.1'	118.0°	10°02.4'	-41.7'	118.2°	9°34.0'	-42.4'	118.3°	9°05.5'	-43.0'	118.5°	8°36.8'	-43.7'	118.6°	15
16	10°47.0'	-39.8'	118.4°	10°18.3'	-40.5'	118.6°	9°49.6'	-41.1'	118.7°	9°20.6'	-41.8'	118.9°	8°51.6'	-42.5'	119.0°	8°22.4'	-43.1'	119.2°	7°53.1'	-43.8'	119.3°	16
17	10°07.2'	-39.9'	119.2°	9°37.9'	-40.6'	119.3°	9°08.4'	-41.2'	119.5°	8°38.8'	-41.9'	119.6°	8°09.1'	-42.6'	119.7°	7°39.3'	-43.2'	119.9°	7°09.4'	-43.8'	120.0°	17
18	9°27.3'	-40.0'	119.9°	8°57.3'	-40.7'	120.1°	8°27.2'	-41.3'	120.2°	7°56.9'	-42.0'	120.3°	7°26.6'	-42.6'	120.5°	6°56.1'	-43.3'	120.6°	6°25.5'	-43.9'	120.7°	18
19	8°47.3'	-40.1'	120.7°	8°16.6'	-40.7'	120.8°	7°45.8'	-41.4'	120.9°	7°14.9'	-42.0'	121.1°	6°43.9'	-42.7'	121.2°	6°12.8'	-43.3'	121.3°	5°41.7'	-43.9'	121.3°	19
20	8°07.3'	-40.2'	121.4°	7°35.9'	-40.8'	121.6°	7°04.4'	-41.5'	121.7°	6°32.9'	-42.1'	121.8°	6°01.3'	-42.7'	121.9°	5°29.5'	-43.4'	122.0°	4°57.8'	-44.0'	122.0°	20
21	7°27.1'	-40.2'	122.2°	6°55.1'	-40.9'	122.3°	6°23.0'	-41.5'	122.4°	5°50.8'	-42.2'	122.5°	5°18.5'	-42.8'	122.6°	4°46.2'	-43.4'	122.6°	4°13.8'	-44.0'	122.7°	21
22	6°46.9'	-40.3'	122.9°	6°14.2'	-40.9'	123.0°	5°41.5'	-41.6'	123.1°	5°08.6'	-42.2'	123.2°	4°35.7'	-42.8'	123.3°	4°02.8'	-43.4'	123.3°	3°29.8'	-44.0'	123.4°	22
23	6°06.6'	-40.4'	123.7°	5°33.3'	-41.0'	123.8°	4°59.9'	-41.6'	123.8°	4°26.4'	-42.2'	123.9°	3°52.9'	-42.9'	124.0°	3°19.4'	-43.5'	124.0°	2°45.8'	-44.1'	124.1°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

64° 296° LHA

Latitude CONTRARY to DECLINATION

64° 296° LHA

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

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

63° 297° LHA

Latitude CONTRARY to Declination

63° 297° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	21°49.9'	-37.2'	106.3°	21°32.9'	-38.0'	106.7°	21°15.5'	-38.9'	107.0°	20°57.7'	-39.7'	107.4°	20°39.6'	-40.5'	107.8°	20°21.1'	-41.2'	108.1°	20°02.2'	-42.0'	108.5°	0
1	21°12.7'	-37.5'	107.1°	20°54.9'	-38.3'	107.5°	20°36.6'	-39.1'	107.9°	20°18.1'	-39.9'	108.2°	19°59.1'	-40.7'	108.6°	19°39.8'	-41.4'	108.9°	19°20.2'	-42.2'	109.2°	1
2	20°35.2'	-37.7'	108.0°	20°16.6'	-38.5'	108.3°	19°57.5'	-39.3'	108.7°	19°38.2'	-40.1'	109.0°	19°18.5'	-40.9'	109.3°	18°58.4'	-41.6'	109.7°	18°38.1'	-42.4'	110.0°	2
3	19°57.6'	-37.9'	108.8°	19°38.1'	-38.7'	109.1°	19°18.2'	-39.5'	109.5°	18°58.1'	-40.3'	109.8°	18°37.6'	-41.1'	110.1°	18°16.8'	-41.8'	110.4°	17°55.7'	-42.5'	110.7°	3
4	19°19.7'	-38.1'	109.6°	18°59.4'	-38.9'	110.0°	18°38.7'	-39.7'	110.3°	18°17.8'	-40.5'	110.6°	17°56.5'	-41.2'	110.9°	17°35.0'	-42.0'	111.2°	17°13.2'	-42.7'	111.5°	4
5	18°41.5'	-38.3'	110.4°	18°20.4'	-39.1'	110.8°	17°59.0'	-39.9'	111.1°	17°37.3'	-40.7'	111.4°	17°15.3'	-41.4'	111.7°	16°53.0'	-42.1'	111.9°	16°30.5'	-42.8'	112.2°	5
6	18°03.2'	-38.6'	111.3°	17°41.3'	-39.3'	111.6°	17°19.1'	-40.1'	111.8°	16°56.6'	-40.8'	112.1°	16°33.9'	-41.6'	112.4°	16°10.9'	-42.3'	112.7°	15°47.6'	-43.0'	112.9°	6
7	17°24.6'	-38.7'	112.1°	17°02.0'	-39.5'	112.3°	16°39.0'	-40.3'	112.6°	16°15.8'	-41.0'	112.9°	15°52.3'	-41.7'	113.2°	15°28.6'	-42.4'	113.4°	15°04.6'	-43.1'	113.7°	7
8	16°45.9'	-38.9'	112.9°	16°22.4'	-39.7'	113.1°	15°58.8'	-40.4'	113.4°	15°34.8'	-41.2'	113.7°	15°10.6'	-41.9'	113.9°	14°46.2'	-42.6'	114.1°	14°21.5'	-43.3'	114.4°	8
9	16°07.0'	-39.1'	113.6°	15°42.8'	-39.8'	113.9°	15°18.3'	-40.6'	114.2°	14°53.6'	-41.3'	114.4°	14°28.7'	-42.0'	114.6°	14°03.6'	-42.7'	114.9°	13°38.3'	-43.4'	115.1°	9
10	15°27.9'	-39.3'	114.4°	15°02.9'	-40.0'	114.7°	14°37.7'	-40.7'	114.9°	14°12.3'	-41.4'	115.2°	13°46.7'	-42.1'	115.4°	13°20.9'	-42.8'	115.6°	12°54.9'	-43.5'	115.8°	10
11	14°48.6'	-39.4'	115.2°	14°22.9'	-40.2'	115.5°	13°57.0'	-40.9'	115.7°	13°30.9'	-41.6'	115.9°	13°04.6'	-42.3'	116.1°	12°38.1'	-42.9'	116.3°	12°11.4'	-43.6'	116.5°	11
12	14°09.2'	-39.6'	116.0°	13°42.8'	-40.3'	116.2°	13°16.1'	-41.0'	116.4°	12°49.3'	-41.7'	116.6°	12°22.3'	-42.4'	116.8°	11°55.2'	-43.0'	117.0°	11°27.8'	-43.7'	117.2°	12
13	13°29.6'	-39.7'	116.8°	13°02.5'	-40.4'	117.0°	12°35.1'	-41.1'	117.2°	12°07.6'	-41.8'	117.4°	11°40.0'	-42.5'	117.6°	11°12.1'	-43.1'	117.7°	10°44.1'	-43.8'	117.9°	13
14	12°49.9'	-39.8'	117.5°	12°22.0'	-40.6'	117.7°	11°54.0'	-41.2'	117.9°	11°25.8'	-41.9'	118.1°	10°57.5'	-42.6'	118.3°	10°29.0'	-43.2'	118.5°	10°00.3'	-43.9'	118.6°	14
15	12°10.0'	-40.0'	118.3°	11°41.5'	-40.7'	118.5°	11°12.8'	-41.4'	118.7°	10°43.9'	-42.0'	118.8°	10°14.9'	-42.7'	119.0°	9°45.7'	-43.3'	119.2°	9°16.4'	-44.0'	119.3°	15
16	11°30.0'	-40.1'	119.1°	11°00.8'	-40.8'	119.2°	10°31.4'	-41.5'	119.4°	10°01.9'	-42.1'	119.6°	9°32.2'	-42.8'	119.7°	9°02.4'	-43.4'	119.9°	8°32.5'	-44.0'	120.0°	16
17	10°50.0'	-40.2'	119.8°	10°20.0'	-40.9'	120.0°	9°50.0'	-41.5'	120.1°	9°19.8'	-42.2'	120.3°	8°49.5'	-42.8'	120.4°	8°19.0'	-43.5'	120.6°	7°48.5'	-44.1'	120.7°	17
18	10°09.8'	-40.3'	120.6°	9°39.2'	-41.0'	120.7°	9°08.4'	-41.6'	120.9°	8°37.6'	-42.3'	121.0°	8°06.6'	-42.9'	121.1°	7°35.5'	-43.5'	121.3°	7°04.4'	-44.2'	121.4°	18
19	9°29.4'	-40.4'	121.3°	8°58.2'	-41.1'	121.5°	8°26.8'	-41.7'	121.6°	7°55.3'	-42.4'	121.7°	7°23.7'	-43.0'	121.8°	6°52.0'	-43.6'	121.9°	6°20.2'	-44.2'	122.0°	19
20	8°49.0'	-40.5'	122.1°	8°17.1'	-41.1'	122.2°	7°45.1'	-41.8'	122.3°	7°12.9'	-42.4'	122.4°	6°40.7'	-43.0'	122.5°	6°08.4'	-43.7'	122.6°	5°36.0'	-44.3'	122.7°	20
21	8°08.5'	-40.6'	122.8°	7°36.0'																		

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

62° 298° LHA				Latitude CONTRARY to Declination								62° 298° LHA										
Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	22°37.0'	-37.4'	107.0°	22°19.3'	-38.3'	107.4°	22°01.2'	-39.1'	107.7°	21°42.7'	-39.9'	108.1°	21°23.9'	-40.7'	108.5°	21°04.7'	-41.4'	108.9°	20°45.1'	-42.2'	109.2°	0
1	21°59.6'	-37.7'	107.8°	21°41.1'	-38.5'	108.2°	21°22.2'	-39.3'	108.6°	21°02.9'	-40.1'	108.9°	20°43.2'	-40.9'	109.3°	20°23.2'	-41.6'	109.6°	20°02.9'	-42.4'	110.0°	1
2	21°21.9'	-37.9'	108.6°	21°02.6'	-38.7'	109.0°	20°42.8'	-39.5'	109.4°	20°22.8'	-40.3'	109.7°	20°02.4'	-41.1'	110.1°	19°41.6'	-41.8'	110.4°	19°20.5'	-42.6'	110.7°	2
3	20°44.0'	-38.2'	109.5°	20°23.8'	-39.0'	109.8°	20°03.3'	-39.7'	110.2°	19°42.5'	-40.5'	110.5°	19°21.3'	-41.3'	110.8°	18°59.8'	-42.0'	111.2°	18°37.9'	-42.7'	111.5°	3
4	20°05.9'	-38.4'	110.3°	19°44.9'	-39.2'	110.6°	19°23.6'	-40.0'	111.0°	19°01.9'	-40.7'	111.3°	18°40.0'	-41.5'	111.6°	18°17.7'	-42.2'	111.9°	17°55.2'	-42.9'	112.2°	4
5	19°27.5'	-38.6'	111.1°	19°05.7'	-39.4'	111.4°	18°43.6'	-40.1'	111.8°	18°21.2'	-40.9'	112.1°	17°58.5'	-41.6'	112.4°	17°35.5'	-42.4'	112.7°	17°12.3'	-43.1'	113.0°	5
6	18°48.9'	-38.8'	111.9°	18°26.3'	-39.6'	112.2°	18°03.5'	-40.3'	112.5°	17°40.3'	-41.1'	112.8°	17°16.9'	-41.8'	113.1°	16°53.2'	-42.5'	113.4°	16°29.2'	-43.2'	113.7°	6
7	18°10.1'	-39.0'	112.7°	17°46.7'	-39.8'	113.0°	17°23.1'	-40.5'	113.3°	16°59.2'	-41.2'	113.6°	16°35.1'	-42.0'	113.9°	16°10.7'	-42.7'	114.1°	15°46.0'	-43.4'	114.4°	7
8	17°31.1'	-39.2'	113.5°	17°07.0'	-39.9'	113.8°	16°42.6'	-40.7'	114.1°	16°18.0'	-41.4'	114.4°	15°53.1'	-42.1'	114.6°	15°28.0'	-42.8'	114.9°	15°02.6'	-43.5'	115.1°	8
9	16°51.9'	-39.4'	114.3°	16°27.0'	-40.1'	114.6°	16°01.9'	-40.8'	114.9°	15°36.6'	-41.6'	115.1°	15°11.0'	-42.3'	115.4°	14°45.2'	-42.9'	115.6°	14°19.1'	-43.6'	115.8°	9
10	16°12.5'	-39.6'	115.1°	15°46.9'	-40.3'	115.4°	15°21.1'	-41.0'	115.6°	14°55.0'	-41.7'	115.9°	14°28.7'	-42.4'	116.1°	14°02.2'	-43.1'	116.3°	13°35.5'	-43.7'	116.5°	10
11	15°32.9'	-39.7'	115.9°	15°06.6'	-40.4'	116.1°	14°40.1'	-41.1'	116.4°	14°13.3'	-41.8'	116.6°	13°46.3'	-42.5'	116.8°	13°19.2'	-43.2'	117.0°	12°51.8'	-43.9'	117.2°	11
12	14°53.2'	-39.9'	116.7°	14°26.2'	-40.6'	116.9°	13°58.9'	-41.3'	117.1°	13°31.5'	-42.0'	117.3°	13°03.8'	-42.6'	117.6°	12°36.0'	-43.3'	117.8°	12°07.9'	-44.0'	117.9°	12
13	14°13.3'	-40.0'	117.4°	13°45.6'	-40.7'	117.7°	13°17.6'	-41.4'	117.9°	12°49.5'	-42.1'	118.1°	12°21.2'	-42.8'	118.3°	11°52.7'	-43.4'	118.5°	11°24.0'	-44.1'	118.6°	13
14	13°33.3'	-40.2'	118.2°	13°04.9'	-40.9'	118.4°	12°36.2'	-41.5'	118.6°	12°07.4'	-42.2'	118.8°	11°38.4'	-42.9'	119.0°	11°09.2'	-43.5'	119.2°	10°39.9'	-44.1'	119.3°	14
15	12°53.2'	-40.3'	119.0°	12°24.0'	-41.0'	119.2°	11°54.7'	-41.7'	119.4°	11°25.2'	-42.3'	119.5°	10°55.5'	-43.0'	119.7°	10°25.7'	-43.6'	119.9°	9°55.8'	-44.2'	120.0°	15
16	12°12.9'	-40.4'	119.7°	11°43.0'	-41.1'	119.9°	11°13.0'	-41.8'	120.1°	10°42.9'	-42.4'	120.3°	10°12.6'	-43.1'	120.4°	9°42.1'	-43.7'	120.6°	9°11.6'	-44.3'	120.7°	16
17	11°32.5'	-40.5'	120.5°	11°01.9'	-41.2'	120.7°	10°31.3'	-41.9'	120.8°	10°00.5'	-42.5'	121.0°	9°29.5'	-43.1'	121.1°	8°58.4'	-43.8'	121.3°	8°27.3'	-44.4'	121.4°	17
18	10°51.9'	-40.6'	121.2°	10°20.7'	-41.3'	121.4°	9°49.4'	-42.0'	121.5°	9°18.0'	-42.6'	121.7°	8°46.4'	-43.2'	121.8°	8°14.7'	-43.8'	122.0°	7°42.9'	-44.4'	122.1°	18
19	10°11.3'	-40.7'	122.0°	9°39.4'	-41.4'	122.1°	9°07.5'	-42.0'	122.3°	8°35.4'	-42.7'	122.4°	8°03.2'	-43.3'	122.5°	7°30.9'	-43.9'	122.6°	6°58.4'	-44.5'	122.7°	19
20	9°30.5'	-40.8'	122.7°	8°58.0'	-41.5'	122.9°	8°25.4'	-42.1'	123.0°	7°52.7'	-42.7'	123.1°	7°19.9'	-43.4'	123.2°	6°47.0'	-44.0'	123.3°	6°13.9'	-44.5'	123.4°	20
21	8°49.7'	-40.9'	123.5°	8°16.6'	-41.6'	123.6°	7°43.3'	-42.2'	123.7°	7°10.0'	-42.8'	123.8°	6°36.5'	-43.4'	123.9°	6°03.0'	-44.0'	124.0°	5°29.4'	-44.6'	124.1°	21
22	8°08.8'	-41.0'	124.2°	7°35.0'	-41.6'	124.3°	7°01.1'	-42.3'	124.4°	6°27.2'	-42.9'	124.5°	5°53.1'	-43.5'	124.6°	5°19.0'	-44.1'	124.7°	4°44.8'	-44.6'	124.8°	22
23	7°27.8'	-41.1'	124.9°	6°53.4'	-41.7'	125.0°	6°18.9'	-42.3'	125.1°	5°44.3'	-42.9'	125.2°	5°09.6'	-43.5'	125.3°	4°34.9'	-44.1'	125.4°	4°00.2'	-44.7'	125.4°	23

62° 298° LHA Latitude CONTRARY to DECLINATION 62° 298° LHA

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

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

61° 299° LHA				Latitude CONTRARY to Declination								61° 299° LHA										
Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	23°23.9'	-37.6'	107.6°	23°05.6'	-38.5'	108.0°	22°46.8'	-39.3'	108.4°	22°27.6'	-40.1'	108.8°	22°08.0'	-40.9'	109.2°	21°48.1'	-41.6'	109.6°	21°27.7'	-42.4'	110.0°	0
1	22°46.3'	-37.9'	108.5°	22°27.1'	-38.7'	108.9°	22°07.5'	-39.5'	109.3°	21°47.5'	-40.3'	109.6°	21°27.1'	-41.1'	110.0°	21°06.4'	-41.9'	110.4°	20°45.3'	-42.6'	110.7°	1
2	22°08.4'	-38.2'	109.3°	21°48.4'	-39.0'	109.7°	21°28.0'	-39.8'	110.1°	21°07.2'	-40.5'	110.4°	20°46.0'	-41.3'	110.8°	20°24.6'	-42.1'	111.2°	20°02.7'	-42.8'	111.5°	2
3	21°30.3'	-38.4'	110.2°	21°09.4'	-39.2'	110.5°	20°48.2'	-40.0'	110.9°	20°26.6'	-40.8'	111.2°	20°04.7'	-41.5'	111.6°	19°42.5'	-42.2'	111.9°	19°20.0'	-43.0'	112.2°	3
4	20°51.9'	-38.6'	111.0°	20°30.2'	-39.4'	111.3°	20°08.2'	-40.2'	111.7°	19°45.9'	-41.0'	112.0°	19°23.2'	-41.7'	112.3°	19°00.3'	-42.4'	112.7°	18°37.0'	-43.1'	113.0°	4
5	20°13.2'	-38.9'	111.8°	19°50.8'	-39.6'	112.1°	19°28.0'	-40.4'	112.5°	19°04.9'	-41.1'	112.8°	18°41.5'	-41.9'	113.1°	18°17.8'	-42.6'	113.4°	17°53.9'	-43.3'	113.7°	5
6	19°34.4'	-39.1'	112.6°	19°11.1'	-39.8'	112.9°	18°47.6'	-40.6'	113.2°	18°23.8'	-41.3'	113.6°	17°59.7'	-42.1'	113.9°	17°35.2'	-42.8'	114.1°	17°10.6'	-43.5'	114.4°	6
7	18°55.3'	-39.3'	113.4°	18°31.3'	-40.0'	113.7°	18°07.0'	-40.8'	114.0°	17°42.4'	-41.5'	114.3°	17°17.6'	-42.2'	114.6°	16°52.5'	-42.9'	114.9°	16°27.1'	-43.6'	115.2°	7
8	18°16.0'	-39.5'	114.2°	17°51.3'	-40.2'	114.5°	17°26.2'	-41.0'	114.8°	17°00.9'	-41.7'	115.1°	16°35.4'	-42.4'	115.3°	16°09.6'	-43.1'	115.6°	15°43.5'	-43.7'	115.9°	8
9	17°36.5'	-39.7'	115.0°	17°11.0'	-40.4'	115.3°	16°45.3'	-41.1'	115.6°	16°19.3'	-41.8'	115.8°	15°53.0'	-42.5'	116.1°	15°26.5'	-43.2'	116.3°	14°59.8'	-43.9'	116.6°	9
10	16°56.9'	-39.8'	115.8°	16°30.6'	-40.6'	116.1°	16°04.2'	-41.3'	116.3°	15°37.4'	-42.0'	116.6°	15°10.5'	-42.7'	116.8°	14°43.3'	-43.3'	117.1°	14°15.9'	-44.0'	117.3°	10
11	16°17.0'	-40.0'	116.6°	15°50.1'	-40.7'	116.8°	15°22.9'	-41.4'	117.1°	14°55.5'	-42.1'	117.3°	14°27.8'	-42.8'	117.5°	13°60.0'	-43.5'	117.8°	13°31.9'	-44.1'	118.0°	11
12	15°37.0'	-40.2'	117.3°	15°09.3'	-40.9'	117.6°	14°41.4'	-41.6'	117.8°	14°13.3'	-42.3'	118.0°	13°45.0'	-42.9'	118.3°	13°16.5'	-43.6'	118.5°	12°47.8'	-44.2'	118.7°	12
13	14°56.8'	-40.3'	118.1°	14°28.5'	-41.0'	118.3°	13°59.9'	-41.7'	118.6°	13°31.1'	-42.4'	118.8°	13°02.1'	-43.0'	119.0°	12°32.9'	-43.7'	119.2°	12°03.6'	-44.3'	119.4°	13
14	14°16.5'	-40.5'	118.9°	13°47.4'	-41.2'	119.1°	13°18.2'	-41.8'	119.3°	12°48.7'	-42.5'	119.5°	12°19.1'	-43.2'	119.7°	11°49.2'	-43.8'	119.9°	11°19.3'	-44.4'	120.1°	14
15	13°36.0'	-40.6'	119.6°	13°06.3'	-41.3'	119.8°	12°36.3'	-42.0'	120.0°	12°06.2'	-42.6'	120.2°	11°35.9'	-43.3'	120.4°	11°05.5'	-43.9'	120.6°	10°34.8'	-44.5'	120.7°	15
16	12°55.4'	-40.7'	120.4°	12°25.0'	-41.4'	120.6°	11°54.4'	-42.1'	120.8°	11°23.6'	-42.7'	120.9°	10°52.6'	-43.4'	121.1°	10°21.6'	-44.0'	121.3°	9°50.3'	-44.6'	121.4°	16
17	12°14.7'	-40.9'	121.1°	11°43.6'	-41.5'	121.3°	11°12.3'	-42.2'	121.5°	10°40.9'	-42.8'	121.7°	10°09.3'	-43.4'	121.8°	9°37.6'	-44.1'	122.0°	9°05.8'	-44.7'	122.1°	17
18	11°33.8'	-41.0'	121.9°	11°02.0'	-41.6'	122.1°	10°30.1'	-42.3'	122.2°	9°58.0'	-42.9'	122.4°	9°25.8'	-43.5'	122.5°	8°53.5'	-44.1'	122.7°	8°21.1'	-44.7'	122.8°	18
19	10°52.8'	-41.1'	122.6°	10°20.4'	-41.7'	122.8°	9°47.8'	-42.4'	122.9°	9°15.1'	-43.0'	123.1°	8°42.3'	-43.6'	123.2°	8°09.4'	-44.2'	123.3°	7°36.4'	-44.8'	123.5°	19
20	10°11.7'	-41.2'	123.4°	9°38.7'	-41.8'	123.5°	9°05.5'	-42.5'	123.7°	8°32.1'	-43.1'	123.8°	7°58.7'	-43.7'	123.9°	7°25.2'	-44.3'	124.0°	6°51.6'	-44.8'	124.1°	20
21	9°30.5'	-41.3'	124.1°	8°56.8'	-41.9'	124.3°	8°23.0'	-42.5'	124.4°	7°49.1'	-43.1'	124.5°	7°15.1'	-43.7'	124.6°	6°40.9'	-44.3'	124.7°	6°06.7'	-44.9'	124.8°	21
22	8°49.3'	-41.4'	124.9°	8°14.9'	-42.0'	125.0°	7°40.5'	-42.6'	125.1°	7°05.9'	-43.2'	125.2°	6°31.3'	-43.8'	125.3°	5°56.6'	-44.4'	125.4°	5°21.8'	-44.9'	125.5°	22
23	8°07.9'	-41.4'	125.6°	7°32.9'</																		

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

60° 300° LHA

Latitude CONTRARY to Declination

60° 300° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	24°10.6'	-37.9'	108.3°	23°51.6'	-38.7'	108.7°	23°32.1'	-39.5'	109.2°	23°12.2'	-40.3'	109.6°	22°51.9'	-41.1'	110.0°	22°31.3'	-41.9'	110.4°	22°10.2'	-42.6'	110.7°	0
1	23°32.8'	-38.1'	109.2°	23°12.9'	-39.0'	109.6°	22°52.6'	-39.8'	110.0°	22°31.9'	-40.5'	110.4°	22°10.8'	-41.3'	110.8°	21°49.4'	-42.1'	111.1°	21°27.6'	-42.8'	111.5°	1
2	22°54.6'	-38.4'	110.0°	22°34.0'	-39.2'	110.4°	22°12.9'	-40.0'	110.8°	21°51.4'	-40.8'	111.2°	21°29.5'	-41.5'	111.5°	21°07.3'	-42.3'	111.9°	20°44.8'	-43.0'	112.3°	2
3	22°16.3'	-38.7'	110.8°	21°54.8'	-39.4'	111.2°	21°32.9'	-40.2'	111.6°	21°10.6'	-41.0'	112.0°	20°48.0'	-41.7'	112.3°	20°25.0'	-42.5'	112.7°	20°01.8'	-43.2'	113.0°	3
4	21°37.6'	-38.9'	111.7°	21°15.3'	-39.7'	112.0°	20°52.6'	-40.4'	112.4°	20°29.6'	-41.2'	112.7°	20°06.2'	-41.9'	113.1°	19°42.6'	-42.7'	113.4°	19°18.6'	-43.4'	113.7°	4
5	20°58.7'	-39.1'	112.5°	20°35.6'	-39.9'	112.8°	20°12.2'	-40.7'	113.2°	19°48.4'	-41.4'	113.5°	19°24.3'	-42.1'	113.8°	18°59.9'	-42.8'	114.2°	18°35.2'	-43.5'	114.5°	5
6	20°19.6'	-39.3'	113.3°	19°55.7'	-40.1'	113.6°	19°31.5'	-40.9'	114.0°	19°07.0'	-41.6'	114.3°	18°42.2'	-42.3'	114.6°	18°17.1'	-43.0'	114.9°	17°51.7'	-43.7'	115.2°	6
7	19°40.3'	-39.6'	114.1°	19°15.6'	-40.3'	114.4°	18°50.7'	-41.0'	114.7°	18°25.4'	-41.8'	115.0°	17°59.9'	-42.5'	115.3°	17°34.1'	-43.2'	115.6°	17°08.0'	-43.8'	115.9°	7
8	19°00.7'	-39.8'	114.9°	18°35.3'	-40.5'	115.2°	18°09.6'	-41.2'	115.5°	17°43.6'	-41.9'	115.8°	17°17.4'	-42.6'	116.1°	16°50.9'	-43.3'	116.4°	16°24.1'	-44.0'	116.6°	8
9	18°20.9'	-40.0'	115.7°	17°54.8'	-40.7'	116.0°	17°28.4'	-41.4'	116.3°	17°01.7'	-42.1'	116.5°	16°34.8'	-42.8'	116.8°	16°07.6'	-43.5'	117.1°	15°40.1'	-44.1'	117.3°	9
10	17°41.0'	-40.1'	116.5°	17°14.1'	-40.9'	116.8°	16°47.0'	-41.6'	117.0°	16°19.6'	-42.3'	117.3°	15°52.0'	-42.9'	117.5°	15°24.1'	-43.6'	117.8°	14°56.0'	-44.3'	118.0°	10
11	17°00.8'	-40.3'	117.2°	16°33.3'	-41.0'	117.5°	16°05.4'	-41.7'	117.8°	15°37.3'	-42.4'	118.0°	15°09.0'	-43.1'	118.3°	14°40.5'	-43.7'	118.5°	14°11.8'	-44.4'	118.7°	11
12	16°20.5'	-40.5'	118.0°	15°52.2'	-41.2'	118.3°	15°23.7'	-41.9'	118.5°	14°54.9'	-42.5'	118.8°	14°25.9'	-43.2'	119.0°	13°56.8'	-43.9'	119.2°	13°27.4'	-44.5'	119.4°	12
13	15°40.0'	-40.6'	118.8°	15°11.0'	-41.3'	119.0°	14°41.8'	-42.0'	119.3°	14°12.4'	-42.7'	119.5°	13°42.7'	-43.3'	119.7°	13°12.9'	-44.0'	119.9°	12°42.9'	-44.6'	120.1°	13
14	14°59.4'	-40.8'	119.6°	14°29.7'	-41.5'	119.8°	13°59.8'	-42.1'	120.0°	13°29.7'	-42.8'	120.2°	12°59.4'	-43.4'	120.4°	12°28.9'	-44.1'	120.6°	11°58.3'	-44.7'	120.8°	14
15	14°18.6'	-40.9'	120.3°	13°48.2'	-41.6'	120.5°	13°17.6'	-42.3'	120.7°	12°46.9'	-42.9'	120.9°	12°16.0'	-43.6'	121.1°	11°44.9'	-44.2'	121.3°	11°13.6'	-44.8'	121.5°	15
16	13°37.7'	-41.1'	121.1°	13°06.6'	-41.7'	121.3°	12°35.4'	-42.4'	121.5°	12°04.0'	-43.0'	121.6°	11°32.4'	-43.7'	121.8°	11°00.7'	-44.3'	122.0°	10°28.8'	-44.9'	122.2°	16
17	12°56.6'	-41.2'	121.8°	12°24.9'	-41.9'	122.0°	11°53.0'	-42.5'	122.2°	11°20.9'	-43.1'	122.4°	10°48.8'	-43.7'	122.5°	10°16.4'	-44.4'	122.7°	9°44.0'	-44.9'	122.8°	17
18	12°15.4'	-41.3'	122.6°	11°43.0'	-42.0'	122.7°	11°10.5'	-42.6'	122.9°	10°37.8'	-43.2'	123.1°	10°05.0'	-43.8'	123.2°	9°32.1'	-44.4'	123.4°	8°59.0'	-45.0'	123.5°	18
19	11°34.1'	-41.4'	123.3°	11°01.0'	-42.1'	123.5°	10°27.9'	-42.7'	123.6°	9°54.6'	-43.3'	123.8°	9°21.2'	-43.9'	123.9°	8°47.6'	-44.5'	124.0°	8°14.0'	-45.1'	124.2°	19
20	10°52.6'	-41.5'	124.0°	10°19.0'	-42.2'	124.2°	9°45.2'	-42.8'	124.3°	9°11.3'	-43.4'	124.5°	8°37.3'	-44.0'	124.6°	8°03.1'	-44.6'	124.7°	7°28.9'	-45.1'	124.8°	20
21	10°11.1'	-41.6'	124.8°	9°36.8'	-42.3'	124.9°	9°02.4'	-42.9'	125.0°	8°27.9'	-43.5'	125.2°	7°53.3'	-44.1'	125.3°	7°18.6'	-44.6'	125.4°	6°43.8'	-45.2'	125.5°	21
22	9°29.4'	-41.7'	125.5°	8°54.5'	-42.3'	125.6°	8°19.5'	-42.9'	125.8°	7°44.4'	-43.5'	125.9°	7°09.2'	-44.1'	126.0°	6°33.9'	-44.7'	126.1°	5°58.6'	-45.2'	126.2°	22
23	8°47.7'	-41.8'	126.2°	8°12.2'	-42.4'	126.3°	7°36.6'	-43.0'	126.5°	7°00.9'	-43.6'	126.6°	6°25.1'	-44.2'	126.7°	5°49.2'	-44.7'	126.7°	5°13.3'	-45.3'	126.8°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	24°57.2'	-38.1'	109.0°	24°37.5'	-38.9'	109.5°	24°17.3'	-39.7'	109.9°	23°56.7'	-40.5'	110.3°	23°35.7'	-41.3'	110.7°	23°14.2'	-42.1'	111.1°	22°52.4'	-42.8'	111.5°	0
1	24°19.1'	-38.4'	109.9°	23°58.6'	-39.2'	110.3°	23°37.5'	-40.0'	110.7°	23°16.1'	-40.8'	111.1°	22°54.3'	-41.6'	111.5°	22°32.2'	-42.3'	111.9°	22°09.6'	-43.0'	112.3°	1
2	23°40.7'	-38.7'	110.7°	23°19.4'	-39.5'	111.1°	22°57.5'	-40.2'	111.5°	22°35.4'	-41.0'	111.9°	22°12.8'	-41.8'	112.3°	21°49.9'	-42.5'	112.7°	21°26.6'	-43.2'	113.0°	2
3	23°02.1'	-38.9'	111.5°	22°39.9'	-39.7'	111.9°	22°17.3'	-40.5'	112.3°	21°54.3'	-41.2'	112.7°	21°31.0'	-42.0'	113.1°	21°07.3'	-42.7'	113.4°	20°43.3'	-43.4'	113.8°	3
4	22°23.2'	-39.2'	112.4°	22°00.2'	-39.9'	112.7°	21°36.8'	-40.7'	113.1°	21°13.1'	-41.5'	113.5°	20°49.0'	-42.2'	113.8°	20°24.6'	-42.9'	114.2°	19°59.9'	-43.6'	114.5°	4
5	21°44.0'	-39.4'	113.2°	21°20.2'	-40.2'	113.5°	20°56.1'	-40.9'	113.9°	20°31.6'	-41.7'	114.2°	20°06.8'	-42.4'	114.6°	19°41.7'	-43.1'	114.9°	19°16.3'	-43.8'	115.2°	5
6	21°04.6'	-39.6'	114.0°	20°40.1'	-40.4'	114.3°	20°15.2'	-41.1'	114.7°	19°50.0'	-41.9'	115.0°	19°24.5'	-42.6'	115.3°	18°58.6'	-43.3'	115.6°	18°32.5'	-43.9'	116.0°	6
7	20°25.0'	-39.8'	114.8°	19°59.7'	-40.6'	115.1°	19°34.1'	-41.3'	115.5°	19°08.1'	-42.0'	115.8°	18°41.9'	-42.7'	116.1°	18°15.4'	-43.4'	116.4°	17°48.6'	-44.1'	116.7°	7
8	19°45.2'	-40.1'	115.6°	19°19.1'	-40.8'	115.9°	18°52.7'	-41.5'	116.2°	18°26.1'	-42.2'	116.5°	17°59.1'	-42.9'	116.8°	17°31.9'	-43.6'	117.1°	17°04.5'	-44.2'	117.4°	8
9	19°05.1'	-40.3'	116.4°	18°38.3'	-41.0'	116.7°	18°11.2'	-41.7'	117.0°	17°43.9'	-42.4'	117.3°	17°16.2'	-43.1'	117.6°	16°48.4'	-43.7'	117.8°	16°20.2'	-44.4'	118.1°	9
10	18°24.9'	-40.4'	117.2°	17°57.3'	-41.2'	117.5°	17°29.5'	-41.9'	117.7°	17°01.5'	-42.5'	118.0°	16°33.2'	-43.2'	118.3°	16°04.6'	-43.9'	118.5°	15°35.8'	-44.5'	118.8°	10
11	17°44.4'	-40.6'	117.9°	17°16.2'	-41.3'	118.2°	16°47.7'	-42.0'	118.5°	16°18.9'	-42.7'	118.8°	15°49.9'	-43.4'	119.0°	15°20.7'	-44.0'	119.2°	14°51.3'	-44.6'	119.5°	11
12	17°03.8'	-40.8'	118.7°	16°34.8'	-41.5'	119.0°	16°05.6'	-42.2'	119.2°	15°36.2'	-42.8'	119.5°	15°06.6'	-43.5'	119.7°	14°36.7'	-44.1'	119.9°	14°06.7'	-44.8'	120.2°	12
13	16°23.0'	-41.0'	119.5°	15°53.3'	-41.7'	119.7°	15°23.5'	-42.3'	120.0°	14°53.4'	-43.0'	120.2°	14°23.1'	-43.6'	120.4°	13°52.6'	-44.3'	120.6°	13°21.9'	-44.9'	120.9°	13
14	15°42.0'	-41.1'	120.2°	15°11.7'	-41.8'	120.5°	14°41.1'	-42.5'	120.7°	14°10.4'	-43.1'	120.9°	13°39.5'	-43.7'	121.1°	13°08.4'	-44.4'	121.3°	12°37.1'	-45.0'	121.5°	14
15	15°00.9'	-41.3'	121.0°	14°29.9'	-41.9'	121.2°	13°58.7'	-42.6'	121.4°	13°27.3'	-43.2'	121.6°	12°55.7'	-43.9'	121.8°	12°24.0'	-44.5'	122.0°	11°52.1'	-45.1'	122.2°	15
16	14°19.6'	-41.4'	121.7°	13°47.9'	-42.1'	122.0°	13°16.1'	-42.7'	122.2°	12°44.1'	-43.3'	122.4°	12°11.9'	-44.0'	122.5°	11°39.5'	-44.6'	122.7°	11°07.0'	-45.2'	122.9°	16
17	13°38.2'	-41.5'	122.5°	13°05.9'	-42.2'	122.7°	12°33.4'	-42.8'	122.9°	12°00.7'	-43.4'	123.1°	11°27.9'	-44.1'	123.2°	10°55.0'	-44.7'	123.4°	10°21.9'	-45.2'	123.6°	17
18	12°56.6'	-41.7'	123.2°	12°23.7'	-42.3'	123.4°	11°50.6'	-42.9'	123.6°	11°17.3'	-43.5'	123.8°	10°43.9'	-44.1'	123.9°	10°10.3'	-44.7'	124.1°	9°36.6'	-45.3'	124.2°	18
19	12°15.0'	-41.8'	124.0°	11°41.4'	-42.4'	124.1°	11°07.6'	-43.0'	124.3°	10°33.7'	-43.6'	124.5°	9°59.7'	-44.2'	124.6°	9°25.6'	-44.8'	124.8°	8°51.3'	-45.4'	124.9°	19
20	11°33.2'	-41.9'	124.7°	10°59.0'	-42.5'	124.9°	10°24.6'	-43.1'	125.0°	9°50.1'	-43.7'	125.2°	9°15.5'	-44.3'	125.3°	8°40.8'	-44.9'	125.4°	8°05.9'	-45.5'	125.6°	20
21	10°51.3																					

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

**58° 302° LHA**

**Latitude CONTRARY to Declination**

**58° 302° LHA**

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	25°43.6'	-38.3'	109.7°	25°23.2'	-39.2'	110.2°	25°02.3'	-40.0'	110.6°	24°40.9'	-40.8'	111.0°	24°19.2'	-41.6'	111.5°	23°57.0'	-42.3'	111.9°	23°34.4'	-43.1'	112.3°	0
1	25°05.2'	-38.6'	110.6°	24°44.0'	-39.5'	111.0°	24°22.3'	-40.3'	111.4°	24°00.1'	-41.0'	111.8°	23°37.6'	-41.8'	112.3°	23°14.7'	-42.5'	112.7°	22°51.4'	-43.3'	113.0°	1
2	24°26.6'	-38.9'	111.4°	24°04.5'	-39.7'	111.8°	23°42.0'	-40.5'	112.2°	23°19.1'	-41.3'	112.6°	22°55.8'	-42.0'	113.0°	22°32.2'	-42.8'	113.4°	22°08.1'	-43.5'	113.8°	2
3	23°47.7'	-39.2'	112.2°	23°24.8'	-40.0'	112.7°	23°01.5'	-40.7'	113.0°	22°37.8'	-41.5'	113.4°	22°13.8'	-42.2'	113.8°	21°49.4'	-43.0'	114.2°	21°24.6'	-43.7'	114.5°	3
4	23°08.5'	-39.4'	113.1°	22°44.8'	-40.2'	113.5°	22°20.8'	-41.0'	113.8°	21°56.3'	-41.7'	114.2°	21°31.6'	-42.4'	114.6°	21°06.4'	-43.2'	114.9°	20°41.0'	-43.9'	115.3°	4
5	22°29.1'	-39.7'	113.9°	22°04.6'	-40.4'	114.3°	21°39.8'	-41.2'	114.6°	21°14.6'	-41.9'	115.0°	20°49.1'	-42.6'	115.3°	20°23.3'	-43.3'	115.7°	19°57.1'	-44.0'	116.0°	5
6	21°49.4'	-39.9'	114.7°	21°24.2'	-40.7'	115.1°	20°58.6'	-41.4'	115.4°	20°32.7'	-42.1'	115.8°	20°06.5'	-42.8'	116.1°	19°39.9'	-43.5'	116.4°	19°13.1'	-44.2'	116.7°	6
7	21°09.5'	-40.1'	115.5°	20°43.5'	-40.9'	115.8°	20°17.2'	-41.6'	116.2°	19°50.6'	-42.3'	116.5°	19°23.6'	-43.0'	116.8°	18°56.4'	-43.7'	117.1°	18°28.9'	-44.4'	117.4°	7
8	20°29.4'	-40.4'	116.3°	20°02.6'	-41.1'	116.6°	19°35.6'	-41.8'	116.9°	19°08.2'	-42.5'	117.3°	18°40.6'	-43.2'	117.6°	18°12.7'	-43.9'	117.9°	17°44.5'	-44.5'	118.1°	8
9	19°49.0'	-40.6'	117.1°	19°21.5'	-41.3'	117.4°	18°53.8'	-42.0'	117.7°	18°25.7'	-42.7'	118.0°	17°57.4'	-43.3'	118.3°	17°28.9'	-44.0'	118.6°	17°00.0'	-44.7'	118.9°	9
10	19°08.4'	-40.8'	117.9°	18°40.3'	-41.5'	118.2°	18°11.8'	-42.2'	118.5°	17°43.1'	-42.8'	118.7°	17°14.1'	-43.5'	119.0°	16°44.9'	-44.2'	119.3°	16°15.4'	-44.8'	119.5°	10
11	18°27.7'	-40.9'	118.6°	17°58.8'	-41.6'	118.9°	17°29.6'	-42.3'	119.2°	17°00.2'	-43.0'	119.5°	16°30.6'	-43.6'	119.7°	16°00.7'	-44.3'	120.0°	15°30.6'	-44.9'	120.2°	11
12	17°46.7'	-41.1'	119.4°	17°17.1'	-41.8'	119.7°	16°47.3'	-42.5'	120.0°	16°17.2'	-43.1'	120.2°	15°46.9'	-43.8'	120.5°	15°16.4'	-44.4'	120.7°	14°45.7'	-45.0'	120.9°	12
13	17°05.6'	-41.3'	120.2°	16°35.3'	-42.0'	120.4°	16°04.8'	-42.6'	120.7°	15°34.1'	-43.3'	120.9°	15°03.1'	-43.9'	121.2°	14°32.0'	-44.5'	121.4°	14°00.6'	-45.1'	121.6°	13
14	16°24.3'	-41.5'	120.9°	15°53.4'	-42.1'	121.2°	15°22.2'	-42.8'	121.4°	14°50.8'	-43.4'	121.6°	14°19.2'	-44.0'	121.9°	13°47.5'	-44.7'	122.1°	13°15.5'	-45.3'	122.3°	14
15	15°42.9'	-41.6'	121.7°	15°11.2'	-42.3'	121.9°	14°39.4'	-42.9'	122.1°	14°07.4'	-43.5'	122.4°	13°35.2'	-44.2'	122.6°	13°02.8'	-44.8'	122.8°	12°30.2'	-45.4'	123.0°	15
16	15°01.2'	-41.8'	122.4°	14°29.0'	-42.4'	122.7°	13°56.5'	-43.0'	122.9°	13°23.9'	-43.7'	123.1°	12°51.0'	-44.3'	123.3°	12°18.0'	-44.9'	123.5°	11°44.9'	-45.4'	123.6°	16
17	14°19.5'	-41.9'	123.2°	13°46.6'	-42.5'	123.4°	13°13.5'	-43.2'	123.6°	12°40.2'	-43.8'	123.8°	12°06.8'	-44.4'	124.0°	11°33.2'	-45.0'	124.1°	10°59.4'	-45.5'	124.3°	17
18	13°37.6'	-42.0'	123.9°	13°04.0'	-42.7'	124.1°	12°30.3'	-43.3'	124.3°	11°56.4'	-43.9'	124.5°	11°22.4'	-44.5'	124.6°	10°48.2'	-45.0'	124.8°	10°13.9'	-45.6'	125.0°	18
19	12°55.6'	-42.1'	124.6°	12°21.4'	-42.8'	124.8°	11°47.0'	-43.4'	125.0°	11°12.6'	-44.0'	125.2°	10°37.9'	-44.6'	125.3°	10°03.2'	-45.1'	125.5°	9°28.3'	-45.7'	125.6°	19
20	12°13.4'	-42.3'	125.4°	11°38.6'	-42.9'	125.5°	11°03.7'	-43.5'	125.7°	10°28.6'	-44.1'	125.9°	9°53.4'	-44.6'	126.0°	9°18.0'	-45.2'	126.1°	8°42.6'	-45.8'	126.3°	20
21	11°31.2'	-42.4'	126.1°	10°55.8'	-43.0'	126.3°	10°20.2'	-43.6'	126.4°	9°44.5'	-44.1'	126.6°	9°08.7'	-44.7'	126.7°	8°32.8'	-45.3'	126.8°	7°56.8'	-45.8'	126.9°	21
22	10°48.8'	-42.5'	126.8°	10°12.8'	-43.1'	127.0°	9°36.6'	-43.6'	127.1°	9°00.4'	-44.2'	127.2°	8°24.0'	-44.8'	127.4°	7°47.6'	-45.3'	127.5°	7°11.0'	-45.9'	127.6°	22
23	10°06.3'	-42.6'	127.5°	9°29.7'	-43.1'	127.7°	8°53.0'	-43.7'	127.8°	8°16.2'	-44.3'	127.9°	7°39.2'	-44.8'	128.0°	7°02.2'	-45.4'	128.1°	6°25.1'	-45.9'	128.2°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	<b>35</b>			<b>36</b>			<b>37</b>			<b>38</b>			<b>39</b>			<b>40</b>			<b>41</b>			

**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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	26°29.7'	-38.6'	110.4°	26°08.6'	-39.4'	110.9°	25°47.0'	-40.2'	111.3°	25°24.9'	-41.0'	111.8°	25°02.4'	-41.8'	112.2°	24°39.5'	-42.6'	112.7°	24°16.2'	-43.3'	113.1°	0
1	25°51.1'	-38.9'	111.3°	25°29.2'	-39.7'	111.7°	25°06.8'	-40.5'	112.2°	24°43.9'	-41.3'	112.6°	24°20.6'	-42.0'	113.0°	23°57.0'	-42.8'	113.4°	23°32.9'	-43.5'	113.8°	1
2	25°12.2'	-39.2'	112.1°	24°49.5'	-40.0'	112.6°	24°26.2'	-40.8'	113.0°	24°02.6'	-41.5'	113.4°	23°38.6'	-42.3'	113.8°	23°14.2'	-43.0'	114.2°	22°49.4'	-43.7'	114.6°	2
3	24°33.1'	-39.5'	113.0°	24°09.5'	-40.2'	113.4°	23°45.5'	-41.0'	113.8°	23°21.1'	-41.8'	114.2°	22°56.3'	-42.5'	114.6°	22°31.2'	-43.2'	115.0°	22°05.7'	-43.9'	115.3°	3
4	23°53.6'	-39.7'	113.8°	23°29.2'	-40.5'	114.2°	23°04.5'	-41.2'	114.6°	22°39.3'	-42.0'	115.0°	22°13.8'	-42.7'	115.3°	21°48.0'	-43.4'	115.7°	21°21.8'	-44.1'	116.1°	4
5	23°13.9'	-40.0'	114.6°	22°48.7'	-40.7'	115.0°	22°23.2'	-41.5'	115.4°	21°57.3'	-42.2'	115.7°	21°31.1'	-42.9'	116.1°	21°04.6'	-43.6'	116.4°	20°37.7'	-44.3'	116.8°	5
6	22°33.9'	-40.2'	115.4°	22°08.0'	-41.0'	115.8°	21°41.7'	-41.7'	116.1°	21°15.1'	-42.4'	116.5°	20°48.2'	-43.1'	116.8°	20°21.0'	-43.8'	117.2°	19°53.4'	-44.5'	117.5°	6
7	21°53.7'	-40.4'	116.2°	21°27.1'	-41.2'	116.6°	21°00.1'	-41.9'	116.9°	20°32.7'	-42.6'	117.3°	20°05.1'	-43.3'	117.6°	19°37.2'	-44.0'	117.9°	19°08.9'	-44.6'	118.2°	7
8	21°13.3'	-40.7'	117.0°	20°45.9'	-41.4'	117.4°	20°18.2'	-42.1'	117.7°	19°50.1'	-42.8'	118.0°	19°21.8'	-43.5'	118.3°	18°53.2'	-44.1'	118.6°	18°24.3'	-44.8'	118.9°	8
9	20°32.6'	-40.9'	117.8°	20°04.5'	-41.6'	118.1°	19°36.1'	-42.3'	118.4°	19°07.3'	-43.0'	118.8°	18°38.3'	-43.6'	119.1°	18°09.1'	-44.3'	119.3°	17°39.5'	-44.9'	119.6°	9
10	19°51.7'	-41.1'	118.6°	19°22.9'	-41.8'	118.9°	18°53.8'	-42.5'	119.2°	18°24.4'	-43.1'	119.5°	17°54.7'	-43.8'	119.8°	17°24.8'	-44.4'	120.0°	16°54.6'	-45.1'	120.3°	10
11	19°10.7'	-41.3'	119.4°	18°41.1'	-42.0'	119.6°	18°11.3'	-42.6'	119.9°	17°41.2'	-43.3'	120.2°	17°10.9'	-43.9'	120.5°	16°40.4'	-44.6'	120.8°	16°09.6'	-45.2'	121.0°	11
12	18°29.4'	-41.5'	120.1°	17°59.2'	-42.1'	120.4°	17°28.7'	-42.8'	120.7°	16°57.9'	-43.4'	120.9°	16°27.0'	-44.1'	121.2°	15°55.8'	-44.7'	121.4°	15°24.4'	-45.3'	121.7°	12
13	17°47.9'	-41.6'	120.9°	17°17.0'	-42.3'	121.1°	16°45.9'	-43.0'	121.4°	16°14.5'	-43.6'	121.7°	15°42.9'	-44.2'	121.9°	15°11.1'	-44.8'	122.1°	14°39.1'	-45.4'	122.4°	13
14	17°06.3'	-41.8'	121.6°	16°34.7'	-42.5'	121.9°	16°02.9'	-43.1'	122.1°	15°30.9'	-43.7'	122.4°	14°58.7'	-44.3'	122.6°	14°26.2'	-45.0'	122.8°	13°53.6'	-45.5'	123.0°	14
15	16°24.5'	-42.0'	122.4°	15°52.3'	-42.6'	122.6°	15°19.8'	-43.2'	122.9°	14°47.2'	-43.9'	123.1°	14°14.3'	-44.5'	123.3°	13°41.3'	-45.1'	123.5°	13°08.1'	-45.6'	123.7°	15
16	15°42.6'	-42.1'	123.1°	15°09.7'	-42.7'	123.4°	14°36.6'	-43.4'	123.6°	14°03.3'	-44.0'	123.8°	13°29.9'	-44.6'	124.0°	12°56.2'	-45.2'	124.2°	12°22.4'	-45.7'	124.4°	16
17	15°00.5'	-42.2'	123.9°	14°26.9'	-42.9'	124.1°	13°53.2'	-43.5'	124.3°	13°19.3'	-44.1'	124.5°	12°45.3'	-44.7'	124.7°	12°11.0'	-45.3'	124.9°	11°36.7'	-45.8'	125.0°	17
18	14°18.2'	-42.4'	124.6°	13°44.1'	-43.0'	124.8°	13°09.7'	-43.6'	125.0°	12°35.2'	-44.2'	125.2°	12°00.6'	-44.8'	125.4°	11°25.8'	-45.4'	125.5°	10°50.8'	-45.9'	125.7°	18
19	13°35.8'	-42.5'	125.3°	13°01.1'	-43.1'	125.5°	12°26.1'	-43.7'	125.7°	11°51.0'	-44.3'	125.9°	11°15.8'	-44.9'	126.0°	10°40.4'	-45.4'	126.2°	10°04.9'	-46.0'	126.3°	19
20	12°53.3'	-42.6'	126.1°	12°17.9'	-43.2'	126.2°	11°42.4'	-43.8'	126.4°	11°06.7'	-44.4'	126.6°	10°30.9'	-45.0'	126.7°	9°55						



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

56° 304° LHA

Latitude CONTRARY to Declination

56° 304° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	27°15.7'	-38.9'	111.2°	26°53.9'	-39.7'	111.6°	26°31.5'	-40.5'	112.1°	26°08.7'	-41.3'	112.6°	25°45.5'	-42.1'	113.0°	25°21.8'	-42.8'	113.4°	24°57.8'	-43.5'	113.9°	0
1	26°36.8'	-39.2'	112.0°	26°14.2'	-40.0'	112.5°	25°51.0'	-40.8'	112.9°	25°27.4'	-41.5'	113.4°	25°03.4'	-42.3'	113.8°	24°39.0'	-43.0'	114.2°	24°14.2'	-43.8'	114.6°	1
2	25°57.6'	-39.5'	112.8°	25°34.2'	-40.3'	113.3°	25°10.2'	-41.0'	113.7°	24°45.9'	-41.8'	114.2°	24°21.1'	-42.5'	114.6°	23°56.0'	-43.3'	115.0°	23°30.5'	-44.0'	115.4°	2
3	25°18.2'	-39.7'	113.7°	24°53.9'	-40.5'	114.1°	24°29.2'	-41.3'	114.5°	24°04.1'	-42.0'	114.9°	23°38.6'	-42.8'	115.3°	23°12.7'	-43.5'	115.7°	22°46.5'	-44.2'	116.1°	3
4	24°38.5'	-40.0'	114.5°	24°13.4'	-40.8'	114.9°	23°47.9'	-41.5'	115.3°	23°22.1'	-42.3'	115.7°	22°55.8'	-43.0'	116.1°	22°29.3'	-43.7'	116.5°	22°02.3'	-44.4'	116.8°	4
5	23°58.5'	-40.3'	115.3°	23°32.6'	-41.0'	115.7°	23°06.4'	-41.8'	116.1°	22°39.8'	-42.5'	116.5°	22°12.9'	-43.2'	116.9°	21°45.6'	-43.9'	117.2°	21°18.0'	-44.5'	117.6°	5
6	23°18.2'	-40.5'	116.1°	22°51.6'	-41.3'	116.5°	22°24.6'	-42.0'	116.9°	21°57.3'	-42.7'	117.3°	21°29.7'	-43.4'	117.6°	21°01.7'	-44.1'	118.0°	20°33.4'	-44.7'	118.3°	6
7	22°37.7'	-40.8'	116.9°	22°10.3'	-41.5'	117.3°	21°42.6'	-42.2'	117.7°	21°14.6'	-42.9'	118.0°	20°46.3'	-43.6'	118.4°	20°17.6'	-44.2'	118.7°	19°48.7'	-44.9'	119.0°	7
8	21°56.9'	-41.0'	117.7°	21°28.9'	-41.7'	118.1°	21°00.4'	-42.4'	118.4°	20°31.7'	-43.1'	118.8°	20°02.7'	-43.8'	119.1°	19°33.4'	-44.4'	119.4°	19°03.8'	-45.0'	119.7°	8
9	21°16.0'	-41.2'	118.5°	20°47.2'	-41.9'	118.9°	20°18.0'	-42.6'	119.2°	19°48.6'	-43.3'	119.5°	19°19.0'	-43.9'	119.8°	18°49.0'	-44.6'	120.1°	18°18.8'	-45.2'	120.4°	9
10	20°34.8'	-41.4'	119.3°	20°05.3'	-42.1'	119.6°	19°35.5'	-42.8'	119.9°	19°05.4'	-43.4'	120.2°	18°35.0'	-44.1'	120.5°	18°04.4'	-44.7'	120.8°	17°33.6'	-45.3'	121.1°	10
11	19°53.4'	-41.6'	120.1°	19°23.2'	-42.3'	120.4°	18°52.7'	-43.0'	120.7°	18°21.9'	-43.6'	121.0°	17°50.9'	-44.2'	121.2°	17°19.7'	-44.9'	121.5°	16°48.2'	-45.5'	121.8°	11
12	19°11.8'	-41.8'	120.8°	18°40.9'	-42.5'	121.1°	18°09.7'	-43.1'	121.4°	17°38.3'	-43.8'	121.7°	17°06.7'	-44.4'	122.0°	16°34.8'	-45.0'	122.2°	16°02.7'	-45.6'	122.5°	12
13	18°30.0'	-42.0'	121.6°	17°58.4'	-42.6'	121.9°	17°26.6'	-43.3'	122.1°	16°54.6'	-43.9'	122.4°	16°22.3'	-44.5'	122.7°	15°49.8'	-45.1'	122.9°	15°17.1'	-45.7'	123.1°	13
14	17°48.0'	-42.1'	122.3°	17°15.8'	-42.8'	122.6°	16°43.3'	-43.4'	122.9°	16°10.7'	-44.0'	123.1°	15°37.8'	-44.7'	123.4°	15°04.7'	-45.3'	123.6°	14°31.4'	-45.8'	123.8°	14
15	17°05.9'	-42.3'	123.1°	16°33.0'	-42.9'	123.3°	15°59.9'	-43.6'	123.6°	15°26.6'	-44.2'	123.8°	14°53.1'	-44.8'	124.0°	14°19.4'	-45.4'	124.3°	13°45.6'	-45.9'	124.5°	15
16	16°23.6'	-42.5'	123.8°	15°50.1'	-43.1'	124.1°	15°16.3'	-43.7'	124.3°	14°42.4'	-44.3'	124.5°	14°08.3'	-44.9'	124.7°	13°34.1'	-45.5'	124.9°	12°59.6'	-46.0'	125.1°	16
17	15°41.1'	-42.6'	124.6°	15°07.0'	-43.2'	124.8°	14°32.6'	-43.8'	125.0°	13°58.1'	-44.4'	125.2°	13°23.4'	-45.0'	125.4°	12°48.6'	-45.6'	125.6°	12°13.6'	-46.1'	125.8°	17
18	14°58.5'	-42.7'	125.3°	14°23.7'	-43.4'	125.5°	13°48.8'	-43.9'	125.7°	13°13.7'	-44.5'	125.9°	12°38.4'	-45.1'	126.1°	12°03.0'	-45.7'	126.3°	11°27.4'	-46.2'	126.4°	18
19	14°15.8'	-42.9'	126.0°	13°40.4'	-43.5'	126.2°	13°04.9'	-44.1'	126.4°	12°29.2'	-44.6'	126.6°	11°53.3'	-45.2'	126.8°	11°17.3'	-45.8'	126.9°	10°41.2'	-46.3'	127.1°	19
20	13°32.9'	-43.0'	126.7°	12°56.9'	-43.6'	126.9°	12°20.8'	-44.2'	127.1°	11°44.5'	-44.7'	127.3°	11°08.1'	-45.3'	127.4°	10°31.6'	-45.8'	127.6°	9°54.9'	-46.4'	127.7°	20
21	12°49.9'	-43.1'	127.5°	12°13.3'	-43.7'	127.6°	11°36.6'	-44.3'	127.8°	10°59.8'	-44.8'	128.0°	10°22.8'	-45.4'	128.1°	9°45.7'	-45.9'	128.2°	9°08.5'	-46.4'	128.4°	21
22	12°06.8'	-43.2'	128.2°	11°29.6'	-43.8'	128.3°	10°52.4'	-44.4'	128.5°	10°15.0'	-44.9'	128.6°	9°37.4'	-45.5'	128.8°	8°59.8'	-46.0'	128.9°	8°22.1'	-46.5'	129.0°	22
23	11°23.6'	-43.3'	128.9°	10°45.9'	-43.9'	129.0°	10°08.0'	-44.4'	129.2°	9°30.1'	-45.0'	129.3°	8°52.0'	-45.5'	129.4°	8°13.8'	-46.0'	129.5°	7°35.6'	-46.6'	129.7°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

56° 304° LHA

Latitude CONTRARY to DECLINATION

56° 304° LHA

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

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

55° 305° LHA

Latitude CONTRARY to Declination

55° 305° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	28°01.4'	-39.1'	111.9°	27°38.9'	-40.0'	112.4°	27°15.8'	-40.8'	112.9°	26°52.3'	-41.5'	113.3°	26°28.3'	-42.3'	113.8°	26°03.9'	-43.1'	114.2°	25°39.0'	-43.8'	114.7°	0
1	27°22.3'	-39.5'	112.7°	26°58.9'	-40.3'	113.2°	26°35.0'	-41.0'	113.7°	26°10.7'	-41.8'	114.1°	25°46.0'	-42.6'	114.6°	25°20.8'	-43.3'	115.0°	24°55.3'	-44.0'	115.4°	1
2	26°42.8'	-39.8'	113.6°	26°18.6'	-40.5'	114.0°	25°54.0'	-41.3'	114.5°	25°28.9'	-42.1'	114.9°	25°03.4'	-42.8'	115.4°	24°37.5'	-43.5'	115.8°	24°11.2'	-44.2'	116.2°	2
3	26°03.1'	-40.0'	114.4°	25°38.1'	-40.8'	114.9°	25°12.7'	-41.6'	115.3°	24°46.8'	-42.3'	115.7°	24°20.6'	-43.0'	116.1°	23°54.0'	-43.7'	116.5°	23°27.0'	-44.4'	116.9°	3
4	25°23.1'	-40.3'	115.2°	24°57.3'	-41.1'	115.7°	24°31.1'	-41.8'	116.1°	24°04.5'	-42.5'	116.5°	23°37.6'	-43.3'	116.9°	23°10.3'	-44.0'	117.3°	22°42.6'	-44.6'	117.6°	4
5	24°42.8'	-40.6'	116.1°	24°16.2'	-41.3'	116.5°	23°49.3'	-42.1'	116.9°	23°22.0'	-42.8'	117.3°	22°54.3'	-43.5'	117.6°	22°26.3'	-44.2'	118.0°	21°58.0'	-44.8'	118.4°	5
6	24°02.2'	-40.8'	116.9°	23°34.9'	-41.6'	117.3°	23°07.2'	-42.3'	117.6°	22°39.2'	-43.0'	118.0°	22°10.8'	-43.7'	118.4°	21°42.2'	-44.3'	118.7°	21°13.1'	-45.0'	119.1°	6
7	23°21.4'	-41.1'	117.7°	22°53.3'	-41.8'	118.1°	22°24.9'	-42.5'	118.4°	21°56.2'	-43.2'	118.8°	21°27.2'	-43.9'	119.1°	20°57.8'	-44.5'	119.5°	20°28.2'	-45.2'	119.8°	7
8	22°40.3'	-41.3'	118.5°	22°11.5'	-42.0'	118.8°	21°42.4'	-42.7'	119.2°	21°13.0'	-43.4'	119.5°	20°43.3'	-44.0'	119.9°	20°13.3'	-44.7'	120.2°	19°43.0'	-45.3'	120.5°	8
9	21°59.0'	-41.5'	119.2°	21°29.5'	-42.2'	119.6°	20°59.7'	-42.9'	119.9°	20°29.6'	-43.6'	120.3°	19°59.3'	-44.2'	120.6°	19°28.6'	-44.9'	120.9°	18°57.7'	-45.5'	121.2°	9
10	21°17.5'	-41.7'	120.0°	20°47.3'	-42.4'	120.4°	20°16.8'	-43.1'	120.7°	19°46.1'	-43.7'	121.0°	19°15.0'	-44.4'	121.3°	18°43.7'	-45.0'	121.6°	18°12.2'	-45.6'	121.9°	10
11	20°35.7'	-41.9'	120.8°	20°04.9'	-42.6'	121.1°	19°33.7'	-43.3'	121.4°	19°02.3'	-43.9'	121.7°	18°30.6'	-44.5'	122.0°	17°58.7'	-45.2'	122.3°	17°26.5'	-45.8'	122.6°	11
12	19°53.8'	-42.1'	121.6°	19°22.3'	-42.8'	121.9°	18°50.5'	-43.4'	122.2°	18°18.4'	-44.1'	122.4°	17°46.1'	-44.7'	122.7°	17°13.6'	-45.3'	123.0°	16°40.8'	-45.9'	123.2°	12
13	19°11.7'	-42.3'	122.3°	18°39.5'	-43.0'	122.6°	18°07.0'	-43.6'	122.9°	17°34.3'	-44.2'	123.2°	17°01.4'	-44.8'	123.4°	16°28.3'	-45.4'	123.7°	15°54.9'	-46.0'	123.9°	13
14	18°29.4'	-42.5'	123.1°	17°56.5'	-43.1'	123.3°	17°23.4'	-43.8'	123.6°	16°50.1'	-44.4'	123.9°	16°16.6'	-45.0'	124.1°	15°42.8'	-45.6'	124.3°	15°08.9'	-46.1'	124.6°	14
15	17°46.9'	-42.7'	123.8°	17°13.4'	-43.3'	124.1°	16°39.7'	-43.9'	124.3°	16°05.7'	-44.5'	124.6°	15°31.6'	-45.1'	124.8°	14°57.3'	-45.7'	125.0°	14°22.7'	-46.2'	125.2°	15
16	17°04.2'	-42.8'	124.5°	16°30.1'	-43.4'	124.8°	15°55.8'	-44.0'	125.0°	15°21.2'	-44.6'	125.3°	14°46.5'	-45.2'	125.5°	14°11.6'	-45.8'	125.7°	13°36.5'	-46.3'	125.9°	16
17	16°21.4'	-43.0'	125.3°	15°46.7'	-43.6'	125.5°	15°11.7'	-44.2'	125.7°	14°36.6'	-44.8'	125.9°	14°01.3'	-45.3'	126.2°	13°25.8'	-45.9'	126.4°	12°50.1'	-46.4'	126.5°	17
18	15°38.4'	-43.1'	126.0°	15°03.1'	-43.7'	126.2°	14°27.5'	-44.3'	126.4°	13°51.8'	-44.9'	126.6°	13°15.9'	-45.4'	126.8°	12°39.9'	-46.0'	127.0°	12°03.7'	-46.5'	127.2°	18
19	14°55.3'	-43.2'	126.7°	14°19.4'	-43.8'	126.9°	13°43.2'	-44.4'	127.1°	13°06.9'	-45.0'	127.3°	12°30.5'	-45.5'	127.5°	11°53.9'	-46.1'	127.7°	11°17.2'	-46.6'	127.8°	19
20	14°12.1'	-43.4'	127.4°	13°35.5'	-43.9'	127.6°	12°58.8'	-44.5'	127.8°	12°22.0'	-45.1'	128.0°	11°45.0'	-45.6'	128.2°	11°07.8'	-46.2'	128.3°	10°30.5'	-46.7'	128.5°	

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

54° 306° LHA

Latitude CONTRARY to Declination

54° 306° LHA

Table with 12 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of astronomical data.

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 12 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of astronomical data.

53° 307° LHA

Latitude CONTRARY to DECLINATION

53° 307° LHA

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

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

52° 308° LHA

**Latitude CONTRARY to Declination**

52° 308° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	30°17.1'	-40.0'	114.1°	29°52.4'	-40.8'	114.7°	29°27.1'	-41.6'	115.2°	29°01.3'	-42.4'	115.7°	28°35.1'	-43.1'	116.2°	28°08.4'	-43.9'	116.7°	27°41.2'	-44.6'	117.1°	0
1	29°37.1'	-40.4'	115.0°	29°11.6'	-41.1'	115.5°	28°45.5'	-41.9'	116.0°	28°18.9'	-42.7'	116.5°	27°52.0'	-43.4'	117.0°	27°24.5'	-44.1'	117.4°	26°56.7'	-44.8'	117.9°	1
2	28°56.8'	-40.7'	115.8°	28°30.4'	-41.4'	116.3°	28°03.6'	-42.2'	116.8°	27°36.3'	-42.9'	117.3°	27°08.5'	-43.7'	117.7°	26°40.4'	-44.4'	118.2°	26°11.8'	-45.0'	118.6°	2
3	28°16.1'	-41.0'	116.7°	27°49.0'	-41.7'	117.2°	27°21.4'	-42.5'	117.6°	26°53.3'	-43.2'	118.1°	26°24.9'	-43.9'	118.5°	25°56.0'	-44.6'	118.9°	25°26.8'	-45.3'	119.4°	3
4	27°35.2'	-41.3'	117.5°	27°07.2'	-42.0'	118.0°	26°38.9'	-42.7'	118.4°	26°10.1'	-43.4'	118.9°	25°41.0'	-44.1'	119.3°	25°11.5'	-44.8'	119.7°	24°41.6'	-45.5'	120.1°	4
5	26°53.9'	-41.5'	118.3°	26°25.2'	-42.3'	118.8°	25°56.2'	-43.0'	119.2°	25°26.7'	-43.7'	119.6°	24°56.9'	-44.4'	120.0°	24°26.7'	-45.0'	120.4°	23°56.1'	-45.7'	120.8°	5
6	26°12.4'	-41.8'	119.1°	25°43.0'	-42.5'	119.6°	25°13.2'	-43.2'	120.0°	24°43.0'	-43.9'	120.4°	24°12.5'	-44.6'	120.8°	23°41.6'	-45.2'	121.1°	23°10.4'	-45.8'	121.5°	6
7	25°30.6'	-42.1'	119.9°	25°00.4'	-42.8'	120.3°	24°30.0'	-43.4'	120.7°	23°59.1'	-44.1'	121.1°	23°27.9'	-44.8'	121.5°	22°56.4'	-45.4'	121.9°	22°24.6'	-46.0'	122.2°	7
8	24°48.5'	-42.3'	120.7°	24°17.7'	-43.0'	121.1°	23°46.5'	-43.7'	121.5°	23°15.0'	-44.3'	121.9°	22°43.2'	-45.0'	122.2°	22°11.0'	-45.6'	122.6°	21°38.6'	-46.2'	122.9°	8
9	24°06.2'	-42.5'	121.5°	23°34.7'	-43.2'	121.9°	23°02.8'	-43.9'	122.2°	22°30.7'	-44.5'	122.6°	21°58.2'	-45.1'	122.9°	21°25.4'	-45.8'	123.3°	20°52.4'	-46.4'	123.6°	9
10	23°23.7'	-42.8'	122.3°	22°51.5'	-43.4'	122.6°	22°19.0'	-44.1'	123.0°	21°46.2'	-44.7'	123.3°	21°13.1'	-45.3'	123.6°	20°39.7'	-45.9'	124.0°	20°06.0'	-46.5'	124.3°	10
11	22°40.9'	-43.0'	123.0°	22°08.0'	-43.6'	123.4°	21°34.9'	-44.3'	123.7°	21°01.4'	-44.9'	124.0°	20°27.7'	-45.5'	124.3°	19°53.7'	-46.1'	124.7°	19°19.5'	-46.7'	124.9°	11
12	21°57.9'	-43.2'	123.8°	21°24.4'	-43.8'	124.1°	20°50.6'	-44.4'	124.4°	20°16.6'	-45.1'	124.7°	19°42.2'	-45.6'	125.0°	19°07.7'	-46.2'	125.3°	18°32.8'	-46.8'	125.6°	12
13	21°14.7'	-43.4'	124.5°	20°40.6'	-44.0'	124.8°	20°06.2'	-44.6'	125.2°	19°31.5'	-45.2'	125.4°	18°56.6'	-45.8'	125.7°	18°21.4'	-46.4'	126.0°	17°46.1'	-46.9'	126.3°	13
14	20°31.4'	-43.6'	125.3°	19°56.6'	-44.2'	125.6°	19°21.6'	-44.8'	125.9°	18°46.3'	-45.4'	126.1°	18°10.8'	-45.9'	126.4°	17°35.1'	-46.5'	126.7°	16°59.1'	-47.0'	126.9°	14
15	19°47.8'	-43.7'	126.0°	19°12.4'	-44.3'	126.3°	18°36.8'	-44.9'	126.6°	18°00.9'	-45.5'	126.8°	17°24.8'	-46.1'	127.1°	16°48.6'	-46.6'	127.3°	16°12.1'	-47.2'	127.6°	15
16	19°04.1'	-43.9'	126.7°	18°28.1'	-44.5'	127.0°	17°51.8'	-45.1'	127.3°	17°15.4'	-45.7'	127.5°	16°38.8'	-46.2'	127.8°	16°01.9'	-46.7'	128.0°	15°24.9'	-47.3'	128.2°	16
17	18°20.2'	-44.1'	127.4°	17°43.6'	-44.7'	127.7°	17°06.8'	-45.2'	128.0°	16°29.8'	-45.8'	128.2°	15°52.6'	-46.3'	128.4°	15°15.2'	-46.9'	128.6°	14°37.6'	-47.4'	128.8°	17
18	17°36.1'	-44.2'	128.2°	16°58.9'	-44.8'	128.4°	16°21.5'	-45.4'	128.6°	15°44.0'	-45.9'	128.9°	15°06.2'	-46.4'	129.1°	14°28.3'	-47.0'	129.3°	13°50.3'	-47.5'	129.5°	18
19	16°51.9'	-44.4'	128.9°	16°14.1'	-44.9'	129.1°	15°36.2'	-45.5'	129.3°	14°58.1'	-46.0'	129.5°	14°19.8'	-46.5'	129.7°	13°41.4'	-47.1'	129.9°	13°02.8'	-47.6'	130.1°	19
20	16°07.5'	-44.5'	129.6°	15°29.2'	-45.1'	129.8°	14°50.7'	-45.6'	130.0°	14°12.0'	-46.1'	130.2°	13°33.2'	-46.6'	130.4°	12°54.3'	-47.2'	130.6°	12°15.2'	-47.7'	130.7°	20
21	15°23.0'	-44.6'	130.3°	14°44.1'	-45.2'	130.5°	14°05.1'	-45.7'	130.7°	13°25.9'	-46.2'	130.9°	12°46.6'	-46.7'	131.0°	12°07.1'	-47.2'	131.2°	11°27.6'	-47.7'	131.4°	21
22	14°38.4'	-44.8'	131.0°	13°58.9'	-45.3'	131.2°	13°19.4'	-45.8'	131.3°	12°39.7'	-46.3'	131.5°	11°59.9'	-46.8'	131.7°	11°19.9'	-47.3'	131.8°	10°39.8'	-47.8'	132.0°	22
23	13°53.6'	-44.9'	131.6°	13°13.7'	-45.4'	131.8°	12°33.6'	-45.9'	132.0°	11°53.4'	-46.4'	132.2°	11°13.0'	-46.9'	132.3°	10°32.6'	-47.4'	132.5°	9°52.0'	-47.9'	132.6°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

52° 308° LHA

**Latitude CONTRARY to DECLINATION**

52° 308° LHA

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

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

51° 309° LHA

**Latitude CONTRARY to Declination**

51° 309° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	31°01.8'	-40.3'	114.9°	30°36.4'	-41.1'	115.5°	30°10.3'	-41.9'	116.0°	29°43.8'	-42.7'	116.5°	29°16.8'	-43.4'	117.0°	28°49.3'	-44.2'	117.5°	28°21.4'	-44.9'	118.0°	0
1	30°21.5'	-40.7'	115.8°	29°55.2'	-41.5'	116.3°	29°28.4'	-42.2'	116.8°	29°01.1'	-43.0'	117.3°	28°33.4'	-43.7'	117.8°	28°05.2'	-44.4'	118.3°	27°36.5'	-45.1'	118.7°	1
2	29°40.8'	-41.0'	116.6°	29°13.8'	-41.8'	117.1°	28°46.2'	-42.5'	117.6°	28°18.1'	-43.2'	118.1°	27°49.7'	-44.0'	118.6°	27°20.8'	-44.6'	119.0°	26°51.4'	-45.3'	119.5°	2
3	28°59.9'	-41.3'	117.5°	28°32.0'	-42.1'	117.9°	28°03.7'	-42.8'	118.4°	27°34.9'	-43.5'	118.9°	27°05.7'	-44.2'	119.3°	26°36.1'	-44.9'	119.8°	26°06.1'	-45.5'	120.2°	3
4	28°18.6'	-41.6'	118.3°	27°50.0'	-42.3'	118.8°	27°20.9'	-43.1'	119.2°	26°51.4'	-43.8'	119.7°	26°21.5'	-44.4'	120.1°	25°51.2'	-45.1'	120.5°	25°20.6'	-45.8'	120.9°	4
5	27°37.0'	-41.9'	119.1°	27°07.6'	-42.6'	119.6°	26°37.8'	-43.3'	120.0°	26°07.6'	-44.0'	120.4°	25°37.1'	-44.7'	120.8°	25°06.1'	-45.3'	121.2°	24°34.8'	-46.0'	121.6°	5
6	26°55.1'	-42.1'	119.9°	26°25.0'	-42.9'	120.3°	25°54.5'	-43.5'	120.8°	25°23.6'	-44.2'	121.2°	24°52.4'	-44.9'	121.6°	24°20.8'	-45.5'	122.0°	23°48.9'	-46.1'	122.3°	6
7	26°13.0'	-42.4'	120.7°	25°42.2'	-43.1'	121.1°	25°11.0'	-43.8'	121.5°	24°39.4'	-44.4'	121.9°	24°07.5'	-45.1'	122.3°	23°35.3'	-45.7'	122.7°	23°02.7'	-46.3'	123.0°	7
8	25°30.6'	-42.7'	121.5°	24°59.1'	-43.3'	121.9°	24°27.2'	-44.0'	122.3°	23°55.0'	-44.6'	122.7°	23°22.4'	-45.3'	123.0°	22°49.6'	-45.9'	123.4°	22°16.4'	-46.5'	123.7°	8
9	24°47.9'	-42.9'	122.3°	24°15.7'	-43.6'	122.7°	23°43.2'	-44.2'	123.0°	23°10.3'	-44.8'	123.4°	22°37.2'	-45.5'	123.7°	22°03.7'	-46.1'	124.1°	21°29.9'	-46.7'	124.4°	9
10	24°05.0'	-43.1'	123.0°	23°32.2'	-43.8'	123.4°	22°59.0'	-44.4'	123.8°	22°25.5'	-45.0'	124.1°	21°51.7'	-45.6'	124.4°	21°17.6'	-46.2'	124.8°	20°43.3'	-46.8'	125.1°	10
11	23°21.9'	-43.3'	123.8°	22°48.4'	-44.0'	124.2°	22°14.6'	-44.6'	124.5°	21°40.4'	-45.2'	124.8°	21°06.0'	-45.8'	125.1°	20°31.4'	-46.4'	125.5°	19°56.4'	-47.0'	125.8°	11
12	22°38.6'	-43.5'	124.5°	22°04.4'	-44.2'	124.9°	21°30.0'	-44.8'	125.2°	20°55.2'	-45.4'	125.5°	20°20.2'	-46.0'	125.8°	19°45.0'	-46.5'	126.1°	19°09.5'	-47.1'	126.4°	12
13	21°55.0'	-43.7'	125.3°	21°20.2'	-44.4'	125.6°	20°45.2'	-45.0'	125.9°	20°09.8'	-45.6'	126.2°	19°34.3'	-46.1'	126.5°	18°58.4'	-46.7'	126.8°	18°22.4'	-47.2'	127.1°	13
14	21°11.3'	-43.9'	126.0°	20°35.9'	-44.5'	126.3°	20°00.2'	-45.1'	126.6°	19°24.3'	-45.7'	126.9°	18°48.1'	-46.3'	127.2°	18°11.7'	-46.8'	127.5°	17°35.1'	-47.4'	127.7°	14
15	20°27.4'	-44.1'	126.8°	19°51.3'	-44.7'	127.0°	19°15.1'	-45.3'	127.3°	18°38.6'	-45.9'	127.6°	18°01.9'	-46.4'	127.9°	17°24.9'	-47.0'	128.1°	16°47.8'	-47.5'	128.4°	15
16	19°43.3'	-44.3'	127.5°	19°06.6'	-44.9'	127.8°	18°29.8'	-45.4'	128.0°	17°52.7'	-46.0'	128.3°	17°15.4'	-46.5'	128.5°	16°38.0'	-47.1'	128.8°	16°00.3'	-47.6'	129.0°	16
17	18°59.0'	-44.4'	128.2°	18°21.8'	-45.0'	128.5°	17°44.3'	-45.6'	128.7°	17°06.7'	-46.1'	129.0°	16°28.9'	-46.7'	129.2°	15°50.9'	-47.2'	129.4°	15°12.7'	-47.7'	129.6°	17
18	18°14.5'	-44.6'	128.9°	17°36.7'	-45.2'	129.2°	16°58.8'	-45.7'	129.4°	16°20.6'	-46.3'	129.6°	15°42.2'	-46.8'	129.8°	15°03.7'	-47.3'	130.1°	14°25.0'	-47.8'	130.3°	18
19	17°29.9'	-44.7'	129.6°	16°51.6'	-45.3'	129.8°	16°13.0'	-45.8'	130.1°	15°34.3'	-46.4'	130.3°	14°55.5'	-46.9'	130.5°	14°16.4'	-47.4'	130.7°	13°37.2'	-47.9'	130.9°	19
20	16°45.2'	-44.9'	130.3°	16°06.3'	-45.4'	130.5°	15°27.2'	-46.0'	130.7°	14°48.0'	-46.5'	130.9°	14°08.6'	-47.0'	131.1°							

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

50° 310° LHA

Latitude CONTRARY to Declination

50° 310° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	31°46.3'	40.7'	115.7°	31°20.0'	41.5'	116.3°	30°53.2'	42.2'	116.8°	30°26.0'	43.0'	117.3°	29°58.2'	43.7'	117.8°	29°29.9'	44.4'	118.3°	29°01.2'	45.1'	118.8°	0
1	31°05.6'	41.0'	116.6°	30°38.6'	41.8'	117.1°	30°11.0'	42.5'	117.6°	29°43.0'	43.3'	118.1°	29°14.4'	44.0'	118.6°	28°45.5'	44.7'	119.1°	28°16.1'	45.4'	119.6°	1
2	30°24.6'	41.3'	117.4°	29°56.8'	42.1'	117.9°	29°28.5'	42.8'	118.4°	28°59.7'	43.6'	118.9°	28°30.4'	44.3'	119.4°	28°00.8'	44.9'	119.9°	27°30.7'	45.6'	120.3°	2
3	29°43.4'	41.6'	118.3°	29°14.7'	42.4'	118.7°	28°45.6'	43.1'	119.2°	28°16.1'	43.8'	119.7°	27°46.2'	44.5'	120.2°	27°15.8'	45.2'	120.6°	26°45.1'	45.8'	121.1°	3
4	29°01.7'	41.9'	119.1°	28°32.3'	42.7'	119.6°	28°02.5'	43.4'	120.0°	27°32.3'	44.1'	120.5°	27°01.7'	44.8'	120.9°	26°30.6'	45.4'	121.4°	25°59.2'	46.0'	121.8°	4
5	28°19.8'	42.2'	119.9°	27°49.7'	42.9'	120.4°	27°19.2'	43.6'	120.8°	26°48.2'	44.3'	121.2°	26°16.9'	45.0'	121.7°	25°45.2'	45.6'	122.1°	25°13.2'	46.2'	122.5°	5
6	27°37.6'	42.5'	120.7°	27°06.7'	43.2'	121.1°	26°35.5'	43.9'	121.6°	26°03.9'	44.5'	122.0°	25°31.9'	45.2'	122.4°	24°59.6'	45.8'	122.8°	24°26.9'	46.4'	123.2°	6
7	26°55.1'	42.8'	121.5°	26°23.5'	43.4'	121.9°	25°51.6'	44.1'	122.3°	25°19.4'	44.8'	122.7°	24°46.7'	45.4'	123.1°	24°13.8'	46.0'	123.5°	23°40.5'	46.6'	123.9°	7
8	26°12.3'	43.0'	122.3°	25°40.1'	43.7'	122.7°	25°07.5'	44.3'	123.1°	24°34.6'	45.0'	123.5°	24°01.3'	45.6'	123.8°	23°27.8'	46.2'	124.2°	22°53.9'	46.8'	124.6°	8
9	25°29.3'	43.2'	123.1°	24°56.4'	43.9'	123.4°	24°23.2'	44.6'	123.8°	23°49.6'	45.2'	124.2°	23°15.7'	45.8'	124.6°	22°41.6'	46.4'	124.9°	22°07.1'	47.0'	125.2°	9
10	24°46.1'	43.5'	123.8°	24°12.5'	44.1'	124.2°	23°38.6'	44.8'	124.6°	23°04.4'	45.4'	124.9°	22°30.0'	46.0'	125.3°	21°55.2'	46.6'	125.6°	21°20.1'	47.1'	125.9°	10
11	24°02.6'	43.7'	124.6°	23°28.4'	44.3'	124.9°	22°53.9'	45.0'	125.3°	22°19.1'	45.6'	125.6°	21°44.0'	46.1'	126.0°	21°08.6'	46.7'	126.3°	20°33.0'	47.3'	126.6°	11
12	23°18.9'	43.9'	125.3°	22°44.0'	44.5'	125.7°	22°08.9'	45.1'	126.0°	21°33.5'	45.7'	126.3°	20°57.8'	46.3'	126.6°	20°21.9'	46.9'	126.9°	19°45.7'	47.4'	127.2°	12
13	22°35.0'	44.1'	126.1°	21°59.5'	44.7'	126.4°	21°23.8'	45.3'	126.7°	20°47.8'	45.9'	127.0°	20°11.5'	46.5'	127.3°	19°35.0'	47.0'	127.6°	18°58.3'	47.5'	127.9°	13
14	21°50.9'	44.3'	126.8°	21°14.8'	44.9'	127.1°	20°38.5'	45.5'	127.4°	20°01.9'	46.1'	127.7°	19°25.1'	46.6'	128.0°	18°48.0'	47.1'	128.3°	18°10.8'	47.7'	128.5°	14
15	21°06.6'	44.5'	127.5°	20°29.9'	45.1'	127.8°	19°53.0'	45.6'	128.1°	19°15.8'	46.2'	128.4°	18°38.5'	46.7'	128.7°	18°00.9'	47.3'	128.9°	17°23.1'	47.8'	129.2°	15
16	20°22.1'	44.7'	128.2°	19°44.8'	45.2'	128.5°	19°07.3'	45.8'	128.8°	18°29.6'	46.3'	129.1°	17°51.7'	46.9'	129.3°	17°13.6'	47.4'	129.6°	16°35.3'	47.9'	129.8°	16
17	19°37.4'	44.8'	128.9°	18°59.6'	45.4'	129.2°	18°21.5'	45.9'	129.5°	17°43.3'	46.5'	129.7°	17°04.8'	47.0'	130.0°	16°26.2'	47.5'	130.2°	15°47.4'	48.0'	130.4°	17
18	18°52.6'	45.0'	129.6°	18°14.2'	45.5'	129.9°	17°35.6'	46.1'	130.2°	16°56.8'	46.6'	130.4°	16°17.8'	47.1'	130.6°	15°38.7'	47.6'	130.8°	14°59.4'	48.1'	131.0°	18
19	18°07.6'	45.1'	130.3°	17°28.6'	45.7'	130.6°	16°49.5'	46.2'	130.8°	16°10.2'	46.7'	131.0°	15°30.7'	47.2'	131.3°	14°51.1'	47.7'	131.5°	14°11.3'	48.2'	131.7°	19
20	17°22.5'	45.3'	131.0°	16°43.0'	45.8'	131.3°	16°03.3'	46.3'	131.5°	15°23.5'	46.8'	131.7°	14°43.5'	47.3'	131.9°	14°03.3'	47.8'	132.1°	13°23.0'	48.3'	132.3°	20
21	16°37.2'	45.4'	131.7°	15°57.2'	45.9'	131.9°	15°17.0'	46.4'	132.2°	14°36.6'	46.9'	132.3°	13°56.1'	47.4'	132.5°	13°15.5'	47.9'	132.7°	12°34.7'	48.4'	132.9°	21
22	15°51.8'	45.5'	132.4°	15°11.2'	46.1'	132.6°	14°30.5'	46.6'	132.8°	13°49.7'	47.1'	133.0°	13°08.7'	47.5'	133.2°	12°27.6'	48.0'	133.3°	11°46.4'	48.5'	133.5°	22
23	15°06.2'	45.7'	133.1°	14°25.2'	46.2'	133.3°	13°44.0'	46.7'	133.5°	13°02.6'	47.1'	133.6°	12°21.2'	47.6'	133.8°	11°39.6'	48.1'	133.9°	10°57.9'	48.5'	134.1°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	32°30.4'	41.0'	116.5°	32°03.4'	41.8'	117.1°	31°35.9'	42.6'	117.6°	31°07.8'	43.3'	118.2°	30°39.2'	44.0'	118.7°	30°10.2'	44.7'	119.2°	29°40.7'	45.4'	119.7°	0
1	31°49.4'	41.3'	117.4°	31°21.6'	42.1'	117.9°	30°53.3'	42.9'	118.4°	30°24.5'	43.6'	119.0°	29°55.2'	44.3'	119.5°	29°25.5'	45.0'	120.0°	28°55.3'	45.7'	120.4°	1
2	31°08.1'	41.7'	118.2°	30°39.5'	42.4'	118.7°	30°10.4'	43.2'	119.3°	29°40.9'	43.9'	119.8°	29°10.9'	44.6'	120.2°	28°40.5'	45.3'	120.7°	28°09.6'	45.9'	121.2°	2
3	30°26.5'	42.0'	119.1°	29°57.1'	42.7'	119.6°	29°27.3'	43.4'	120.1°	28°57.0'	44.1'	120.5°	28°26.3'	44.8'	121.0°	27°55.2'	45.5'	121.5°	27°23.7'	46.1'	121.9°	3
4	29°44.5'	42.3'	119.9°	29°14.4'	43.0'	120.4°	28°43.8'	43.7'	120.8°	28°12.9'	44.4'	121.3°	27°41.5'	45.1'	121.8°	27°09.7'	45.7'	122.2°	26°37.6'	46.3'	122.6°	4
5	29°02.2'	42.6'	120.7°	28°31.4'	43.3'	121.2°	28°00.1'	44.0'	121.6°	27°28.5'	44.6'	122.1°	26°56.4'	45.3'	122.5°	26°24.0'	45.9'	122.9°	25°51.2'	46.6'	123.3°	5
6	28°19.7'	42.8'	121.5°	27°48.1'	43.5'	121.9°	27°16.2'	44.2'	122.4°	26°43.8'	44.9'	122.8°	26°11.1'	45.5'	123.2°	25°38.1'	46.1'	123.6°	25°04.7'	46.7'	124.0°	6
7	27°36.8'	43.1'	122.3°	27°04.6'	43.8'	122.7°	26°31.9'	44.5'	123.1°	25°59.0'	45.1'	123.6°	25°25.6'	45.7'	124.0°	24°51.9'	46.3'	124.3°	24°17.9'	46.9'	124.7°	7
8	26°53.7'	43.4'	123.1°	26°20.8'	44.0'	123.5°	25°47.5'	44.7'	123.9°	25°13.9'	45.3'	124.3°	24°39.9'	45.9'	124.7°	24°05.6'	46.5'	125.0°	23°31.0'	47.1'	125.4°	8
9	26°10.3'	43.6'	123.8°	25°36.7'	44.3'	124.2°	25°02.8'	44.9'	124.6°	24°28.5'	45.5'	125.0°	23°54.0'	46.1'	125.4°	23°19.1'	46.7'	125.7°	22°43.9'	47.3'	126.1°	9
10	25°26.7'	43.8'	124.6°	24°52.5'	44.5'	125.0°	24°17.9'	45.1'	125.4°	23°43.0'	45.7'	125.7°	23°07.8'	46.3'	126.1°	22°32.4'	46.9'	126.4°	21°56.6'	47.4'	126.7°	10
11	24°42.9'	44.1'	125.4°	24°08.0'	44.7'	125.7°	23°32.8'	45.3'	126.1°	22°57.3'	45.9'	126.4°	22°21.5'	46.5'	126.8°	21°45.5'	47.0'	127.1°	21°09.2'	47.6'	127.4°	11
12	23°58.8'	44.3'	126.1°	23°23.3'	44.9'	126.5°	22°47.5'	45.5'	126.8°	22°11.4'	46.1'	127.1°	21°35.1'	46.6'	127.4°	20°58.4'	47.2'	127.8°	20°21.6'	47.7'	128.1°	12
13	23°14.5'	44.5'	126.8°	22°38.4'	45.1'	127.2°	22°02.0'	45.7'	127.5°	21°25.3'	46.2'	127.8°	20°48.4'	46.8'	128.1°	20°11.3'	47.3'	128.4°	19°33.9'	47.9'	128.7°	13
14	22°30.0'	44.7'	127.6°	21°53.3'	45.3'	127.9°	21°16.3'	45.8'	128.2°	20°39.1'	46.4'	128.5°	20°01.6'	46.9'	128.8°	19°23.9'	47.5'	129.1°	18°46.0'	48.0'	129.3°	14
15	21°45.3'	44.9'	128.3°	21°08.0'	45.4'	128.6°	20°30.5'	46.0'	128.9°	19°52.7'	46.6'	129.2°	19°14.7'	47.1'	129.5°	18°36.4'	47.6'	129.7°	17°58.0'	48.1'	130.0°	15
16	21°00.5'	45.0'	129.0°	20°22.6'	45.6'	129.3°	19°44.5'	46.2'	129.6°	19°06.1'	46.7'	129.8°	18°27.6'	47.2'	130.1°	17°48.8'	47.7'	130.4°	17°09.9'	48.2'	130.6°	16
17	20°15.4'	45.2'	129.7°	19°37.0'	45.8'	130.0°	18°58.3'	46.3'	130.3°	18°19.4'	46.8'	130.5°	17°40.4'	47.3'	130.8°	17°01.1'	47.8'	131.0°	16°21.7'	48.3'	131.2°	17
18	19°30.2'	45.4'	130.4°	18°51.2'	45.9'	130.7°	18°12.0'	46.4'	131.0°	17°32.6'	47.0'	131.2°	16°53.0'	47.5'	131.4°	16°13.3'	48.0'	131.6°	15°33.3'	48.4'	131.8°	18
19	18°44.8'	45.5'	131.1°	18°05.3'	46.1'	131.3°	17°25.6'	46.6'	131.6°	16°45.6'	47.1'	131.8°	16°05.6'	47.6'	132.0°	15°25.3'	48.1'	132.2°	14°44.9'	48.5'	132.4°	19
20	17°59.3'	45.7'	131.8°	17°19.2'	46.2'	132.0°	16°39.0'	46.7'	132.2°	15°58.6'	47.2'	132.5°	15°18.0'	47.7'	132.7°							

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

48° 312° LHA

Latitude CONTRARY to Declination

48° 312° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	33°14.2'	41.3'	117.3°	32°46.5'	42.1'	117.9°	32°18.2'	42.9'	118.5°	31°49.3'	43.6'	119.0°	31°20.0'	44.3'	119.5°	30°50.2'	45.1'	120.1°	30°19.9'	45.7'	120.6°	0
1	32°32.9'	41.7'	118.2°	32°04.4'	42.4'	118.7°	31°35.3'	43.2'	119.3°	31°05.7'	43.9'	119.8°	30°35.6'	44.6'	120.3°	30°05.1'	45.3'	120.8°	29°34.1'	46.0'	121.3°	1
2	31°51.2'	42.0'	119.0°	31°21.9'	42.8'	119.6°	30°52.1'	43.5'	120.1°	30°21.8'	44.2'	120.6°	29°51.0'	44.9'	121.1°	29°19.8'	45.6'	121.6°	28°48.2'	46.2'	122.1°	2
3	31°09.3'	42.3'	119.9°	30°39.2'	43.1'	120.4°	30°08.6'	43.8'	120.9°	29°37.6'	44.5'	121.4°	29°06.1'	45.1'	121.9°	28°34.2'	45.8'	122.3°	28°01.9'	46.4'	122.8°	3
4	30°27.0'	42.6'	120.7°	29°56.1'	43.4'	121.2°	29°24.8'	44.1'	121.7°	28°53.1'	44.7'	122.1°	28°21.0'	45.4'	122.6°	27°48.4'	46.0'	123.1°	27°15.5'	46.7'	123.5°	4
5	29°44.3'	42.9'	121.5°	29°12.7'	43.6'	122.0°	28°40.8'	44.3'	122.5°	28°08.4'	45.0'	122.9°	27°35.6'	45.6'	123.4°	27°02.4'	46.3'	123.8°	26°28.8'	46.9'	124.2°	5
6	29°01.4'	43.2'	122.3°	28°29.1'	43.9'	122.8°	27°56.4'	44.6'	123.2°	27°23.4'	45.2'	123.7°	26°49.9'	45.8'	124.1°	26°16.1'	46.5'	124.5°	25°42.0'	47.1'	124.9°	6
7	28°18.2'	43.5'	123.1°	27°45.2'	44.2'	123.5°	27°11.9'	44.8'	124.0°	26°38.2'	45.4'	124.4°	26°04.1'	46.1'	124.8°	25°29.7'	46.7'	125.2°	24°54.9'	47.2'	125.6°	7
8	27°34.7'	43.7'	123.9°	27°01.1'	44.4'	124.3°	26°27.1'	45.0'	124.7°	25°52.7'	45.7'	125.1°	25°18.0'	46.3'	125.5°	24°43.0'	46.8'	125.9°	24°07.7'	47.4'	126.3°	8
9	26°51.0'	44.0'	124.6°	26°16.7'	44.6'	125.1°	25°42.0'	45.3'	125.5°	25°07.1'	45.9'	125.8°	24°31.8'	46.5'	126.2°	23°56.2'	47.0'	126.6°	23°20.3'	47.6'	126.9°	9
10	26°07.0'	44.2'	125.4°	25°32.0'	44.9'	125.8°	24°56.8'	45.5'	126.2°	24°21.2'	46.1'	126.6°	23°45.3'	46.6'	126.9°	23°09.1'	47.2'	127.3°	22°32.7'	47.7'	127.6°	10
11	25°22.7'	44.4'	126.2°	24°47.2'	45.1'	126.5°	24°11.3'	45.7'	126.9°	23°35.1'	46.2'	127.3°	22°58.7'	46.8'	127.6°	22°21.9'	47.4'	127.9°	21°44.9'	47.9'	128.2°	11
12	24°38.3'	44.7'	126.9°	24°02.1'	45.3'	127.3°	23°25.7'	45.9'	127.6°	22°48.9'	46.4'	127.9°	22°11.9'	47.0'	128.3°	21°34.6'	47.5'	128.6°	20°57.0'	48.0'	128.9°	12
13	23°53.6'	44.9'	127.6°	23°16.9'	45.5'	128.0°	22°39.8'	46.0'	128.3°	22°02.5'	46.6'	128.6°	21°24.9'	47.1'	128.9°	20°47.1'	47.7'	129.2°	20°09.0'	48.2'	129.5°	13
14	23°08.8'	45.1'	128.4°	22°31.4'	45.6'	128.7°	21°53.8'	46.2'	129.0°	21°15.9'	46.8'	129.3°	20°37.8'	47.3'	129.6°	19°59.4'	47.8'	129.9°	19°20.8'	48.3'	130.2°	14
15	22°23.7'	45.3'	129.1°	21°45.8'	45.8'	129.4°	21°07.6'	46.4'	129.7°	20°29.1'	46.9'	130.0°	19°50.5'	47.4'	130.3°	19°11.6'	47.9'	130.5°	18°32.5'	48.4'	130.8°	15
16	21°38.5'	45.4'	129.8°	20°59.9'	46.0'	130.1°	20°21.2'	46.5'	130.4°	19°42.2'	47.1'	130.6°	19°03.0'	47.6'	130.9°	18°23.6'	48.1'	131.2°	17°44.1'	48.6'	131.4°	16
17	20°53.0'	45.6'	130.5°	20°14.0'	46.1'	130.8°	19°34.7'	46.7'	131.0°	18°55.2'	47.2'	131.3°	18°15.5'	47.7'	131.6°	17°35.6'	48.2'	131.8°	16°55.5'	48.7'	132.0°	17
18	20°07.4'	45.8'	131.2°	19°27.8'	46.3'	131.4°	18°48.0'	46.8'	131.7°	18°08.0'	47.3'	132.0°	17°27.8'	47.8'	132.2°	16°47.4'	48.3'	132.4°	16°06.8'	48.8'	132.6°	18
19	19°21.7'	45.9'	131.9°	18°41.5'	46.4'	132.1°	18°01.2'	46.9'	132.4°	17°20.7'	47.4'	132.6°	16°40.0'	47.9'	132.8°	15°59.1'	48.4'	133.0°	15°18.1'	48.9'	133.2°	19
20	18°35.7'	46.1'	132.5°	17°55.1'	46.6'	132.8°	17°14.2'	47.1'	133.0°	16°33.2'	47.6'	133.2°	15°52.0'	48.0'	133.4°	15°10.7'	48.5'	133.7°	14°29.2'	49.0'	133.8°	20
21	17°49.7'	46.2'	133.2°	17°08.5'	46.7'	133.4°	16°27.2'	47.2'	133.7°	15°45.7'	47.7'	133.9°	15°04.0'	48.1'	134.1°	14°22.2'	48.6'	134.3°	13°40.3'	49.0'	134.4°	21
22	17°03.5'	46.3'	133.9°	16°21.8'	46.8'	134.1°	15°40.0'	47.3'	134.3°	14°58.0'	47.8'	134.5°	14°15.9'	48.2'	134.7°	13°33.6'	48.7'	134.9°	12°51.2'	49.1'	135.0°	22
23	16°17.2'	46.3'	134.5°	15°35.0'	46.9'	134.8°	14°52.7'	47.4'	134.9°	14°10.2'	47.9'	135.1°	13°27.6'	48.3'	135.3°	12°44.9'	48.8'	135.5°	12°02.1'	49.2'	135.6°	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

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	33°57.7'	41.7'	118.1°	33°29.2'	42.5'	118.7°	33°00.1'	43.2'	119.3°	32°30.5'	44.0'	119.9°	32°00.4'	44.7'	120.4°	31°29.8'	45.4'	120.9°	30°58.7'	46.0'	121.5°	0
1	33°16.1'	42.0'	119.0°	32°46.8'	42.8'	119.6°	32°16.9'	43.5'	120.1°	31°46.5'	44.3'	120.7°	31°15.7'	45.0'	121.2°	30°44.4'	45.6'	121.7°	30°12.6'	46.3'	122.2°	1
2	32°34.0'	42.4'	119.9°	32°04.0'	43.1'	120.4°	31°33.4'	43.8'	120.9°	31°02.3'	44.5'	121.5°	30°30.8'	45.2'	122.0°	29°58.8'	45.9'	122.5°	29°26.4'	46.5'	122.9°	2
3	31°51.7'	42.7'	120.7°	31°20.9'	43.4'	121.2°	30°49.5'	44.1'	121.7°	30°17.7'	44.8'	122.2°	29°45.5'	45.5'	122.7°	29°12.9'	46.1'	123.2°	28°39.8'	46.8'	123.7°	3
4	31°09.0'	43.0'	121.5°	30°37.4'	43.7'	122.0°	30°05.4'	44.4'	122.5°	29°32.9'	45.1'	123.0°	29°00.0'	45.7'	123.5°	28°26.8'	46.4'	123.9°	27°53.1'	47.0'	124.4°	4
5	30°26.0'	43.3'	122.3°	29°53.7'	44.0'	122.8°	29°21.0'	44.7'	123.3°	28°47.9'	45.3'	123.8°	28°14.3'	46.0'	124.2°	27°40.4'	46.6'	124.6°	27°06.1'	47.2'	125.1°	5
6	29°42.7'	43.6'	123.1°	29°09.7'	44.3'	123.6°	28°36.3'	44.9'	124.1°	28°02.5'	45.6'	124.5°	27°28.4'	46.2'	124.9°	26°53.8'	46.8'	125.4°	26°18.9'	47.4'	125.8°	6
7	28°59.2'	43.9'	123.9°	28°25.5'	44.5'	124.4°	27°51.4'	45.2'	124.8°	27°17.0'	45.8'	125.2°	26°42.2'	46.4'	125.7°	26°07.0'	47.0'	126.1°	25°31.6'	47.6'	126.4°	7
8	28°15.3'	44.1'	124.7°	27°41.0'	44.8'	125.1°	27°06.3'	45.4'	125.6°	26°31.2'	46.0'	126.0°	25°55.8'	46.6'	126.4°	25°20.1'	47.2'	126.7°	24°44.0'	47.7'	127.1°	8
9	27°31.2'	44.4'	125.5°	26°56.2'	45.0'	125.9°	26°20.9'	45.6'	126.3°	25°45.2'	46.2'	126.7°	25°09.2'	46.8'	127.1°	24°32.9'	47.4'	127.4°	23°56.3'	47.9'	127.8°	9
10	26°46.8'	44.6'	126.2°	26°11.2'	45.2'	126.6°	25°35.3'	45.8'	127.0°	24°59.0'	46.4'	127.4°	24°22.4'	47.0'	127.7°	23°45.5'	47.5'	128.1°	23°08.4'	48.1'	128.4°	10
11	26°02.2'	44.8'	127.0°	25°26.0'	45.4'	127.3°	24°49.4'	46.0'	127.7°	24°12.6'	46.6'	128.1°	23°35.4'	47.2'	128.4°	22°58.0'	47.7'	128.8°	22°20.3'	48.2'	129.1°	11
12	25°17.4'	45.0'	127.7°	24°40.5'	45.6'	128.1°	24°03.4'	46.2'	128.4°	23°26.0'	46.8'	128.8°	22°48.3'	47.3'	129.1°	22°10.3'	47.9'	129.4°	21°32.1'	48.4'	129.7°	12
13	24°32.4'	45.3'	128.4°	23°54.9'	45.8'	128.8°	23°17.2'	46.4'	129.1°	22°39.2'	46.9'	129.4°	22°00.9'	47.5'	129.8°	21°22.4'	48.0'	130.1°	20°43.7'	48.5'	130.4°	13
14	23°47.1'	45.5'	129.2°	23°09.1'	46.0'	129.5°	22°30.8'	46.6'	129.8°	21°52.3'	47.1'	130.1°	21°13.5'	47.6'	130.4°	20°34.4'	48.1'	130.7°	19°55.2'	48.6'	131.0°	14
15	23°01.6'	45.6'	129.9°	22°23.1'	46.2'	130.2°	21°44.2'	46.7'	130.5°	21°05.1'	47.3'	130.8°	20°25.8'	47.8'	131.1°	19°46.3'	48.3'	131.3°	19°06.6'	48.8'	131.6°	15
16	22°16.0'	45.8'	130.6°	21°36.9'	46.4'	130.9°	20°57.5'	46.9'	131.2°	20°17.9'	47.4'	131.4°	19°38.1'	47.9'	131.7°	18°58.0'	48.4'	132.0°	18°17.8'	48.9'	132.2°	16
17	21°30.2'	46.0'	131.3°	20°50.5'	46.5'	131.6°	20°10.6'	47.0'	131.8°	19°30.5'	47.5'	132.1°	18°50.2'	48.0'	132.4°	18°09.6'	48.5'	132.6°	17°28.9'	49.0'	132.8°	17
18	20°44.2'	46.2'	131.9°	20°04.0'	46.7'	132.2°	19°23.6'	47.2'	132.5°	18°42.9'	47.7'	132.7°	18°02.1'	48.2'	133.0°	17°21.1'	48.6'	133.2°	16°39.9'	49.1'	133.4°	18
19	19°58.0'	46.3'	132.6°	19°17.3'	46.8'	132.9°	18°36.4'	47.3'	133.1°	17°55.3'	47.8'	133.4°	17°13.9'	48.3'	133.6°	16°32.5'	48.7'	133.8°	15°50.8'	49.2'	134.0°	19
20	19°11.7'	46.5'	133.3°	18°30.5'	47.0'	133.6°	17°49.1'	47.4'	133.8°	17°07.4'	47.9'	134.0°	16°25.7'	48.4'	134.2°	15°43.7'	48.8'	134.4°	15°01.7'	49.3'	134.6°	20
21	18°25.3'	46.6'	134.0°	17°43.5'	47.1'	134.2°	17°01.6'	47.6'	134.4°	16°19.5'	48.0'	134.6°	15°37.3'	48.5'	134.8°	14°54.9'	48.9'	135.0°	14°12.4'	49.4'	135.2°	21
22	17°38.7'	46.7'	134.6°	16°56.4'	47.2'	134.9°	16°14.0'	47.7'	135.1°	15°31.5'	48.1'	135.3°	14°48.8'	48.6'	135.5°	14°06.0'	49.0'					

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

46° 314° LHA

Latitude CONTRARY to Declination

46° 314° LHA

Table with columns: Dec°, 35 (Hc°, d', Z°), 36 (Hc°, d', Z°), 37 (Hc°, d', Z°), 38 (Hc°, d', Z°), 39 (Hc°, d', Z°), 40 (Hc°, d', Z°), 41 (Hc°, d', Z°), Dec°. Rows 0-23.

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

Table with columns: Dec°, 35 (Hc°, d', Z°), 36 (Hc°, d', Z°), 37 (Hc°, d', Z°), 38 (Hc°, d', Z°), 39 (Hc°, d', Z°), 40 (Hc°, d', Z°), 41 (Hc°, d', Z°), Dec°. Rows 0-23.

45° 315° LHA

Latitude CONTRARY to 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

44° 316° LHA

Latitude CONTRARY to Declination

44° 316° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	36°06.2'	-42.8'	120.7°	35°35.3'	-43.5'	121.3°	35°03.8'	-44.3'	121.9°	34°31.8'	-45.0'	122.5°	33°59.3'	-45.7'	123.1°	33°26.3'	-46.4'	123.6°	32°52.8'	-47.0'	124.2°	0
1	35°23.4'	-43.1'	121.6°	34°51.8'	-43.9'	122.2°	34°19.6'	-44.6'	122.8°	33°46.8'	-45.3'	123.3°	33°13.6'	-46.0'	123.9°	32°40.0'	-46.6'	124.4°	32°05.8'	-47.3'	124.9°	1
2	34°40.2'	-43.5'	122.4°	34°07.9'	-44.2'	123.0°	33°35.0'	-44.9'	123.6°	33°01.5'	-45.6'	124.1°	32°27.7'	-46.2'	124.6°	31°53.3'	-46.9'	125.2°	31°18.6'	-47.5'	125.7°	2
3	33°56.8'	-43.8'	123.3°	33°23.7'	-44.5'	123.8°	32°50.0'	-45.2'	124.4°	32°16.0'	-45.9'	124.9°	31°41.4'	-46.5'	125.4°	31°06.5'	-47.1'	125.9°	30°31.1'	-47.7'	126.4°	3
4	33°13.0'	-44.1'	124.1°	32°39.1'	-44.8'	124.6°	32°04.8'	-45.5'	125.1°	31°30.1'	-46.1'	125.6°	30°54.9'	-46.8'	126.1°	30°19.3'	-47.4'	126.6°	29°43.4'	-47.9'	127.1°	4
5	32°28.8'	-44.4'	124.9°	31°54.3'	-45.1'	125.4°	31°19.3'	-45.8'	125.9°	30°44.0'	-46.4'	126.4°	30°08.2'	-47.0'	126.9°	29°32.0'	-47.6'	127.3°	28°55.4'	-48.1'	127.8°	5
6	31°44.4'	-44.7'	125.7°	31°09.2'	-45.4'	126.2°	30°33.6'	-46.0'	126.7°	29°57.6'	-46.6'	127.1°	29°21.2'	-47.2'	127.6°	28°44.4'	-47.8'	128.0°	28°07.3'	-48.3'	128.4°	6
7	30°59.7'	-45.0'	126.5°	30°23.8'	-45.6'	126.9°	29°47.6'	-46.3'	127.4°	29°10.9'	-46.9'	127.8°	28°34.0'	-47.4'	128.3°	27°56.6'	-48.0'	128.7°	27°18.9'	-48.5'	129.1°	7
8	30°14.7'	-45.3'	127.2°	29°38.2'	-45.9'	127.7°	29°01.3'	-46.5'	128.1°	28°24.1'	-47.1'	128.6°	27°46.5'	-47.6'	129.0°	27°08.6'	-48.2'	129.4°	26°30.4'	-48.7'	129.8°	8
9	29°29.4'	-45.5'	128.0°	28°52.3'	-46.1'	128.4°	28°14.8'	-46.7'	128.8°	27°37.0'	-47.3'	129.3°	26°58.9'	-47.8'	129.7°	26°20.4'	-48.4'	130.0°	25°41.7'	-48.9'	130.4°	9
10	28°43.9'	-45.8'	128.7°	28°06.1'	-46.4'	129.1°	27°28.1'	-46.9'	129.6°	26°49.7'	-47.5'	129.9°	26°11.1'	-48.0'	130.3°	25°32.1'	-48.5'	130.7°	24°52.8'	-49.0'	131.1°	10
11	27°58.1'	-46.0'	129.5°	27°19.8'	-46.6'	129.9°	26°41.2'	-47.1'	130.3°	26°02.2'	-47.7'	130.6°	25°23.0'	-48.2'	131.0°	24°43.5'	-48.7'	131.3°	24°03.8'	-49.2'	131.7°	11
12	27°12.1'	-46.2'	130.2°	26°33.2'	-46.8'	130.6°	25°54.0'	-47.3'	130.9°	25°14.6'	-47.9'	131.3°	24°34.8'	-48.4'	131.7°	23°54.8'	-48.9'	132.0°	23°14.6'	-49.3'	132.3°	12
13	26°25.9'	-46.4'	130.9°	25°46.4'	-47.0'	131.3°	25°06.7'	-47.5'	131.6°	24°26.7'	-48.0'	132.0°	23°46.5'	-48.5'	132.3°	23°06.0'	-49.0'	132.6°	22°25.2'	-49.5'	132.9°	13
14	25°39.4'	-46.6'	131.6°	24°59.5'	-47.2'	132.0°	24°19.2'	-47.7'	132.3°	23°38.7'	-48.2'	132.6°	22°57.9'	-48.7'	132.9°	22°16.9'	-49.2'	133.2°	21°35.7'	-49.6'	133.5°	14
15	24°52.8'	-46.8'	132.3°	24°12.3'	-47.3'	132.6°	23°31.5'	-47.9'	133.0°	22°50.5'	-48.3'	133.3°	22°09.3'	-48.8'	133.6°	21°27.8'	-49.3'	133.9°	20°46.1'	-49.7'	134.1°	15
16	24°06.0'	-47.0'	133.0°	23°24.9'	-47.5'	133.3°	22°43.7'	-48.0'	133.6°	22°02.2'	-48.5'	133.9°	21°20.4'	-49.0'	134.2°	20°38.5'	-49.4'	134.5°	19°56.4'	-49.9'	134.7°	16
17	23°19.0'	-47.2'	133.7°	22°37.4'	-47.7'	134.0°	21°55.7'	-48.2'	134.3°	21°13.7'	-48.6'	134.5°	20°31.5'	-49.1'	134.8°	19°49.1'	-49.5'	135.1°	19°06.5'	-50.0'	135.3°	17
18	22°31.8'	-47.3'	134.3°	21°49.7'	-47.8'	134.6°	21°07.5'	-48.3'	134.9°	20°25.0'	-48.8'	135.2°	19°42.4'	-49.2'	135.4°	18°59.5'	-49.7'	135.7°	18°16.5'	-50.1'	135.9°	18
19	21°44.4'	-47.5'	135.0°	21°01.9'	-48.0'	135.3°	20°19.2'	-48.4'	135.5°	19°36.3'	-48.9'	135.8°	18°53.2'	-49.3'	136.0°	18°09.9'	-49.8'	136.3°	17°26.5'	-50.2'	136.5°	19
20	20°56.9'	-47.6'	135.7°	20°13.9'	-48.1'	135.9°	19°30.7'	-48.6'	136.2°	18°47.4'	-49.0'	136.4°	18°03.8'	-49.4'	136.6°	17°20.1'	-49.9'	136.9°	16°36.3'	-50.3'	137.1°	20
21	20°09.3'	-47.8'	136.3°	19°25.8'	-48.2'	136.6°	18°42.2'	-48.7'	136.8°	17°58.4'	-49.1'	137.0°	17°14.4'	-49.5'	137.2°	16°30.3'	-50.0'	137.4°	15°46.0'	-50.4'	137.6°	21
22	19°21.5'	-47.9'	136.9°	18°37.6'	-48.4'	137.2°	17°53.5'	-48.8'	137.4°	17°09.2'	-49.2'	137.6°	16°24.8'	-49.6'	137.8°	15°40.3'	-50.0'	138.0°	14°55.7'	-50.4'	138.2°	22
23	18°33.6'	-48.1'	137.6°	17°49.2'	-48.5'	137.8°	17°04.7'	-48.9'	138.0°	16°20.0'	-49.3'	138.2°	15°35.2'	-49.7'	138.4°	14°50.3'	-50.1'	138.6°	14°05.2'	-50.5'	138.8°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	36°48.2'	-43.2'	121.6°	36°16.6'	-43.9'	122.2°	35°44.3'	-44.7'	122.8°	35°11.5'	-45.4'	123.4°	34°38.2'	-46.0'	124.0°	34°04.4'	-46.7'	124.6°	33°30.1'	-47.3'	125.1°	0
1	36°05.1'	-43.5'	122.5°	35°32.6'	-44.3'	123.1°	34°59.6'	-45.0'	123.7°	34°26.1'	-45.7'	124.2°	33°52.2'	-46.3'	124.8°	33°17.7'	-47.0'	125.3°	32°42.8'	-47.6'	125.9°	1
2	35°21.5'	-43.9'	123.3°	34°48.4'	-44.6'	123.9°	34°14.7'	-45.3'	124.5°	33°40.5'	-46.0'	125.0°	33°05.8'	-46.6'	125.6°	32°30.7'	-47.2'	126.1°	31°55.2'	-47.8'	126.6°	2
3	34°37.7'	-44.2'	124.1°	34°03.8'	-44.9'	124.7°	33°29.4'	-45.6'	125.3°	32°54.5'	-46.2'	125.8°	32°19.2'	-46.9'	126.3°	31°43.5'	-47.5'	126.8°	31°07.3'	-48.1'	127.3°	3
4	33°53.5'	-44.5'	125.0°	33°18.9'	-45.2'	125.5°	32°43.8'	-45.9'	126.0°	32°08.3'	-46.5'	126.5°	31°32.4'	-47.1'	127.0°	30°56.0'	-47.7'	127.5°	30°19.3'	-48.3'	128.0°	4
5	33°08.9'	-44.8'	125.8°	32°33.7'	-45.5'	126.3°	31°57.9'	-46.1'	126.8°	31°21.8'	-46.8'	127.3°	30°45.3'	-47.3'	127.8°	30°08.3'	-47.9'	128.2°	29°31.0'	-48.5'	128.7°	5
6	32°24.1'	-45.1'	126.6°	31°48.2'	-45.8'	127.1°	31°11.8'	-46.4'	127.5°	30°35.0'	-47.0'	128.0°	29°57.9'	-47.6'	128.5°	29°20.4'	-48.1'	128.9°	28°42.5'	-48.7'	129.3°	6
7	31°39.0'	-45.4'	127.3°	31°02.4'	-46.0'	127.8°	30°25.4'	-46.6'	128.3°	29°48.1'	-47.2'	128.7°	29°10.3'	-47.8'	129.2°	28°32.3'	-48.3'	129.6°	27°53.9'	-48.9'	130.0°	7
8	30°53.6'	-45.7'	128.1°	30°16.4'	-46.3'	128.6°	29°38.8'	-46.9'	129.0°	29°00.8'	-47.4'	129.4°	28°22.5'	-48.0'	129.9°	27°43.9'	-48.5'	130.3°	27°05.0'	-49.0'	130.7°	8
9	30°07.9'	-45.9'	128.8°	29°30.1'	-46.5'	129.3°	28°51.9'	-47.1'	129.7°	28°13.4'	-47.6'	130.1°	27°34.6'	-48.2'	130.5°	26°55.4'	-48.7'	130.9°	26°15.9'	-49.2'	131.3°	9
10	29°22.0'	-46.2'	129.6°	28°43.6'	-46.7'	130.0°	28°04.8'	-47.3'	130.4°	27°25.7'	-47.8'	130.8°	26°46.4'	-48.4'	131.2°	26°06.7'	-48.9'	131.6°	25°26.7'	-49.4'	131.9°	10
11	28°35.8'	-46.4'	130.3°	27°56.8'	-47.0'	130.7°	27°17.5'	-47.5'	131.1°	26°37.9'	-48.0'	131.5°	25°58.0'	-48.6'	131.9°	25°17.8'	-49.0'	132.2°	24°37.3'	-49.5'	132.6°	11
12	27°49.4'	-46.6'	131.0°	27°09.8'	-47.2'	131.4°	26°30.0'	-47.7'	131.8°	25°49.9'	-48.2'	132.2°	25°09.4'	-48.7'	132.5°	24°28.8'	-49.2'	132.9°	23°47.8'	-49.7'	133.2°	12
13	27°02.8'	-46.8'	131.7°	26°22.7'	-47.4'	132.1°	25°42.3'	-47.9'	132.5°	25°01.6'	-48.4'	132.8°	24°20.7'	-48.9'	133.2°	23°39.5'	-49.4'	133.5°	22°58.1'	-49.8'	133.8°	13
14	26°15.9'	-47.0'	132.4°	25°35.3'	-47.6'	132.8°	24°54.4'	-48.1'	133.1°	24°13.2'	-48.6'	133.5°	23°31.8'	-49.0'	133.8°	22°50.2'	-49.5'	134.1°	22°08.3'	-49.9'	134.4°	14
15	25°28.9'	-47.2'	133.1°	24°47.8'	-47.7'	133.5°	24°06.3'	-48.2'	133.8°	23°24.7'	-48.7'	134.1°	22°42.8'	-49.2'	134.4°	22°00.7'	-49.6'	134.7°	21°18.4'	-50.1'	135.0°	15
16	24°41.7'	-47.4'	133.8°	24°00.0'	-47.9'	134.1°	23°18.1'	-48.4'	134.5°	22°36.0'	-48.9'	134.8°	21°53.6'	-49.3'	135.0°	21°11.1'	-49.8'	135.3°	20°28.3'	-50.2'	135.6°	16
17	23°54.3'	-47.6'	134.5°	23°12.1'	-48.1'	134.8°	22°29.7'	-48.5'	135.1°	21°47.1'	-49.0'	135.4°	21°04.3'	-49.4'	135.7°	20°21.3'	-49.9'	135.9°	19°38.1'	-50.3'	136.2°	17
18	23°06.7'	-47.7'	135.2°	22°24.0'	-48.2'	135.4°	21°41.2'	-48.7'	135.7°	20°58.1'	-49.1'	136.0°	20°14.9'	-49.6'	136.3°	19°31.4'	-50.0'	136.5°	18°47.8'	-50.4'	136.8°	18
19	22°19.0'	-47.9'	135.8°	21°35.8'	-48.4'	136.1°	20°52.5'	-48.8'	136.4°	20°09.0'	-49.3'	136.6°	19°25.3'	-49.7'	136.9°	18°41.4'	-50.1'	137.1°	17°57.4'	-50.5'	137.3°	19
20	21°31.1'	-48.1'	136.5°	20°47.5'	-48.5'	136.7°	20°03.7'	-48.9'	137.0°	19°19.7'	-49.3'	137.2°	18°35.6'	-49.8'	137.5°	17°51.3'</						

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

42° 318° LHA

**Latitude CONTRARY to Declination**

42° 318° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	37°29.9'	-43.6'	122.5°	36°57.4'	-44.3'	123.1°	36°24.4'	-45.0'	123.8°	35°50.7'	-45.7'	124.4°	35°16.6'	-46.4'	125.0°	34°42.0'	-47.0'	125.5°	34°06.9'	-47.7'	126.1°	0
1	36°46.3'	-43.9'	123.4°	36°13.1'	-44.7'	124.0°	35°39.3'	-45.4'	124.6°	35°05.0'	-46.0'	125.2°	34°30.2'	-46.7'	125.7°	33°55.0'	-47.3'	126.3°	33°19.2'	-47.9'	126.8°	1
2	36°02.4'	-44.3'	124.2°	35°28.5'	-45.0'	124.8°	34°54.0'	-45.7'	125.4°	34°19.0'	-46.3'	125.9°	33°43.5'	-47.0'	126.5°	33°07.6'	-47.6'	127.0°	32°31.3'	-48.2'	127.5°	2
3	35°18.2'	-44.6'	125.0°	34°43.5'	-45.3'	125.6°	34°08.3'	-46.0'	126.2°	33°32.7'	-46.6'	126.7°	32°56.6'	-47.2'	127.2°	32°20.1'	-47.8'	127.7°	31°43.1'	-48.4'	128.2°	3
4	34°33.5'	-44.9'	125.9°	33°58.2'	-45.6'	126.4°	33°22.3'	-46.2'	126.9°	32°46.1'	-46.9'	127.5°	32°09.4'	-47.5'	128.0°	31°32.3'	-48.1'	128.4°	30°54.7'	-48.6'	128.9°	4
5	33°48.6'	-45.2'	126.7°	33°12.6'	-45.9'	127.2°	32°36.1'	-46.5'	127.7°	31°59.2'	-47.1'	128.2°	31°21.9'	-47.7'	128.7°	30°44.2'	-48.3'	129.1°	30°06.1'	-48.8'	129.6°	5
6	33°03.4'	-45.5'	127.4°	32°26.7'	-46.2'	127.9°	31°49.6'	-46.8'	128.4°	31°12.1'	-47.4'	128.9°	30°34.2'	-47.9'	129.4°	29°55.9'	-48.5'	129.8°	29°17.3'	-49.0'	130.3°	6
7	32°17.8'	-45.8'	128.2°	31°40.5'	-46.4'	128.7°	31°02.8'	-47.0'	129.2°	30°24.7'	-47.6'	129.6°	29°46.3'	-48.1'	130.1°	29°07.4'	-48.7'	130.5°	28°28.3'	-49.2'	130.9°	7
8	31°32.0'	-46.1'	129.0°	30°54.1'	-46.7'	129.4°	30°15.8'	-47.3'	129.9°	29°37.1'	-47.8'	130.3°	28°58.1'	-48.4'	130.8°	28°18.8'	-48.9'	131.2°	27°39.1'	-49.4'	131.6°	8
9	30°45.9'	-46.3'	129.7°	30°07.4'	-46.9'	130.2°	29°28.5'	-47.5'	130.6°	28°49.3'	-48.0'	131.0°	28°09.8'	-48.5'	131.4°	27°29.9'	-49.1'	131.8°	26°49.7'	-49.6'	132.2°	9
10	29°59.6'	-46.6'	130.5°	29°20.5'	-47.1'	130.9°	28°41.1'	-47.7'	131.3°	28°01.3'	-48.2'	131.7°	27°21.2'	-48.7'	132.1°	26°40.8'	-49.2'	132.5°	26°00.2'	-49.7'	132.8°	10
11	29°13.0'	-46.8'	131.2°	28°33.4'	-47.4'	131.6°	27°53.4'	-47.9'	132.0°	27°13.1'	-48.4'	132.4°	26°32.5'	-48.9'	132.8°	25°51.6'	-49.4'	133.1°	25°10.5'	-49.9'	133.5°	11
12	28°26.2'	-47.0'	131.9°	27°46.0'	-47.6'	132.3°	27°05.5'	-48.1'	132.7°	26°24.7'	-48.6'	133.0°	25°43.6'	-49.1'	133.4°	25°02.2'	-49.6'	133.7°	24°20.6'	-50.0'	134.1°	12
13	27°39.2'	-47.2'	132.6°	26°58.4'	-47.8'	133.0°	26°17.4'	-48.3'	133.3°	25°36.1'	-48.8'	133.7°	24°54.5'	-49.2'	134.0°	24°12.7'	-49.7'	134.4°	23°30.6'	-50.1'	134.7°	13
14	26°52.0'	-47.4'	133.3°	26°10.7'	-47.9'	133.7°	25°29.1'	-48.4'	134.0°	24°47.3'	-48.9'	134.3°	24°05.2'	-49.4'	134.7°	23°22.9'	-49.8'	135.0°	22°40.4'	-50.3'	135.3°	14
15	26°04.5'	-47.6'	134.0°	25°22.7'	-48.1'	134.3°	24°40.7'	-48.6'	134.7°	23°58.4'	-49.1'	135.0°	23°15.9'	-49.5'	135.3°	22°33.1'	-50.0'	135.6°	21°50.1'	-50.4'	135.9°	15
16	25°16.9'	-47.8'	134.7°	24°34.6'	-48.3'	135.0°	23°52.1'	-48.8'	135.3°	23°09.3'	-49.2'	135.6°	22°26.3'	-49.7'	135.9°	21°43.1'	-50.1'	136.2°	20°59.7'	-50.5'	136.5°	16
17	24°29.1'	-48.0'	135.3°	23°46.3'	-48.5'	135.6°	23°03.3'	-48.9'	135.9°	22°20.1'	-49.4'	136.2°	21°36.7'	-49.8'	136.5°	20°53.0'	-50.2'	136.8°	20°09.2'	-50.6'	137.0°	17
18	23°41.1'	-48.1'	136.0°	22°57.9'	-48.6'	136.3°	22°14.4'	-49.1'	136.6°	21°30.7'	-49.5'	136.8°	20°46.9'	-49.9'	137.1°	20°02.8'	-50.3'	137.4°	19°18.6'	-50.7'	137.6°	18
19	22°53.0'	-48.3'	136.6°	22°09.2'	-48.8'	136.9°	21°25.3'	-49.2'	137.2°	20°41.2'	-49.6'	137.4°	19°56.9'	-50.0'	137.7°	19°12.5'	-50.4'	137.9°	18°27.8'	-50.8'	138.2°	19
20	22°04.7'	-48.5'	137.3°	21°20.5'	-48.9'	137.5°	20°36.1'	-49.3'	137.8°	19°51.6'	-49.7'	138.0°	19°06.9'	-50.1'	138.3°	18°22.0'	-50.5'	138.5°	17°37.0'	-50.9'	138.7°	20
21	21°16.2'	-48.6'	137.9°	20°31.6'	-49.0'	138.2°	19°46.8'	-49.4'	138.4°	19°01.9'	-49.9'	138.6°	18°16.7'	-50.3'	138.9°	17°31.5'	-50.6'	139.1°	16°46.1'	-51.0'	139.3°	21
22	20°27.6'	-48.7'	138.5°	19°42.6'	-49.1'	138.8°	18°57.4'	-49.6'	139.0°	18°12.0'	-50.0'	139.2°	17°26.5'	-50.4'	139.4°	16°40.8'	-50.7'	139.6°	15°55.1'	-51.1'	139.8°	22
23	19°38.9'	-48.9'	139.2°	18°53.4'	-49.3'	139.4°	18°07.8'	-49.7'	139.6°	17°22.0'	-50.1'	139.8°	16°36.1'	-50.4'	140.0°	15°50.1'	-50.8'	140.2°	15°04.0'	-51.2'	140.4°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	38°11.1'	-44.0'	123.4°	37°37.9'	-44.7'	124.1°	37°04.0'	-45.4'	124.7°	36°29.6'	-46.1'	125.3°	35°54.6'	-46.8'	125.9°	35°19.2'	-47.4'	126.5°	34°43.3'	-48.0'	127.0°	0
1	37°27.2'	-44.3'	124.3°	36°53.1'	-45.1'	124.9°	36°18.6'	-45.7'	125.5°	35°43.5'	-46.4'	126.1°	35°07.9'	-47.1'	126.7°	34°31.8'	-47.7'	127.2°	33°55.3'	-48.3'	127.8°	1
2	36°42.8'	-44.7'	125.1°	36°08.1'	-45.4'	125.7°	35°32.8'	-46.1'	126.3°	34°57.0'	-46.7'	126.9°	34°20.8'	-47.3'	127.4°	33°44.1'	-47.9'	128.0°	33°07.0'	-48.5'	128.5°	2
3	35°58.2'	-45.0'	126.0°	35°22.7'	-45.7'	126.5°	34°46.8'	-46.4'	127.1°	34°10.3'	-47.0'	127.6°	33°33.5'	-47.6'	128.2°	32°56.2'	-48.2'	128.7°	32°18.5'	-48.7'	129.2°	3
4	35°13.1'	-45.3'	126.8°	34°37.0'	-46.0'	127.3°	34°00.4'	-46.6'	127.8°	33°23.4'	-47.2'	128.4°	32°45.9'	-47.8'	128.9°	32°08.0'	-48.4'	129.4°	31°29.7'	-49.0'	129.9°	4
5	34°27.8'	-45.7'	127.6°	33°51.0'	-46.3'	128.1°	33°13.8'	-46.9'	128.6°	32°36.1'	-47.5'	129.1°	31°58.1'	-48.1'	129.6°	31°19.6'	-48.6'	130.1°	30°40.8'	-49.2'	130.5°	5
6	33°42.1'	-45.9'	128.3°	33°04.7'	-46.6'	128.9°	32°26.9'	-47.2'	129.4°	31°48.6'	-47.7'	129.8°	31°10.0'	-48.3'	130.3°	30°31.0'	-48.8'	130.8°	29°51.6'	-49.4'	131.2°	6
7	32°56.2'	-46.2'	129.1°	32°18.1'	-46.8'	129.6°	31°39.7'	-47.4'	130.1°	31°00.9'	-48.0'	130.6°	30°21.7'	-48.5'	131.0°	29°42.1'	-49.0'	131.4°	29°02.3'	-49.5'	131.9°	7
8	32°10.0'	-46.5'	129.9°	31°31.3'	-47.1'	130.3°	30°52.3'	-47.6'	130.8°	30°12.9'	-48.2'	131.3°	29°33.2'	-48.7'	131.7°	28°53.1'	-49.2'	132.1°	28°12.7'	-49.7'	132.5°	8
9	31°23.5'	-46.7'	130.6°	30°44.3'	-47.3'	131.1°	30°04.7'	-47.9'	131.5°	29°24.7'	-48.4'	131.9°	28°44.5'	-48.9'	132.4°	28°03.9'	-49.4'	132.7°	27°23.0'	-49.9'	133.1°	9
10	30°36.8'	-47.0'	131.3°	29°56.9'	-47.5'	131.8°	29°16.8'	-48.1'	132.2°	28°36.3'	-48.6'	132.6°	27°55.6'	-49.1'	133.0°	27°14.5'	-49.6'	133.4°	26°33.1'	-50.0'	133.8°	10
11	29°49.8'	-47.2'	132.1°	29°09.4'	-47.8'	132.5°	28°28.7'	-48.3'	132.9°	27°47.7'	-48.8'	133.3°	27°06.5'	-49.3'	133.7°	26°24.9'	-49.7'	134.0°	25°43.1'	-50.2'	134.4°	11
12	29°02.6'	-47.4'	132.8°	28°21.7'	-48.0'	133.2°	27°40.4'	-48.5'	133.6°	26°59.0'	-49.0'	133.9°	26°17.2'	-49.4'	134.3°	25°35.2'	-49.9'	134.6°	24°52.9'	-50.3'	135.0°	12
13	28°15.1'	-47.6'	133.5°	27°33.7'	-48.2'	133.9°	26°52.0'	-48.7'	134.2°	26°10.0'	-49.1'	134.6°	25°27.8'	-49.6'	134.9°	24°45.3'	-50.0'	135.3°	24°02.5'	-50.5'	135.6°	13
14	27°27.5'	-47.8'	134.2°	26°45.5'	-48.3'	134.5°	26°03.3'	-48.8'	134.9°	25°20.9'	-49.3'	135.2°	24°38.2'	-49.7'	135.5°	23°55.2'	-50.2'	135.9°	23°12.0'	-50.6'	136.2°	14
15	26°39.6'	-48.0'	134.8°	25°57.2'	-48.5'	135.2°	25°14.5'	-49.0'	135.5°	24°31.6'	-49.4'	135.8°	23°48.4'	-49.9'	136.2°	23°05.0'	-50.3'	136.5°	22°21.4'	-50.7'	136.7°	15
16	25°51.6'	-48.2'	135.5°	25°08.7'	-48.7'	135.8°	24°25.5'	-49.1'	136.2°	23°42.1'	-49.6'	136.5°	22°58.5'	-50.0'	136.8°	22°14.7'	-50.4'	137.1°	21°30.7'	-50.9'	137.3°	16
17	25°03.4'	-48.4'	136.2°	24°20.0'	-48.8'	136.5°	23°36.4'	-49.3'	136.8°	22°52.5'	-49.7'	137.1°	22°08.5'	-50.2'	137.4°	21°24.3'	-50.6'	137.6°	20°39.8'	-51.0'	137.9°	17
18	24°15.0'	-48.6'	136.8°	23°31.1'	-49.0'	137.1°	22°47.1'	-49.4'	137.4°	22°02.8'	-49.9'	137.7°	21°18.3'	-50.3'	138.0°	20°33.7'	-50.7'	138.2°	19°48.9'	-51.1'	138.5°	18
19	23°26.5'	-48.7'	137.5°	22°42.1'	-49.1'	137.7°	21°57.6'	-49.6'	138.0°	21°12.9'	-50.0'	138.3°	20°28.1'	-50.4'	138.5°	19°43.0'	-50.8'	138.8°	18°57.8'	-51.2'	139.0°	19
20	22°37.7'	-48.9'	138.1°	21°53.0'	-49.3'	138.4°	21°08.1'	-49.7'	138.6°	20°22.9'	-50.1'	138.9°	19°37.7'	-50.5'	139.1°	18°52.2'	-50.9'	139.3°	18°06.			



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

40° 320° LHA

**Latitude CONTRARY to Declination**

40° 320° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	38°51.9'	44.4'	124.4°	38°17.8'	45.1'	125.0°	37°43.1'	45.8'	125.6°	37°07.9'	46.5'	126.3°	36°32.2'	47.1'	126.9°	35°55.9'	47.8'	127.5°	35°19.2'	48.4'	128.0°	0
1	38°07.5'	44.8'	125.2°	37°32.7'	45.5'	125.8°	36°57.3'	46.1'	126.5°	36°21.4'	46.8'	127.1°	35°45.0'	47.4'	127.6°	35°08.1'	48.0'	128.2°	34°30.8'	48.6'	128.7°	1
2	37°22.8'	45.1'	126.1°	36°47.3'	45.8'	126.7°	36°11.2'	46.5'	127.3°	35°34.6'	47.1'	127.8°	34°57.6'	47.7'	128.4°	34°20.1'	48.3'	128.9°	33°42.2'	48.9'	129.4°	2
3	36°37.7'	45.4'	126.9°	36°01.5'	46.1'	127.5°	35°24.7'	46.7'	128.0°	34°47.5'	47.4'	128.6°	34°09.9'	48.0'	129.1°	33°31.8'	48.5'	129.6°	32°53.3'	49.1'	130.1°	3
4	35°52.3'	45.8'	127.7°	35°15.4'	46.4'	128.3°	34°38.0'	47.0'	128.8°	34°00.2'	47.6'	129.3°	33°21.9'	48.2'	129.8°	32°43.3'	48.8'	130.3°	32°04.3'	49.3'	130.8°	4
5	35°06.5'	46.1'	128.5°	34°29.0'	46.7'	129.0°	33°51.0'	47.3'	129.6°	33°12.5'	47.9'	130.1°	32°33.7'	48.4'	130.6°	31°54.5'	49.0'	131.0°	31°15.0'	49.5'	131.5°	5
6	34°20.4'	46.4'	129.3°	33°42.3'	47.0'	129.8°	33°03.7'	47.6'	130.3°	32°24.7'	48.1'	130.8°	31°45.3'	48.7'	131.3°	31°05.5'	49.2'	131.7°	30°25.4'	49.7'	132.2°	6
7	33°34.1'	46.6'	130.0°	32°55.3'	47.2'	130.5°	32°16.1'	47.8'	131.0°	31°36.5'	48.3'	131.5°	30°56.6'	48.9'	131.9°	30°16.4'	49.4'	132.4°	29°35.7'	49.9'	132.8°	7
8	32°47.4'	46.9'	130.8°	32°08.1'	47.5'	131.3°	31°28.3'	48.0'	131.7°	30°48.2'	48.6'	132.2°	30°07.7'	49.1'	132.6°	29°27.0'	49.6'	133.0°	28°45.9'	50.1'	133.4°	8
9	32°00.5'	47.2'	131.5°	31°20.6'	47.7'	132.0°	30°40.3'	48.3'	132.4°	29°59.6'	48.8'	132.9°	29°18.7'	49.3'	133.3°	28°37.4'	49.8'	133.7°	27°55.8'	50.2'	134.1°	9
10	31°13.4'	47.4'	132.2°	30°32.9'	47.9'	132.7°	29°52.0'	48.5'	133.1°	29°10.9'	49.0'	133.5°	28°29.4'	49.5'	133.9°	27°47.6'	49.9'	134.3°	27°05.6'	50.4'	134.7°	10
11	30°26.0'	47.6'	133.0°	29°44.9'	48.2'	133.4°	29°03.6'	48.7'	133.8°	28°21.9'	49.2'	134.2°	27°39.9'	49.6'	134.6°	26°57.7'	50.1'	134.9°	26°15.2'	50.5'	135.3°	11
12	29°38.4'	47.8'	133.7°	28°56.8'	48.4'	134.1°	28°14.9'	48.9'	134.5°	27°32.7'	49.3'	134.8°	26°50.3'	49.8'	135.2°	26°07.6'	50.2'	135.5°	25°24.6'	50.7'	135.9°	12
13	28°50.5'	48.1'	134.4°	28°08.4'	48.6'	134.7°	27°26.1'	49.0'	135.1°	26°43.4'	49.5'	135.5°	26°00.5'	50.0'	135.8°	25°17.4'	50.4'	136.2°	24°34.0'	50.8'	136.5°	13
14	28°02.5'	48.3'	135.0°	27°19.9'	48.7'	135.4°	26°37.0'	49.2'	135.8°	25°53.9'	49.7'	136.1°	25°10.6'	50.1'	136.4°	24°27.0'	50.5'	136.8°	23°43.1'	50.9'	137.1°	14
15	27°14.2'	48.4'	135.7°	26°31.1'	48.9'	136.1°	25°47.8'	49.4'	136.4°	25°04.2'	49.8'	136.7°	24°20.4'	50.2'	137.0°	23°36.4'	50.7'	137.3°	22°52.2'	51.1'	137.6°	15
16	26°25.8'	48.6'	136.4°	25°42.2'	49.1'	136.7°	24°58.4'	49.5'	137.0°	24°14.4'	50.0'	137.3°	23°30.2'	50.4'	137.6°	22°45.8'	50.8'	137.9°	22°01.1'	51.2'	138.2°	16
17	25°37.2'	48.8'	137.0°	24°53.1'	49.2'	137.3°	24°08.9'	49.7'	137.7°	23°24.5'	50.1'	137.9°	22°39.8'	50.5'	138.2°	21°55.0'	50.9'	138.5°	21°09.9'	51.3'	138.8°	17
18	24°48.4'	49.0'	137.7°	24°03.9'	49.4'	138.0°	23°19.2'	49.8'	138.3°	22°34.4'	50.2'	138.5°	21°49.3'	50.6'	138.8°	21°04.1'	51.0'	139.1°	20°18.6'	51.4'	139.3°	18
19	23°59.4'	49.1'	138.3°	23°14.5'	49.5'	138.6°	22°29.4'	50.0'	138.9°	21°44.1'	50.4'	139.1°	20°58.7'	50.7'	139.4°	20°13.0'	51.1'	139.6°	19°27.2'	51.5'	139.9°	19
20	23°10.3'	49.3'	138.9°	22°25.0'	49.7'	139.2°	21°39.5'	50.1'	139.5°	20°53.8'	50.5'	139.7°	20°07.9'	50.9'	140.0°	19°21.9'	51.2'	140.2°	18°35.7'	51.6'	140.4°	20
21	22°21.0'	49.4'	139.5°	21°35.3'	49.8'	139.8°	20°49.4'	50.2'	140.1°	20°03.3'	50.6'	140.3°	19°17.1'	51.0'	140.5°	18°30.7'	51.3'	140.7°	17°44.2'	51.7'	140.9°	21
22	21°31.7'	49.5'	140.2°	20°45.5'	49.9'	140.4°	19°59.2'	50.3'	140.6°	19°12.7'	50.7'	140.9°	18°26.1'	51.1'	141.1°	17°39.4'	51.4'	141.3°	16°52.5'	51.8'	141.5°	22
23	20°42.1'	49.7'	140.8°	19°55.6'	50.0'	141.0°	19°08.9'	50.4'	141.2°	18°22.0'	50.8'	141.4°	17°35.1'	51.1'	141.6°	16°47.9'	51.5'	141.8°	16°00.7'	51.8'	142.0°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

40° 320° LHA

**Latitude CONTRARY to DECLINATION**

40° 320° LHA

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

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

39° 321° LHA

**Latitude CONTRARY to Declination**

39° 321° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	39°32.3'	44.8'	125.3°	38°57.4'	45.5'	126.0°	38°21.8'	46.2'	126.6°	37°45.8'	46.9'	127.2°	37°09.2'	47.5'	127.9°	36°32.2'	48.1'	128.4°	35°54.6'	48.7'	129.0°	0
1	38°47.5'	45.2'	126.2°	38°11.8'	45.9'	126.8°	37°35.6'	46.5'	127.4°	36°58.9'	47.2'	128.0°	36°21.7'	47.8'	128.6°	35°44.0'	48.4'	129.2°	35°05.9'	49.0'	129.7°	1
2	38°02.3'	45.5'	127.0°	37°26.0'	46.2'	127.6°	36°49.1'	46.9'	128.2°	36°11.7'	47.5'	128.8°	35°33.9'	48.1'	129.4°	34°55.6'	48.7'	129.9°	34°16.9'	49.2'	130.4°	2
3	37°16.8'	45.9'	127.8°	36°39.8'	46.5'	128.4°	36°02.2'	47.1'	129.0°	35°24.2'	47.8'	129.6°	34°45.8'	48.3'	130.1°	34°07.0'	48.9'	130.6°	33°27.7'	49.4'	131.1°	3
4	36°30.9'	46.2'	128.6°	35°53.2'	46.8'	129.2°	35°15.1'	47.4'	129.8°	34°36.5'	48.0'	130.3°	33°57.5'	48.6'	130.8°	33°18.1'	49.1'	131.3°	32°38.3'	49.7'	131.8°	4
5	35°44.7'	46.5'	129.4°	35°06.4'	47.1'	130.0°	34°27.7'	47.7'	130.5°	33°48.5'	48.3'	131.0°	33°08.9'	48.8'	131.5°	32°28.9'	49.3'	132.0°	31°48.6'	49.9'	132.5°	5
6	34°58.2'	46.8'	130.2°	34°19.3'	47.4'	130.7°	33°40.0'	47.9'	131.2°	33°00.2'	48.5'	131.7°	32°20.1'	49.0'	132.2°	31°39.6'	49.6'	132.7°	30°58.8'	50.0'	133.1°	6
7	34°11.5'	47.1'	131.0°	33°31.9'	47.6'	131.5°	32°52.0'	48.2'	132.0°	32°11.7'	48.7'	132.4°	31°31.1'	49.2'	132.9°	30°50.0'	49.7'	133.3°	30°08.7'	50.2'	133.8°	7
8	33°24.4'	47.3'	131.7°	32°44.3'	47.9'	132.2°	32°03.8'	48.4'	132.7°	31°23.0'	48.9'	133.1°	30°41.8'	49.4'	133.6°	30°00.3'	49.9'	134.0°	29°18.5'	50.4'	134.4°	8
9	32°37.1'	47.6'	132.4°	31°56.4'	48.1'	132.9°	31°15.4'	48.6'	133.4°	30°34.0'	49.2'	133.8°	29°52.4'	49.6'	134.2°	29°10.4'	50.1'	134.6°	28°28.1'	50.6'	135.0°	9
10	31°49.5'	47.8'	133.2°	31°08.3'	48.3'	133.6°	30°26.7'	48.9'	134.0°	29°44.9'	49.3'	134.5°	29°02.7'	49.8'	134.9°	28°20.3'	50.3'	135.2°	27°37.5'	50.7'	135.6°	10
11	31°01.7'	48.0'	133.9°	30°20.0'	48.6'	134.3°	29°37.9'	49.1'	134.7°	28°55.5'	49.5'	135.1°	28°12.9'	50.0'	135.5°	27°30.0'	50.4'	135.9°	26°46.8'	50.9'	136.2°	11
12	30°13.7'	48.3'	134.6°	29°31.4'	48.8'	135.0°	28°48.8'	49.2'	135.4°	28°06.0'	49.7'	135.7°	27°22.9'	50.2'	136.1°	26°39.5'	50.6'	136.5°	25°55.9'	51.0'	136.8°	12
13	29°25.4'	48.5'	135.3°	28°42.6'	49.0'	135.6°	27°59.6'	49.4'	136.0°	27°16.3'	49.9'	136.4°	26°32.7'	50.3'	136.7°	25°48.9'	50.7'	137.1°	25°04.9'	51.2'	137.4°	13
14	28°36.9'	48.7'	135.9°	27°53.7'	49.1'	136.3°	27°10.2'	49.6'	136.7°	26°26.4'	50.0'	137.0°	25°42.4'	50.5'	137.3°	24°58.2'	50.9'	137.7°	24°13.7'	51.3'	138.0°	14
15	27°48.3'	48.8'	136.6°	27°04.6'	49.3'	136.9°	26°20.6'	49.8'	137.3°	25°36.4'	50.2'	137.6°	24°52.0'	50.6'	137.9°	24°07.3'	51.0'	138.2°	23°22.4'	51.4'	138.5°	15
16	26°59.4'	49.0'	137.2°	26°15.2'	49.5'	137.6°	25°30.8'	49.9'	137.9°	24°46.2'	50.3'	138.2°	24°01.4'	50.7'	138.5°	23°16.3'	51.1'	138.8°	22°31.0'	51.5'	139.1°	16
17	26°10.4'	49.2'	137.9°	25°25.8'	49.6'	138.2°	24°40.9'	50.1'	138.5°	23°55.9'	50.5'	138.8°	23°10.6'	50.9'	139.1°	22°25.2'	51.3'	139.4°	21°39.5'	51.6'	139.6°	17
18	25°21.2'	49.4'	138.5°	24°36.1'	49.8'	138.8°	23°50.9'	50.2'	139.1°	23°05.4'	50.6'	139.4°	22°19.7'	51.0'	139.7°	21°33.9'	51.4'	139.9°	20°47.9'	51.7'	140.2°	18
19	24°31.8'	49.7'	139.2°	23°46.4'	49.9'	139.4°	23°00.7'	50.3'	139.7°	22°14.8'	50.7'	140.0°	21°28.8'	51.1'	140.2°	20°42.5'	51.5'	140.5°	19°56.2'	51.8'	140.7°	19
20	23°42.3'	49.7'	139.8°	22°56.4'	50.1'	140.0°	22°10.3'	50.5'	140.3°	21°24.1'	50.8'	140.6°	20°37.7'	51.2'								

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

38° 322° LHA

Latitude CONTRARY to Declination

38° 322° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	40°12.1'	-45.2'	126.3°	39°36.4'	-46.0'	127.0°	39°00.1'	-46.6'	127.6°	38°23.2'	-47.3'	128.2°	37°45.8'	-47.9'	128.9°	37°07.9'	-48.5'	129.4°	36°29.6'	-49.1'	130.0°	0
1	39°26.9'	-45.6'	127.1°	38°50.4'	-46.3'	127.8°	38°13.4'	-47.0'	128.4°	37°35.9'	-47.6'	129.0°	36°57.9'	-48.2'	129.6°	36°19.4'	-48.8'	130.2°	35°40.5'	-49.3'	130.7°	1
2	38°41.3'	-46.0'	128.0°	38°04.2'	-46.6'	128.6°	37°26.5'	-47.3'	129.2°	36°48.3'	-47.9'	129.8°	36°09.7'	-48.5'	130.4°	35°30.6'	-49.0'	130.9°	34°51.1'	-49.6'	131.4°	2
3	37°55.4'	-46.3'	128.8°	37°17.5'	-46.9'	129.4°	36°39.2'	-47.6'	130.0°	36°00.4'	-48.1'	130.5°	35°21.2'	-48.7'	131.1°	34°41.6'	-49.3'	131.6°	34°01.6'	-49.8'	132.1°	3
4	37°09.1'	-46.6'	129.6°	36°30.6'	-47.2'	130.2°	35°51.7'	-47.8'	130.7°	35°12.3'	-48.4'	131.3°	34°32.5'	-49.0'	131.8°	33°52.3'	-49.5'	132.3°	33°11.8'	-50.0'	132.8°	4
5	36°22.4'	-46.9'	130.4°	35°43.3'	-47.5'	130.9°	35°03.8'	-48.1'	131.5°	34°23.9'	-48.7'	132.0°	33°43.6'	-49.2'	132.5°	33°02.8'	-49.7'	133.0°	32°21.8'	-50.2'	133.4°	5
6	35°35.5'	-47.2'	131.2°	34°55.8'	-47.8'	131.7°	34°15.7'	-48.4'	132.2°	33°35.2'	-48.9'	132.7°	32°54.4'	-49.4'	133.2°	32°13.1'	-49.9'	133.6°	31°31.6'	-50.4'	134.1°	6
7	34°48.3'	-47.5'	131.9°	34°08.0'	-48.0'	132.4°	33°27.4'	-48.6'	132.9°	32°46.3'	-49.1'	133.4°	32°04.9'	-49.6'	133.8°	31°23.2'	-50.1'	134.3°	30°41.2'	-50.6'	134.7°	7
8	34°00.8'	-47.7'	132.6°	33°20.0'	-48.3'	133.1°	32°38.8'	-48.8'	133.6°	31°57.2'	-49.3'	134.1°	31°15.3'	-49.8'	134.5°	30°33.1'	-50.3'	134.9°	29°50.6'	-50.7'	135.3°	8
9	33°13.1'	-48.0'	133.4°	32°31.7'	-48.5'	133.8°	31°50.0'	-49.0'	134.3°	31°07.9'	-49.5'	134.7°	30°25.5'	-50.0'	135.2°	29°42.8'	-50.5'	135.6°	28°59.8'	-50.9'	136.0°	9
10	32°25.1'	-48.2'	134.1°	31°43.2'	-48.7'	134.5°	31°00.9'	-49.2'	135.0°	30°18.4'	-49.7'	135.4°	29°35.5'	-50.2'	135.8°	28°52.3'	-50.6'	136.2°	28°08.9'	-51.1'	136.6°	10
11	31°36.9'	-48.5'	134.8°	30°54.4'	-49.0'	135.2°	30°11.7'	-49.4'	135.6°	29°28.6'	-49.9'	136.0°	28°45.3'	-50.4'	136.4°	28°01.7'	-50.8'	136.8°	27°17.8'	-51.2'	137.1°	11
12	30°48.4'	-48.7'	135.5°	30°05.5'	-49.2'	135.9°	29°22.2'	-49.6'	136.3°	28°38.7'	-50.1'	136.7°	27°54.9'	-50.5'	137.0°	27°10.9'	-50.9'	137.4°	26°26.6'	-51.4'	137.7°	12
13	29°59.7'	-48.9'	136.2°	29°16.3'	-49.4'	136.6°	28°32.6'	-49.8'	136.9°	27°48.6'	-50.3'	137.3°	27°04.4'	-50.7'	137.6°	26°20.0'	-51.1'	138.0°	25°35.3'	-51.5'	138.3°	13
14	29°10.8'	-49.1'	136.8°	28°27.0'	-49.5'	137.2°	27°42.8'	-50.0'	137.6°	26°58.4'	-50.4'	137.9°	26°13.7'	-50.8'	138.2°	25°28.9'	-51.2'	138.6°	24°43.8'	-51.6'	138.9°	14
15	28°21.8'	-49.3'	137.5°	27°37.4'	-49.7'	137.8°	26°52.8'	-50.1'	138.2°	26°08.0'	-50.6'	138.5°	25°22.9'	-51.0'	138.8°	24°37.6'	-51.4'	139.1°	23°52.2'	-51.7'	139.4°	15
16	27°32.5'	-49.4'	138.1°	26°47.7'	-49.9'	138.5°	26°02.7'	-50.3'	138.8°	25°17.4'	-50.7'	139.1°	24°32.0'	-51.1'	139.4°	23°46.3'	-51.5'	139.7°	23°00.4'	-51.8'	140.0°	16
17	26°43.1'	-49.6'	138.8°	25°57.8'	-50.0'	139.1°	25°12.4'	-50.4'	139.4°	24°26.7'	-50.8'	139.7°	23°40.9'	-51.2'	140.0°	22°54.8'	-51.6'	140.3°	22°08.6'	-52.0'	140.5°	17
18	25°53.5'	-49.8'	139.4°	25°07.8'	-50.2'	139.7°	24°21.9'	-50.6'	140.0°	23°35.9'	-51.0'	140.3°	22°49.6'	-51.3'	140.6°	22°03.2'	-51.7'	140.8°	21°16.6'	-52.1'	141.1°	18
19	25°03.7'	-49.9'	140.0°	24°17.6'	-50.3'	140.3°	23°31.4'	-50.7'	140.6°	22°44.9'	-51.1'	140.9°	21°58.3'	-51.5'	141.1°	21°11.5'	-51.8'	141.4°	20°24.6'	-52.2'	141.6°	19
20	24°13.8'	-50.1'	140.6°	23°27.3'	-50.5'	140.9°	22°40.7'	-50.8'	141.2°	21°53.8'	-51.2'	141.4°	21°06.8'	-51.6'	141.7°	20°19.7'	-51.9'	141.9°	19°32.4'	-52.2'	142.1°	20
21	23°23.7'	-50.2'	141.2°	22°36.9'	-50.6'	141.5°	21°49.8'	-50.9'	141.7°	21°02.6'	-51.3'	142.0°	20°15.3'	-51.7'	142.2°	19°27.8'	-52.0'	142.4°	18°40.2'	-52.3'	142.6°	21
22	22°33.5'	-50.3'	141.8°	21°46.3'	-50.7'	142.1°	20°58.9'	-51.1'	142.3°	20°11.3'	-51.4'	142.5°	19°23.6'	-51.8'	142.8°	18°35.8'	-52.1'	143.0°	17°47.8'	-52.4'	143.2°	22
23	21°43.2'	-50.4'	142.4°	20°55.6'	-50.8'	142.6°	20°07.8'	-51.2'	142.9°	19°19.9'	-51.5'	143.1°	18°31.9'	-51.8'	143.3°	17°43.7'	-52.2'	143.5°	16°55.4'	-52.5'	143.7°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

38° 322° LHA

Latitude CONTRARY to DECLINATION

38° 322° LHA

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

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

37° 323° LHA

Latitude CONTRARY to Declination

37° 323° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	40°51.5'	-45.7'	127.3°	40°14.9'	-46.4'	128.0°	39°37.8'	-47.0'	128.6°	39°00.1'	-47.7'	129.2°	38°21.8'	-48.3'	129.9°	37°43.1'	-48.9'	130.5°	37°04.0'	-49.5'	131.0°	0
1	40°05.8'	-46.1'	128.1°	39°28.6'	-46.7'	128.8°	38°50.7'	-47.4'	129.4°	38°12.4'	-48.0'	130.0°	37°33.5'	-48.6'	130.6°	36°54.3'	-49.2'	131.2°	36°14.5'	-49.7'	131.7°	1
2	39°19.8'	-46.4'	129.0°	38°41.8'	-47.1'	129.6°	38°03.3'	-47.7'	130.2°	37°24.4'	-48.3'	130.8°	36°45.0'	-48.8'	131.4°	36°05.1'	-49.4'	131.9°	35°24.8'	-49.9'	132.4°	2
3	38°33.4'	-46.7'	129.8°	37°54.8'	-47.4'	130.4°	37°15.7'	-48.0'	131.0°	36°36.1'	-48.5'	131.5°	35°56.1'	-49.1'	132.1°	35°15.7'	-49.6'	132.6°	34°34.9'	-50.2'	133.1°	3
4	37°46.7'	-47.1'	130.6°	37°07.4'	-47.7'	131.2°	36°27.7'	-48.2'	131.7°	35°47.6'	-48.8'	132.3°	35°07.0'	-49.3'	132.8°	34°26.1'	-49.9'	133.3°	33°44.7'	-50.4'	133.8°	4
5	36°59.6'	-47.4'	131.4°	36°19.7'	-47.9'	131.9°	35°39.5'	-48.5'	132.5°	34°58.8'	-49.0'	133.0°	34°17.7'	-49.6'	133.5°	33°36.2'	-50.1'	134.0°	32°54.4'	-50.6'	134.4°	5
6	36°12.3'	-47.6'	132.1°	35°31.8'	-48.2'	132.7°	34°50.9'	-48.8'	133.2°	34°09.7'	-49.3'	133.7°	33°28.1'	-49.8'	134.2°	32°46.1'	-50.3'	134.6°	32°03.8'	-50.7'	135.1°	6
7	35°24.6'	-47.9'	132.9°	34°43.6'	-48.5'	133.4°	34°02.2'	-49.0'	133.9°	33°20.4'	-49.5'	134.4°	32°38.3'	-50.0'	134.8°	31°55.8'	-50.5'	135.3°	31°13.1'	-50.9'	135.7°	7
8	34°36.7'	-48.2'	133.6°	33°55.1'	-48.7'	134.1°	33°13.2'	-49.2'	134.6°	32°30.9'	-49.7'	135.0°	31°48.3'	-50.2'	135.5°	31°05.4'	-50.7'	135.9°	30°22.1'	-51.1'	136.3°	8
9	33°48.5'	-48.4'	134.3°	33°06.4'	-48.9'	134.8°	32°24.0'	-49.4'	135.3°	31°41.2'	-49.9'	135.7°	30°58.1'	-50.4'	136.1°	30°14.7'	-50.8'	136.5°	29°31.0'	-51.3'	136.9°	9
10	33°00.1'	-48.7'	135.0°	32°17.5'	-49.2'	135.5°	31°34.5'	-49.6'	135.9°	30°51.3'	-50.1'	136.3°	30°07.7'	-50.6'	136.7°	29°23.9'	-51.0'	137.1°	28°39.8'	-51.4'	137.5°	10
11	32°11.4'	-48.9'	135.7°	31°28.3'	-49.4'	136.2°	30°44.9'	-49.8'	136.6°	30°01.2'	-50.3'	137.0°	29°17.2'	-50.7'	137.4°	28°32.9'	-51.1'	137.7°	27°48.4'	-51.6'	138.1°	11
12	31°22.6'	-49.1'	136.4°	30°39.0'	-49.6'	136.8°	29°55.1'	-50.0'	137.2°	29°10.9'	-50.5'	137.6°	28°26.4'	-50.9'	138.0°	27°41.8'	-51.3'	138.3°	26°56.8'	-51.7'	138.7°	12
13	30°33.5'	-49.3'	137.1°	29°49.4'	-49.8'	137.5°	29°05.0'	-50.2'	137.9°	28°20.4'	-50.6'	138.2°	27°35.6'	-51.0'	138.6°	26°50.5'	-51.4'	138.9°	26°05.1'	-51.8'	139.2°	13
14	29°44.2'	-49.5'	137.7°	28°59.6'	-49.9'	138.1°	28°14.8'	-50.4'	138.5°	27°29.8'	-50.8'	138.8°	26°44.5'	-51.2'	139.2°	25°59.0'	-51.6'	139.5°	25°13.3'	-52.0'	139.8°	14
15	28°54.7'	-49.7'	138.4°	28°09.7'	-50.1'	138.7°	27°24.5'	-50.5'	139.1°	26°39.0'	-50.9'	139.4°	25°53.3'	-51.3'	139.7°	25°07.4'	-51.7'	140.1°	24°21.3'	-52.1'	140.3°	15
16	28°05.0'	-49.8'	139.0°	27°19.6'	-50.3'	139.4°	26°34.0'	-50.7'	139.7°	25°48.1'	-51.1'	140.0°	25°02.0'	-51.5'	140.3°	24°15.7'	-51.8'	140.6°	23°29.3'	-52.2'	140.9°	16
17	27°15.2'	-50.0'	139.7°	26°29.3'	-50.4'	140.0°	25°43.3'	-50.8'	140.3°	24°57.0'	-51.2'	140.6°	24°10.6'	-51.6'	140.9°	23°23.9'	-51.9'	141.2°	22°37.1'	-52.3'	141.4°	17
18	26°25.2'	-50.2'	140.3°	25°38.9'	-50.6'	140.6°	24°52.5'	-51.0'	140.9°	24°05.8'	-51.3'	141.2°	23°19.0'	-51.7'	141.4°	22°32.0'	-52.0'	141.7°	21°44.8'	-52.4'	142.0°	18
19	25°35.0'	-50.3'	140.9°	24°48.4'	-50.7'	141.2°	24°01.5'	-51.1'	141.5°	23°14.5'	-51.4'	141.7°	22°27.3'	-51.8'	142.0°	21°39.9'	-52.1'	142.2°	20°52.4'	-52.5'	142.5°	19
20	24°44.7'	-50.5'	141.5°	23°57.6'	-50.8'	141.8°	23°10.4'	-51.2'	142.0°	22°23.0'	-51.6'	142.3°	21°35.5'	-51.9'	142.5°							

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

36° 324° LHA

Latitude CONTRARY to Declination

36° 324° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	41°30.4'	-46.1'	128.3°	40°52.9'	-46.8'	129.0°	40°14.9'	-47.5'	129.6°	39°36.4'	-48.1'	130.3°	38°57.4'	-48.7'	130.9°	38°17.8'	-49.3'	131.5°	37°37.9'	-49.8'	132.1°	0
1	40°44.2'	-46.5'	129.1°	40°06.1'	-47.2'	129.8°	39°27.5'	-47.8'	130.4°	38°48.3'	-48.4'	131.0°	38°08.7'	-49.0'	131.6°	37°28.6'	-49.5'	132.2°	36°48.0'	-50.1'	132.8°	1
2	39°57.7'	-46.9'	130.0°	39°19.0'	-47.5'	130.6°	38°39.7'	-48.1'	131.2°	37°59.9'	-48.7'	131.8°	37°19.7'	-49.2'	132.4°	36°39.0'	-49.8'	132.9°	35°58.0'	-50.3'	133.5°	2
3	39°10.9'	-47.2'	130.8°	38°31.5'	-47.8'	131.4°	37°51.6'	-48.4'	132.0°	37°11.2'	-48.9'	132.5°	36°30.4'	-49.5'	133.1°	35°49.3'	-50.0'	133.6°	35°07.7'	-50.5'	134.1°	3
4	38°23.7'	-47.5'	131.6°	37°43.7'	-48.1'	132.2°	37°03.2'	-48.7'	132.7°	36°22.3'	-49.2'	133.3°	35°41.0'	-49.7'	133.8°	34°59.2'	-50.2'	134.3°	34°17.1'	-50.7'	134.8°	4
5	37°36.2'	-47.8'	132.3°	36°55.6'	-48.4'	132.9°	36°14.5'	-48.9'	133.4°	35°33.1'	-49.4'	134.0°	34°51.2'	-50.0'	134.5°	34°09.0'	-50.4'	135.0°	33°26.4'	-50.9'	135.4°	5
6	36°48.4'	-48.1'	133.1°	36°07.2'	-48.6'	133.6°	35°25.6'	-49.2'	134.2°	34°43.6'	-49.7'	134.7°	34°01.3'	-50.2'	135.1°	33°18.6'	-50.6'	135.6°	32°35.5'	-51.1'	136.1°	6
7	36°00.3'	-48.3'	133.8°	35°18.6'	-48.9'	134.4°	34°36.4'	-49.4'	134.9°	33°53.9'	-49.9'	135.3°	33°11.1'	-50.4'	135.8°	32°27.9'	-50.8'	136.3°	31°44.4'	-51.3'	136.7°	7
8	35°12.0'	-48.6'	134.6°	34°29.7'	-49.1'	135.1°	33°47.0'	-49.6'	135.5°	33°04.0'	-50.1'	136.0°	32°20.7'	-50.6'	136.5°	31°37.1'	-51.0'	136.9°	30°53.1'	-51.4'	137.3°	8
9	34°23.4'	-48.8'	135.3°	33°40.6'	-49.4'	135.8°	32°57.4'	-49.8'	136.2°	32°13.9'	-50.3'	136.7°	31°30.2'	-50.8'	137.1°	30°46.1'	-51.2'	137.5°	30°01.7'	-51.6'	137.9°	9
10	33°34.5'	-49.1'	136.0°	32°51.2'	-49.6'	136.4°	32°07.6'	-50.0'	136.9°	31°23.6'	-50.5'	137.3°	30°39.4'	-50.9'	137.7°	29°54.9'	-51.3'	138.1°	29°10.1'	-51.8'	138.5°	10
11	32°45.5'	-49.3'	136.7°	32°01.7'	-49.8'	137.1°	31°17.5'	-50.2'	137.5°	30°33.1'	-50.7'	137.9°	29°48.5'	-51.1'	138.3°	29°03.5'	-51.5'	138.7°	28°18.3'	-51.9'	139.1°	11
12	31°56.2'	-49.5'	137.4°	31°11.9'	-50.0'	137.8°	30°27.3'	-50.4'	138.2°	29°42.5'	-50.8'	138.6°	28°57.4'	-51.3'	138.9°	28°12.0'	-51.6'	139.3°	27°26.4'	-52.0'	139.6°	12
13	31°06.7'	-49.7'	138.0°	30°21.9'	-50.2'	138.4°	29°36.9'	-50.6'	138.8°	28°51.6'	-51.0'	139.2°	28°06.1'	-51.4'	139.5°	27°20.4'	-51.8'	139.9°	26°34.4'	-52.2'	140.2°	13
14	30°16.9'	-49.9'	138.7°	29°31.8'	-50.3'	139.0°	28°46.3'	-50.8'	139.4°	28°00.6'	-51.2'	139.8°	27°14.7'	-51.5'	140.1°	26°28.6'	-51.9'	140.4°	25°42.2'	-52.3'	140.7°	14
15	29°27.0'	-50.1'	139.3°	28°41.4'	-50.5'	139.7°	27°55.6'	-50.9'	140.0°	27°09.5'	-51.3'	140.3°	26°23.2'	-51.7'	140.7°	25°36.7'	-52.0'	141.0°	24°50.0'	-52.4'	141.3°	15
16	28°37.0'	-50.3'	139.9°	27°50.9'	-50.7'	140.3°	27°04.7'	-51.1'	140.6°	26°18.2'	-51.4'	140.9°	25°31.5'	-51.8'	141.2°	24°44.6'	-52.2'	141.5°	23°57.6'	-52.5'	141.8°	16
17	27°46.7'	-50.4'	140.6°	27°00.3'	-50.8'	140.9°	26°13.6'	-51.2'	141.2°	25°26.7'	-51.6'	141.5°	24°39.7'	-51.9'	141.8°	23°52.5'	-52.3'	142.1°	23°05.0'	-52.6'	142.3°	17
18	26°56.3'	-50.6'	141.2°	26°09.4'	-51.0'	141.5°	25°22.4'	-51.3'	141.8°	24°35.2'	-51.7'	142.1°	23°47.8'	-52.0'	142.3°	23°00.2'	-52.4'	142.6°	22°12.4'	-52.7'	142.9°	18
19	26°05.7'	-50.7'	141.8°	25°18.5'	-51.1'	142.1°	24°31.1'	-51.5'	142.3°	23°43.5'	-51.8'	142.6°	22°55.7'	-52.2'	142.9°	22°07.8'	-52.5'	143.1°	21°19.7'	-52.8'	143.4°	19
20	25°15.0'	-50.9'	142.4°	24°27.4'	-51.2'	142.6°	23°39.6'	-51.6'	142.9°	22°51.7'	-51.9'	143.2°	22°03.6'	-52.3'	143.4°	21°15.3'	-52.6'	143.7°	20°26.9'	-52.9'	143.9°	20
21	24°24.1'	-51.0'	142.9°	23°36.2'	-51.3'	143.2°	22°48.0'	-51.7'	143.5°	21°59.7'	-52.0'	143.7°	21°11.3'	-52.4'	143.9°	20°22.7'	-52.7'	144.2°	19°34.0'	-53.0'	144.4°	21
22	23°33.1'	-51.1'	143.5°	22°44.8'	-51.5'	143.8°	21°56.3'	-51.8'	144.0°	21°07.7'	-52.1'	144.2°	20°19.0'	-52.4'	144.5°	19°30.1'	-52.8'	144.7°	18°41.0'	-53.1'	144.9°	22
23	22°42.0'	-51.2'	144.1°	21°53.3'	-51.6'	144.3°	21°04.5'	-51.9'	144.6°	20°15.6'	-52.2'	144.8°	19°26.5'	-52.5'	145.0°	18°37.3'	-52.8'	145.2°	17°48.0'	-53.1'	145.4°	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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	42°08.7'	-46.6'	129.3°	41°30.4'	-47.3'	130.0°	40°51.6'	-47.9'	130.7°	40°12.2'	-48.5'	131.3°	39°32.3'	-49.1'	131.9°	38°52.0'	-49.7'	132.6°	38°11.2'	-50.2'	133.1°	0
1	41°22.1'	-47.0'	130.2°	40°43.1'	-47.6'	130.8°	40°03.7'	-48.2'	131.5°	39°23.7'	-48.8'	132.1°	38°43.2'	-49.4'	132.7°	38°02.3'	-49.9'	133.3°	37°21.0'	-50.4'	133.8°	1
2	40°35.1'	-47.3'	131.0°	39°55.5'	-47.9'	131.6°	39°15.4'	-48.5'	132.2°	38°34.9'	-49.1'	132.8°	37°53.8'	-49.6'	133.4°	37°12.4'	-50.2'	134.0°	36°30.5'	-50.7'	134.5°	2
3	39°47.8'	-47.6'	131.8°	39°07.6'	-48.2'	132.4°	38°26.9'	-48.8'	133.0°	37°45.8'	-49.4'	133.6°	37°04.2'	-49.9'	134.1°	36°22.2'	-50.4'	134.7°	35°39.9'	-50.9'	135.2°	3
4	39°00.2'	-47.9'	132.6°	38°19.4'	-48.5'	133.2°	37°38.1'	-49.1'	133.7°	36°56.4'	-49.6'	134.3°	36°14.3'	-50.1'	134.8°	35°31.8'	-50.6'	135.3°	34°49.0'	-51.1'	135.8°	4
5	38°12.3'	-48.2'	133.4°	37°30.8'	-48.8'	133.9°	36°49.0'	-49.3'	134.5°	36°06.8'	-49.8'	135.0°	35°24.2'	-50.3'	135.5°	34°41.2'	-50.8'	136.0°	33°57.9'	-51.3'	136.5°	5
6	37°24.0'	-48.5'	134.1°	36°42.1'	-49.1'	134.6°	35°59.7'	-49.6'	135.2°	35°17.0'	-50.1'	135.7°	34°33.9'	-50.6'	136.2°	33°50.4'	-51.0'	136.6°	33°06.6'	-51.5'	137.1°	6
7	36°35.5'	-48.8'	134.8°	35°53.0'	-49.3'	135.4°	35°10.1'	-49.8'	135.9°	34°26.9'	-50.3'	136.3°	33°43.3'	-50.8'	136.8°	32°59.4'	-51.2'	137.3°	32°15.2'	-51.6'	137.7°	7
8	35°46.7'	-49.0'	135.6°	35°03.7'	-49.5'	136.1°	34°20.3'	-50.0'	136.5°	33°36.6'	-50.5'	137.0°	32°52.6'	-50.9'	137.4°	32°08.2'	-51.4'	137.9°	31°23.6'	-51.8'	138.3°	8
9	34°57.7'	-49.3'	136.3°	34°14.1'	-49.8'	136.7°	33°30.3'	-50.2'	137.2°	32°46.1'	-50.7'	137.6°	32°01.6'	-51.1'	138.1°	31°16.8'	-51.5'	138.5°	30°31.8'	-51.9'	138.9°	9
10	34°08.4'	-49.5'	137.0°	33°24.4'	-50.0'	137.4°	32°40.0'	-50.4'	137.9°	31°55.4'	-50.9'	138.3°	31°10.5'	-51.3'	138.7°	30°25.3'	-51.7'	139.1°	29°39.8'	-52.1'	139.5°	10
11	33°18.9'	-49.7'	137.6°	32°34.4'	-50.2'	138.1°	31°49.6'	-50.6'	138.5°	31°04.5'	-51.1'	138.9°	30°19.2'	-51.5'	139.3°	29°33.6'	-51.9'	139.7°	28°47.7'	-52.2'	140.0°	11
12	32°29.2'	-49.9'	138.3°	31°44.2'	-50.4'	138.7°	30°59.0'	-50.8'	139.1°	30°13.5'	-51.2'	139.5°	29°27.7'	-51.6'	139.9°	28°41.7'	-52.0'	140.2°	27°55.5'	-52.4'	140.6°	12
13	31°39.2'	-50.1'	139.0°	30°53.8'	-50.6'	139.4°	30°08.2'	-51.0'	139.7°	29°22.3'	-51.4'	140.1°	28°36.1'	-51.8'	140.5°	27°49.7'	-52.1'	140.8°	27°03.1'	-52.5'	141.1°	13
14	30°49.1'	-50.3'	139.6°	30°03.3'	-50.7'	140.0°	29°17.2'	-51.1'	140.3°	28°30.9'	-51.5'	140.7°	27°44.3'	-51.9'	141.0°	26°57.6'	-52.3'	141.4°	26°10.6'	-52.6'	141.7°	14
15	29°58.8'	-50.5'	140.2°	29°12.5'	-50.9'	140.6°	28°26.1'	-51.3'	140.9°	27°39.4'	-51.7'	141.3°	26°52.4'	-52.0'	141.6°	26°05.3'	-52.4'	141.9°	25°18.0'	-52.7'	142.2°	15
16	29°08.3'	-50.7'	140.9°	28°21.6'	-51.1'	141.2°	27°34.8'	-51.4'	141.5°	26°47.7'	-51.8'	141.9°	26°00.4'	-52.2'	142.2°	25°12.9'	-52.5'	142.5°	24°25.3'	-52.8'	142.7°	16
17	28°17.6'	-50.8'	141.5°	27°30.6'	-51.2'	141.8°	26°43.3'	-51.6'	142.1°	25°55.9'	-51.9'	142.4°	25°08.2'	-52.3'	142.7°	24°20.4'	-52.6'	143.0°	23°32.4'	-52.9'	143.3°	17
18	27°26.8'	-51.0'	142.1°	26°39.4'	-51.3'	142.4°	25°51.8'	-51.7'	142.7°	25°03.9'	-52.1'	143.0°	24°16.0'	-52.4'	143.2°	23°27.8'	-52.7'	143.5°	22°39.5'	-53.0'	143.8°	18
19	26°35.8'	-51.1'	142.7°	25°48.0'	-51.5'	143.0°	25°00.0'	-51.8'	143.2°	24°11.9'	-52.2'	143.5°	23°23.6'	-52.5'	143.8°	22°35.1'	-52.8'	144.0°	21°46.4'	-53.1'	144.3°	19
20	25°44.7'	-51.3'	143.2°	24°56.5'	-51.6'	143.5°	24°08.2'	-52.0'	143.8°	23°19.7'	-52.3'	144.1°	22°31.1'	-52.6'	144.3°	21°42.3'	-52.9'	144.5°	20°53.3'	-53.2'	144.8°	20
21	24°53.4'	-51.4'	143.8°	24°04.9'	-51.7'	144.1°	23°16.3'	-52.1'	144.3°	22°27.4'	-52.4'	144.6°	21°38.5'	-52.7'	144.8°	20°49.3'	-53.0'	145.0°	20°00.1'	-53.3'	145.3°	21

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

34° 326° LHA

Latitude CONTRARY to Declination

34° 326° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	42°46.4'	-47.1'	130.4°	42°07.3'	-47.7'	131.1°	41°27.6'	-48.3'	131.7°	40°47.4'	-48.9'	132.4°	40°06.7'	-49.5'	133.0°	39°25.6'	-50.1'	133.6°	38°43.9'	-50.6'	134.2°	0
1	41°59.3'	-47.4'	131.2°	41°19.6'	-48.1'	131.9°	40°39.3'	-48.7'	132.5°	39°58.5'	-49.2'	133.1°	39°17.2'	-49.8'	133.7°	38°35.5'	-50.3'	134.3°	37°53.4'	-50.8'	134.9°	1
2	41°11.9'	-47.8'	132.0°	40°31.5'	-48.4'	132.7°	39°50.6'	-49.0'	133.3°	39°09.2'	-49.5'	133.9°	38°27.4'	-50.0'	134.5°	37°45.2'	-50.5'	135.0°	37°02.5'	-51.0'	135.6°	2
3	40°24.2'	-48.1'	132.8°	39°43.1'	-48.7'	133.4°	39°01.7'	-49.2'	134.0°	38°19.7'	-49.8'	134.6°	37°37.4'	-50.3'	135.2°	36°54.6'	-50.8'	135.7°	36°11.5'	-51.2'	136.2°	3
4	39°36.1'	-48.4'	133.6°	38°54.5'	-49.0'	134.2°	38°12.4'	-49.5'	134.8°	37°30.0'	-50.0'	135.3°	36°47.1'	-50.5'	135.9°	36°03.9'	-51.0'	136.4°	35°20.3'	-51.4'	136.9°	4
5	38°47.7'	-48.7'	134.4°	38°05.5'	-49.2'	134.9°	37°22.9'	-49.8'	135.5°	36°39.9'	-50.3'	136.0°	35°56.6'	-50.7'	136.5°	35°12.9'	-51.2'	137.0°	34°28.8'	-51.6'	137.5°	5
6	37°59.0'	-49.0'	135.1°	37°16.3'	-49.5'	135.7°	36°33.2'	-50.0'	136.2°	35°49.7'	-50.5'	136.7°	35°05.9'	-50.9'	137.2°	34°21.7'	-51.4'	137.6°	33°37.2'	-51.8'	138.1°	6
7	37°10.0'	-49.2'	135.9°	36°26.8'	-49.7'	136.4°	35°43.2'	-50.2'	136.9°	34°59.2'	-50.7'	137.4°	34°14.9'	-51.1'	137.8°	33°30.3'	-51.6'	138.3°	32°45.4'	-52.0'	138.7°	7
8	36°20.8'	-49.5'	136.6°	35°37.1'	-50.0'	137.1°	34°53.0'	-50.4'	137.5°	34°08.5'	-50.9'	138.0°	33°23.8'	-51.3'	138.5°	32°38.7'	-51.7'	138.9°	31°53.4'	-52.1'	139.3°	8
9	35°31.3'	-49.7'	137.3°	34°47.1'	-50.2'	137.7°	34°02.5'	-50.6'	138.2°	33°17.6'	-51.1'	138.6°	32°32.5'	-51.5'	139.1°	31°47.0'	-51.9'	139.5°	31°01.2'	-52.3'	139.9°	9
10	34°41.6'	-49.9'	137.9°	33°56.9'	-50.4'	138.4°	33°11.9'	-50.8'	138.8°	32°26.6'	-51.3'	139.3°	31°41.0'	-51.7'	139.7°	30°55.1'	-52.1'	140.1°	30°09.0'	-52.4'	140.4°	10
11	33°51.7'	-50.2'	138.6°	33°06.5'	-50.6'	139.1°	32°21.1'	-51.0'	139.5°	31°35.3'	-51.4'	139.9°	30°49.3'	-51.8'	140.3°	30°03.0'	-52.2'	140.6°	29°16.5'	-52.6'	141.0°	11
12	33°01.5'	-50.4'	139.3°	32°15.9'	-50.8'	139.7°	31°30.0'	-51.2'	140.1°	30°43.9'	-51.6'	140.5°	29°57.5'	-52.0'	140.9°	29°10.8'	-52.4'	141.2°	28°23.9'	-52.7'	141.6°	12
13	32°11.2'	-50.5'	139.9°	31°25.1'	-51.0'	140.3°	30°38.8'	-51.4'	140.7°	29°52.3'	-51.8'	141.1°	29°05.5'	-52.1'	141.4°	28°18.5'	-52.5'	141.8°	27°31.2'	-52.8'	142.1°	13
14	31°20.6'	-50.7'	140.6°	30°34.2'	-51.1'	140.9°	29°47.5'	-51.5'	141.3°	29°00.5'	-51.9'	141.7°	28°13.4'	-52.3'	142.0°	27°26.0'	-52.6'	142.3°	26°38.4'	-52.9'	142.6°	14
15	30°29.9'	-50.9'	141.2°	29°43.0'	-51.3'	141.5°	28°55.9'	-51.7'	141.9°	28°08.6'	-52.0'	142.2°	27°21.1'	-52.4'	142.5°	26°33.4'	-52.7'	142.9°	25°45.4'	-53.1'	143.1°	15
16	29°39.0'	-51.1'	141.8°	28°51.7'	-51.5'	142.1°	28°04.3'	-51.8'	142.5°	27°16.6'	-52.2'	142.8°	26°28.7'	-52.5'	143.1°	25°40.6'	-52.8'	143.4°	24°52.4'	-53.2'	143.7°	16
17	28°47.9'	-51.2'	142.4°	28°00.3'	-51.6'	142.7°	27°12.5'	-52.0'	143.0°	26°24.4'	-52.3'	143.3°	25°36.2'	-52.6'	143.6°	24°47.8'	-53.0'	143.9°	23°59.2'	-53.3'	144.2°	17
18	27°56.7'	-51.4'	143.0°	27°08.7'	-51.7'	143.3°	26°20.5'	-52.1'	143.6°	25°32.1'	-52.4'	143.9°	24°43.6'	-52.7'	144.2°	23°54.8'	-53.1'	144.4°	23°06.0'	-53.4'	144.7°	18
19	27°05.3'	-51.5'	143.6°	26°17.0'	-51.9'	143.9°	25°28.4'	-52.2'	144.2°	24°39.7'	-52.5'	144.4°	23°50.8'	-52.8'	144.7°	23°01.8'	-53.2'	144.9°	22°12.6'	-53.4'	145.2°	19
20	26°13.8'	-51.7'	144.1°	25°25.1'	-52.0'	144.4°	24°36.2'	-52.3'	144.7°	23°47.2'	-52.6'	145.0°	22°58.0'	-52.9'	145.2°	22°08.6'	-53.2'	145.4°	21°19.2'	-53.5'	145.7°	20
21	25°22.2'	-51.8'	144.7°	24°33.1'	-52.1'	145.0°	23°43.9'	-52.4'	145.2°	22°54.5'	-52.7'	145.5°	22°05.0'	-53.0'	145.7°	21°15.4'	-53.3'	145.9°	20°25.6'	-53.6'	146.1°	21
22	24°30.4'	-51.9'	145.3°	23°41.0'	-52.2'	145.5°	22°51.5'	-52.5'	145.8°	22°01.8'	-52.8'	146.0°	21°12.0'	-53.1'	146.2°	20°22.1'	-53.4'	146.4°	19°32.0'	-53.7'	146.6°	22
23	23°38.5'	-52.0'	145.8°	22°48.8'	-52.3'	146.1°	21°58.9'	-52.6'	146.3°	21°09.0'	-52.9'	146.5°	20°18.9'	-53.2'	146.7°	19°28.7'	-53.5'	146.9°	18°38.3'	-53.8'	147.1°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

34° 326° LHA

Latitude CONTRARY to DECLINATION

34° 326° LHA

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

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

33° 327° LHA

Latitude CONTRARY to Declination

33° 327° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	43°23.5'	-47.5'	131.5°	42°43.6'	-48.2'	132.1°	42°03.1'	-48.8'	132.8°	41°22.0'	-49.4'	133.5°	40°40.5'	-49.9'	134.1°	39°58.5'	-50.5'	134.7°	39°16.1'	-51.0'	135.3°	0
1	42°36.0'	-47.9'	132.3°	41°55.4'	-48.5'	133.0°	41°14.3'	-49.1'	133.6°	40°32.7'	-49.7'	134.2°	39°50.6'	-50.2'	134.8°	39°08.1'	-50.7'	135.4°	38°25.1'	-51.2'	136.0°	1
2	41°48.1'	-48.2'	133.1°	41°06.9'	-48.8'	133.7°	40°25.2'	-49.4'	134.4°	39°43.0'	-49.9'	135.0°	39°00.4'	-50.4'	135.5°	38°17.4'	-50.9'	136.1°	37°33.9'	-51.4'	136.6°	2
3	40°59.9'	-48.6'	133.9°	40°18.1'	-49.1'	134.5°	39°35.8'	-49.7'	135.1°	38°53.1'	-50.2'	135.7°	38°10.0'	-50.7'	136.2°	37°26.4'	-51.2'	136.8°	36°42.5'	-51.6'	137.3°	3
4	40°11.4'	-48.9'	134.7°	39°29.0'	-49.4'	135.3°	38°46.1'	-49.9'	135.8°	38°02.9'	-50.4'	136.4°	37°19.3'	-50.9'	136.9°	36°35.3'	-51.4'	137.4°	35°50.9'	-51.8'	137.9°	4
5	39°22.5'	-49.1'	135.4°	38°39.6'	-49.7'	136.0°	37°56.2'	-50.2'	136.5°	37°12.5'	-50.7'	137.1°	36°28.4'	-51.1'	137.6°	35°43.9'	-51.6'	138.1°	34°59.1'	-52.0'	138.5°	5
6	38°33.4'	-49.4'	136.2°	37°49.9'	-49.9'	136.7°	37°06.0'	-50.4'	137.2°	36°21.8'	-50.9'	137.7°	35°37.2'	-51.3'	138.2°	34°52.3'	-51.8'	138.7°	34°07.1'	-52.2'	139.1°	6
7	37°44.0'	-49.7'	136.9°	36°60.0'	-50.2'	137.4°	36°15.6'	-50.6'	137.9°	35°30.9'	-51.1'	138.4°	34°45.9'	-51.5'	138.8°	34°00.6'	-51.9'	139.3°	33°15.0'	-52.3'	139.7°	7
8	36°54.3'	-49.9'	137.6°	36°09.8'	-50.4'	138.1°	35°25.0'	-50.8'	138.6°	34°39.9'	-51.3'	139.0°	33°54.4'	-51.7'	139.5°	33°08.7'	-52.1'	139.9°	32°22.6'	-52.5'	140.3°	8
9	36°04.4'	-50.1'	138.3°	35°19.4'	-50.6'	138.8°	34°34.2'	-51.0'	139.2°	33°48.6'	-51.5'	139.7°	33°02.7'	-51.9'	140.1°	32°16.5'	-52.3'	140.5°	31°30.1'	-52.6'	140.9°	9
10	35°14.2'	-50.4'	139.0°	34°28.8'	-50.8'	139.4°	33°43.1'	-51.2'	139.8°	32°57.1'	-51.6'	140.3°	32°10.8'	-52.0'	140.7°	31°24.3'	-52.4'	141.1°	30°37.5'	-52.8'	141.4°	10
11	34°23.9'	-50.6'	139.6°	33°38.0'	-51.0'	140.0°	32°51.9'	-51.4'	140.5°	32°05.5'	-51.8'	140.9°	31°18.8'	-52.2'	141.3°	30°31.9'	-52.6'	141.6°	29°44.7'	-52.9'	142.0°	11
12	33°33.3'	-50.8'	140.3°	32°47.0'	-51.2'	140.7°	32°00.5'	-51.6'	141.1°	31°13.6'	-52.0'	141.5°	30°26.6'	-52.3'	141.8°	29°39.3'	-52.7'	142.2°	28°51.8'	-53.0'	142.5°	12
13	32°42.5'	-51.0'	140.9°	31°55.8'	-51.4'	141.3°	31°08.9'	-51.8'	141.7°	30°21.7'	-52.1'	142.0°	29°34.2'	-52.5'	142.4°	28°46.6'	-52.8'	142.7°	27°58.7'	-53.2'	143.1°	13
14	31°51.5'	-51.1'	141.5°	31°04.4'	-51.5'	141.9°	30°17.1'	-51.9'	142.3°	29°29.5'	-52.3'	142.6°	28°41.8'	-52.6'	143.0°	27°53.8'	-53.0'	143.3°	27°05.6'	-53.3'	143.6°	14
15	31°00.4'	-51.3'	142.1°	30°12.9'	-51.7'	142.5°	29°25.2'	-52.1'	142.8°	28°37.3'	-52.4'	143.2°	27°49.1'	-52.7'	143.5°	27°00.8'	-53.1'	143.8°	26°12.3'	-53.4'	144.1°	15
16	30°09.1'	-51.5'	142.7°	29°21.2'	-51.8'	143.1°	28°33.1'	-52.2'	143.4°	27°44.9'	-52.5'	143.7°	26°56.4'	-52.9'	144.0°	26°07.7'	-53.2'	144.3°	25°18.9'	-53.5'	144.6°	16
17	29°17.6'	-51.6'	143.3°	28°29.4'	-52.0'	143.7°	27°41.0'	-52.3'	144.0°	26°52.3'	-52.7'	144.3°	26°03.5'	-53.0'	144.6°	25°14.6'	-53.3'	144.8°	24°25.4'	-53.6'	145.1°	17
18	28°26.0'	-51.8'	143.9°	27°37.4'	-52.1'	144.2°	26°48.6'	-52.5'	144.5°	25°59.7'	-52.8'	144.8°	25°10.6'	-53.1'	145.1°	24°21.3'	-53.4'	145.3°	23°31.8'	-53.7'	145.6°	18
19	27°34.2'	-51.9'	144.5°	26°45.3'	-52.2'	144.8°	25°56.2'	-52.6'	145.1°	25°06.9'	-52.9'	145.3°	24°17.5'	-53.2'	145.6°	23°27.9'	-53.5'	145.8°	22°38.2'	-53.8'	146.1°	19
20	26°42.3'	-52.0'	145.0°	25°53.0'	-52.4'	145.3°	25°03.6'	-52.7'	145.6°	24°14.0'	-53.0'	145.9°	23°24.3'	-53.3'	146.1°							

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

32° 328° LHA

Latitude CONTRARY to Declination

32° 328° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	44°00.1'	-48.0'	132.5°	43°19.3'	-48.6'	133.2°	42°37.9'	-49.2'	133.9°	41°56.0'	-49.8'	134.6°	41°13.7'	-50.3'	135.2°	40°30.9'	-50.9'	135.8°	39°47.6'	-51.3'	136.4°	0
1	43°12.0'	-48.4'	133.4°	42°30.6'	-49.0'	134.0°	41°48.7'	-49.5'	134.7°	41°06.2'	-50.1'	135.3°	40°23.3'	-50.6'	135.9°	39°40.0'	-51.1'	136.5°	38°56.3'	-51.6'	137.1°	1
2	42°23.7'	-48.7'	134.2°	41°41.6'	-49.3'	134.8°	40°59.1'	-49.8'	135.4°	40°16.1'	-50.3'	136.0°	39°32.7'	-50.8'	136.6°	38°48.9'	-51.3'	137.2°	38°04.7'	-51.8'	137.7°	2
3	41°35.0'	-49.0'	135.0°	40°52.4'	-49.6'	135.6°	40°09.3'	-50.1'	136.2°	39°25.8'	-50.6'	136.8°	38°41.9'	-51.1'	137.3°	37°57.6'	-51.5'	137.8°	37°12.9'	-52.0'	138.4°	3
4	40°46.0'	-49.3'	135.7°	40°02.8'	-49.8'	136.3°	39°19.2'	-50.4'	136.9°	38°35.2'	-50.8'	137.4°	37°50.8'	-51.3'	138.0°	37°06.1'	-51.7'	138.5°	36°21.0'	-52.2'	139.0°	4
5	39°56.7'	-49.6'	136.5°	39°13.0'	-50.1'	137.0°	38°28.8'	-50.6'	137.6°	37°44.4'	-51.1'	138.1°	36°59.5'	-51.5'	138.6°	36°14.3'	-51.9'	139.1°	35°28.8'	-52.4'	139.6°	5
6	39°07.1'	-49.9'	137.2°	38°22.9'	-50.4'	137.8°	37°38.3'	-50.8'	138.3°	36°53.3'	-51.3'	138.8°	36°08.0'	-51.7'	139.3°	35°22.4'	-52.1'	139.7°	34°36.4'	-52.5'	140.2°	6
7	38°17.2'	-50.1'	137.9°	37°32.5'	-50.6'	138.4°	36°47.4'	-51.0'	138.9°	36°02.0'	-51.5'	139.4°	35°16.3'	-51.9'	139.9°	34°30.2'	-52.3'	140.3°	33°43.9'	-52.7'	140.8°	7
8	37°27.1'	-50.4'	138.6°	36°41.9'	-50.8'	139.1°	35°56.4'	-51.3'	139.6°	35°10.5'	-51.7'	140.1°	34°24.4'	-52.1'	140.5°	33°37.9'	-52.5'	140.9°	32°51.2'	-52.8'	141.3°	8
9	36°36.8'	-50.6'	139.3°	35°51.1'	-51.0'	139.8°	35°05.1'	-51.4'	140.2°	34°18.9'	-51.9'	140.7°	33°32.3'	-52.2'	141.1°	32°45.5'	-52.6'	141.5°	31°58.4'	-53.0'	141.9°	9
10	35°46.2'	-50.8'	140.0°	35°00.1'	-51.2'	140.4°	34°13.7'	-51.6'	140.9°	33°27.0'	-52.0'	141.3°	32°40.1'	-52.4'	141.7°	31°52.8'	-52.8'	142.1°	31°05.4'	-53.1'	142.5°	10
11	34°55.4'	-51.0'	140.6°	34°08.8'	-51.4'	141.1°	33°22.0'	-51.8'	141.5°	32°35.0'	-52.2'	141.9°	31°47.6'	-52.6'	142.3°	31°00.1'	-52.9'	142.6°	30°12.3'	-53.3'	143.0°	11
12	34°04.4'	-51.2'	141.3°	33°17.4'	-51.6'	141.7°	32°30.2'	-52.0'	142.1°	31°42.8'	-52.4'	142.5°	30°55.1'	-52.7'	142.8°	30°07.2'	-53.0'	143.2°	29°19.0'	-53.4'	143.5°	12
13	33°13.2'	-51.4'	141.9°	32°25.8'	-51.8'	142.3°	31°38.3'	-52.1'	142.7°	30°50.4'	-52.5'	143.0°	30°02.4'	-52.8'	143.4°	29°14.1'	-53.2'	143.7°	28°25.6'	-53.5'	144.0°	13
14	32°21.8'	-51.6'	142.5°	31°34.1'	-51.9'	142.9°	30°46.1'	-52.3'	143.2°	29°57.9'	-52.6'	143.6°	29°09.5'	-53.0'	143.9°	28°20.9'	-53.3'	144.3°	27°32.2'	-53.6'	144.6°	14
15	31°30.2'	-51.7'	143.1°	30°42.1'	-52.1'	143.5°	29°53.8'	-52.4'	143.8°	29°05.3'	-52.8'	144.1°	28°16.6'	-53.1'	144.5°	27°27.6'	-53.4'	144.8°	26°38.5'	-53.7'	145.1°	15
16	30°38.5'	-51.9'	143.7°	29°50.1'	-52.2'	144.0°	29°01.4'	-52.6'	144.4°	28°12.5'	-52.9'	144.7°	27°23.5'	-53.2'	145.0°	26°34.2'	-53.5'	145.3°	25°44.8'	-53.8'	145.6°	16
17	29°46.6'	-52.0'	144.3°	28°57.8'	-52.4'	144.6°	28°08.8'	-52.7'	144.9°	27°19.6'	-53.0'	145.2°	26°30.3'	-53.3'	145.5°	25°40.7'	-53.6'	145.8°	24°51.0'	-53.9'	146.0°	17
18	28°54.6'	-52.2'	144.8°	28°05.4'	-52.5'	145.2°	27°16.1'	-52.8'	145.5°	26°26.6'	-53.1'	145.7°	25°36.9'	-53.4'	146.0°	24°47.1'	-53.7'	146.3°	23°57.1'	-54.0'	146.5°	18
19	28°02.4'	-52.3'	145.4°	27°12.9'	-52.6'	145.7°	26°23.3'	-52.9'	146.0°	25°33.5'	-53.2'	146.3°	24°43.5'	-53.5'	146.5°	23°53.4'	-53.8'	146.8°	23°03.1'	-54.1'	147.0°	19
20	27°10.1'	-52.4'	146.0°	26°20.3'	-52.7'	146.2°	25°30.4'	-53.0'	146.5°	24°40.2'	-53.3'	146.8°	23°50.0'	-53.6'	147.0°	22°59.6'	-53.9'	147.3°	22°09.0'	-54.2'	147.5°	20
21	26°17.7'	-52.6'	146.5°	25°27.6'	-52.9'	146.8°	24°37.3'	-53.2'	147.0°	23°46.9'	-53.4'	147.3°	22°56.6'	-53.7'	147.5°	22°05.7'	-54.0'	147.7°	21°14.9'	-54.2'	147.9°	21
22	25°25.1'	-52.7'	147.0°	24°34.7'	-53.0'	147.3°	23°44.2'	-53.3'	147.5°	22°53.5'	-53.5'	147.8°	22°02.6'	-53.8'	148.0°	21°11.7'	-54.1'	148.2°	20°20.7'	-54.3'	148.4°	22
23	24°32.5'	-52.8'	147.6°	23°41.7'	-53.1'	147.8°	22°50.9'	-53.3'	148.0°	21°59.9'	-53.6'	148.3°	21°08.9'	-53.9'	148.5°	20°17.7'	-54.1'	148.7°	19°26.4'	-54.4'	148.8°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	44°35.9'	-48.5'	133.7°	43°54.3'	-49.1'	134.4°	43°12.1'	-49.7'	135.0°	42°29.4'	-50.2'	135.7°	41°46.2'	-50.8'	136.3°	41°02.6'	-51.3'	136.9°	40°18.6'	-51.7'	137.5°	0
1	43°47.4'	-48.9'	134.5°	43°05.2'	-49.4'	135.2°	42°22.4'	-50.0'	135.8°	41°39.1'	-50.5'	136.4°	40°55.4'	-51.0'	137.0°	40°11.3'	-51.5'	137.6°	39°26.8'	-52.0'	138.2°	1
2	42°58.6'	-49.2'	135.3°	42°15.7'	-49.7'	135.9°	41°32.4'	-50.3'	136.6°	40°48.6'	-50.8'	137.2°	40°04.4'	-51.3'	137.7°	39°19.8'	-51.7'	138.3°	38°34.9'	-52.2'	138.8°	2
3	42°09.4'	-49.5'	136.1°	41°26.0'	-50.0'	136.7°	40°42.1'	-50.5'	137.3°	39°57.9'	-51.0'	137.9°	39°13.2'	-51.5'	138.4°	38°28.1'	-51.9'	138.9°	37°42.7'	-52.4'	139.4°	3
4	41°20.0'	-49.8'	136.8°	40°36.0'	-50.3'	137.4°	39°51.6'	-50.8'	138.0°	39°06.8'	-51.3'	138.5°	38°21.7'	-51.7'	139.1°	37°36.2'	-52.1'	139.6°	36°50.4'	-52.5'	140.1°	4
5	40°30.2'	-50.1'	137.6°	39°45.7'	-50.5'	138.1°	39°00.8'	-51.0'	138.7°	38°15.6'	-51.5'	139.2°	37°30.0'	-51.9'	139.7°	36°44.1'	-52.3'	140.2°	35°57.8'	-52.7'	140.7°	5
6	39°40.1'	-50.3'	138.3°	38°55.2'	-50.8'	138.8°	38°09.8'	-51.2'	139.3°	37°24.1'	-51.7'	139.9°	36°38.1'	-52.1'	140.3°	35°51.7'	-52.5'	140.8°	35°05.1'	-52.9'	141.2°	6
7	38°49.8'	-50.6'	139.0°	38°04.4'	-51.0'	139.5°	37°18.6'	-51.5'	140.0°	36°32.4'	-51.9'	140.5°	35°46.0'	-52.3'	140.9°	34°59.3'	-52.7'	141.4°	34°12.2'	-53.0'	141.8°	7
8	37°59.3'	-50.8'	139.7°	37°13.3'	-51.2'	140.2°	36°27.1'	-51.7'	140.6°	35°40.6'	-52.1'	141.1°	34°53.7'	-52.5'	141.6°	34°06.6'	-52.8'	142.0°	33°19.2'	-53.2'	142.4°	8
9	37°08.5'	-51.0'	140.3°	36°22.1'	-51.4'	140.8°	35°35.4'	-51.9'	141.3°	34°48.5'	-52.2'	141.7°	34°01.3'	-52.6'	142.1°	33°13.8'	-53.0'	142.5°	32°26.0'	-53.3'	142.9°	9
10	36°17.4'	-51.2'	141.0°	35°30.7'	-51.6'	141.5°	34°43.6'	-52.0'	141.9°	33°56.2'	-52.4'	142.3°	33°08.6'	-52.8'	142.7°	32°20.8'	-53.1'	143.1°	31°32.7'	-53.5'	143.5°	10
11	35°26.2'	-51.4'	141.6°	34°39.0'	-51.8'	142.1°	33°51.6'	-52.2'	142.5°	33°03.8'	-52.6'	142.9°	32°15.9'	-52.9'	143.3°	31°27.6'	-53.3'	143.7°	30°39.2'	-53.6'	144.0°	11
12	34°34.8'	-51.6'	142.3°	33°47.2'	-52.0'	142.7°	32°59.4'	-52.4'	143.1°	32°11.3'	-52.7'	143.5°	31°22.9'	-53.1'	143.8°	30°34.4'	-53.4'	144.2°	29°45.6'	-53.7'	144.5°	12
13	33°43.2'	-51.8'	142.9°	32°55.2'	-52.2'	143.3°	32°07.0'	-52.5'	143.7°	31°18.5'	-52.9'	144.0°	30°29.9'	-53.2'	144.4°	29°41.0'	-53.5'	144.7°	28°51.9'	-53.8'	145.0°	13
14	32°51.4'	-52.0'	143.5°	32°03.0'	-52.3'	143.9°	31°14.5'	-52.7'	144.2°	30°25.7'	-53.0'	144.6°	29°36.7'	-53.3'	144.9°	28°47.5'	-53.6'	145.2°	27°58.1'	-53.9'	145.5°	14
15	31°59.4'	-52.1'	144.1°	31°10.7'	-52.5'	144.4°	30°21.8'	-52.8'	144.8°	29°32.7'	-53.1'	145.1°	28°43.3'	-53.4'	145.4°	27°53.8'	-53.7'	145.7°	27°04.2'	-54.0'	146.0°	15
16	31°07.3'	-52.3'	144.7°	30°18.2'	-52.6'	145.0°	29°29.0'	-52.9'	145.3°	28°39.5'	-53.3'	145.7°	27°49.9'	-53.6'	146.0°	27°00.1'	-53.8'	146.2°	26°10.1'	-54.1'	146.5°	16
17	30°15.0'	-52.4'	145.2°	29°25.6'	-52.8'	145.6°	28°36.0'	-53.1'	145.9°	27°46.3'	-53.4'	146.2°	26°56.3'	-53.7'	146.5°	26°06.2'	-53.9'	146.7°	25°16.0'	-54.2'	147.0°	17
18	29°22.6'	-52.6'	145.8°	28°32.8'	-52.9'	146.1°	27°43.0'	-53.2'	146.4°	26°52.9'	-53.5'	146.7°	26°02.7'	-53.8'	147.0°	25°12.3'	-54.0'	147.2°	24°21.8'	-54.3'	147.5°	18
19	28°30.0'	-52.7'	146.3°	27°40.0'	-53.0'	146.6°	26°49.8'	-53.3'	146.9°	25°59.4'	-53.6'	147.2°	25°08.9'	-53.9'	147.5°	24°18.3'	-54.1'	147.7°	23°27.5'	-54.4'	147.9°	19
20	27°37.3'	-52.8'	146.9°	26°47.0'	-53.1'	147.2°	25°56.5'	-53.4'	147.4°	25°05.8'	-53.7'	147.7°	24°15.0'	-54.0'	147.9°	23°24.1'	-54.2'	148.2°	22°33.1'	-54.5'</		

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

30° 330° LHA

**Latitude CONTRARY to Declination**

30° 330° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	45°11.1'	-49.0'	134.8°	44°28.7'	-49.6'	135.5°	43°45.6'	-50.1'	136.2°	43°02.1'	-50.7'	136.8°	42°18.1'	-51.2'	137.5°	41°33.6'	-51.7'	138.1°	40°48.8'	-52.1'	138.7°	0
1	44°22.1'	-49.3'	135.6°	43°39.1'	-49.9'	136.3°	42°55.5'	-50.4'	136.9°	42°11.4'	-50.9'	137.6°	41°26.9'	-51.4'	138.2°	40°42.0'	-51.9'	138.7°	39°56.7'	-52.3'	139.3°	1
2	43°32.8'	-49.7'	136.4°	42°49.2'	-50.2'	137.1°	42°05.0'	-50.7'	137.7°	41°20.4'	-51.2'	138.3°	40°35.5'	-51.7'	138.8°	39°50.1'	-52.1'	139.4°	39°04.4'	-52.5'	139.9°	2
3	42°43.2'	-50.0'	137.2°	41°59.0'	-50.5'	137.8°	41°14.3'	-51.0'	138.4°	40°29.2'	-51.4'	139.0°	39°43.8'	-51.9'	139.5°	38°58.0'	-52.3'	140.0°	38°11.8'	-52.7'	140.6°	3
4	41°53.2'	-50.2'	137.9°	41°08.5'	-50.7'	138.5°	40°23.3'	-51.2'	139.1°	39°37.8'	-51.7'	139.6°	38°51.9'	-52.1'	140.2°	38°05.7'	-52.5'	140.7°	37°19.1'	-52.9'	141.2°	4
5	41°03.0'	-50.5'	138.7°	40°17.7'	-51.0'	139.2°	39°32.1'	-51.4'	139.8°	38°46.1'	-51.9'	140.3°	37°59.8'	-52.3'	140.8°	37°13.2'	-52.7'	141.3°	36°26.2'	-53.1'	141.7°	5
6	40°12.5'	-50.8'	139.4°	39°26.8'	-51.2'	139.9°	38°40.7'	-51.7'	140.4°	37°54.3'	-52.1'	140.9°	37°07.5'	-52.5'	141.4°	36°20.5'	-52.9'	141.9°	35°33.1'	-53.2'	142.3°	6
7	39°21.7'	-51.0'	140.1°	38°35.5'	-51.4'	140.6°	37°49.0'	-51.9'	141.1°	37°02.2'	-52.3'	141.6°	36°15.0'	-52.7'	142.0°	35°27.6'	-53.0'	142.5°	34°39.9'	-53.4'	142.9°	7
8	38°30.7'	-51.2'	140.7°	37°44.1'	-51.7'	141.2°	36°57.1'	-52.1'	141.7°	36°09.9'	-52.5'	142.2°	35°22.4'	-52.8'	142.6°	34°34.6'	-53.2'	143.0°	33°46.5'	-53.5'	143.4°	8
9	37°39.5'	-51.5'	141.4°	36°52.4'	-51.9'	141.9°	36°05.1'	-52.3'	142.3°	35°17.4'	-52.6'	142.8°	34°29.5'	-53.0'	143.2°	33°41.4'	-53.3'	143.6°	32°53.0'	-53.7'	144.0°	9
10	36°48.0'	-51.7'	142.1°	36°00.6'	-52.1'	142.5°	35°12.8'	-52.4'	142.9°	34°24.8'	-52.8'	143.4°	33°36.5'	-53.1'	143.8°	32°48.0'	-53.5'	144.1°	31°59.3'	-53.8'	144.5°	10
11	35°56.4'	-51.9'	142.7°	35°08.5'	-52.2'	143.1°	34°20.4'	-52.6'	143.5°	33°32.0'	-53.0'	143.9°	32°43.4'	-53.3'	144.3°	31°54.6'	-53.6'	144.7°	31°05.5'	-53.9'	145.0°	11
12	35°04.5'	-52.0'	143.3°	34°16.3'	-52.4'	143.7°	33°27.8'	-52.8'	144.1°	32°39.1'	-53.1'	144.5°	31°50.1'	-53.4'	144.9°	31°00.9'	-53.7'	145.2°	30°11.6'	-54.0'	145.5°	12
13	34°12.5'	-52.2'	143.9°	33°23.9'	-52.6'	144.3°	32°35.0'	-52.9'	144.7°	31°46.0'	-53.2'	145.0°	30°56.7'	-53.6'	145.4°	30°07.2'	-53.9'	145.7°	29°17.5'	-54.1'	146.0°	13
14	33°20.3'	-52.4'	144.5°	32°31.3'	-52.7'	144.9°	31°42.1'	-53.1'	145.2°	30°52.7'	-53.4'	145.6°	30°03.1'	-53.7'	145.9°	29°13.4'	-54.0'	146.2°	28°23.4'	-54.3'	146.5°	14
15	32°27.9'	-52.5'	145.1°	31°38.6'	-52.9'	145.4°	30°49.1'	-53.2'	145.8°	29°59.4'	-53.5'	146.1°	29°09.5'	-53.8'	146.4°	28°19.4'	-54.1'	146.7°	27°29.1'	-54.3'	147.0°	15
16	31°35.4'	-52.7'	145.7°	30°45.7'	-53.0'	146.0°	29°55.9'	-53.3'	146.3°	29°05.9'	-53.6'	146.6°	28°15.7'	-53.9'	146.9°	27°25.3'	-54.2'	147.2°	26°34.8'	-54.4'	147.5°	16
17	30°42.7'	-52.8'	146.2°	29°52.7'	-53.1'	146.5°	29°02.6'	-53.4'	146.8°	28°12.3'	-53.7'	147.1°	27°21.8'	-54.0'	147.4°	26°31.1'	-54.3'	147.7°	25°40.3'	-54.5'	148.0°	17
18	29°49.8'	-53.0'	146.8°	28°59.6'	-53.3'	147.1°	28°09.1'	-53.6'	147.4°	27°18.5'	-53.8'	147.6°	26°27.8'	-54.1'	147.9°	25°36.9'	-54.4'	148.2°	24°45.8'	-54.6'	148.4°	18
19	28°56.9'	-53.1'	147.3°	28°06.3'	-53.4'	147.6°	27°15.6'	-53.7'	147.9°	26°24.7'	-53.9'	148.1°	25°33.7'	-54.2'	148.4°	24°42.5'	-54.4'	148.6°	23°51.2'	-54.7'	148.9°	19
20	28°03.8'	-53.2'	147.8°	27°12.9'	-53.5'	148.1°	26°21.9'	-53.8'	148.4°	25°30.8'	-54.0'	148.6°	24°39.5'	-54.3'	148.9°	23°48.1'	-54.5'	149.1°	22°56.5'	-54.8'	149.3°	20
21	27°10.6'	-53.3'	148.4°	26°19.5'	-53.6'	148.6°	25°28.2'	-53.9'	148.9°	24°36.7'	-54.1'	149.1°	23°45.2'	-54.4'	149.3°	22°53.5'	-54.6'	149.6°	22°01.7'	-54.8'	149.8°	21
22	26°17.3'	-53.4'	148.9°	25°25.9'	-53.7'	149.1°	24°34.3'	-54.0'	149.4°	23°42.6'	-54.2'	149.6°	22°50.8'	-54.4'	149.8°	22°06.9'	-54.7'	150.0°	21°06.9'	-54.9'	150.2°	22
23	25°23.9'	-53.5'	149.4°	24°32.2'	-53.8'	149.6°	23°40.4'	-54.0'	149.8°	22°48.4'	-54.3'	150.0°	21°56.4'	-54.5'	150.3°	21°04.2'	-54.7'	150.4°	20°12.0'	-55.0'	150.6°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

30° 330° LHA

**Latitude CONTRARY to DECLINATION**

30° 330° LHA

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

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

29° 331° LHA

**Latitude CONTRARY to Declination**

29° 331° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	45°45.7'	-49.5'	136.0°	45°02.3'	-50.1'	136.7°	44°18.4'	-50.6'	137.4°	43°34.1'	-51.1'	138.0°	42°49.2'	-51.6'	138.6°	42°04.0'	-52.1'	139.2°	41°18.4'	-52.5'	139.8°	0
1	44°56.2'	-49.8'	136.8°	44°12.2'	-50.4'	137.5°	43°27.8'	-50.9'	138.1°	42°42.9'	-51.4'	138.7°	41°57.6'	-51.8'	139.3°	41°11.9'	-52.3'	139.9°	40°25.9'	-52.7'	140.4°	1
2	44°06.3'	-50.1'	137.6°	43°21.9'	-50.7'	138.2°	42°36.9'	-51.2'	138.8°	41°51.6'	-51.6'	139.4°	41°05.8'	-52.1'	140.0°	40°19.7'	-52.5'	140.5°	39°33.2'	-52.9'	141.1°	2
3	43°16.2'	-50.4'	138.3°	42°31.2'	-50.9'	138.9°	41°45.8'	-51.4'	139.5°	40°59.9'	-51.9'	140.1°	40°13.7'	-52.3'	140.6°	39°27.2'	-52.7'	141.2°	38°40.2'	-53.1'	141.7°	3
4	42°25.8'	-50.7'	139.1°	41°40.3'	-51.2'	139.7°	40°54.4'	-51.6'	140.2°	40°08.1'	-52.1'	140.8°	39°21.4'	-52.5'	141.3°	38°34.4'	-52.9'	141.8°	37°47.1'	-53.3'	142.3°	4
5	41°35.1'	-51.0'	139.8°	40°49.1'	-51.4'	140.3°	40°02.7'	-51.9'	140.9°	39°16.0'	-52.3'	141.4°	38°28.9'	-52.7'	141.9°	37°41.6'	-53.1'	142.4°	36°53.9'	-53.4'	142.8°	5
6	40°44.1'	-51.2'	140.5°	39°57.7'	-51.7'	141.0°	39°10.8'	-52.1'	141.5°	38°23.7'	-52.5'	142.0°	37°36.2'	-52.9'	142.5°	36°48.5'	-53.2'	143.0°	36°00.4'	-53.6'	143.4°	6
7	39°52.9'	-51.5'	141.2°	39°06.0'	-51.9'	141.7°	38°18.8'	-52.3'	142.2°	37°31.2'	-52.7'	142.6°	36°43.4'	-53.0'	143.1°	35°55.3'	-53.4'	143.5°	35°06.9'	-53.7'	144.0°	7
8	39°01.4'	-51.7'	141.8°	38°14.1'	-52.1'	142.3°	37°26.5'	-52.5'	142.8°	36°38.5'	-52.8'	143.2°	35°50.3'	-53.2'	143.7°	35°01.9'	-53.5'	144.1°	34°13.1'	-53.9'	144.5°	8
9	38°09.8'	-51.9'	142.5°	37°22.0'	-52.3'	143.0°	36°34.0'	-52.7'	143.4°	35°45.7'	-53.0'	143.8°	34°57.1'	-53.4'	144.3°	34°08.3'	-53.7'	144.7°	33°19.3'	-54.0'	145.0°	9
10	37°17.9'	-52.1'	143.1°	36°29.8'	-52.5'	143.6°	35°41.3'	-52.8'	144.0°	34°52.7'	-53.2'	144.4°	34°03.8'	-53.5'	144.8°	33°14.6'	-53.8'	145.2°	32°25.2'	-54.1'	145.6°	10
11	36°25.8'	-52.3'	143.7°	35°37.3'	-52.6'	144.2°	34°48.5'	-53.0'	144.6°	33°59.5'	-53.3'	145.0°	33°10.3'	-53.6'	145.4°	32°20.8'	-54.0'	145.7°	31°31.1'	-54.3'	146.1°	11
12	35°33.5'	-52.5'	144.3°	34°44.6'	-52.8'	144.8°	33°55.5'	-53.1'	145.1°	33°06.2'	-53.5'	145.5°	32°16.6'	-53.8'	145.9°	31°26.8'	-54.1'	146.2°	30°36.9'	-54.4'	146.6°	12
13	34°41.1'	-52.6'	144.9°	33°51.8'	-53.0'	145.3°	33°02.4'	-53.3'	145.7°	32°12.7'	-53.6'	146.1°	31°22.8'	-53.9'	146.4°	30°32.8'	-54.2'	146.7°	29°42.5'	-54.5'	147.1°	13
14	33°48.4'	-52.8'	145.5°	32°58.9'	-53.1'	145.9°	32°09.1'	-53.4'	146.2°	31°19.1'	-53.7'	146.6°	30°28.9'	-54.0'	146.9°	29°38.6'	-54.3'	147.2°	28°48.0'	-54.6'	147.5°	14
15	32°55.7'	-52.9'	146.1°	32°05.8'	-53.3'	146.4°	31°15.7'	-53.6'	146.8°	30°25.4'	-53.8'	147.1°	29°34.9'	-54.1'	147.4°	28°44.3'	-54.4'	147.7°	27°53.5'	-54.7'	148.0°	15
16	32°02.7'	-53.1'	146.6°	31°12.5'	-53.4'	147.0°	30°22.1'	-53.7'	147.3°	29°31.5'	-54.0'	147.6°	28°40.8'	-54.2'	147.9°	27°49.9'	-54.5'	148.2°	26°58.8'	-54.8'	148.5°	16
17	31°09.7'	-53.2'	147.2°	30°19.1'	-53.5'	147.5°	29°28.4'	-53.8'	147.8°	28°37.6'	-54.1'	148.1°	27°46.5'	-54.3'	148.4°	26°55.4'	-54.6'	148.7°	26°04.0'	-54.8'	148.9°	17
18	30°16.4'	-53.3'	147.7°	29°25.6'	-53.6'	148.0°	28°34.6'	-53.9'	148.3°	27°43.5'	-54.2'	148.6°	26°52.2'	-54.4'	148.9°	26°00.8'	-54.7'	149.1°	25°09.2'	-54.9'	149.4°	18
19	29°23.1'	-53.5'	148.3°	28°32.0'	-53.7'	148.5°	27°40.7'	-54.0'	148.8°	26°49.3'	-54.3'	149.1°	25°57.8'	-54.5'	149.3°	25°06.1'	-54.8'	149.6°	24°14.3'	-55.0'	149.8°	19
20	28°29.6'	-53.6'	148.8°	27°38.2'	-53.9'	149.1°	26°46.7'	-54.1'	149.3°	25°55.1'	-54.4'	149.6°	25°03.3'	-54.6'	149.8°	24°11.3'	-54.8'	150.0°	23°19			

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

28° 332° LHA

**Latitude CONTRARY to Declination**

28° 332° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	46°19.4'	-50.0'	137.2°	45°35.2'	-50.5'	137.9°	44°50.5'	-51.1'	138.5°	44°05.3'	-51.6'	139.2°	43°19.7'	-52.0'	139.8°	42°33.7'	-52.5'	140.4°	41°47.2'	-52.9'	141.0°	0
1	45°29.4'	-50.3'	138.0°	44°44.7'	-50.8'	138.6°	43°59.4'	-51.3'	139.3°	43°13.8'	-51.8'	139.9°	42°27.7'	-52.3'	140.5°	41°41.2'	-52.7'	141.1°	40°54.3'	-53.1'	141.6°	1
2	44°39.1'	-50.6'	138.7°	43°53.9'	-51.1'	139.4°	43°08.1'	-51.6'	140.0°	42°22.0'	-52.1'	140.6°	41°35.4'	-52.5'	141.1°	40°48.5'	-52.9'	141.7°	40°01.3'	-53.3'	142.2°	2
3	43°48.5'	-50.9'	139.5°	43°02.7'	-51.4'	140.1°	42°16.5'	-51.8'	140.7°	41°29.9'	-52.3'	141.2°	40°42.9'	-52.7'	141.8°	39°55.6'	-53.1'	142.3°	39°08.0'	-53.5'	142.8°	3
4	42°57.6'	-51.2'	140.2°	42°11.3'	-51.6'	140.8°	41°24.7'	-52.1'	141.4°	40°37.6'	-52.5'	141.9°	39°50.2'	-52.9'	142.4°	39°02.5'	-53.3'	142.9°	38°14.5'	-53.6'	143.4°	4
5	42°06.5'	-51.4'	140.9°	41°19.7'	-51.9'	141.5°	40°32.6'	-52.3'	142.0°	39°45.1'	-52.7'	142.5°	38°57.3'	-53.1'	143.0°	38°09.3'	-53.4'	143.5°	37°20.9'	-53.8'	144.0°	5
6	41°15.0'	-51.7'	141.6°	40°27.8'	-52.1'	142.1°	39°40.3'	-52.5'	142.7°	38°52.4'	-52.9'	143.2°	38°04.3'	-53.3'	143.6°	37°15.8'	-53.6'	144.1°	36°27.1'	-53.9'	144.5°	6
7	40°23.3'	-51.9'	142.3°	39°35.7'	-52.3'	142.8°	38°47.8'	-52.7'	143.3°	37°59.5'	-53.1'	143.8°	37°11.0'	-53.4'	144.2°	36°22.2'	-53.8'	144.6°	35°33.1'	-54.1'	145.1°	7
8	39°31.4'	-52.1'	142.9°	38°43.4'	-52.5'	143.4°	37°55.1'	-52.9'	143.9°	37°06.5'	-53.2'	144.3°	36°17.6'	-53.6'	144.8°	35°28.5'	-53.9'	145.2°	34°39.1'	-54.2'	145.6°	8
9	38°39.3'	-52.3'	143.6°	37°50.9'	-52.7'	144.0°	37°02.2'	-53.1'	144.5°	36°13.2'	-53.4'	144.9°	35°24.0'	-53.7'	145.3°	34°34.5'	-54.0'	145.7°	33°44.9'	-54.3'	146.1°	9
10	37°47.0'	-52.5'	144.2°	36°58.2'	-52.9'	144.6°	36°09.1'	-53.2'	145.1°	35°19.8'	-53.6'	145.5°	34°30.3'	-53.9'	145.9°	33°40.5'	-54.2'	146.3°	32°50.5'	-54.5'	146.6°	10
11	36°54.5'	-52.7'	144.8°	36°05.3'	-53.0'	145.2°	35°15.9'	-53.4'	145.6°	34°26.3'	-53.7'	146.0°	33°36.4'	-54.0'	146.4°	32°46.3'	-54.3'	146.8°	31°56.0'	-54.6'	147.1°	11
12	36°01.8'	-52.9'	145.4°	35°12.3'	-53.2'	145.8°	34°22.6'	-53.5'	146.2°	33°32.6'	-53.8'	146.6°	32°42.4'	-54.1'	146.9°	31°52.0'	-54.4'	147.3°	31°01.5'	-54.7'	147.6°	12
13	35°08.9'	-53.0'	146.0°	34°19.1'	-53.4'	146.4°	33°29.0'	-53.7'	146.7°	32°38.8'	-54.0'	147.1°	31°48.3'	-54.2'	147.4°	30°57.6'	-54.5'	147.8°	30°06.8'	-54.8'	148.1°	13
14	34°15.9'	-53.2'	146.6°	33°25.7'	-53.5'	146.9°	32°35.4'	-53.8'	147.3°	31°44.8'	-54.1'	147.6°	30°54.0'	-54.4'	147.9°	30°03.1'	-54.6'	148.2°	29°12.0'	-54.9'	148.5°	14
15	33°22.7'	-53.3'	147.1°	32°32.2'	-53.6'	147.5°	31°41.6'	-53.9'	147.8°	30°50.7'	-54.2'	148.1°	29°59.7'	-54.5'	148.4°	29°08.5'	-54.7'	148.7°	28°17.1'	-55.0'	149.0°	15
16	32°29.4'	-53.5'	147.7°	31°38.6'	-53.8'	148.0°	30°47.6'	-54.0'	148.3°	29°56.5'	-54.3'	148.6°	29°05.2'	-54.6'	148.9°	28°13.7'	-54.8'	149.2°	27°22.1'	-55.1'	149.5°	16
17	31°35.9'	-53.6'	148.2°	30°44.8'	-53.9'	148.5°	29°53.6'	-54.2'	148.8°	29°02.2'	-54.4'	149.1°	28°10.6'	-54.7'	149.4°	27°18.9'	-54.9'	149.6°	26°27.1'	-55.1'	149.9°	17
18	30°42.3'	-53.7'	148.7°	29°51.0'	-54.0'	149.0°	28°59.4'	-54.3'	149.3°	28°07.8'	-54.5'	149.6°	27°16.0'	-54.8'	149.8°	26°24.0'	-55.0'	150.1°	25°31.9'	-55.2'	150.3°	18
19	29°48.6'	-53.8'	149.2°	28°57.0'	-54.1'	149.5°	28°05.2'	-54.4'	149.8°	27°13.3'	-54.6'	150.1°	26°21.2'	-54.8'	150.3°	25°29.0'	-55.1'	150.5°	24°36.7'	-55.3'	150.8°	19
20	28°54.8'	-54.0'	149.7°	28°02.9'	-54.2'	150.0°	27°10.8'	-54.5'	150.3°	26°18.7'	-54.7'	150.5°	25°26.4'	-54.9'	150.8°	24°34.0'	-55.1'	151.0°	23°41.4'	-55.4'	151.2°	20
21	28°00.8'	-54.1'	150.2°	27°08.7'	-54.3'	150.5°	26°16.4'	-54.5'	150.7°	25°24.0'	-54.8'	151.0°	24°31.4'	-55.0'	151.2°	23°38.8'	-55.2'	151.4°	22°46.1'	-55.4'	151.6°	21
22	27°06.7'	-54.2'	150.7°	26°14.3'	-54.4'	151.0°	25°21.8'	-54.6'	151.2°	24°29.2'	-54.9'	151.4°	23°36.4'	-55.1'	151.6°	22°43.6'	-55.3'	151.8°	21°50.6'	-55.5'	152.0°	22
23	26°12.6'	-54.3'	151.2°	25°19.9'	-54.5'	151.4°	24°27.2'	-54.7'	151.7°	23°34.3'	-54.9'	151.9°	22°41.4'	-55.1'	152.1°	21°48.3'	-55.3'	152.3°	20°55.2'	-55.5'	152.4°	23

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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	46°52.5'	-50.5'	138.4°	46°07.4'	-51.0'	139.1°	45°21.9'	-51.5'	139.7°	44°35.9'	-52.0'	140.4°	43°49.4'	-52.5'	141.0°	43°02.6'	-52.9'	141.6°	42°15.4'	-53.3'	142.2°	0
1	46°02.0'	-50.8'	139.2°	45°16.4'	-51.3'	139.8°	44°30.3'	-51.8'	140.5°	43°43.8'	-52.3'	141.1°	42°57.0'	-52.7'	141.7°	42°09.7'	-53.1'	142.2°	41°22.1'	-53.5'	142.8°	1
2	45°11.2'	-51.1'	139.9°	44°25.1'	-51.6'	140.6°	43°38.5'	-52.0'	141.2°	42°51.6'	-52.5'	141.8°	42°04.3'	-52.9'	142.3°	41°16.6'	-53.3'	142.9°	40°28.6'	-53.7'	143.4°	2
3	44°20.1'	-51.4'	140.7°	43°33.5'	-51.8'	141.3°	42°46.5'	-52.3'	141.9°	41°59.1'	-52.7'	142.4°	41°11.4'	-53.1'	143.0°	40°23.3'	-53.5'	143.5°	39°35.0'	-53.8'	144.0°	3
4	43°28.7'	-51.6'	141.4°	42°41.6'	-52.1'	142.0°	41°54.2'	-52.5'	142.5°	41°06.4'	-52.9'	143.1°	40°18.3'	-53.3'	143.6°	39°29.9'	-53.6'	144.1°	38°41.1'	-54.0'	144.5°	4
5	42°37.1'	-51.9'	142.1°	41°49.5'	-52.3'	142.6°	41°01.7'	-52.7'	143.2°	40°13.5'	-53.1'	143.7°	39°25.0'	-53.5'	144.2°	38°36.2'	-53.8'	144.6°	37°47.2'	-54.1'	145.1°	5
6	41°45.2'	-52.1'	142.8°	40°57.2'	-52.5'	143.3°	40°09.0'	-52.9'	143.8°	39°20.4'	-53.3'	144.3°	38°31.5'	-53.6'	144.8°	37°42.4'	-54.0'	145.2°	36°53.0'	-54.3'	145.6°	6
7	40°53.0'	-52.3'	143.4°	40°04.7'	-52.7'	143.9°	39°16.1'	-53.1'	144.4°	38°27.1'	-53.5'	144.9°	37°37.9'	-53.8'	145.3°	36°48.4'	-54.1'	145.8°	35°58.7'	-54.4'	146.2°	7
8	40°00.7'	-52.6'	144.1°	39°12.0'	-52.9'	144.5°	38°22.9'	-53.3'	145.0°	37°33.7'	-53.6'	145.4°	36°44.1'	-53.9'	145.9°	35°54.3'	-54.3'	146.3°	35°04.3'	-54.6'	146.7°	8
9	39°08.1'	-52.8'	144.7°	38°19.0'	-53.1'	145.1°	37°29.7'	-53.5'	145.6°	36°40.0'	-53.8'	146.0°	35°50.2'	-54.1'	146.4°	35°00.1'	-54.4'	146.8°	34°09.7'	-54.7'	147.2°	9
10	38°15.4'	-52.9'	145.3°	37°25.9'	-53.3'	145.7°	36°36.2'	-53.6'	146.2°	35°46.3'	-53.9'	146.6°	34°56.1'	-54.2'	147.0°	34°05.7'	-54.5'	147.3°	33°15.1'	-54.8'	147.7°	10
11	37°22.4'	-53.1'	145.9°	36°32.6'	-53.4'	146.3°	35°42.6'	-53.8'	146.7°	34°52.3'	-54.1'	147.1°	34°01.9'	-54.4'	147.5°	33°11.2'	-54.6'	147.8°	32°20.3'	-54.9'	148.2°	11
12	36°29.3'	-53.3'	146.5°	35°39.2'	-53.6'	146.9°	34°48.8'	-53.9'	147.3°	33°58.3'	-54.2'	147.6°	33°07.5'	-54.5'	148.0°	32°16.5'	-54.7'	148.3°	31°25.4'	-55.0'	148.6°	12
13	35°36.1'	-53.4'	147.0°	34°45.6'	-53.7'	147.4°	33°54.9'	-54.0'	147.8°	33°04.1'	-54.3'	148.1°	32°13.0'	-54.6'	148.5°	31°21.8'	-54.8'	148.8°	30°30.4'	-55.1'	149.1°	13
14	34°42.6'	-53.6'	147.6°	33°51.9'	-53.9'	148.0°	33°00.9'	-54.2'	148.3°	32°09.8'	-54.4'	148.6°	31°18.4'	-54.7'	149.0°	30°26.9'	-55.0'	149.3°	29°35.3'	-55.2'	149.6°	14
15	33°49.0'	-53.7'	148.1°	32°58.0'	-54.0'	148.5°	32°06.7'	-54.3'	148.8°	31°15.3'	-54.5'	149.1°	30°23.7'	-54.8'	149.4°	29°32.0'	-55.0'	149.7°	28°40.1'	-55.3'	150.0°	15
16	32°55.3'	-53.9'	148.7°	32°04.0'	-54.1'	149.0°	31°12.5'	-54.4'	149.3°	30°20.8'	-54.7'	149.6°	29°28.9'	-54.9'	149.9°	28°36.9'	-55.1'	150.2°	27°44.8'	-55.4'	150.5°	16
17	32°01.5'	-54.0'	149.2°	31°09.8'	-54.2'	149.5°	30°18.1'	-54.5'	149.8°	29°26.1'	-54.8'	150.1°	28°34.0'	-55.0'	150.4°	27°41.8'	-55.2'	150.6°	26°49.5'	-55.4'	150.9°	17
18	31°07.5'	-54.1'	149.7°	30°15.6'	-54.4'	150.0°	29°23.6'	-54.6'	150.3°	28°31.4'	-54.8'	150.6°	27°39.0'	-55.1'	150.8°	26°46.6'	-55.3'	151.1°	25°54.0'	-55.5'	151.3°	18
19	30°13.4'	-54.2'	150.2°	29°21.2'	-54.5'	150.5°	28°28.9'	-54.7'	150.8°	27°36.5'	-54.9'	151.0°	26°44.0'	-55.2'	151.3°	25°51.3'	-55.4'	151.5°	24°58.5'	-55.6'	151.7°	19
20	29°19.2'	-54.3'	150.7°	28°26.8'	-54.8'	151.0°	27°34.2'	-54.8'	151.2°	26°41.6'	-55.0'	151.5°	25°48.8'	-55.2'	151.7°	24°55.9'	-55.4'	151.9°	24°02.9'	-55.6'	152.1°	20
21	28°24.8'	-54.4'	151.2°	27°32.2'	-54.7'	151.4°	26°39.4'	-54.9'	151.7°	25°46.6'	-55.1'	151.9°	24°53.6'	-55.3'	152.1°	24°00.5'	-55.5'	152.4°	23°07.3'	-55.7'	152.6°	21

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

26° 334° LHA

**Latitude CONTRARY to Declination**

26° 334° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	47°24.7'	-51.0'	139.6°	46°38.8'	-51.5'	140.3°	45°52.4'	-52.0'	141.0°	45°05.6'	-52.4'	141.6°	44°18.4'	-52.9'	142.2°	43°30.8'	-53.3'	142.8°	42°42.8'	-53.7'	143.4°	0
1	46°33.7'	-51.3'	140.4°	45°47.3'	-51.8'	141.1°	45°00.4'	-52.3'	141.7°	44°13.2'	-52.7'	142.3°	43°25.5'	-53.1'	142.9°	42°37.5'	-53.5'	143.4°	41°49.1'	-53.9'	144.0°	1
2	45°42.4'	-51.6'	141.1°	44°55.5'	-52.1'	141.8°	44°08.2'	-52.5'	142.4°	43°20.5'	-52.9'	143.0°	42°32.4'	-53.3'	143.5°	41°44.0'	-53.7'	144.1°	40°55.3'	-54.0'	144.6°	2
3	44°50.8'	-51.9'	141.9°	44°03.5'	-52.3'	142.5°	43°15.7'	-52.7'	143.0°	42°27.6'	-53.1'	143.6°	41°39.1'	-53.5'	144.1°	40°50.3'	-53.9'	144.6°	40°01.2'	-54.2'	145.1°	3
4	43°59.0'	-52.1'	142.6°	43°11.1'	-52.5'	143.1°	42°23.0'	-52.9'	143.7°	41°34.4'	-53.3'	144.2°	40°45.6'	-53.7'	144.7°	39°56.5'	-54.0'	145.2°	39°07.0'	-54.3'	145.7°	4
5	43°06.9'	-52.4'	143.3°	42°18.6'	-52.8'	143.8°	41°30.0'	-53.1'	144.3°	40°41.1'	-53.5'	144.8°	39°51.9'	-53.9'	145.3°	39°02.4'	-54.2'	145.8°	38°12.7'	-54.5'	146.2°	5
6	42°14.5'	-52.6'	143.9°	41°25.9'	-53.0'	144.4°	40°36.9'	-53.3'	144.9°	39°47.6'	-53.7'	145.4°	38°58.1'	-54.0'	145.9°	38°08.3'	-54.3'	146.3°	37°18.2'	-54.6'	146.8°	6
7	41°21.9'	-52.8'	144.6°	40°32.9'	-53.2'	145.1°	39°43.6'	-53.5'	145.5°	38°53.9'	-53.8'	146.0°	38°04.1'	-54.2'	146.4°	37°13.9'	-54.5'	146.9°	36°23.6'	-54.8'	147.3°	7
8	40°29.1'	-53.0'	145.2°	39°39.7'	-53.3'	145.7°	38°50.0'	-53.7'	146.1°	38°00.1'	-54.0'	146.6°	37°09.9'	-54.3'	147.0°	36°19.5'	-54.6'	147.4°	35°28.8'	-54.9'	147.8°	8
9	39°36.1'	-53.2'	145.8°	38°46.4'	-53.5'	146.3°	37°56.4'	-53.8'	146.7°	37°06.1'	-54.2'	147.1°	36°15.6'	-54.4'	147.5°	35°24.9'	-54.7'	147.9°	34°33.9'	-55.0'	148.3°	9
10	38°43.0'	-53.4'	146.4°	37°52.9'	-53.7'	146.8°	37°02.5'	-54.0'	147.3°	36°11.9'	-54.3'	147.7°	35°21.1'	-54.6'	148.0°	34°30.1'	-54.9'	148.4°	33°38.9'	-55.1'	148.8°	10
11	37°49.6'	-53.5'	147.0°	36°59.2'	-53.8'	147.4°	36°08.5'	-54.1'	147.8°	35°17.6'	-54.4'	148.2°	34°26.6'	-54.7'	148.5°	33°35.3'	-55.0'	148.9°	32°43.8'	-55.2'	149.2°	11
12	36°56.1'	-53.7'	147.6°	36°05.3'	-54.0'	148.0°	35°14.4'	-54.3'	148.3°	34°23.2'	-54.6'	148.7°	33°31.9'	-54.8'	149.0°	32°40.3'	-55.1'	149.4°	31°48.6'	-55.3'	149.7°	12
13	36°02.4'	-53.8'	148.1°	35°11.4'	-54.1'	148.5°	34°20.1'	-54.4'	148.9°	33°28.7'	-54.7'	149.2°	32°37.0'	-54.9'	149.5°	31°45.2'	-55.2'	149.8°	30°53.3'	-55.4'	150.2°	13
14	35°08.6'	-54.0'	148.7°	34°17.2'	-54.3'	149.0°	33°25.7'	-54.5'	149.4°	32°34.0'	-54.8'	149.7°	31°42.1'	-55.0'	150.0°	30°50.1'	-55.3'	150.3°	29°57.9'	-55.5'	150.6°	14
15	34°14.6'	-54.1'	149.2°	33°23.0'	-54.4'	149.5°	32°31.2'	-54.6'	149.9°	31°39.2'	-54.9'	150.2°	30°47.1'	-55.1'	150.5°	29°54.8'	-55.4'	150.8°	29°02.4'	-55.6'	151.0°	15
16	33°20.5'	-54.2'	149.7°	32°28.6'	-54.5'	150.0°	31°36.5'	-54.7'	150.3°	30°44.3'	-55.0'	150.6°	29°52.0'	-55.2'	150.9°	28°59.4'	-55.4'	151.2°	28°06.8'	-55.7'	151.5°	16
17	32°26.3'	-54.4'	150.2°	31°34.1'	-54.6'	150.5°	30°41.8'	-54.9'	150.8°	29°49.3'	-55.1'	151.1°	28°56.7'	-55.3'	151.4°	28°04.0'	-55.5'	151.6°	27°11.1'	-55.7'	151.9°	17
18	31°31.9'	-54.5'	150.7°	30°39.5'	-54.7'	151.0°	29°46.9'	-54.9'	151.3°	28°54.2'	-55.2'	151.6°	28°01.4'	-55.4'	151.8°	27°08.5'	-55.6'	152.1°	26°15.4'	-55.8'	152.3°	18
19	30°37.4'	-54.6'	151.2°	29°44.8'	-54.8'	151.5°	28°52.0'	-55.0'	151.8°	27°59.1'	-55.3'	152.0°	27°06.0'	-55.5'	152.3°	26°12.9'	-55.7'	152.5°	25°19.6'	-55.9'	152.7°	19
20	29°42.8'	-54.7'	151.7°	28°50.0'	-54.9'	152.0°	27°56.9'	-55.1'	152.2°	27°03.8'	-55.3'	152.4°	26°10.6'	-55.5'	152.7°	25°17.2'	-55.7'	152.9°	24°23.7'	-55.9'	153.1°	20
21	28°48.2'	-54.8'	152.2°	27°55.1'	-55.0'	152.4°	27°01.8'	-55.2'	152.6°	26°08.5'	-55.4'	152.9°	25°15.0'	-55.6'	153.1°	24°21.5'	-55.8'	153.3°	23°27.8'	-56.0'	153.5°	21
22	27°53.4'	-54.9'	152.6°	27°00.1'	-55.1'	152.9°	26°06.6'	-55.3'	153.1°	25°13.1'	-55.5'	153.3°	24°19.4'	-55.7'	153.5°	23°25.7'	-55.9'	153.7°	22°31.8'	-56.0'	153.9°	22
23	26°58.5'	-55.0'	153.1°	26°05.0'	-55.2'	153.3°	25°11.3'	-55.4'	153.5°	24°17.6'	-55.6'	153.7°	23°23.7'	-55.7'	153.9°	22°29.8'	-55.9'	154.1°	21°35.8'	-56.1'	154.3°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

26° 334° LHA

**Latitude CONTRARY to DECLINATION**

26° 334° LHA

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

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

25° 335° LHA

**Latitude CONTRARY to Declination**

25° 335° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	47°56.1'	-51.5'	140.9°	47°09.4'	-52.0'	141.6°	46°22.2'	-52.5'	142.2°	45°34.6'	-52.9'	142.9°	44°46.5'	-53.3'	143.5°	43°58.2'	-53.7'	144.0°	43°09.4'	-54.1'	144.6°	0
1	47°04.6'	-51.8'	141.6°	46°17.4'	-52.3'	142.3°	45°29.7'	-52.7'	142.9°	44°41.7'	-53.1'	143.5°	43°53.2'	-53.5'	144.1°	43°04.5'	-53.9'	144.7°	42°15.4'	-54.2'	145.2°	1
2	46°12.8'	-52.1'	142.4°	45°25.1'	-52.5'	143.0°	44°37.0'	-52.9'	143.6°	43°48.6'	-53.3'	144.2°	42°59.7'	-53.7'	144.7°	42°10.6'	-54.1'	145.3°	41°21.1'	-54.4'	145.8°	2
3	45°20.8'	-52.3'	143.1°	44°32.6'	-52.8'	143.7°	43°44.1'	-53.2'	144.3°	42°55.2'	-53.5'	144.8°	42°06.0'	-53.9'	145.3°	41°16.5'	-54.2'	145.8°	40°26.7'	-54.6'	146.3°	3
4	44°28.4'	-52.6'	143.8°	43°39.9'	-53.0'	144.4°	42°50.9'	-53.4'	144.9°	42°01.7'	-53.7'	145.4°	41°12.1'	-54.1'	145.9°	40°22.3'	-54.4'	146.4°	39°32.2'	-54.7'	146.9°	4
5	43°35.9'	-52.8'	144.5°	42°46.9'	-53.2'	145.0°	41°57.6'	-53.6'	145.5°	41°08.0'	-53.9'	146.0°	40°18.1'	-54.2'	146.5°	39°27.9'	-54.5'	147.0°	38°37.5'	-54.8'	147.4°	5
6	42°43.0'	-53.0'	145.1°	41°53.7'	-53.4'	145.6°	41°04.0'	-53.7'	146.1°	40°14.1'	-54.1'	146.6°	39°23.8'	-54.4'	147.1°	38°33.4'	-54.7'	147.5°	37°42.6'	-55.0'	147.9°	6
7	41°50.0'	-53.2'	145.7°	41°00.3'	-53.6'	146.2°	40°10.3'	-53.9'	146.7°	39°20.0'	-54.2'	147.2°	38°29.4'	-54.5'	147.6°	37°38.7'	-54.8'	148.0°	36°47.7'	-55.1'	148.4°	7
8	40°56.8'	-53.4'	146.4°	40°06.7'	-53.8'	146.8°	39°16.3'	-54.1'	147.3°	38°25.7'	-54.4'	147.7°	37°34.9'	-54.7'	148.1°	36°43.9'	-54.9'	148.5°	35°52.6'	-55.2'	148.9°	8
9	40°03.4'	-53.6'	147.0°	39°12.9'	-53.9'	147.4°	38°22.3'	-54.2'	147.8°	37°31.4'	-54.5'	148.2°	36°40.2'	-54.8'	148.6°	35°48.9'	-55.1'	149.0°	34°57.4'	-55.3'	149.4°	9
10	39°09.8'	-53.8'	147.5°	38°19.0'	-54.1'	148.0°	37°28.0'	-54.4'	148.4°	36°36.8'	-54.7'	148.8°	35°45.4'	-54.9'	149.1°	34°53.8'	-55.2'	149.5°	34°02.0'	-55.4'	149.9°	10
11	38°16.0'	-53.9'	148.1°	37°24.9'	-54.2'	148.5°	36°33.7'	-54.5'	148.9°	35°42.2'	-54.8'	149.3°	34°50.5'	-55.0'	149.6°	33°58.6'	-55.3'	150.0°	33°06.6'	-55.5'	150.3°	11
12	37°22.1'	-54.1'	148.7°	36°30.7'	-54.4'	149.0°	35°39.2'	-54.6'	149.4°	34°47.4'	-54.9'	149.8°	33°55.5'	-55.2'	150.1°	33°03.4'	-55.4'	150.4°	32°11.1'	-55.6'	150.8°	12
13	36°28.0'	-54.2'	149.2°	35°36.3'	-54.5'	149.6°	34°44.5'	-54.8'	149.9°	33°52.5'	-55.0'	150.3°	33°00.3'	-55.3'	150.6°	32°08.0'	-55.5'	150.9°	31°15.5'	-55.7'	151.2°	13
14	35°33.7'	-54.4'	149.7°	34°41.8'	-54.6'	150.1°	33°49.7'	-54.9'	150.4°	32°57.5'	-55.1'	150.7°	32°05.1'	-55.4'	151.1°	31°12.5'	-55.6'	151.4°	30°19.7'	-55.8'	151.6°	14
15	34°39.4'	-54.5'	150.2°	33°47.2'	-54.7'	150.6°	32°54.9'	-55.0'	150.9°	32°02.4'	-55.2'	151.2°	31°09.7'	-55.5'	151.5°	30°16.9'	-55.7'	151.8°	29°24.0'	-55.9'	152.1°	15
16	33°44.9'	-54.6'	150.8°	32°52.5'	-54.9'	151.1°	31°59.9'	-55.1'	151.4°	31°07.1'	-55.3'	151.7°	30°14.2'	-55.5'	152.0°	29°21.2'	-55.7'	152.2°	28°28.1'	-55.9'	152.5°	16
17	32°50.3'	-54.7'	151.2°	31°57.6'	-55.0'	151.6°	31°04.8'	-55.2'	151.8°	30°11.8'	-55.4'	152.1°	29°18.7'	-55.6'	152.4°	28°25.5'	-55.8'	152.6°	27°32.1'	-56.0'	152.9°	17
18	31°55.6'	-54.8'	151.7°	31°02.6'	-55.1'	152.0°	30°09.6'	-55.3'	152.3°	29°16.4'	-55.5'	152.6°	28°23.1'	-55.7'	152.8°	27°29.7'	-55.9'	153.1°	26°36.1'	-56.1'	153.3°	18
19	31°00.7'	-54.9'	152.2°	30°07.6'	-55.2'	152.5°	29°14.3'	-55.4'	152.7°	28°20.9'	-55.6'	153.0°	27°27.4'	-55.8'	153.2°	26°33.8'	-56.0'	153.5°	25°40.0'	-56.1'	153.7°	19
20	30°05.8'	-55.0'	152.7°	29°12.4'	-55.2'	152.9°	28°18.9'	-55.5'	153.2°	27°25.3'	-55.7'	153.4°	26°31.6'	-55.8'								



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

24° 336° LHA

Latitude CONTRARY to Declination

24° 336° LHA

Table with 10 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of latitude/longitude data.

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

Table with 10 columns (Dec, 35, 36, 37, 38, 39, 40, 41, Dec) and 24 rows of latitude/longitude data.

23° 337° LHA

Latitude CONTRARY to DECLINATION

23° 337° LHA

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

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

22° 338° LHA

Latitude CONTRARY to Declination

22° 338° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	49°25.2'	-53.0'	144.8°	48°36.0'	-53.5'	145.5°	47°46.3'	-53.8'	146.1°	46°56.4'	-54.2'	146.7°	46°06.0'	-54.5'	147.3°	45°15.4'	-54.9'	147.8°	44°24.4'	-55.2'	148.4°	0
1	48°32.1'	-53.3'	145.6°	47°42.5'	-53.7'	146.2°	46°52.5'	-54.1'	146.8°	46°02.2'	-54.4'	147.3°	45°11.5'	-54.7'	147.9°	44°20.5'	-55.0'	148.4°	43°29.3'	-55.3'	148.9°	1
2	47°38.9'	-53.5'	146.2°	46°48.8'	-53.9'	146.8°	45°58.5'	-54.3'	147.4°	45°07.8'	-54.6'	148.0°	44°16.8'	-54.9'	148.5°	43°25.5'	-55.2'	149.0°	42°33.9'	-55.5'	149.4°	2
3	46°45.4'	-53.8'	146.9°	45°54.9'	-54.1'	147.5°	45°04.2'	-54.4'	148.0°	44°13.2'	-54.8'	148.5°	43°21.9'	-55.1'	149.0°	42°30.3'	-55.3'	149.5°	41°38.5'	-55.6'	150.0°	3
4	45°51.6'	-54.0'	147.5°	45°00.8'	-54.3'	148.1°	44°09.8'	-54.6'	148.6°	43°18.4'	-54.9'	149.1°	42°26.8'	-55.2'	149.6°	41°34.9'	-55.5'	150.0°	40°42.8'	-55.7'	150.5°	4
5	44°57.7'	-54.2'	148.2°	44°06.5'	-54.5'	148.7°	43°15.1'	-54.8'	149.2°	42°23.5'	-55.1'	149.6°	41°31.6'	-55.3'	150.1°	40°39.5'	-55.6'	150.5°	39°47.1'	-55.8'	150.9°	5
6	44°03.5'	-54.3'	148.8°	43°12.1'	-54.7'	149.3°	42°20.4'	-54.9'	149.7°	41°28.4'	-55.2'	150.2°	40°36.2'	-55.5'	150.6°	39°43.9'	-55.7'	151.0°	38°51.3'	-56.0'	151.4°	6
7	43°09.1'	-54.5'	149.4°	42°17.4'	-54.8'	149.8°	41°25.4'	-55.1'	150.3°	40°33.2'	-55.4'	150.7°	39°40.8'	-55.6'	151.1°	38°48.1'	-55.8'	151.5°	37°55.3'	-56.1'	151.9°	7
8	42°14.6'	-54.7'	149.9°	41°22.6'	-55.0'	150.4°	40°30.3'	-55.2'	150.8°	39°37.8'	-55.5'	151.2°	38°45.2'	-55.7'	151.6°	37°52.3'	-55.9'	152.0°	36°59.2'	-56.2'	152.3°	8
9	41°19.9'	-54.8'	150.5°	40°27.6'	-55.1'	150.9°	39°35.1'	-55.4'	151.3°	38°42.4'	-55.6'	151.7°	37°49.4'	-55.8'	152.1°	36°56.3'	-56.0'	152.4°	36°03.1'	-56.3'	152.8°	9
10	40°25.1'	-55.0'	151.0°	39°32.5'	-55.2'	151.4°	38°39.7'	-55.5'	151.8°	37°46.8'	-55.7'	152.2°	36°53.6'	-55.9'	152.5°	36°00.3'	-56.1'	152.9°	35°06.8'	-56.3'	153.2°	10
11	39°30.1'	-55.1'	151.5°	38°37.3'	-55.4'	151.9°	37°44.3'	-55.6'	152.3°	36°51.0'	-55.8'	152.6°	35°57.7'	-56.0'	153.0°	35°04.1'	-56.2'	153.3°	34°10.5'	-56.4'	153.6°	11
12	38°35.0'	-55.2'	152.0°	37°41.9'	-55.5'	152.4°	36°48.7'	-55.7'	152.8°	35°55.2'	-55.9'	153.1°	35°01.6'	-56.1'	153.4°	34°07.9'	-56.3'	153.7°	33°14.0'	-56.5'	154.0°	12
13	37°39.8'	-55.4'	152.5°	36°46.4'	-55.6'	152.9°	35°52.9'	-55.8'	153.2°	34°59.3'	-56.0'	153.5°	34°05.5'	-56.2'	153.8°	33°11.6'	-56.4'	154.1°	32°17.5'	-56.6'	154.4°	13
14	36°44.4'	-55.5'	153.0°	35°50.8'	-55.7'	153.4°	34°57.1'	-55.9'	153.7°	34°03.3'	-56.1'	154.0°	33°09.3'	-56.3'	154.3°	32°15.2'	-56.5'	154.5°	31°21.0'	-56.7'	154.8°	14
15	35°48.9'	-55.6'	153.5°	34°55.1'	-55.8'	153.8°	34°01.2'	-56.0'	154.1°	33°07.2'	-56.2'	154.4°	32°13.0'	-56.4'	154.7°	31°18.7'	-56.5'	154.9°	30°24.3'	-56.7'	155.2°	15
16	34°53.3'	-55.7'	154.0°	33°59.3'	-55.9'	154.3°	33°05.2'	-56.1'	154.5°	32°11.0'	-56.3'	154.8°	31°16.6'	-56.4'	155.1°	30°22.2'	-56.6'	155.3°	29°27.6'	-56.8'	155.6°	16
17	33°57.6'	-55.8'	154.4°	33°03.4'	-56.0'	154.7°	32°09.1'	-56.2'	155.0°	31°14.7'	-56.3'	155.2°	30°20.2'	-56.5'	155.5°	29°25.5'	-56.7'	155.7°	28°30.8'	-56.8'	155.9°	17
18	33°01.8'	-55.9'	154.9°	32°07.5'	-56.1'	155.1°	31°13.0'	-56.2'	155.4°	30°18.4'	-56.4'	155.6°	29°23.7'	-56.6'	155.9°	28°28.9'	-56.7'	156.1°	27°34.0'	-56.9'	156.3°	18
19	32°06.0'	-56.0'	155.3°	31°11.4'	-56.1'	155.5°	30°16.7'	-56.3'	155.8°	29°22.0'	-56.5'	156.0°	28°27.1'	-56.6'	156.2°	27°32.1'	-56.8'	156.5°	26°37.1'	-56.9'	156.7°	19
20	31°10.0'	-56.0'	155.7°	30°15.2'	-56.2'	156.0°	29°20.4'	-56.4'	156.2°	28°25.5'	-56.6'	156.4°	27°30.4'	-56.7'	156.6°	26°35.3'	-56.9'	156.8°	25°40.1'	-57.0'	157.0°	20
21	30°13.9'	-56.1'	156.1°	29°19.0'	-56.3'	156.4°	28°24.0'	-56.5'	156.6°	27°28.9'	-56.6'	156.8°	26°33.7'	-56.8'	157.0°	25°38.5'	-56.9'	157.2°	24°43.1'	-57.0'	157.4°	21
22	29°17.8'	-56.2'	156.5°	28°22.7'	-56.4'	156.7°	27°27.6'	-56.5'	157.0°	26°32.3'	-56.7'	157.2°	25°37.0'	-56.8'	157.3°	24°41.6'	-57.0'	157.5°	23°46.1'	-57.1'	157.7°	22
23	28°21.6'	-56.3'	156.9°	27°26.4'	-56.4'	157.1°	26°31.0'	-56.6'	157.3°	25°35.6'	-56.7'	157.5°	24°40.2'	-56.9'	157.7°	23°44.6'	-57.0'	157.9°	22°49.0'	-57.1'	158.0°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

22° 338° LHA

Latitude CONTRARY to DECLINATION

22° 338° LHA

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

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

21° 339° LHA

Latitude CONTRARY to Declination

21° 339° LHA

Dec°	35			36			37			38			39			40			41			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'	-53.5'	146.2°	49°03.0'	-53.9'	146.9°	48°12.6'	-54.3'	147.5°	47°21.8'	-54.6'	148.1°	46°30.8'	-55.0'	148.6°	45°39.4'	-55.3'	149.2°	44°47.7'	-55.5'	149.7°	0
1	48°59.5'	-53.8'	146.9°	48°09.1'	-54.1'	147.5°	47°18.3'	-54.5'	148.1°	46°27.2'	-54.8'	148.7°	45°35.8'	-55.1'	149.2°	44°44.1'	-55.4'	149.7°	43°52.2'	-55.7'	150.2°	1
2	48°05.7'	-54.0'	147.6°	47°14.9'	-54.4'	148.2°	46°23.8'	-54.7'	148.7°	45°32.4'	-55.0'	149.2°	44°40.7'	-55.3'	149.8°	43°48.7'	-55.6'	150.2°	42°56.5'	-55.8'	150.7°	2
3	47°11.7'	-54.2'	148.2°	46°20.6'	-54.5'	148.8°	45°29.1'	-54.9'	149.3°	44°37.4'	-55.2'	149.8°	43°45.4'	-55.4'	150.3°	42°53.2'	-55.7'	150.8°	42°00.7'	-55.9'	151.2°	3
4	46°17.5'	-54.4'	148.8°	45°26.0'	-54.7'	149.4°	44°34.3'	-55.0'	149.9°	43°42.2'	-55.3'	150.4°	42°50.0'	-55.6'	150.8°	41°57.5'	-55.8'	151.3°	41°04.8'	-56.1'	151.7°	4
5	45°23.1'	-54.6'	149.4°	44°31.3'	-54.9'	150.0°	43°39.2'	-55.2'	150.4°	42°46.9'	-55.5'	150.9°	41°54.4'	-55.7'	151.3°	41°01.6'	-55.9'	151.8°	40°08.7'	-56.2'	152.2°	5
6	44°28.5'	-54.8'	150.0°	43°36.4'	-55.1'	150.5°	42°44.1'	-55.3'	151.0°	41°51.5'	-55.6'	151.4°	40°58.7'	-55.8'	151.8°	40°05.7'	-56.1'	152.2°	39°12.5'	-56.3'	152.6°	6
7	43°33.7'	-54.9'	150.6°	42°41.3'	-55.2'	151.1°	41°48.7'	-55.5'	151.5°	40°55.9'	-55.7'	151.9°	40°02.9'	-55.9'	152.3°	39°09.6'	-56.2'	152.7°	38°16.2'	-56.4'	153.1°	7
8	42°38.8'	-55.1'	151.2°	41°46.1'	-55.4'	151.6°	40°53.3'	-55.6'	152.0°	40°00.2'	-55.8'	152.4°	39°06.9'	-56.1'	152.8°	38°13.5'	-56.3'	153.1°	37°19.9'	-56.5'	153.5°	8
9	41°43.7'	-55.2'	151.7°	40°50.8'	-55.5'	152.1°	39°57.7'	-55.7'	152.5°	39°04.4'	-55.9'	152.9°	38°10.9'	-56.2'	153.2°	37°17.2'	-56.4'	153.6°	36°23.4'	-56.6'	153.9°	9
10	40°48.5'	-55.4'	152.2°	39°55.3'	-55.6'	152.6°	39°01.9'	-55.8'	153.0°	38°08.4'	-56.1'	153.3°	37°14.7'	-56.3'	153.7°	36°20.8'	-56.5'	154.0°	35°26.8'	-56.6'	154.3°	10
11	39°53.1'	-55.5'	152.7°	38°59.7'	-55.7'	153.1°	38°06.1'	-55.9'	153.4°	37°12.4'	-56.2'	153.8°	36°18.4'	-56.3'	154.1°	35°24.4'	-56.5'	154.4°	34°30.2'	-56.7'	154.7°	11
12	38°57.6'	-55.6'	153.2°	38°04.0'	-55.8'	153.6°	37°10.2'	-56.0'	153.9°	36°16.2'	-56.2'	154.2°	35°22.1'	-56.4'	154.5°	34°27.9'	-56.6'	154.8°	33°33.5'	-56.8'	155.1°	12
13	38°02.0'	-55.7'	153.7°	37°08.1'	-55.9'	154.0°	36°14.1'	-56.1'	154.3°	35°20.0'	-56.3'	154.7°	34°25.7'	-56.5'	155.0°	33°31.2'	-56.7'	155.2°	32°36.7'	-56.9'	155.5°	13
14	37°06.3'	-55.8'	154.2°	36°12.2'	-56.0'	154.5°	35°18.0'	-56.2'	154.8°	34°23.6'	-56.4'	155.1°	33°29.1'	-56.6'	155.4°	32°34.6'	-56.8'	155.6°	31°39.8'	-56.9'	155.9°	14
15	36°10.4'	-55.9'	154.6°	35°16.1'	-56.1'	154.9°	34°21.7'	-56.3'	155.2°	33°27.2'	-56.5'	155.5°	32°32.6'	-56.7'	155.8°	31°37.8'	-56.8'	156.0°	30°42.9'	-57.0'	156.3°	15
16	35°14.5'	-56.0'	155.1°	34°20.0'	-56.2'	155.3°	33°25.4'	-56.4'	155.6°	32°30.7'	-56.6'	155.9°	31°35.9'	-56.7'	156.1°	30°41.0'	-56.9'	156.4°	29°45.9'	-57.0'	156.6°	16
17	34°18.4'	-56.1'	155.5°	33°23.8'	-56.3'	155.8°	32°29.0'	-56.5'	156.0°	31°34.1'	-56.6'	156.3°	30°39.2'	-56.8'	156.5°	29°44.1'	-57.0'	156.8°	28°48.9'	-57.1'	157.0°	17
18	33°22.3'	-56.2'	155.9°	32°27.5'	-56.4'	156.2°	31°32.5'	-56.6'	156.4°	30°37.5'	-56.7'	156.7°	29°42.4'	-56.9'	156.9°	28°47.1'	-57.0'	157.1°	27°51.8'	-57.1'	157.3°	18
19	32°26.1'	-56.3'	156.3°	31°31.1'	-56.5'	156.6°	30°36.0'	-56.6'	156.8°	29°40.8'	-56.8'	157.0°	28°45.5'	-56.9'	157.3°	27°50.1'	-57.1'	157.5°	26°54.7'	-57.2'	157.7°	19
20	31°29.8'	-56.4'	156.7°	30°34.6'	-56.5'	157.0°	29°39.4'	-56.7'	157.2°	28°44.0'	-56.8'	157.4°	27°48.6'	-57.0'	157.6°							

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

20° 340° LHA

Latitude CONTRARY to Declination

20° 340° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	50°19.8'	-54.0'	147.6°	49°29.1'	-54.4'	148.2°	48°37.9'	-54.7'	148.8°	47°46.4'	-55.1'	149.4°	46°54.6'	-55.4'	150.0°	46°02.5'	-55.6'	150.5°	45°10.2'	-55.9'	151.0°	0
1	49°25.8'	-54.3'	148.3°	48°34.7'	-54.6'	148.9°	47°43.1'	-54.9'	149.4°	46°51.3'	-55.2'	150.0°	45°59.2'	-55.5'	150.5°	45°06.9'	-55.8'	151.0°	44°14.3'	-56.0'	151.5°	1
2	48°31.6'	-54.5'	148.9°	47°40.1'	-54.8'	149.5°	46°48.2'	-55.1'	150.0°	45°56.1'	-55.4'	150.6°	45°03.7'	-55.7'	151.1°	44°11.1'	-55.9'	151.5°	43°18.2'	-56.2'	152.0°	2
3	47°37.1'	-54.7'	149.6°	46°45.3'	-55.0'	150.1°	45°53.1'	-55.3'	150.6°	45°00.7'	-55.5'	151.1°	44°08.1'	-55.8'	151.6°	43°15.2'	-56.0'	152.0°	42°22.1'	-56.3'	152.5°	3
4	46°42.5'	-54.9'	150.2°	45°50.3'	-55.1'	150.7°	44°57.8'	-55.4'	151.2°	44°05.2'	-55.7'	151.6°	43°12.3'	-55.9'	152.1°	42°19.1'	-56.2'	152.5°	41°25.8'	-56.4'	152.9°	4
5	45°47.6'	-55.0'	150.7°	44°55.1'	-55.3'	151.2°	44°02.4'	-55.6'	151.7°	43°09.5'	-55.8'	152.2°	42°16.3'	-56.1'	152.6°	41°23.0'	-56.3'	153.0°	40°29.4'	-56.5'	153.4°	5
6	44°52.6'	-55.2'	151.3°	43°59.8'	-55.5'	151.8°	43°06.8'	-55.7'	152.2°	42°13.7'	-55.9'	152.7°	41°20.3'	-56.2'	153.1°	40°26.7'	-56.4'	153.5°	39°32.9'	-56.6'	153.8°	6
7	43°57.4'	-55.3'	151.9°	43°04.4'	-55.6'	152.3°	42°11.1'	-55.8'	152.7°	41°17.7'	-56.1'	153.1°	40°24.1'	-56.3'	153.5°	39°30.3'	-56.5'	153.9°	38°36.3'	-56.7'	154.3°	7
8	43°02.0'	-55.5'	152.4°	42°08.8'	-55.7'	152.8°	41°15.3'	-56.0'	153.2°	40°21.6'	-56.2'	153.6°	39°27.8'	-56.4'	154.0°	38°33.8'	-56.6'	154.3°	37°39.7'	-56.8'	154.7°	8
9	42°06.6'	-55.6'	152.9°	41°13.0'	-55.9'	153.3°	40°19.3'	-56.1'	153.7°	39°25.5'	-56.3'	154.1°	38°31.4'	-56.5'	154.4°	37°37.2'	-56.7'	154.8°	36°42.9'	-56.8'	155.1°	9
10	41°10.9'	-55.8'	153.4°	40°17.2'	-56.0'	153.8°	39°23.3'	-56.2'	154.2°	38°29.2'	-56.4'	154.5°	37°35.0'	-56.6'	154.8°	36°40.6'	-56.7'	155.2°	35°46.0'	-56.9'	155.5°	10
11	40°15.2'	-55.9'	153.9°	39°21.2'	-56.1'	154.3°	38°27.1'	-56.3'	154.6°	37°32.8'	-56.5'	154.9°	36°38.4'	-56.7'	155.3°	35°43.8'	-56.8'	155.6°	34°49.1'	-57.0'	155.9°	11
12	39°19.3'	-56.0'	154.4°	38°25.1'	-56.2'	154.7°	37°30.8'	-56.4'	155.1°	36°36.3'	-56.6'	155.4°	35°41.7'	-56.7'	155.7°	34°47.0'	-56.9'	156.0°	33°52.1'	-57.1'	156.2°	12
13	38°23.3'	-56.1'	154.8°	37°29.0'	-56.3'	155.2°	36°34.4'	-56.5'	155.5°	35°39.8'	-56.6'	155.8°	34°45.0'	-56.8'	156.1°	33°50.1'	-57.0'	156.3°	32°55.1'	-57.1'	156.6°	13
14	37°27.2'	-56.2'	155.3°	36°32.7'	-56.4'	155.6°	35°38.0'	-56.6'	155.9°	34°43.1'	-56.7'	156.2°	33°48.2'	-56.9'	156.5°	32°53.1'	-57.0'	156.7°	31°58.0'	-57.2'	157.0°	14
15	36°31.1'	-56.3'	155.7°	35°36.3'	-56.5'	156.0°	34°41.4'	-56.6'	156.3°	33°46.4'	-56.8'	156.6°	32°51.3'	-57.0'	156.8°	31°56.1'	-57.1'	157.1°	31°00.8'	-57.2'	157.3°	15
16	35°34.8'	-56.4'	156.2°	34°39.8'	-56.5'	156.4°	33°44.8'	-56.7'	156.7°	32°49.6'	-56.9'	157.0°	31°54.3'	-57.0'	157.2°	30°59.0'	-57.2'	157.5°	30°03.5'	-57.3'	157.7°	16
17	34°38.4'	-56.5'	156.6°	33°43.3'	-56.6'	156.8°	32°48.1'	-56.8'	157.1°	31°52.8'	-56.9'	157.3°	30°57.3'	-57.1'	157.6°	30°01.8'	-57.2'	157.8°	29°06.2'	-57.3'	158.0°	17
18	33°41.9'	-56.5'	157.0°	32°46.7'	-56.7'	157.2°	31°51.3'	-56.8'	157.5°	30°55.8'	-57.0'	157.7°	30°00.3'	-57.1'	157.9°	29°04.6'	-57.3'	158.1°	28°08.9'	-57.4'	158.4°	18
19	32°45.4'	-56.6'	157.4°	31°50.0'	-56.8'	157.6°	30°54.4'	-56.9'	157.9°	29°58.8'	-57.1'	158.1°	29°03.1'	-57.2'	158.3°	28°07.3'	-57.3'	158.5°	27°11.5'	-57.4'	158.7°	19
20	31°48.8'	-56.7'	157.8°	30°53.2'	-56.8'	158.0°	29°57.5'	-57.0'	158.2°	29°01.8'	-57.1'	158.4°	28°05.9'	-57.2'	158.6°	27°10.0'	-57.4'	158.8°	26°14.0'	-57.5'	159.0°	20
21	30°52.1'	-56.7'	158.2°	29°56.4'	-56.9'	158.4°	29°00.6'	-57.0'	158.6°	28°04.7'	-57.2'	158.8°	27°08.9'	-57.3'	159.0°	26°12.7'	-57.4'	159.2°	25°16.6'	-57.5'	159.3°	21
22	29°55.4'	-56.8'	158.5°	28°59.5'	-56.9'	158.7°	28°03.5'	-57.1'	158.9°	27°07.5'	-57.2'	159.1°	26°11.4'	-57.3'	159.3°	25°15.3'	-57.4'	159.5°	24°19.0'	-57.6'	159.6°	22
23	28°58.6'	-56.9'	158.9°	28°02.6'	-57.0'	159.1°	27°06.5'	-57.1'	159.3°	26°10.3'	-57.3'	159.5°	25°14.1'	-57.4'	159.6°	24°17.8'	-57.5'	159.8°	23°21.5'	-57.6'	159.9°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	50°45.7'	-54.5'	149.0°	49°54.1'	-54.9'	149.6°	49°02.2'	-55.2'	150.2°	48°10.0'	-55.5'	150.8°	47°17.4'	-55.7'	151.3°	46°24.7'	-56.0'	151.8°	45°31.7'	-56.3'	152.3°	0
1	49°51.1'	-54.7'	149.7°	48°59.2'	-55.0'	150.3°	48°07.0'	-55.3'	150.8°	47°14.5'	-55.6'	151.3°	46°21.7'	-55.9'	151.9°	45°28.7'	-56.1'	152.3°	44°35.4'	-56.4'	152.8°	1
2	48°56.4'	-54.9'	150.3°	48°04.2'	-55.2'	150.9°	47°11.7'	-55.5'	151.4°	46°18.9'	-55.8'	151.9°	45°25.8'	-56.0'	152.4°	44°32.5'	-56.3'	152.8°	43°39.0'	-56.5'	153.3°	2
3	48°01.5'	-55.1'	150.9°	47°09.0'	-55.4'	151.4°	46°16.1'	-55.7'	151.9°	45°23.1'	-55.9'	152.4°	44°29.8'	-56.2'	152.9°	43°36.3'	-56.4'	153.3°	42°42.6'	-56.6'	153.7°	3
4	47°06.4'	-55.3'	151.5°	46°13.6'	-55.6'	152.0°	45°20.5'	-55.8'	152.5°	44°27.1'	-56.1'	152.9°	43°33.6'	-56.3'	153.4°	42°39.9'	-56.5'	153.8°	41°46.0'	-56.7'	154.2°	4
5	46°11.1'	-55.4'	152.1°	45°18.0'	-55.7'	152.5°	44°24.7'	-56.0'	153.0°	43°31.1'	-56.2'	153.4°	42°37.3'	-56.4'	153.8°	41°43.4'	-56.6'	154.2°	40°49.3'	-56.8'	154.6°	5
6	45°15.7'	-55.6'	152.6°	44°22.3'	-55.8'	153.1°	43°28.7'	-56.1'	153.5°	42°34.9'	-56.3'	153.9°	41°40.9'	-56.5'	154.3°	40°46.8'	-56.7'	154.7°	39°52.5'	-56.9'	155.0°	6
7	44°20.1'	-55.7'	153.1°	43°26.5'	-56.0'	153.6°	42°32.6'	-56.2'	154.0°	41°38.6'	-56.4'	154.4°	40°44.4'	-56.6'	154.8°	39°50.1'	-56.8'	155.1°	38°55.6'	-57.0'	155.5°	7
8	43°24.3'	-55.9'	153.7°	42°30.5'	-56.1'	154.1°	41°36.4'	-56.3'	154.5°	40°42.2'	-56.5'	154.8°	39°47.8'	-56.7'	155.2°	38°53.3'	-56.9'	155.5°	37°58.6'	-57.0'	155.9°	8
9	42°28.5'	-56.0'	154.2°	41°34.4'	-56.2'	154.5°	40°40.1'	-56.4'	154.9°	39°45.7'	-56.6'	155.3°	38°51.1'	-56.8'	155.6°	37°56.4'	-57.0'	155.9°	37°01.6'	-57.1'	156.2°	9
10	41°32.5'	-56.1'	154.6°	40°38.2'	-56.3'	155.0°	39°43.7'	-56.5'	155.4°	38°49.1'	-56.7'	155.7°	37°54.3'	-56.9'	156.0°	36°59.4'	-57.0'	156.3°	36°04.4'	-57.2'	156.6°	10
11	40°36.3'	-56.2'	155.1°	39°41.8'	-56.4'	155.5°	38°47.2'	-56.6'	155.8°	37°52.4'	-56.8'	156.1°	36°57.5'	-57.0'	156.4°	36°02.4'	-57.1'	156.7°	35°07.2'	-57.3'	157.0°	11
12	39°40.1'	-56.3'	155.6°	38°45.4'	-56.5'	155.9°	37°50.6'	-56.7'	156.2°	36°55.6'	-56.9'	156.5°	36°00.5'	-57.0'	156.8°	35°05.3'	-57.2'	157.1°	34°10.0'	-57.3'	157.4°	12
13	38°43.8'	-56.4'	156.0°	37°48.9'	-56.6'	156.3°	36°53.9'	-56.8'	156.6°	35°58.7'	-56.9'	156.9°	35°03.5'	-57.1'	157.2°	34°08.1'	-57.2'	157.5°	33°12.7'	-57.4'	157.7°	13
14	37°47.3'	-56.5'	156.4°	36°52.3'	-56.7'	156.7°	35°57.1'	-56.9'	157.0°	35°01.8'	-57.0'	157.3°	34°06.4'	-57.2'	157.6°	33°10.9'	-57.3'	157.8°	32°15.3'	-57.4'	158.1°	14
15	36°50.8'	-56.6'	156.9°	35°55.6'	-56.8'	157.1°	35°00.2'	-56.9'	157.4°	34°04.8'	-57.1'	157.7°	33°09.2'	-57.2'	157.9°	32°13.6'	-57.4'	158.2°	31°17.8'	-57.5'	158.4°	15
16	35°54.2'	-56.7'	157.3°	34°58.8'	-56.9'	157.5°	34°03.3'	-57.0'	157.8°	33°07.7'	-57.1'	158.1°	32°12.0'	-57.3'	158.3°	31°16.2'	-57.4'	158.5°	30°20.3'	-57.5'	158.7°	16
17	34°57.5'	-56.8'	157.7°	34°02.0'	-56.9'	157.9°	33°06.3'	-57.1'	158.2°	32°10.6'	-57.2'	158.4°	31°14.7'	-57.3'	158.6°	30°18.8'	-57.5'	158.9°	29°22.8'	-57.6'	159.1°	17
18	34°00.7'	-56.8'	158.1°	33°05.0'	-57.0'	158.3°	32°09.2'	-57.1'	158.5°	31°13.3'	-57.3'	158.8°	30°17.4'	-57.4'	159.0°	29°21.3'	-57.5'	159.2°	28°25.2'	-57.6'	159.4°	18
19	33°03.9'	-56.9'	158.4°	32°08.0'	-57.1'	158.7°	31°12.1'	-57.2'	158.9°	30°16.1'	-57.3'	159.1°	29°20.0'	-57.4'	159.3°	28°23.8'	-57.6'	159.5°	27°27.6'	-57.7'	159.7°	19
20	32°07.0'	-57.0'	158.8°	31°11.0'	-57.1'	159.0°	30°14.9'	-57.2'	159.3°	29°18.8'	-57.4'	159.5°	28°22.5'	-57.5'	159.7°	27°26.3'	-57.6'	159.8°	26°29.9'	-57.7'</		

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

18° 342° LHA

**Latitude CONTRARY to Declination**

18° 342° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	51°10.4'	-55.0'	150.5°	50°18.1'	-55.3'	151.1°	49°25.5'	-55.6'	151.6°	48°32.5'	-55.9'	152.2°	47°39.3'	-56.1'	152.7°	46°45.9'	-56.4'	153.2°	45°52.2'	-56.6'	153.7°	0
1	50°15.4'	-55.2'	151.1°	49°22.8'	-55.5'	151.7°	48°29.9'	-55.8'	152.2°	47°36.7'	-56.0'	152.7°	46°43.2'	-56.3'	153.2°	45°49.5'	-56.5'	153.7°	44°55.7'	-56.7'	154.1°	1
2	49°20.2'	-55.4'	151.7°	48°27.3'	-55.7'	152.2°	47°34.1'	-55.9'	152.8°	46°40.6'	-56.2'	153.2°	45°46.9'	-56.4'	153.7°	44°53.0'	-56.6'	154.2°	43°58.9'	-56.8'	154.6°	2
3	48°24.9'	-55.5'	152.3°	47°31.7'	-55.8'	152.8°	46°38.2'	-56.1'	153.3°	45°44.5'	-56.3'	153.8°	44°50.6'	-56.5'	154.2°	43°56.4'	-56.7'	154.6°	43°02.1'	-56.9'	155.0°	3
4	47°29.4'	-55.7'	152.9°	46°35.9'	-56.0'	153.3°	45°42.1'	-56.2'	153.8°	44°48.2'	-56.4'	154.2°	43°54.0'	-56.6'	154.7°	42°59.7'	-56.8'	155.1°	42°05.2'	-57.0'	155.5°	4
5	46°33.7'	-55.9'	153.4°	45°39.9'	-56.1'	153.9°	44°45.9'	-56.3'	154.3°	43°51.8'	-56.5'	154.7°	42°57.4'	-56.7'	155.1°	42°02.9'	-56.9'	155.5°	41°08.2'	-57.1'	155.9°	5
6	45°37.8'	-56.0'	153.9°	44°43.8'	-56.2'	154.4°	43°49.6'	-56.4'	154.8°	42°55.2'	-56.6'	155.2°	42°00.7'	-56.8'	155.6°	41°06.0'	-57.0'	155.9°	40°11.1'	-57.2'	156.3°	6
7	44°41.8'	-56.1'	154.4°	43°47.6'	-56.3'	154.9°	42°53.2'	-56.5'	155.3°	41°58.6'	-56.7'	155.6°	41°03.9'	-56.9'	156.0°	40°09.0'	-57.1'	156.3°	39°13.9'	-57.3'	156.7°	7
8	43°45.7'	-56.3'	154.9°	42°51.2'	-56.5'	155.3°	41°56.6'	-56.7'	155.7°	41°01.9'	-56.8'	156.1°	40°06.9'	-57.0'	156.4°	39°11.9'	-57.2'	156.7°	38°16.7'	-57.3'	157.1°	8
9	42°49.4'	-56.4'	155.4°	41°54.8'	-56.6'	155.8°	40°60.0'	-56.7'	156.1°	40°05.0'	-56.9'	156.5°	39°09.9'	-57.1'	156.8°	38°14.7'	-57.2'	157.1°	37°19.4'	-57.4'	157.4°	9
10	41°53.0'	-56.5'	155.9°	40°58.2'	-56.7'	156.2°	40°03.2'	-56.8'	156.6°	39°08.1'	-57.0'	156.9°	38°12.8'	-57.2'	157.2°	37°17.5'	-57.3'	157.5°	36°22.0'	-57.5'	157.8°	10
11	40°56.6'	-56.6'	156.3°	40°01.5'	-56.8'	156.7°	39°06.4'	-56.9'	157.0°	38°11.1'	-57.1'	157.3°	37°15.7'	-57.2'	157.6°	36°20.1'	-57.4'	157.9°	35°24.5'	-57.5'	158.2°	11
12	39°60.0'	-56.7'	156.8°	39°04.8'	-56.8'	157.1°	38°09.4'	-57.0'	157.4°	37°14.0'	-57.2'	157.7°	36°18.4'	-57.3'	158.0°	35°22.8'	-57.4'	158.2°	34°27.0'	-57.6'	158.5°	12
13	39°03.3'	-56.8'	157.2°	38°07.9'	-56.9'	157.5°	37°12.4'	-57.1'	157.8°	36°16.8'	-57.2'	158.1°	35°21.1'	-57.4'	158.3°	34°25.3'	-57.5'	158.6°	33°29.4'	-57.6'	158.8°	13
14	38°06.5'	-56.9'	157.6°	37°11.0'	-57.0'	157.9°	36°15.4'	-57.2'	158.2°	35°19.6'	-57.3'	158.4°	34°23.8'	-57.4'	158.7°	33°27.8'	-57.6'	158.9°	32°31.8'	-57.7'	159.2°	14
15	37°09.7'	-56.9'	158.0°	36°14.0'	-57.1'	158.3°	35°18.2'	-57.2'	158.5°	34°22.3'	-57.4'	158.8°	33°26.3'	-57.5'	159.0°	32°30.3'	-57.6'	159.3°	31°34.1'	-57.7'	159.5°	15
16	36°12.7'	-57.0'	158.4°	35°16.9'	-57.2'	158.7°	34°21.0'	-57.3'	158.9°	33°24.9'	-57.4'	159.2°	32°28.8'	-57.5'	159.4°	31°32.6'	-57.7'	159.6°	30°36.4'	-57.8'	159.8°	16
17	35°15.7'	-57.1'	158.8°	34°19.8'	-57.2'	159.0°	33°23.7'	-57.3'	159.3°	32°27.5'	-57.5'	159.5°	31°31.3'	-57.6'	159.7°	30°35.0'	-57.7'	159.9°	29°38.6'	-57.8'	160.1°	17
18	34°18.7'	-57.1'	159.2°	33°22.5'	-57.3'	159.4°	32°26.3'	-57.4'	159.6°	31°30.1'	-57.5'	159.8°	30°33.7'	-57.6'	160.0°	29°37.3'	-57.8'	160.2°	28°40.8'	-57.9'	160.4°	18
19	33°21.5'	-57.2'	159.5°	32°25.3'	-57.3'	159.7°	31°28.9'	-57.5'	160.0°	30°32.5'	-57.6'	160.2°	29°36.1'	-57.7'	160.4°	28°39.5'	-57.8'	160.6°	27°42.9'	-57.9'	160.7°	19
20	32°24.3'	-57.3'	159.9°	31°27.9'	-57.4'	160.1°	30°31.5'	-57.5'	160.3°	29°35.0'	-57.6'	160.5°	28°38.4'	-57.7'	160.7°	27°41.7'	-57.8'	160.9°	26°45.0'	-57.9'	161.0°	20
21	31°27.0'	-57.3'	160.2°	30°30.5'	-57.4'	160.4°	29°34.0'	-57.6'	160.6°	28°37.3'	-57.7'	160.8°	27°40.6'	-57.8'	161.0°	26°43.9'	-57.9'	161.2°	25°47.1'	-58.0'	161.3°	21
22	30°29.7'	-57.4'	160.6°	29°33.1'	-57.5'	160.8°	28°36.4'	-57.6'	161.0°	27°39.7'	-57.7'	161.1°	26°42.9'	-57.8'	161.3°	25°46.0'	-57.9'	161.4°	24°49.1'	-58.0'	161.6°	22
23	29°32.3'	-57.4'	160.9°	28°35.6'	-57.5'	161.1°	27°38.8'	-57.6'	161.3°	26°42.0'	-57.7'	161.4°	25°45.1'	-57.8'	161.6°	24°48.1'	-57.9'	161.7°	23°51.1'	-58.0'	161.9°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	51°34.1'	-55.5'	151.9°	50°41.1'	-55.7'	152.5°	49°47.7'	-56.0'	153.1°	48°54.1'	-56.3'	153.6°	48°00.2'	-56.5'	154.1°	47°06.1'	-56.7'	154.6°	46°11.9'	-56.9'	155.0°	0
1	50°38.6'	-55.6'	152.5°	49°45.3'	-55.9'	153.1°	48°51.7'	-56.2'	153.6°	47°57.8'	-56.4'	154.1°	47°03.7'	-56.6'	154.6°	46°09.4'	-56.8'	155.0°	45°14.9'	-57.0'	155.5°	1
2	49°43.0'	-55.8'	153.1°	48°49.4'	-56.1'	153.7°	47°55.5'	-56.3'	154.1°	47°01.4'	-56.5'	154.6°	46°07.1'	-56.7'	155.1°	45°12.6'	-56.9'	155.5°	44°17.9'	-57.1'	155.9°	2
3	48°47.2'	-56.0'	153.7°	47°53.3'	-56.2'	154.2°	46°59.2'	-56.4'	154.7°	46°04.9'	-56.7'	155.1°	45°10.4'	-56.9'	155.5°	44°15.7'	-57.0'	155.9°	43°20.8'	-57.2'	156.3°	3
4	47°51.3'	-56.1'	154.2°	46°57.1'	-56.3'	154.7°	46°02.8'	-56.6'	155.2°	45°08.2'	-56.8'	155.6°	44°13.5'	-57.0'	156.0°	43°18.6'	-57.1'	156.4°	42°23.6'	-57.3'	156.7°	4
5	46°55.1'	-56.3'	154.8°	46°00.8'	-56.5'	155.2°	45°06.2'	-56.7'	155.6°	44°11.5'	-56.9'	156.0°	43°16.6'	-57.1'	156.4°	42°21.5'	-57.2'	156.8°	41°26.3'	-57.4'	157.1°	5
6	45°58.9'	-56.4'	155.3°	45°04.3'	-56.6'	155.7°	44°09.5'	-56.8'	156.1°	43°14.6'	-57.0'	156.5°	42°19.5'	-57.1'	156.8°	41°24.3'	-57.3'	157.2°	40°28.9'	-57.5'	157.5°	6
7	45°02.5'	-56.5'	155.8°	44°07.7'	-56.7'	156.2°	43°12.7'	-56.9'	156.5°	42°17.6'	-57.1'	156.9°	41°22.4'	-57.2'	157.3°	40°27.0'	-57.4'	157.6°	39°31.4'	-57.5'	157.9°	7
8	44°06.0'	-56.6'	156.2°	43°11.0'	-56.8'	156.6°	42°15.9'	-57.0'	157.0°	41°20.6'	-57.1'	157.3°	40°25.1'	-57.3'	157.6°	39°29.6'	-57.5'	158.0°	38°33.9'	-57.6'	158.3°	8
9	43°09.4'	-56.7'	156.7°	42°14.2'	-56.9'	157.0°	41°18.9'	-57.1'	157.4°	40°23.4'	-57.2'	157.7°	39°27.8'	-57.4'	158.0°	38°32.1'	-57.5'	158.3°	37°36.3'	-57.7'	158.6°	9
10	42°12.6'	-56.8'	157.1°	41°17.3'	-57.0'	157.5°	40°21.8'	-57.2'	157.8°	39°26.2'	-57.3'	158.1°	38°30.5'	-57.4'	158.4°	37°34.6'	-57.6'	158.7°	36°38.7'	-57.7'	159.0°	10
11	41°15.8'	-56.9'	157.6°	40°20.3'	-57.1'	157.9°	39°24.6'	-57.2'	158.2°	38°28.9'	-57.4'	158.5°	37°33.0'	-57.5'	158.8°	36°37.0'	-57.6'	159.0°	35°40.9'	-57.8'	159.3°	11
12	40°18.9'	-57.0'	158.0°	39°23.2'	-57.2'	158.3°	38°27.4'	-57.3'	158.6°	37°31.5'	-57.4'	158.9°	36°35.5'	-57.6'	159.1°	35°39.4'	-57.7'	159.4°	34°43.2'	-57.8'	159.6°	12
13	39°21.9'	-57.1'	158.4°	38°26.0'	-57.2'	158.7°	37°30.1'	-57.4'	159.0°	36°34.1'	-57.5'	159.2°	35°37.9'	-57.6'	159.5°	34°41.7'	-57.8'	159.7°	33°45.3'	-57.9'	160.0°	13
14	38°24.8'	-57.2'	158.8°	37°28.8'	-57.3'	159.1°	36°32.7'	-57.4'	159.3°	35°36.5'	-57.6'	159.6°	34°40.3'	-57.7'	159.8°	33°43.9'	-57.8'	160.1°	32°47.5'	-57.9'	160.3°	14
15	37°27.6'	-57.2'	159.2°	36°31.5'	-57.4'	159.4°	35°35.3'	-57.5'	159.7°	34°39.0'	-57.6'	159.9°	33°42.6'	-57.7'	160.2°	32°46.1'	-57.9'	160.4°	31°49.6'	-58.0'	160.6°	15
16	36°30.4'	-57.3'	159.5°	35°34.1'	-57.4'	159.8°	34°37.8'	-57.6'	160.0°	33°41.3'	-57.7'	160.3°	32°44.8'	-57.8'	160.5°	31°48.2'	-57.9'	160.7°	30°51.6'	-58.0'	160.9°	16
17	35°33.1'	-57.4'	159.9°	34°36.7'	-57.5'	160.1°	33°40.2'	-57.6'	160.4°	32°43.7'	-57.7'	160.6°	31°47.0'	-57.8'	160.8°	30°50.3'	-57.9'	161.0°	29°53.6'	-58.0'	161.2°	17
18	34°35.7'	-57.4'	160.3°	33°39.2'	-57.6'	160.5°	32°42.6'	-57.7'	160.7°	31°45.9'	-57.8'	160.9°	30°49.2'	-57.9'	161.1°	29°52.4'	-58.0'	161.3°	28°55.5'	-58.1'	161.5°	18
19	33°38.3'	-57.5'	160.6°	32°41.6'	-57.6'	160.8°	31°44.9'	-57.7'	161.0°	30°48.2'	-57.8'	161.2°	29°51.3'	-57.9'	161.4°	28°54.4'	-58.0'	161.6°	27°57.5'	-58.1'	161.8°	19
20	32°40.8'	-57.5'	160.9°	31°44.0'	-57.7'	161.2°	30°47.2'	-57.8'	161.3°	29°50.3'	-57.9'	161.5°	28°53.4'	-58.0'	161.7°	27°56.4'	-58.1'	161.9°	26°59.3'	-5		

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

16° 344° LHA

**Latitude CONTRARY to Declination**

16° 344° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	51°56.7'	-55.9'	153.4°	51°02.9'	-56.2'	154.0°	50°08.9'	-56.4'	154.5°	49°14.6'	-56.6'	155.0°	48°20.1'	-56.9'	155.5°	47°25.4'	-57.1'	156.0°	46°30.5'	-57.2'	156.4°	0
1	51°00.7'	-56.1'	154.0°	50°06.7'	-56.3'	154.5°	49°12.4'	-56.6'	155.0°	48°17.9'	-56.8'	155.5°	47°23.2'	-57.0'	156.0°	46°28.3'	-57.2'	156.4°	45°33.3'	-57.3'	156.8°	1
2	50°04.6'	-56.2'	154.6°	49°10.4'	-56.5'	155.1°	48°15.9'	-56.7'	155.6°	47°21.2'	-56.9'	156.0°	46°26.2'	-57.1'	156.4°	45°31.2'	-57.3'	156.8°	44°35.9'	-57.4'	157.2°	2
3	49°08.5'	-56.4'	155.1°	48°13.9'	-56.6'	155.6°	47°19.2'	-56.8'	156.0°	46°24.3'	-57.0'	156.5°	45°29.2'	-57.2'	156.9°	44°33.9'	-57.3'	157.3°	43°38.5'	-57.5'	157.6°	3
4	48°12.1'	-56.5'	155.6°	47°17.3'	-56.7'	156.1°	46°22.4'	-56.9'	156.5°	45°27.3'	-57.1'	156.9°	44°32.0'	-57.3'	157.3°	43°36.6'	-57.4'	157.7°	42°41.0'	-57.6'	158.0°	4
5	47°15.6'	-56.6'	156.1°	46°20.6'	-56.8'	156.6°	45°25.5'	-57.0'	157.0°	44°30.2'	-57.2'	157.4°	43°34.7'	-57.4'	157.7°	42°39.1'	-57.5'	158.1°	41°43.4'	-57.7'	158.4°	5
6	46°18.9'	-56.8'	156.6°	45°23.8'	-56.9'	157.0°	44°28.4'	-57.1'	157.4°	43°33.0'	-57.3'	157.8°	42°37.4'	-57.4'	158.1°	41°41.6'	-57.6'	158.5°	40°45.7'	-57.7'	158.8°	6
7	45°22.2'	-56.9'	157.1°	44°26.8'	-57.0'	157.5°	43°31.3'	-57.2'	157.8°	42°35.7'	-57.4'	158.2°	41°39.9'	-57.5'	158.5°	40°44.0'	-57.7'	158.8°	39°48.0'	-57.8'	159.1°	7
8	44°25.3'	-57.0'	157.5°	43°29.8'	-57.1'	157.9°	42°34.1'	-57.3'	158.2°	41°38.3'	-57.4'	158.6°	40°42.4'	-57.6'	158.9°	39°46.4'	-57.7'	159.2°	38°50.2'	-57.9'	159.5°	8
9	43°28.3'	-57.1'	158.0°	42°32.6'	-57.2'	158.3°	41°36.8'	-57.4'	158.6°	40°40.9'	-57.5'	159.0°	39°44.8'	-57.7'	159.3°	38°48.6'	-57.8'	159.6°	37°52.4'	-57.9'	159.8°	9
10	42°31.2'	-57.2'	158.4°	41°35.4'	-57.3'	158.7°	40°39.4'	-57.5'	159.0°	39°43.3'	-57.6'	159.3°	38°47.1'	-57.7'	159.6°	37°50.9'	-57.8'	159.9°	36°54.5'	-58.0'	160.2°	10
11	41°34.1'	-57.2'	158.8°	40°38.1'	-57.4'	159.1°	39°42.0'	-57.5'	159.4°	38°45.8'	-57.7'	159.7°	37°49.4'	-57.8'	160.0°	36°53.0'	-57.9'	160.2°	35°56.5'	-58.0'	160.5°	11
12	40°36.8'	-57.3'	159.2°	39°40.7'	-57.5'	159.5°	38°44.4'	-57.6'	159.8°	37°48.1'	-57.7'	160.0°	36°51.6'	-57.8'	160.3°	35°55.1'	-58.0'	160.6°	34°58.5'	-58.1'	160.8°	12
13	39°39.5'	-57.4'	159.6°	38°43.2'	-57.5'	159.9°	37°46.9'	-57.7'	160.1°	36°50.4'	-57.8'	160.4°	35°53.8'	-57.9'	160.6°	34°57.2'	-58.0'	160.9°	34°00.4'	-58.1'	161.1°	13
14	38°42.1'	-57.5'	160.0°	37°45.7'	-57.6'	160.2°	36°49.2'	-57.7'	160.5°	35°52.6'	-57.8'	160.7°	34°55.9'	-57.9'	161.0°	33°59.2'	-58.0'	161.2°	33°02.3'	-58.1'	161.4°	14
15	37°44.6'	-57.5'	160.3°	36°48.1'	-57.7'	160.6°	35°51.5'	-57.8'	160.8°	34°54.8'	-57.9'	161.1°	33°58.0'	-58.0'	161.3°	33°01.1'	-58.1'	161.5°	32°04.2'	-58.2'	161.7°	15
16	36°47.1'	-57.6'	160.7°	35°50.5'	-57.7'	160.9°	34°53.7'	-57.8'	161.2°	33°56.9'	-57.9'	161.4°	32°60.0'	-58.0'	161.6°	32°03.0'	-58.1'	161.8°	31°06.0'	-58.2'	162.0°	16
17	35°49.5'	-57.7'	161.0°	34°52.7'	-57.8'	161.3°	33°55.9'	-57.9'	161.5°	32°59.0'	-58.0'	161.7°	32°02.0'	-58.1'	161.9°	31°04.9'	-58.2'	162.1°	30°07.8'	-58.3'	162.3°	17
18	34°51.9'	-57.7'	161.4°	33°55.0'	-57.8'	161.6°	32°58.0'	-57.9'	161.8°	32°01.0'	-58.0'	162.0°	31°03.9'	-58.1'	162.2°	30°06.7'	-58.2'	162.4°	29°09.5'	-58.3'	162.5°	18
19	33°54.2'	-57.8'	161.7°	32°57.2'	-57.9'	161.9°	32°00.1'	-58.0'	162.1°	31°03.0'	-58.1'	162.3°	30°05.8'	-58.2'	162.5°	29°08.5'	-58.2'	162.6°	28°11.2'	-58.3'	162.8°	19
20	32°56.4'	-57.8'	162.0°	31°59.3'	-57.9'	162.2°	31°02.1'	-58.0'	162.4°	30°04.9'	-58.1'	162.6°	29°07.6'	-58.2'	162.8°	28°10.3'	-58.3'	162.9°	27°12.9'	-58.3'	163.1°	20
21	31°58.6'	-57.9'	162.3°	31°01.4'	-58.0'	162.5°	30°04.1'	-58.0'	162.7°	29°06.8'	-58.1'	162.9°	28°09.4'	-58.2'	163.0°	27°12.0'	-58.3'	163.2°	26°14.6'	-58.4'	163.3°	21
22	31°00.7'	-57.9'	162.7°	30°03.4'	-58.0'	162.8°	29°06.1'	-58.1'	163.0°	28°08.7'	-58.2'	163.2°	27°11.2'	-58.2'	163.3°	26°13.7'	-58.3'	163.4°	25°16.2'	-58.0'	163.6°	22
23	30°02.8'	-57.9'	163.0°	29°05.4'	-58.0'	163.1°	28°08.0'	-58.1'	163.3°	27°10.5'	-58.2'	163.4°	26°13.0'	-58.3'	163.6°	25°15.4'	-58.4'	163.7°	24°17.8'	-58.4'	163.8°	23

16° 344° LHA

**Latitude CONTRARY to DECLINATION**

16° 344° LHA

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

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

15° 345° LHA

**Latitude CONTRARY to Declination**

15° 345° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	52°18.0'	-56.4'	155.0°	51°23.6'	-56.6'	155.5°	50°28.9'	-56.8'	156.0°	49°34.0'	-57.0'	156.5°	48°38.9'	-57.2'	156.9°	47°43.6'	-57.4'	157.4°	46°48.1'	-57.5'	157.8°	0
1	51°21.7'	-56.5'	155.5°	50°27.0'	-56.7'	156.0°	49°32.1'	-56.9'	156.5°	48°37.0'	-57.1'	157.0°	47°41.7'	-57.3'	157.4°	46°46.2'	-57.5'	157.8°	45°50.6'	-57.6'	158.2°	1
2	50°25.2'	-56.6'	156.0°	49°30.3'	-56.9'	156.5°	48°35.2'	-57.1'	157.0°	47°39.8'	-57.2'	157.4°	46°44.4'	-57.4'	157.8°	45°48.7'	-57.6'	158.2°	44°52.9'	-57.7'	158.6°	2
3	49°28.6'	-56.8'	156.6°	48°33.4'	-57.0'	157.0°	47°38.1'	-57.2'	157.4°	46°42.6'	-57.3'	157.9°	45°47.0'	-57.5'	158.2°	44°51.2'	-57.6'	158.6°	43°55.2'	-57.8'	159.0°	3
4	48°31.8'	-56.9'	157.1°	47°36.5'	-57.1'	157.5°	46°40.9'	-57.3'	157.9°	45°45.3'	-57.4'	158.3°	44°49.5'	-57.6'	158.7°	43°53.5'	-57.7'	159.0°	42°57.4'	-57.9'	159.3°	4
5	47°34.9'	-57.0'	157.5°	46°39.4'	-57.2'	157.9°	45°43.7'	-57.4'	158.3°	44°47.9'	-57.5'	158.7°	43°51.9'	-57.7'	159.0°	42°55.8'	-57.8'	159.4°	41°59.6'	-57.9'	159.7°	5
6	46°37.9'	-57.1'	158.0°	45°42.2'	-57.3'	158.4°	44°46.3'	-57.4'	158.7°	43°50.3'	-57.6'	159.1°	42°54.2'	-57.7'	159.4°	41°58.0'	-57.9'	159.7°	41°01.7'	-58.0'	160.0°	6
7	45°40.8'	-57.2'	158.4°	44°44.9'	-57.4'	158.8°	43°48.9'	-57.5'	159.1°	42°52.8'	-57.7'	159.5°	41°56.5'	-57.8'	159.8°	41°00.1'	-57.9'	160.1°	40°03.7'	-58.0'	160.4°	7
8	44°43.5'	-57.3'	158.9°	43°47.5'	-57.5'	159.2°	42°51.4'	-57.6'	159.5°	41°55.1'	-57.7'	159.9°	40°58.7'	-57.9'	160.2°	40°02.2'	-58.0'	160.4°	39°05.6'	-58.1'	160.7°	8
9	43°46.2'	-57.4'	159.3°	42°50.1'	-57.5'	159.6°	41°53.8'	-57.7'	159.9°	40°57.4'	-57.8'	160.2°	40°00.8'	-57.9'	160.5°	39°04.2'	-58.0'	160.8°	38°07.5'	-58.1'	161.0°	9
10	42°48.8'	-57.5'	159.7°	41°52.5'	-57.6'	160.0°	40°56.1'	-57.7'	160.3°	39°59.6'	-57.9'	160.6°	39°02.9'	-58.0'	160.8°	38°06.2'	-58.1'	161.1°	37°09.4'	-58.2'	161.3°	10
11	41°51.4'	-57.6'	160.1°	40°54.9'	-57.7'	160.4°	39°58.3'	-57.8'	160.6°	39°01.7'	-57.9'	160.9°	38°04.9'	-58.0'	161.2°	37°08.1'	-58.1'	161.4°	36°11.2'	-58.2'	161.7°	11
12	40°53.8'	-57.6'	160.4°	39°57.2'	-57.8'	160.7°	39°00.5'	-57.9'	161.0°	38°03.8'	-58.0'	161.2°	37°06.9'	-58.1'	161.5°	36°10.0'	-58.2'	161.7°	35°13.0'	-58.3'	161.9°	12
13	39°56.2'	-57.7'	160.8°	38°59.5'	-57.8'	161.1°	38°02.7'	-57.9'	161.3°	37°05.8'	-58.0'	161.6°	36°08.8'	-58.1'	161.8°	35°11.8'	-58.2'	162.0°	34°14.7'	-58.3'	162.2°	13
14	38°58.5'	-57.8'	161.2°	38°01.7'	-57.9'	161.4°	37°04.7'	-58.0'	161.7°	36°07.8'	-58.1'	161.9°	35°10.7'	-58.2'	162.1°	34°13.6'	-58.3'	162.3°	33°16.4'	-58.4'	162.5°	14
15	38°00.7'	-57.8'	161.5°	37°03.8'	-57.9'	161.7°	36°06.8'	-58.0'	162.0°	35°09.7'	-58.1'	162.2°	34°12.5'	-58.2'	162.4°	33°15.3'	-58.3'	162.6°	32°18.0'	-58.4'	162.8°	15
16	37°02.9'	-57.9'	161.8°	36°05.9'	-58.0'	162.1°	35°08.7'	-58.1'	162.3°	34°11.5'	-58.2'	162.5°	33°14.3'	-58.3'	162.7°	32°17.0'	-58.3'	162.9°	31°19.6'	-58.4'	163.1°	16
17	36°05.0'	-57.9'	162.2°	35°07.9'	-58.0'	162.4°	34°10.7'	-58.1'	162.6°	33°13.4'	-58.2'	162.8°	32°16.0'	-58.3'	163.0°	31°18.6'	-58.4'	163.2°	30°21.2'	-58.5'	163.3°	17
18	35°07.1'	-58.0'	162.5°	34°09.9'	-58.1'	162.7°	33°12.5'	-58.2'	162.9°	32°15.2'	-58.2'	163.1°	31°17.7'	-58.3'	163.3°	30°20.3'	-58.4'	163.4°	29°22.7'	-58.5'	163.6°	18
19	34°09.1'	-58.0'	162.8°	33°11.8'	-58.1'	163.0°	32°14.4'	-58.2'	163.2°	31°16.9'	-58.3'	163.4°	30°19.4'	-58.4'	163.5°	29°21.8'	-58.4'	163.7°	28°24.2'	-58.5'	163.8°	19
20	33°11.1'	-58.1'	163.1°	32°13.7'	-58.2'	163.3°	31°16.2'	-58.2'	163.5°	30°18.6'	-58.3'	163.6°	29°21.0'	-58.4'	163.8°	28°23.4'	-58.5'	164.0°	27°25.7'	-58.5'	164.1°	20
21	32°13.1'	-58.1'	163.4°	31°15.5'	-58.2'	163.6°	30°17.9'	-58.3'	163.7°	29°20.3'	-58.4'	163.9°	28°22.6'	-58.4'	164.1°	27°24.9'	-58.5'	164.2°	26°27.2'	-58.6'	164.3	

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

14° 346° LHA

Latitude CONTRARY to Declination

14° 346° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	52°38.2'	-56.8'	156.5°	51°43.2'	-57.0'	157.0°	50°47.8'	-57.2'	157.5°	49°52.3'	-57.4'	158.0°	48°56.6'	-57.5'	158.4°	48°00.7'	-57.7'	158.8°	47°04.7'	-57.8'	159.2°	0
1	51°41.5'	-56.9'	157.0°	50°46.2'	-57.1'	157.5°	49°50.6'	-57.3'	158.0°	48°54.9'	-57.5'	158.4°	47°59.1'	-57.6'	158.8°	47°03.0'	-57.8'	159.2°	46°06.9'	-57.9'	159.6°	1
2	50°44.5'	-57.0'	157.5°	49°49.1'	-57.2'	158.0°	48°53.3'	-57.4'	158.4°	47°57.5'	-57.6'	158.8°	47°01.4'	-57.7'	159.2°	46°05.3'	-57.9'	159.6°	45°09.0'	-58.0'	160.0°	2
3	49°47.6'	-57.2'	158.0°	48°51.8'	-57.3'	158.5°	47°55.9'	-57.5'	158.9°	46°59.9'	-57.7'	159.3°	46°03.7'	-57.8'	159.6°	45°07.4'	-57.9'	160.0°	44°11.0'	-58.1'	160.3°	3
4	48°50.4'	-57.3'	158.5°	47°54.5'	-57.4'	158.9°	46°58.4'	-57.6'	159.3°	46°02.3'	-57.7'	159.7°	45°05.9'	-57.9'	160.0°	44°09.5'	-58.0'	160.3°	43°12.9'	-58.1'	160.7°	4
5	47°53.1'	-57.4'	158.9°	46°57.1'	-57.5'	159.3°	46°00.9'	-57.7'	159.7°	45°04.5'	-57.8'	160.0°	44°08.1'	-57.9'	160.4°	43°11.5'	-58.1'	160.7°	42°14.8'	-58.2'	161.0°	5
6	46°55.8'	-57.5'	159.4°	45°59.5'	-57.6'	159.7°	45°03.2'	-57.8'	160.1°	44°06.7'	-57.9'	160.4°	43°10.1'	-58.0'	160.7°	42°13.4'	-58.1'	161.0°	41°16.6'	-58.2'	161.3°	6
7	45°58.3'	-57.6'	159.8°	45°01.9'	-57.7'	160.1°	44°05.4'	-57.8'	160.5°	43°08.8'	-57.9'	160.8°	42°12.1'	-58.1'	161.1°	41°15.3'	-58.2'	161.4°	40°18.4'	-58.3'	161.6°	7
8	45°00.7'	-57.6'	160.2°	44°04.2'	-57.8'	160.5°	43°07.6'	-57.9'	160.8°	42°10.9'	-58.0'	161.1°	41°14.1'	-58.1'	161.4°	40°17.1'	-58.2'	161.7°	39°20.1'	-58.3'	162.0°	8
9	44°03.1'	-57.7'	160.6°	43°06.5'	-57.8'	160.9°	42°09.7'	-58.0'	161.2°	41°12.9'	-58.1'	161.5°	40°15.9'	-58.2'	161.8°	39°18.9'	-58.3'	162.0°	38°21.8'	-58.4'	162.3°	9
10	43°05.4'	-57.8'	161.0°	42°08.6'	-57.9'	161.3°	41°11.8'	-58.0'	161.5°	40°14.8'	-58.1'	161.8°	39°17.8'	-58.2'	162.1°	38°20.6'	-58.3'	162.3°	37°23.4'	-58.4'	162.6°	10
11	42°07.6'	-57.9'	161.3°	41°10.7'	-58.0'	161.6°	40°13.7'	-58.1'	161.9°	39°16.7'	-58.2'	162.1°	38°19.5'	-58.3'	162.4°	37°22.3'	-58.4'	162.6°	36°25.0'	-58.5'	162.8°	11
12	41°09.8'	-57.9'	161.7°	40°12.8'	-58.0'	161.9°	39°15.7'	-58.1'	162.2°	38°18.5'	-58.2'	162.4°	37°21.3'	-58.3'	162.7°	36°23.9'	-58.4'	162.9°	35°26.6'	-58.5'	163.1°	12
13	40°11.8'	-58.0'	162.0°	39°14.7'	-58.1'	162.3°	38°17.5'	-58.2'	162.5°	37°20.3'	-58.3'	162.8°	36°22.9'	-58.4'	163.0°	35°25.5'	-58.4'	163.2°	34°28.1'	-58.5'	163.4°	13
14	39°13.9'	-58.0'	162.4°	38°16.6'	-58.1'	162.6°	37°19.4'	-58.2'	162.8°	36°22.0'	-58.3'	163.1°	35°24.6'	-58.4'	163.3°	34°27.1'	-58.5'	163.5°	33°29.5'	-58.6'	163.7°	14
15	38°15.8'	-58.1'	162.7°	37°18.5'	-58.2'	162.9°	36°21.1'	-58.3'	163.1°	35°23.7'	-58.4'	163.3°	34°26.2'	-58.4'	163.5°	33°28.6'	-58.5'	163.7°	32°31.0'	-58.6'	163.9°	15
16	37°17.8'	-58.1'	163.0°	36°20.3'	-58.2'	163.2°	35°22.9'	-58.3'	163.4°	34°25.3'	-58.4'	163.6°	33°27.7'	-58.5'	163.8°	32°30.1'	-58.5'	164.0°	31°32.4'	-58.6'	164.2°	16
17	36°19.6'	-58.2'	163.3°	35°22.1'	-58.3'	163.5°	34°24.5'	-58.4'	163.7°	33°26.9'	-58.4'	163.9°	32°29.3'	-58.5'	164.1°	31°31.5'	-58.6'	164.3°	30°33.8'	-58.6'	164.4°	17
18	35°21.4'	-58.2'	163.6°	34°23.8'	-58.3'	163.8°	33°26.2'	-58.4'	164.0°	32°28.5'	-58.5'	164.2°	31°30.7'	-58.5'	164.3°	30°33.0'	-58.6'	164.5°	29°35.1'	-58.7'	164.7°	18
19	34°23.2'	-58.3'	163.9°	33°25.5'	-58.3'	164.1°	32°27.8'	-58.4'	164.3°	31°30.0'	-58.5'	164.4°	30°32.2'	-58.6'	164.6°	29°34.3'	-58.6'	164.8°	28°36.4'	-58.7'	164.9°	19
20	33°25.0'	-58.3'	164.2°	32°27.2'	-58.4'	164.4°	31°29.4'	-58.5'	164.5°	30°31.5'	-58.5'	164.7°	29°33.6'	-58.6'	164.8°	28°35.7'	-58.7'	165.0°	27°37.7'	-58.7'	165.1°	20
21	32°26.6'	-58.3'	164.5°	31°28.8'	-58.4'	164.6°	30°30.9'	-58.5'	164.8°	29°33.0'	-58.6'	165.0°	28°35.0'	-58.6'	165.1°	27°37.0'	-58.7'	165.2°	26°39.0'	-58.7'	165.4°	21
22	31°28.3'	-58.4'	164.8°	30°30.4'	-58.4'	164.9°	29°32.4'	-58.5'	165.1°	28°34.5'	-58.6'	165.2°	27°36.4'	-58.6'	165.3°	26°38.4'	-58.7'	165.5°	25°40.3'	-58.8'	165.6°	22
23	30°29.9'	-58.4'	165.0°	29°32.0'	-58.5'	165.2°	28°33.9'	-58.5'	165.3°	27°35.9'	-58.6'	165.4°	26°37.8'	-58.7'	165.6°	25°39.7'	-58.7'	165.7°	24°41.5'	-58.8'	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°
	35			36			37			38			39			40			41			

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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	52°57.2'	-57.2'	158.1°	52°01.5'	-57.4'	158.6°	51°05.6'	-57.5'	159.0°	50°09.5'	-57.7'	159.4°	49°13.2'	-57.9'	159.9°	48°16.8'	-58.0'	160.2°	47°20.3'	-58.1'	160.6°	0
1	52°00.0'	-57.3'	158.6°	51°04.1'	-57.5'	159.0°	50°08.0'	-57.6'	159.5°	49°11.8'	-57.8'	159.9°	48°15.4'	-57.9'	160.3°	47°18.8'	-58.1'	160.6°	46°22.2'	-58.2'	161.0°	1
2	51°02.7'	-57.4'	159.0°	50°06.7'	-57.6'	159.5°	49°10.4'	-57.7'	159.9°	48°14.0'	-57.9'	160.3°	47°17.4'	-58.0'	160.6°	46°20.8'	-58.1'	161.0°	45°24.0'	-58.3'	161.3°	2
3	50°05.4'	-57.5'	159.5°	49°09.1'	-57.7'	159.9°	48°12.7'	-57.8'	160.3°	47°16.1'	-58.0'	160.7°	46°19.4'	-58.1'	161.0°	45°22.6'	-58.2'	161.3°	44°25.7'	-58.3'	161.7°	3
4	49°07.8'	-57.6'	159.9°	48°11.4'	-57.8'	160.3°	47°14.8'	-57.9'	160.7°	46°18.2'	-58.0'	161.0°	45°21.3'	-58.1'	161.4°	44°24.4'	-58.3'	161.7°	43°27.4'	-58.4'	162.0°	4
5	48°10.2'	-57.7'	160.4°	47°13.6'	-57.8'	160.7°	46°16.9'	-58.0'	161.1°	45°20.1'	-58.1'	161.4°	44°23.2'	-58.2'	161.7°	43°26.2'	-58.3'	162.0°	42°29.1'	-58.4'	162.3°	5
6	47°12.5'	-57.8'	160.8°	46°15.8'	-57.9'	161.1°	45°19.0'	-58.0'	161.4°	44°22.0'	-58.1'	161.8°	43°25.0'	-58.3'	162.1°	42°27.9'	-58.4'	162.3°	41°30.6'	-58.5'	162.6°	6
7	46°14.7'	-57.9'	161.2°	45°17.9'	-58.0'	161.5°	44°20.9'	-58.1'	161.8°	43°23.9'	-58.2'	162.1°	42°26.7'	-58.3'	162.4°	41°29.5'	-58.4'	162.7°	40°32.2'	-58.5'	162.9°	7
8	45°16.8'	-57.9'	161.5°	44°19.9'	-58.1'	161.9°	43°22.8'	-58.2'	162.2°	42°25.7'	-58.3'	162.4°	41°28.4'	-58.4'	162.7°	40°31.1'	-58.5'	163.0°	39°33.7'	-58.5'	163.2°	8
9	44°18.9'	-58.0'	161.9°	43°21.8'	-58.1'	162.2°	42°24.6'	-58.2'	162.5°	41°27.4'	-58.3'	162.8°	40°30.0'	-58.4'	163.0°	39°32.6'	-58.5'	163.3°	38°35.1'	-58.6'	163.5°	9
10	43°20.9'	-58.1'	162.3°	42°23.7'	-58.2'	162.5°	41°26.4'	-58.3'	162.8°	40°29.1'	-58.4'	163.1°	39°31.6'	-58.5'	163.3°	38°34.1'	-58.5'	163.5°	37°36.5'	-58.6'	163.8°	10
11	42°22.8'	-58.1'	162.6°	41°25.5'	-58.2'	162.9°	40°28.1'	-58.3'	163.1°	39°30.7'	-58.4'	163.4°	38°33.2'	-58.5'	163.6°	37°35.6'	-58.6'	163.8°	36°37.9'	-58.7'	164.0°	11
12	41°24.7'	-58.2'	162.9°	40°27.3'	-58.3'	163.2°	39°29.8'	-58.4'	163.4°	38°32.3'	-58.5'	163.7°	37°34.7'	-58.5'	163.9°	36°37.0'	-58.6'	164.1°	35°39.3'	-58.7'	164.3°	12
13	40°26.5'	-58.2'	163.3°	39°29.0'	-58.3'	163.5°	38°31.4'	-58.4'	163.7°	37°33.8'	-58.5'	163.9°	36°36.1'	-58.6'	164.2°	35°38.4'	-58.7'	164.4°	34°40.6'	-58.7'	164.5°	13
14	39°28.3'	-58.3'	163.6°	38°30.7'	-58.4'	163.8°	37°33.0'	-58.5'	164.0°	36°35.3'	-58.5'	164.2°	35°37.5'	-58.6'	164.4°	34°39.7'	-58.7'	164.6°	33°41.8'	-58.8'	164.8°	14
15	38°30.0'	-58.3'	163.9°	37°32.3'	-58.4'	164.1°	36°34.6'	-58.5'	164.3°	35°36.8'	-58.6'	164.5°	34°38.9'	-58.6'	164.7°	33°41.0'	-58.7'	164.9°	32°43.1'	-58.8'	165.0°	15
16	37°31.6'	-58.4'	164.2°	36°33.9'	-58.5'	164.4°	35°36.1'	-58.5'	164.6°	34°38.2'	-58.6'	164.8°	33°40.3'	-58.7'	164.9°	32°42.3'	-58.7'	165.1°	31°44.3'	-58.8'	165.3°	16
17	36°33.3'	-58.4'	164.5°	35°35.4'	-58.5'	164.7°	34°37.5'	-58.6'	164.8°	33°39.6'	-58.6'	165.0°	32°41.6'	-58.7'	165.2°	31°43.6'	-58.8'	165.3°	30°45.5'	-58.8'	165.5°	17
18	35°34.8'	-58.5'	164.7°	34°36.9'	-58.5'	164.9°	33°39.0'	-58.6'	165.1°	32°41.0'	-58.6'	165.3°	31°42.9'	-58.7'	165.4°	30°44.8'	-58.8'	165.6°	29°46.7'	-58.9'	165.7°	18
19	34°36.4'	-58.5'	165.0°	33°38.4'	-58.6'	165.2°	32°40.4'	-58.6'	165.4°	31°42.3'	-58.7'	165.5°	30°44.2'	-58.8'	165.7°	29°46.0'	-58.8'	165.8°	28°47.8'	-58.9'	166.0°	19
20	33°37.9'	-58.5'	165.3°	32°39.8'	-58.6'	165.5°	31°41.7'	-58.7'	165.6°	30°43.6'	-58.7'	165.8°	29°45.4'	-58.8'	165.9°	28°47.2'	-58.8'	166.0°	27°49.0'	-58.9'</		

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

12° 348° LHA

Latitude CONTRARY to Declination

12° 348° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	53°14.9'	-57.6'	159.7°	52°18.6'	-57.7'	160.1°	51°22.1'	-57.9'	160.5°	50°25.5'	-58.0'	161.0°	49°28.7'	-58.2'	161.3°	48°31.8'	-58.3'	161.7°	47°34.8'	-58.4'	162.0°	0
1	52°17.4'	-57.7'	160.1°	51°20.9'	-57.8'	160.6°	50°24.3'	-58.0'	161.0°	49°27.5'	-58.1'	161.3°	48°30.6'	-58.2'	161.7°	47°33.5'	-58.3'	162.1°	46°36.4'	-58.4'	162.4°	1
2	51°19.7'	-57.8'	160.6°	50°23.1'	-57.9'	161.0°	49°26.3'	-58.0'	161.4°	48°29.4'	-58.2'	161.7°	47°32.3'	-58.3'	162.1°	46°35.2'	-58.4'	162.4°	45°38.0'	-58.5'	162.7°	2
3	50°22.0'	-57.9'	161.0°	49°25.2'	-58.0'	161.4°	48°28.2'	-58.1'	161.8°	47°31.2'	-58.2'	162.1°	46°34.1'	-58.3'	162.4°	45°36.8'	-58.5'	162.7°	44°39.5'	-58.5'	163.0°	3
4	49°24.1'	-57.9'	161.4°	48°27.2'	-58.1'	161.8°	47°30.1'	-58.2'	162.1°	46°33.0'	-58.3'	162.4°	45°35.7'	-58.4'	162.8°	44°38.4'	-58.5'	163.1°	43°40.9'	-58.6'	163.3°	4
5	48°26.1'	-58.0'	161.8°	47°29.1'	-58.1'	162.2°	46°31.9'	-58.3'	162.5°	45°34.7'	-58.4'	162.8°	44°37.3'	-58.5'	163.1°	43°39.9'	-58.6'	163.4°	42°42.3'	-58.6'	163.6°	5
6	47°28.1'	-58.1'	162.2°	46°30.9'	-58.2'	162.5°	45°33.7'	-58.3'	162.8°	44°36.3'	-58.4'	163.1°	43°38.8'	-58.5'	163.4°	42°41.3'	-58.6'	163.7°	41°43.7'	-58.7'	163.9°	6
7	46°30.0'	-58.2'	162.6°	45°32.7'	-58.3'	162.9°	44°35.3'	-58.4'	163.2°	43°37.9'	-58.5'	163.4°	42°40.3'	-58.6'	163.7°	41°42.7'	-58.6'	164.0°	40°45.0'	-58.7'	164.2°	7
8	45°31.8'	-58.2'	162.9°	44°34.5'	-58.3'	163.2°	43°37.0'	-58.4'	163.5°	42°39.4'	-58.5'	163.7°	41°41.8'	-58.6'	164.0°	40°44.1'	-58.7'	164.2°	39°46.3'	-58.8'	164.5°	8
9	44°33.6'	-58.3'	163.2°	43°36.1'	-58.4'	163.5°	42°38.5'	-58.5'	163.8°	41°40.9'	-58.6'	164.0°	40°43.2'	-58.6'	164.3°	39°45.4'	-58.7'	164.5°	38°47.5'	-58.8'	164.7°	9
10	43°35.3'	-58.3'	163.6°	42°37.7'	-58.4'	163.8°	41°40.1'	-58.5'	164.1°	40°42.3'	-58.6'	164.3°	39°44.5'	-58.7'	164.6°	38°46.7'	-58.8'	164.8°	37°48.7'	-58.8'	165.0°	10
11	42°37.0'	-58.4'	163.9°	41°39.3'	-58.5'	164.1°	40°41.5'	-58.6'	164.4°	39°43.7'	-58.6'	164.6°	38°45.9'	-58.7'	164.8°	37°47.9'	-58.8'	165.0°	36°49.9'	-58.9'	165.2°	11
12	41°38.6'	-58.4'	164.2°	40°40.8'	-58.5'	164.4°	39°43.0'	-58.6'	164.7°	38°45.1'	-58.7'	164.9°	37°47.1'	-58.7'	165.1°	36°49.1'	-58.8'	165.3°	35°51.1'	-58.9'	165.5°	12
13	40°40.1'	-58.5'	164.5°	39°42.3'	-58.6'	164.7°	38°44.4'	-58.6'	164.9°	37°46.4'	-58.7'	165.1°	36°48.4'	-58.8'	165.3°	35°50.3'	-58.8'	165.5°	34°52.2'	-58.9'	165.7°	13
14	39°41.7'	-58.5'	164.8°	38°43.7'	-58.6'	165.0°	37°45.7'	-58.7'	165.2°	36°47.7'	-58.7'	165.4°	35°49.6'	-58.8'	165.6°	34°51.5'	-58.9'	165.8°	33°53.3'	-58.9'	165.9°	14
15	38°43.1'	-58.6'	165.1°	37°45.1'	-58.6'	165.3°	36°47.1'	-58.7'	165.5°	35°49.0'	-58.8'	165.7°	34°50.8'	-58.8'	165.8°	33°52.6'	-58.9'	166.0°	32°54.4'	-59.0'	166.2°	15
16	37°44.5'	-58.6'	165.4°	36°46.5'	-58.7'	165.6°	35°48.3'	-58.7'	165.7°	34°50.2'	-58.8'	165.9°	33°52.0'	-58.9'	166.1°	32°53.7'	-58.9'	166.2°	31°55.4'	-59.0'	166.4°	16
17	36°45.9'	-58.6'	165.6°	35°47.8'	-58.7'	165.8°	34°49.6'	-58.8'	166.0°	33°51.4'	-58.8'	166.1°	32°53.1'	-58.9'	166.3°	31°54.8'	-58.9'	166.5°	30°56.4'	-59.0'	166.6°	17
18	35°47.3'	-58.7'	165.9°	34°49.1'	-58.7'	166.1°	33°50.8'	-58.8'	166.2°	32°52.5'	-58.9'	166.4°	31°54.2'	-58.9'	166.5°	30°55.8'	-59.0'	166.7°	29°57.4'	-59.0'	166.8°	18
19	34°48.6'	-58.7'	166.1°	33°50.3'	-58.8'	166.3°	32°52.0'	-58.8'	166.5°	31°53.7'	-58.9'	166.6°	30°55.3'	-58.9'	166.8°	29°56.9'	-59.0'	166.9°	28°58.4'	-59.0'	167.0°	19
20	33°49.9'	-58.7'	166.4°	32°51.6'	-58.8'	166.6°	31°53.2'	-58.9'	166.7°	30°54.8'	-58.9'	166.8°	29°56.3'	-59.0'	167.0°	28°57.9'	-59.0'	167.1°	27°59.4'	-59.1'	167.2°	20
21	32°51.2'	-58.8'	166.6°	31°52.8'	-58.8'	166.8°	30°54.3'	-58.9'	166.9°	29°55.9'	-58.9'	167.1°	28°57.4'	-59.0'	167.2°	27°58.9'	-59.0'	167.3°	27°00.3'	-59.1'	167.4°	21
22	31°52.4'	-58.8'	166.9°	30°53.9'	-58.8'	167.0°	29°55.5'	-58.9'	167.1°	28°57.0'	-58.9'	167.3°	27°58.4'	-59.0'	167.4°	26°59.8'	-59.0'	167.5°	26°01.3'	-59.1'	167.6°	22
23	30°53.6'	-58.8'	167.1°	29°55.1'	-58.9'	167.2°	28°56.6'	-58.9'	167.4°	27°58.0'	-59.0'	167.5°	26°59.4'	-59.0'	167.6°	26°00.8'	-59.1'	167.7°	25°02.2'	-59.1'	167.8°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	53°31.4'	-57.9'	161.3°	52°34.5'	-58.1'	161.7°	51°37.5'	-58.2'	162.1°	50°40.3'	-58.3'	162.5°	49°43.1'	-58.4'	162.8°	48°45.7'	-58.5'	163.2°	47°48.2'	-58.6'	163.5°	0
1	52°33.4'	-58.0'	161.7°	51°36.4'	-58.2'	162.1°	50°39.3'	-58.3'	162.5°	49°42.0'	-58.4'	162.8°	48°44.6'	-58.5'	163.2°	47°47.1'	-58.6'	163.5°	46°49.6'	-58.7'	163.8°	1
2	51°35.4'	-58.1'	162.1°	50°38.3'	-58.2'	162.5°	49°41.0'	-58.3'	162.9°	48°43.6'	-58.5'	163.2°	47°46.1'	-58.5'	163.5°	46°48.6'	-58.6'	163.8°	45°50.9'	-58.7'	164.1°	2
3	50°37.3'	-58.2'	162.5°	49°40.1'	-58.3'	162.9°	48°42.7'	-58.4'	163.2°	47°45.2'	-58.5'	163.5°	46°47.6'	-58.6'	163.8°	45°49.9'	-58.7'	164.1°	44°52.2'	-58.8'	164.4°	3
4	49°39.2'	-58.3'	162.9°	48°41.8'	-58.4'	163.2°	47°44.3'	-58.5'	163.6°	46°46.7'	-58.6'	163.9°	45°49.0'	-58.7'	164.2°	44°51.2'	-58.7'	164.4°	43°53.4'	-58.8'	164.7°	4
5	48°40.9'	-58.3'	163.3°	47°43.4'	-58.4'	163.6°	46°45.8'	-58.5'	163.9°	45°48.1'	-58.6'	164.2°	44°50.3'	-58.7'	164.5°	43°52.5'	-58.8'	164.7°	42°55.6'	-58.8'	165.0°	5
6	47°42.6'	-58.4'	163.6°	46°45.0'	-58.5'	163.9°	45°47.3'	-58.6'	164.2°	44°49.5'	-58.7'	164.5°	43°51.6'	-58.7'	164.7°	42°53.7'	-58.8'	165.0°	41°55.7'	-58.9'	165.2°	6
7	46°44.2'	-58.4'	164.0°	45°46.5'	-58.5'	164.2°	44°48.7'	-58.6'	164.5°	43°50.8'	-58.7'	164.8°	42°52.9'	-58.8'	165.0°	41°54.9'	-58.8'	165.3°	40°56.9'	-58.9'	165.5°	7
8	45°45.7'	-58.5'	164.3°	44°47.9'	-58.6'	164.6°	43°50.1'	-58.7'	164.8°	42°52.1'	-58.7'	165.1°	41°54.1'	-58.8'	165.3°	40°56.1'	-58.9'	165.5°	39°57.9'	-58.9'	165.7°	8
9	44°47.2'	-58.6'	164.6°	43°49.3'	-58.6'	164.9°	42°51.4'	-58.7'	165.1°	41°53.4'	-58.8'	165.3°	40°55.3'	-58.9'	165.6°	39°57.2'	-58.9'	165.8°	38°59.0'	-59.0'	166.0°	9
10	43°48.7'	-58.6'	164.9°	42°50.7'	-58.7'	165.1°	41°52.7'	-58.7'	165.4°	40°54.6'	-58.8'	165.6°	39°56.5'	-58.9'	165.8°	38°58.3'	-58.9'	166.0°	38°00.0'	-59.0'	166.2°	10
11	42°50.1'	-58.6'	165.2°	41°52.0'	-58.7'	165.4°	40°53.9'	-58.8'	165.7°	39°55.8'	-58.9'	165.9°	38°57.6'	-58.9'	166.1°	37°59.3'	-59.0'	166.3°	37°01.0'	-59.0'	166.4°	11
12	41°51.4'	-58.7'	165.5°	40°53.3'	-58.8'	165.7°	39°55.2'	-58.8'	165.9°	38°56.9'	-58.9'	166.1°	37°58.7'	-58.9'	166.3°	37°00.3'	-59.0'	166.5°	36°02.0'	-59.1'	166.7°	12
13	40°52.8'	-58.7'	165.8°	39°54.6'	-58.8'	166.0°	38°56.3'	-58.9'	166.2°	37°58.0'	-58.9'	166.4°	36°59.7'	-59.0'	166.5°	36°01.3'	-59.0'	166.7°	35°02.9'	-59.1'	166.9°	13
14	39°54.0'	-58.8'	166.0°	38°55.8'	-58.8'	166.2°	37°57.5'	-58.9'	166.4°	36°59.1'	-58.9'	166.6°	36°00.7'	-59.0'	166.8°	35°02.3'	-59.0'	166.9°	34°03.9'	-59.1'	167.1°	14
15	38°55.3'	-58.8'	166.3°	37°57.0'	-58.9'	166.5°	36°58.6'	-58.9'	166.7°	36°00.2'	-59.0'	166.8°	35°01.8'	-59.0'	167.0°	34°03.3'	-59.1'	167.1°	33°04.8'	-59.1'	167.3°	15
16	37°56.5'	-58.8'	166.6°	36°58.1'	-58.9'	166.7°	35°59.7'	-58.9'	166.9°	35°01.2'	-59.0'	167.1°	34°02.7'	-59.0'	167.2°	33°04.2'	-59.1'	167.4°	32°05.6'	-59.1'	167.5°	16
17	36°57.7'	-58.9'	166.8°	35°59.2'	-58.9'	167.0°	35°00.7'	-59.0'	167.1°	34°02.2'	-59.0'	167.3°	33°03.7'	-59.1'	167.4°	32°05.1'	-59.1'	167.6°	31°06.5'	-59.2'	167.7°	17
18	35°58.8'	-58.9'	167.0°	35°00.3'	-58.9'	167.2°	34°01.8'	-59.0'	167.4°	33°03.2'	-59.0'	167.5°	32°04.6'	-59.1'	167.6°	31°06.0'	-59.1'	167.8°	30°07.4'	-59.2'	167.9°	18
19	34°59.9'	-58.9'	167.3°	34°01.4'	-59.0'	167.4°	33°02.8'	-59.0'	167.6°	32°04.2'	-59.1'	167.7°	31°05.5'	-59.1'	167.8°	30°06.9'	-59.1'	168.0°	29°08.2'	-59.2'	168.1°	19
20	34°01.0'	-58.9'	167.5°	33°02.4'	-59.0'	167.6°	32°03.8'	-59.0'	167.8°	31°05.1'	-59.1'	167.9°	30°06.4'	-59.1'	168.0°							

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

10° 350° LHA

**Latitude CONTRARY to Declination**

10° 350° LHA

Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	53°46.5'	-58.3'	162.9°	52°49.1'	-58.4'	163.3°	51°51.6'	-58.5'	163.7°	50°54.0'	-58.6'	164.0°	49°56.2'	-58.7'	164.3°	48°58.4'	-58.8'	164.7°	48°00.5'	-58.9'	165.0°	0
1	52°48.2'	-58.4'	163.3°	51°50.7'	-58.5'	163.7°	50°53.1'	-58.6'	164.0°	49°55.4'	-58.7'	164.4°	48°57.5'	-58.7'	164.7°	47°59.6'	-58.8'	165.0°	47°01.6'	-58.9'	165.2°	1
2	51°49.8'	-58.4'	163.7°	50°52.3'	-58.5'	164.0°	49°54.5'	-58.6'	164.4°	48°56.7'	-58.7'	164.7°	47°58.8'	-58.8'	165.0°	47°00.8'	-58.9'	165.3°	46°02.7'	-58.9'	165.5°	2
3	50°51.5'	-58.5'	164.1°	49°53.7'	-58.6'	164.4°	48°55.9'	-58.7'	164.7°	47°58.0'	-58.8'	165.0°	47°00.0'	-58.8'	165.3°	46°01.9'	-58.9'	165.5°	45°03.8'	-59.0'	165.8°	3
4	49°53.0'	-58.5'	164.4°	48°55.2'	-58.6'	164.7°	47°57.2'	-58.7'	165.0°	46°59.2'	-58.8'	165.3°	46°01.2'	-58.9'	165.6°	45°03.0'	-58.9'	165.8°	44°04.8'	-59.0'	166.0°	4
5	48°54.4'	-58.6'	164.7°	47°56.5'	-58.7'	165.0°	46°58.5'	-58.8'	165.3°	46°00.4'	-58.8'	165.6°	45°02.3'	-58.9'	165.8°	44°04.1'	-59.0'	166.1°	43°05.8'	-59.0'	166.3°	5
6	47°55.8'	-58.7'	165.1°	46°57.8'	-58.7'	165.3°	45°59.7'	-58.8'	165.6°	45°01.6'	-58.9'	165.9°	44°03.4'	-59.0'	166.1°	43°05.1'	-59.0'	166.3°	42°06.8'	-59.1'	166.5°	6
7	46°57.2'	-58.7'	165.4°	45°59.1'	-58.8'	165.6°	44°00.9'	-58.9'	165.9°	44°02.7'	-58.9'	166.1°	43°04.4'	-59.0'	166.4°	42°06.1'	-59.0'	166.6°	41°07.7'	-59.1'	166.8°	7
8	45°58.5'	-58.8'	165.7°	44°00.3'	-58.8'	165.9°	44°02.1'	-58.9'	166.2°	43°03.8'	-59.0'	166.4°	42°05.4'	-59.0'	166.6°	41°07.1'	-59.1'	166.8°	40°08.6'	-59.1'	167.0°	8
9	44°59.7'	-58.8'	166.0°	44°01.5'	-58.9'	166.2°	43°03.2'	-58.9'	166.4°	42°04.8'	-59.0'	166.6°	41°06.4'	-59.0'	166.8°	40°08.0'	-59.1'	167.0°	39°09.5'	-59.1'	167.2°	9
10	44°00.9'	-58.8'	166.2°	43°02.6'	-58.9'	166.5°	42°04.3'	-59.0'	166.7°	41°05.8'	-59.0'	166.9°	40°07.4'	-59.1'	167.1°	39°08.9'	-59.1'	167.3°	38°10.3'	-59.2'	167.4°	10
11	43°02.1'	-58.9'	166.5°	42°03.7'	-58.9'	166.7°	41°05.3'	-59.0'	166.9°	40°06.8'	-59.0'	167.1°	39°08.3'	-59.1'	167.3°	38°09.8'	-59.1'	167.5°	37°11.2'	-59.2'	167.6°	11
12	42°03.2'	-58.9'	166.8°	41°04.8'	-59.0'	167.0°	40°06.3'	-59.0'	167.2°	39°07.8'	-59.1'	167.4°	38°09.2'	-59.1'	167.5°	37°10.6'	-59.2'	167.7°	36°12.0'	-59.2'	167.8°	12
13	41°04.3'	-58.9'	167.0°	40°05.8'	-59.0'	167.2°	39°07.3'	-59.0'	167.4°	38°08.7'	-59.1'	167.6°	37°10.1'	-59.1'	167.7°	36°11.4'	-59.2'	167.9°	35°12.8'	-59.2'	168.0°	13
14	40°05.4'	-59.0'	167.3°	39°06.8'	-59.0'	167.5°	38°08.2'	-59.1'	167.6°	37°09.6'	-59.1'	167.8°	36°10.9'	-59.2'	168.0°	35°12.3'	-59.2'	168.1°	34°13.5'	-59.3'	168.2°	14
15	39°06.4'	-59.0'	167.5°	38°07.8'	-59.0'	167.7°	37°09.2'	-59.1'	167.9°	36°10.5'	-59.1'	168.0°	35°11.8'	-59.2'	168.2°	34°13.0'	-59.2'	168.3°	33°14.3'	-59.3'	168.4°	15
16	38°07.4'	-59.0'	167.7°	37°08.8'	-59.1'	167.9°	36°10.1'	-59.1'	168.1°	35°11.3'	-59.2'	168.2°	34°12.6'	-59.2'	168.4°	33°13.8'	-59.2'	168.5°	32°15.0'	-59.3'	168.6°	16
17	37°08.4'	-59.0'	168.0°	36°09.7'	-59.1'	168.1°	35°10.9'	-59.1'	168.3°	34°12.2'	-59.2'	168.4°	33°13.4'	-59.2'	168.6°	32°14.6'	-59.3'	168.7°	31°15.7'	-59.3'	168.8°	17
18	36°09.3'	-59.1'	168.2°	35°10.6'	-59.1'	168.3°	34°11.8'	-59.2'	168.5°	33°13.0'	-59.2'	168.6°	32°14.2'	-59.2'	168.7°	31°15.3'	-59.3'	168.9°	30°16.4'	-59.3'	169.0°	18
19	35°10.3'	-59.1'	168.4°	34°11.5'	-59.1'	168.6°	33°12.6'	-59.2'	168.7°	32°13.8'	-59.2'	168.8°	31°14.9'	-59.3'	168.9°	30°16.0'	-59.3'	169.0°	29°17.1'	-59.3'	169.1°	19
20	34°11.2'	-59.1'	168.6°	33°12.3'	-59.2'	168.8°	32°13.5'	-59.2'	168.9°	31°14.6'	-59.2'	169.0°	30°15.7'	-59.3'	169.1°	29°16.7'	-59.3'	169.2°	28°17.8'	-59.3'	169.3°	20
21	33°12.0'	-59.1'	168.8°	32°13.2'	-59.2'	169.0°	31°14.3'	-59.2'	169.1°	30°15.3'	-59.2'	169.2°	29°16.4'	-59.3'	169.3°	28°17.4'	-59.3'	169.4°	27°18.5'	-59.3'	169.5°	21
22	32°12.9'	-59.2'	169.0°	31°14.0'	-59.2'	169.1°	30°15.1'	-59.2'	169.3°	29°16.1'	-59.3'	169.4°	28°17.1'	-59.3'	169.5°	27°18.1'	-59.3'	169.6°	26°19.1'	-59.4'	169.7°	22
23	31°13.8'	-59.2'	169.2°	30°14.8'	-59.2'	169.3°	29°15.8'	-59.2'	169.4°	28°16.8'	-59.3'	169.5°	27°17.8'	-59.3'	169.6°	26°18.8'	-59.3'	169.7°	25°19.7'	-59.4'	169.8°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	54°00.2'	-58.6'	164.6°	53°02.4'	-58.7'	164.9°	52°04.4'	-58.8'	165.3°	51°06.4'	-58.9'	165.6°	50°08.2'	-58.9'	165.9°	49°10.0'	-59.0'	166.2°	48°11.7'	-59.1'	166.4°	0
1	53°01.7'	-58.7'	164.9°	52°03.7'	-58.7'	165.3°	51°05.7'	-58.8'	165.6°	50°07.5'	-58.9'	165.9°	49°09.3'	-59.0'	166.2°	48°11.0'	-59.0'	166.4°	47°12.6'	-59.1'	166.7°	1
2	52°03.0'	-58.7'	165.3°	51°05.0'	-58.8'	165.6°	50°06.8'	-58.9'	165.9°	49°08.6'	-58.9'	166.2°	48°10.3'	-59.0'	166.4°	47°11.9'	-59.1'	166.7°	46°13.5'	-59.1'	166.9°	2
3	51°04.3'	-58.8'	165.6°	50°06.2'	-58.8'	165.9°	49°08.0'	-58.9'	166.2°	48°09.7'	-59.0'	166.5°	47°11.3'	-59.0'	166.7°	46°12.9'	-59.1'	167.0°	45°14.4'	-59.2'	167.2°	3
4	50°05.6'	-58.8'	165.9°	49°07.3'	-58.9'	166.2°	48°09.0'	-59.0'	166.5°	47°10.7'	-59.0'	166.7°	46°12.2'	-59.1'	167.0°	45°13.8'	-59.1'	167.2°	44°15.2'	-59.2'	167.4°	4
5	49°06.8'	-58.9'	166.2°	48°08.4'	-58.9'	166.5°	47°10.1'	-59.0'	166.7°	46°11.6'	-59.1'	167.0°	45°13.2'	-59.1'	167.2°	44°14.6'	-59.2'	167.4°	43°16.0'	-59.2'	167.6°	5
6	48°07.9'	-58.9'	166.5°	47°09.5'	-59.0'	166.8°	46°11.1'	-59.0'	167.0°	45°12.6'	-59.1'	167.2°	44°14.0'	-59.1'	167.5°	43°15.5'	-59.2'	167.7°	42°16.8'	-59.2'	167.9°	6
7	47°09.0'	-58.9'	166.8°	46°10.5'	-59.0'	167.0°	45°12.0'	-59.1'	167.3°	44°13.5'	-59.1'	167.5°	43°14.9'	-59.2'	167.7°	42°16.3'	-59.2'	167.9°	41°17.6'	-59.3'	168.1°	7
8	46°10.0'	-59.0'	167.1°	45°11.5'	-59.0'	167.3°	44°13.0'	-59.1'	167.5°	43°14.4'	-59.1'	167.7°	42°15.7'	-59.2'	167.9°	41°17.0'	-59.2'	168.1°	40°18.3'	-59.3'	168.3°	8
9	45°11.1'	-59.0'	167.3°	44°12.5'	-59.1'	167.6°	43°13.9'	-59.1'	167.8°	42°15.2'	-59.2'	168.0°	41°16.5'	-59.2'	168.1°	40°17.8'	-59.3'	168.3°	39°19.0'	-59.3'	168.5°	9
10	44°12.0'	-59.0'	167.6°	43°13.4'	-59.1'	167.8°	42°14.8'	-59.2'	168.0°	41°16.1'	-59.2'	168.2°	40°17.3'	-59.2'	168.3°	39°18.5'	-59.3'	168.5°	38°19.7'	-59.3'	168.7°	10
11	43°13.0'	-59.1'	167.8°	42°14.3'	-59.1'	168.0°	41°15.6'	-59.2'	168.2°	40°16.9'	-59.2'	168.4°	39°18.1'	-59.3'	168.6°	38°19.2'	-59.3'	168.7°	37°20.4'	-59.3'	168.9°	11
12	42°13.9'	-59.1'	168.1°	41°15.2'	-59.2'	168.3°	40°16.4'	-59.2'	168.4°	39°17.6'	-59.2'	168.6°	38°18.8'	-59.3'	168.8°	37°19.9'	-59.3'	168.9°	36°21.0'	-59.4'	169.0°	12
13	41°14.8'	-59.1'	168.3°	40°16.0'	-59.2'	168.5°	39°17.2'	-59.2'	168.6°	38°18.4'	-59.3'	168.8°	37°19.5'	-59.3'	168.9°	36°20.6'	-59.3'	169.1°	35°21.7'	-59.4'	169.2°	13
14	40°15.7'	-59.2'	168.5°	39°16.9'	-59.2'	168.7°	38°18.0'	-59.2'	168.8°	37°19.1'	-59.3'	169.0°	36°20.2'	-59.3'	169.1°	35°21.3'	-59.4'	169.3°	34°22.3'	-59.4'	169.4°	14
15	39°16.5'	-59.2'	168.7°	38°17.7'	-59.2'	168.9°	37°18.8'	-59.3'	169.0°	36°19.8'	-59.3'	169.2°	35°20.9'	-59.3'	169.3°	34°21.9'	-59.4'	169.5°	33°22.9'	-59.4'	169.6°	15
16	38°17.3'	-59.2'	169.0°	37°18.4'	-59.2'	169.1°	36°19.5'	-59.3'	169.2°	35°20.5'	-59.3'	169.4°	34°21.6'	-59.4'	169.5°	33°22.5'	-59.4'	169.6°	32°23.5'	-59.4'	169.7°	16
17	37°18.1'	-59.2'	169.2°	36°19.2'	-59.3'	169.3°	35°20.2'	-59.3'	169.4°	34°21.2'	-59.3'	169.6°	33°22.2'	-59.4'	169.7°	32°23.2'	-59.4'	169.8°	31°24.1'	-59.4'	169.9°	17
18	36°18.9'	-59.2'	169.4°	35°19.9'	-59.3'	169.5°	34°20.9'	-59.3'	169.6°	33°21.9'	-59.4'	169.7°	32°22.8'	-59.4'	169.9°	31°23.8'	-59.4'	170.0°	30°24.7'	-59.4'	170.1°	18
19	35°19.7'	-59.3'	169.6°	34°20.6'	-59.3'	169.7°	33°21.6'	-59.3'	169.8°	32°22.5'	-59.4'	169.9°	31°23.4'	-59.4'	170.1°	30°24.3'	-59.4'	170.1°	29°25.2'	-59.5'	170.2°	19
20	34°20.4'	-59.3'	169.7°	33°21.3'	-59.3'	169.9°	32°22.3'	-59.3'	170.0°	31°23.2'	-59.4'	170.1°	30°24.1'	-59.4'	170.2°							



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

8° 352° LHA		Latitude CONTRARY to Declination										8° 352° LHA										
Dec°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	54°12.6'	-58.9'	166.2°	53°14.4'	-59.0'	166.6°	52°16.0'	-59.0'	166.9°	51°17.5'	-59.1'	167.1°	50°19.0'	-59.2'	167.4°	49°20.4'	-59.2'	167.7°	48°21.8'	-59.3'	167.9°	0
1	53°13.8'	-58.9'	166.6°	52°15.4'	-59.0'	166.9°	51°17.0'	-59.1'	167.1°	50°18.4'	-59.1'	167.4°	49°19.8'	-59.2'	167.7°	48°21.2'	-59.2'	167.9°	47°22.5'	-59.3'	168.1°	1
2	52°14.8'	-59.0'	166.9°	51°16.4'	-59.0'	167.2°	50°17.9'	-59.1'	167.4°	49°19.3'	-59.2'	167.7°	48°20.7'	-59.2'	167.9°	47°22.0'	-59.3'	168.1°	46°23.2'	-59.3'	168.4°	2
3	51°15.9'	-59.0'	167.2°	50°17.4'	-59.1'	167.4°	49°18.8'	-59.1'	167.7°	48°20.1'	-59.2'	167.9°	47°21.4'	-59.2'	168.2°	46°22.7'	-59.3'	168.4°	45°23.9'	-59.3'	168.6°	3
4	50°16.9'	-59.1'	167.5°	49°18.3'	-59.1'	167.7°	48°19.6'	-59.2'	167.9°	47°20.9'	-59.2'	168.2°	46°22.2'	-59.3'	168.4°	45°23.4'	-59.3'	168.6°	44°24.6'	-59.4'	168.8°	4
5	49°17.8'	-59.1'	167.7°	48°19.2'	-59.2'	168.0°	47°20.5'	-59.2'	168.2°	46°21.7'	-59.3'	168.4°	45°22.9'	-59.3'	168.6°	44°24.1'	-59.3'	168.8°	43°25.2'	-59.4'	169.0°	5
6	48°18.7'	-59.1'	168.0°	47°20.0'	-59.2'	168.2°	46°21.3'	-59.2'	168.4°	45°22.5'	-59.3'	168.6°	44°23.6'	-59.3'	168.8°	43°24.7'	-59.4'	169.0°	42°25.8'	-59.4'	169.2°	6
7	47°19.6'	-59.2'	168.2°	46°20.8'	-59.2'	168.5°	45°22.0'	-59.3'	168.7°	44°23.2'	-59.3'	168.9°	43°24.3'	-59.3'	169.0°	42°25.4'	-59.4'	169.2°	41°26.4'	-59.4'	169.4°	7
8	46°20.5'	-59.2'	168.5°	45°21.6'	-59.2'	168.7°	44°22.8'	-59.3'	168.9°	43°23.9'	-59.3'	169.1°	42°25.0'	-59.4'	169.2°	41°26.0'	-59.4'	169.4°	40°27.0'	-59.4'	169.6°	8
9	45°21.3'	-59.2'	168.7°	44°22.4'	-59.3'	168.9°	43°23.5'	-59.3'	169.1°	42°24.6'	-59.3'	169.3°	41°25.6'	-59.4'	169.4°	40°26.6'	-59.4'	169.6°	39°27.6'	-59.4'	169.7°	9
10	44°22.0'	-59.2'	168.9°	43°23.1'	-59.3'	169.1°	42°24.2'	-59.3'	169.3°	41°25.2'	-59.4'	169.5°	40°26.2'	-59.4'	169.6°	39°27.2'	-59.4'	169.8°	38°28.1'	-59.5'	169.9°	10
11	43°22.8'	-59.3'	169.2°	42°23.8'	-59.3'	169.3°	41°24.9'	-59.3'	169.5°	40°25.9'	-59.4'	169.7°	39°26.8'	-59.4'	169.8°	38°27.7'	-59.4'	170.0°	37°28.7'	-59.5'	170.1°	11
12	42°23.5'	-59.3'	169.4°	41°24.5'	-59.3'	169.5°	40°25.5'	-59.4'	169.7°	39°26.5'	-59.4'	169.8°	38°27.4'	-59.4'	170.0°	37°28.3'	-59.5'	170.1°	36°29.2'	-59.5'	170.3°	12
13	41°24.2'	-59.3'	169.6°	40°25.2'	-59.3'	169.7°	39°26.2'	-59.4'	169.9°	38°27.1'	-59.4'	170.0°	37°28.0'	-59.4'	170.2°	36°28.8'	-59.5'	170.3°	35°29.7'	-59.5'	170.4°	13
14	40°24.9'	-59.3'	169.8°	39°25.9'	-59.4'	169.9°	38°26.8'	-59.4'	170.1°	37°27.7'	-59.4'	170.2°	36°28.5'	-59.5'	170.3°	35°29.4'	-59.5'	170.5°	34°30.2'	-59.5'	170.6°	14
15	39°25.6'	-59.4'	170.0°	38°26.5'	-59.4'	170.1°	37°27.4'	-59.4'	170.3°	36°28.2'	-59.4'	170.4°	35°29.1'	-59.5'	170.5°	34°29.9'	-59.5'	170.6°	33°30.7'	-59.5'	170.7°	15
16	38°26.2'	-59.4'	170.2°	37°27.1'	-59.4'	170.3°	36°28.0'	-59.4'	170.4°	35°28.8'	-59.5'	170.5°	34°29.6'	-59.5'	170.7°	33°30.4'	-59.5'	170.8°	32°31.1'	-59.5'	170.9°	16
17	37°26.9'	-59.4'	170.3°	36°27.7'	-59.4'	170.5°	35°28.5'	-59.4'	170.6°	34°29.3'	-59.5'	170.7°	33°30.1'	-59.5'	170.8°	32°30.9'	-59.5'	170.9°	31°31.6'	-59.5'	171.0°	17
18	36°27.5'	-59.4'	170.5°	35°28.3'	-59.4'	170.6°	34°29.1'	-59.5'	170.8°	33°29.8'	-59.5'	170.9°	32°30.6'	-59.5'	171.0°	31°31.3'	-59.5'	171.1°	30°32.1'	-59.6'	171.2°	18
19	35°28.1'	-59.4'	170.7°	34°28.9'	-59.4'	170.8°	33°29.6'	-59.5'	170.9°	32°30.4'	-59.5'	171.0°	31°31.1'	-59.5'	171.1°	30°31.8'	-59.5'	171.2°	29°32.5'	-59.6'	171.3°	19
20	34°28.7'	-59.4'	170.9°	33°29.4'	-59.5'	171.0°	32°30.1'	-59.5'	171.1°	31°30.9'	-59.5'	171.2°	30°31.6'	-59.5'	171.3°	29°32.3'	-59.6'	171.4°	28°32.9'	-59.6'	171.4°	20
21	33°29.2'	-59.4'	171.1°	32°30.0'	-59.5'	171.1°	31°30.7'	-59.5'	171.2°	30°31.4'	-59.5'	171.3°	29°32.0'	-59.5'	171.4°	28°32.7'	-59.6'	171.5°	27°33.1'	-59.6'	171.6°	21
22	32°29.8'	-59.5'	171.2°	31°30.5'	-59.5'	171.3°	30°31.2'	-59.5'	171.4°	29°31.8'	-59.5'	171.5°	28°32.5'	-59.5'	171.6°	27°33.1'	-59.6'	171.6°	26°33.8'	-59.6'	171.7°	22
23	31°30.3'	-59.5'	171.4°	30°31.0'	-59.5'	171.4°	29°31.7'	-59.5'	171.5°	28°32.3'	-59.5'	171.6°	27°33.0'	-59.6'	171.7°	26°33.6'	-59.6'	171.8°	25°34.2'	-59.6'	171.8°	23
Dec°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Dec°
	35			36			37			38			39			40			41			

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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	54°23.6'	-59.1'	167.9°	53°25.0'	-59.2'	168.2°	52°26.2'	-59.2'	168.5°	51°27.4'	-59.3'	168.7°	50°28.5'	-59.3'	169.0°	49°29.6'	-59.4'	169.2°	48°30.7'	-59.4'	169.4°	0
1	53°24.5'	-59.2'	168.2°	52°25.8'	-59.2'	168.5°	51°27.0'	-59.3'	168.7°	50°28.1'	-59.3'	169.0°	49°29.2'	-59.4'	169.2°	48°30.2'	-59.4'	169.4°	47°31.2'	-59.5'	169.6°	1
2	52°25.3'	-59.2'	168.5°	51°26.6'	-59.3'	168.7°	50°27.7'	-59.3'	169.0°	49°28.8'	-59.4'	169.2°	48°29.8'	-59.4'	169.4°	47°30.8'	-59.4'	169.6°	46°31.8'	-59.5'	169.8°	2
3	51°26.2'	-59.2'	168.7°	50°27.3'	-59.3'	169.0°	49°28.4'	-59.3'	169.2°	48°29.4'	-59.4'	169.4°	47°30.4'	-59.4'	169.6°	46°31.4'	-59.5'	169.8°	45°32.3'	-59.5'	170.0°	3
4	50°26.9'	-59.3'	169.0°	49°28.0'	-59.3'	169.2°	48°29.0'	-59.4'	169.4°	47°30.0'	-59.4'	169.6°	46°31.0'	-59.4'	169.8°	45°31.9'	-59.5'	170.0°	44°32.8'	-59.5'	170.2°	4
5	49°27.7'	-59.3'	169.2°	48°28.7'	-59.3'	169.4°	47°29.7'	-59.4'	169.6°	46°30.6'	-59.4'	169.8°	45°31.6'	-59.5'	170.0°	44°32.5'	-59.5'	170.2°	43°33.3'	-59.5'	170.4°	5
6	48°28.3'	-59.3'	169.5°	47°29.3'	-59.4'	169.7°	46°30.3'	-59.4'	169.9°	45°31.2'	-59.4'	170.0°	44°32.1'	-59.5'	170.2°	43°33.0'	-59.5'	170.4°	42°33.8'	-59.5'	170.5°	6
7	47°29.0'	-59.4'	169.7°	46°30.0'	-59.4'	169.9°	45°30.9'	-59.4'	170.1°	44°31.8'	-59.5'	170.2°	43°32.6'	-59.5'	170.4°	42°33.5'	-59.5'	170.5°	41°34.3'	-59.6'	170.7°	7
8	46°29.7'	-59.4'	169.9°	45°30.6'	-59.4'	170.1°	44°31.5'	-59.4'	170.3°	43°32.3'	-59.5'	170.4°	42°33.1'	-59.5'	170.6°	41°33.9'	-59.5'	170.7°	40°34.7'	-59.6'	170.9°	8
9	45°30.3'	-59.4'	170.1°	44°31.2'	-59.4'	170.3°	43°32.0'	-59.5'	170.4°	42°32.8'	-59.5'	170.6°	41°33.6'	-59.5'	170.7°	40°34.4'	-59.6'	170.9°	39°35.1'	-59.6'	171.0°	9
10	44°30.9'	-59.4'	170.3°	43°31.7'	-59.5'	170.5°	42°32.5'	-59.5'	170.6°	41°33.3'	-59.5'	170.8°	40°34.1'	-59.5'	170.9°	39°34.8'	-59.6'	171.0°	38°35.6'	-59.6'	171.2°	10
11	43°31.5'	-59.4'	170.5°	42°32.3'	-59.5'	170.7°	41°33.1'	-59.5'	170.8°	40°33.8'	-59.5'	170.9°	39°34.6'	-59.6'	171.1°	38°35.3'	-59.6'	171.2°	37°36.0'	-59.6'	171.3°	11
12	42°32.0'	-59.5'	170.7°	41°32.8'	-59.5'	170.8°	40°33.6'	-59.5'	171.0°	39°34.3'	-59.5'	171.1°	38°35.0'	-59.6'	171.2°	37°35.7'	-59.6'	171.3°	36°36.4'	-59.6'	171.5°	12
13	41°32.6'	-59.5'	170.9°	40°33.3'	-59.5'	171.0°	39°34.1'	-59.5'	171.1°	38°34.8'	-59.6'	171.3°	37°35.4'	-59.6'	171.4°	36°36.1'	-59.6'	171.5°	35°36.8'	-59.6'	171.6°	13
14	40°33.1'	-59.5'	171.0°	39°33.8'	-59.5'	171.2°	38°34.5'	-59.5'	171.3°	37°35.2'	-59.6'	171.4°	36°35.9'	-59.6'	171.5°	35°36.5'	-59.6'	171.6°	34°37.1'	-59.6'	171.7°	14
15	39°33.6'	-59.5'	171.2°	38°34.3'	-59.5'	171.3°	37°35.0'	-59.6'	171.5°	36°35.6'	-59.6'	171.6°	35°36.3'	-59.6'	171.7°	34°36.9'	-59.6'	171.8°	33°37.5'	-59.6'	171.9°	15
16	38°34.1'	-59.5'	171.4°	37°34.8'	-59.5'	171.5°	36°35.4'	-59.6'	171.6°	35°36.1'	-59.6'	171.7°	34°36.7'	-59.6'	171.8°	33°37.3'	-59.6'	171.9°	32°37.9'	-59.6'	172.0°	16
17	37°34.6'	-59.5'	171.5°	36°35.2'	-59.6'	171.7°	35°35.9'	-59.6'	171.8°	34°36.5'	-59.6'	171.9°	33°37.1'	-59.6'	172.0°	32°37.7'	-59.6'	172.0°	31°38.2'	-59.7'	172.1°	17
18	36°35.1'	-59.5'	171.7°	35°35.7'	-59.6'	171.8°	34°36.3'	-59.6'	171.9°	33°36.9'	-59.6'	172.0°	32°37.5'	-59.6'	172.1°	31°38.0'	-59.6'	172.2°	30°38.6'	-59.7'	172.3°	18
19	35°35.5'	-59.6'	171.9°	34°36.1'	-59.6'	172.0°	33°36.7'	-59.6'	172.0°	32°37.3'	-59.6'	172.1°	31°37.8'	-59.6'	172.2°	30°38.4'	-59.6'	172.3°	29°38.9'	-59.7'	172.4°	19
20	34°36.0'	-59.6'	172.0°	33°36.6'	-59.6'	172.1°	32°37.1'	-59.6'	172.2°	31°37.7'	-59.6'	172.3°	30°38.2'	-59.6'	172.4°	29°38.7'	-59.7'	172.4°	28°39.3'	-59.7'	172.5°	20
21	33°36.4'	-59.6'	172.1°	32°37.0'	-59.6'	172.2°	31°37.5'	-59.6'	172.3°	30°38.0'	-59.6'											

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

6° 354° LHA		Latitude CONTRARY to Declination								6° 354° LHA															
Dec°	35			36			37			38			39			40			41			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	54°33.2'	-59.4'	169.6°	53°34.2'	-59.4'	169.9°	52°35.1'	-59.4'	170.1°	51°36.0'	-59.5'	170.3°	50°36.8'	-59.5'	170.5°	49°37.6'	-59.5'	170.7°	48°38.4'	-59.6'	170.9°	0			
1	53°33.8'	-59.4'	169.9°	52°34.8'	-59.4'	170.1°	51°35.7'	-59.5'	170.3°	50°36.5'	-59.5'	170.5°	49°37.3'	-59.5'	170.7°	48°38.1'	-59.6'	170.9°	47°38.8'	-59.6'	171.1°	1			
2	52°34.5'	-59.4'	170.1°	51°35.4'	-59.5'	170.3°	50°36.2'	-59.5'	170.5°	49°37.0'	-59.5'	170.7°	48°37.8'	-59.6'	170.9°	47°38.5'	-59.6'	171.1°	46°39.2'	-59.6'	171.2°	2			
3	51°35.1'	-59.4'	170.3°	50°35.9'	-59.5'	170.5°	49°36.7'	-59.5'	170.7°	48°37.5'	-59.5'	170.9°	47°38.2'	-59.6'	171.1°	46°38.9'	-59.6'	171.3°	45°39.6'	-59.6'	171.4°	3			
4	50°35.7'	-59.5'	170.5°	49°36.5'	-59.5'	170.7°	48°37.2'	-59.5'	170.9°	47°38.0'	-59.6'	171.1°	46°38.7'	-59.6'	171.3°	45°39.3'	-59.6'	171.4°	44°40.0'	-59.6'	171.6°	4			
5	49°36.2'	-59.5'	170.8°	48°37.0'	-59.5'	170.9°	47°37.7'	-59.5'	171.1°	46°38.4'	-59.6'	171.3°	45°39.1'	-59.6'	171.4°	44°39.7'	-59.6'	171.6°	43°40.4'	-59.6'	171.7°	5			
6	48°36.7'	-59.5'	171.0°	47°37.4'	-59.5'	171.1°	46°38.1'	-59.6'	171.3°	45°38.8'	-59.6'	171.4°	44°39.5'	-59.6'	171.6°	43°40.1'	-59.6'	171.7°	42°40.7'	-59.7'	171.9°	6			
7	47°37.2'	-59.5'	171.1°	46°37.9'	-59.6'	171.3°	45°38.6'	-59.6'	171.5°	44°39.2'	-59.6'	171.6°	43°39.9'	-59.6'	171.8°	42°40.5'	-59.6'	171.9°	41°41.1'	-59.7'	172.0°	7			
8	46°37.7'	-59.5'	171.3°	45°38.4'	-59.6'	171.5°	44°39.0'	-59.6'	171.6°	43°39.6'	-59.6'	171.8°	42°40.2'	-59.6'	171.9°	41°40.8'	-59.7'	172.0°	40°41.4'	-59.7'	172.2°	8			
9	45°38.1'	-59.6'	171.5°	44°38.8'	-59.6'	171.7°	43°39.4'	-59.6'	171.8°	42°40.0'	-59.6'	171.9°	41°40.6'	-59.6'	172.1°	40°41.2'	-59.7'	172.2°	39°41.7'	-59.7'	172.3°	9			
10	44°38.6'	-59.6'	171.7°	43°39.2'	-59.6'	171.8°	42°39.8'	-59.6'	172.0°	41°40.4'	-59.6'	172.1°	40°40.9'	-59.7'	172.2°	39°41.5'	-59.7'	172.3°	38°42.0'	-59.7'	172.4°	10			
11	43°39.0'	-59.6'	171.8°	42°39.6'	-59.6'	172.0°	41°40.2'	-59.6'	172.1°	40°40.7'	-59.7'	172.2°	39°41.3'	-59.7'	172.3°	38°41.8'	-59.7'	172.4°	37°42.3'	-59.7'	172.5°	11			
12	42°39.4'	-59.6'	172.0°	41°40.0'	-59.6'	172.1°	40°40.6'	-59.6'	172.3°	39°41.1'	-59.7'	172.4°	38°41.6'	-59.7'	172.5°	37°42.1'	-59.7'	172.6°	36°42.6'	-59.7'	172.7°	12			
13	41°39.8'	-59.6'	172.2°	40°40.4'	-59.6'	172.3°	39°40.9'	-59.7'	172.4°	38°41.4'	-59.7'	172.5°	37°41.9'	-59.7'	172.6°	36°42.4'	-59.7'	172.7°	35°42.9'	-59.7'	172.8°	13			
14	40°40.2'	-59.6'	172.3°	39°40.7'	-59.6'	172.4°	38°41.3'	-59.7'	172.5°	37°41.8'	-59.7'	172.6°	36°42.3'	-59.7'	172.7°	35°42.7'	-59.7'	172.8°	34°43.2'	-59.7'	172.9°	14			
15	39°40.6'	-59.6'	172.5°	38°41.1'	-59.7'	172.6°	37°41.6'	-59.7'	172.7°	36°42.1'	-59.7'	172.8°	35°42.6'	-59.7'	172.9°	34°43.0'	-59.7'	172.9°	33°43.5'	-59.7'	173.0°	15			
16	38°41.0'	-59.6'	172.6°	37°41.5'	-59.7'	172.7°	36°41.9'	-59.7'	172.8°	35°42.4'	-59.7'	172.9°	34°42.9'	-59.7'	173.0°	33°43.3'	-59.7'	173.1°	32°43.7'	-59.7'	173.1°	16			
17	37°41.3'	-59.7'	172.7°	36°41.8'	-59.7'	172.8°	35°42.3'	-59.7'	172.9°	34°42.7'	-59.7'	173.0°	33°43.1'	-59.7'	173.1°	32°43.6'	-59.7'	173.2°	31°44.0'	-59.7'	173.3°	17			
18	36°41.7'	-59.7'	172.9°	35°42.1'	-59.7'	173.0°	34°42.6'	-59.7'	173.1°	33°43.0'	-59.7'	173.1°	32°43.4'	-59.7'	173.2°	31°43.8'	-59.7'	173.3°	30°44.3'	-59.7'	173.4°	18			
19	35°42.0'	-59.7'	173.0°	34°42.4'	-59.7'	173.1°	33°42.9'	-59.7'	173.2°	32°43.3'	-59.7'	173.3°	31°43.7'	-59.7'	173.3°	30°44.1'	-59.7'	173.4°	29°44.5'	-59.8'	173.5°	19			
20	34°42.3'	-59.7'	173.1°	33°42.8'	-59.7'	173.2°	32°43.2'	-59.7'	173.3°	31°43.6'	-59.7'	173.4°	30°44.0'	-59.7'	173.4°	29°44.4'	-59.7'	173.5°	28°44.7'	-59.8'	173.6°	20			
21	33°42.7'	-59.7'	173.3°	32°43.1'	-59.7'	173.3°	31°43.5'	-59.7'	173.4°	30°43.9'	-59.7'	173.5°	29°44.2'	-59.7'	173.5°	28°44.6'	-59.8'	173.6°	27°45.0'	-59.8'	173.7°	21			
22	32°43.0'	-59.7'	173.4°	31°43.4'	-59.7'	173.5°	30°43.8'	-59.7'	173.5°	29°44.1'	-59.7'	173.6°	28°44.5'	-59.7'	173.7°	27°44.9'	-59.8'	173.7°	26°45.2'	-59.8'	173.8°	22			
23	31°43.3'	-59.7'	173.5°	30°43.7'	-59.7'	173.6°	29°44.0'	-59.7'	173.6°	28°44.4'	-59.7'	173.7°	27°44.8'	-59.7'	173.8°	26°45.1'	-59.8'	173.8°	25°45.5'	-59.8'	173.9°	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°
	35			36			37			38			39			40			41						

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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	54°41.3'	-59.6'	171.3°	53°42.1'	-59.6'	171.5°	52°42.7'	-59.6'	171.7°	51°43.3'	-59.6'	171.9°	50°43.9'	-59.7'	172.1°	49°44.5'	-59.7'	172.2°	48°45.0'	-59.7'	172.4°	0
1	53°41.8'	-59.6'	171.5°	52°42.5'	-59.6'	171.7°	51°43.1'	-59.6'	171.9°	50°43.7'	-59.7'	172.1°	49°44.2'	-59.7'	172.3°	48°44.8'	-59.7'	172.4°	47°45.3'	-59.7'	172.6°	1
2	52°42.2'	-59.6'	171.7°	51°42.9'	-59.6'	171.9°	50°43.5'	-59.6'	172.1°	49°44.0'	-59.7'	172.3°	48°44.6'	-59.7'	172.4°	47°45.1'	-59.7'	172.6°	46°45.6'	-59.7'	172.7°	2
3	51°42.7'	-59.6'	171.9°	50°43.3'	-59.6'	172.1°	49°43.8'	-59.7'	172.3°	48°44.3'	-59.7'	172.4°	47°44.9'	-59.7'	172.6°	46°45.4'	-59.7'	172.7°	45°45.8'	-59.7'	172.8°	3
4	50°43.1'	-59.6'	172.1°	49°43.6'	-59.6'	172.3°	48°44.2'	-59.7'	172.4°	47°44.7'	-59.7'	172.6°	46°45.2'	-59.7'	172.7°	45°45.5'	-59.7'	172.9°	44°46.1'	-59.7'	173.0°	4
5	49°43.4'	-59.6'	172.3°	48°44.0'	-59.7'	172.4°	47°44.5'	-59.7'	172.6°	46°45.0'	-59.7'	172.7°	45°45.5'	-59.7'	172.9°	44°46.2'	-59.7'	173.0°	43°46.4'	-59.8'	173.1°	5
6	48°43.8'	-59.7'	172.4°	47°44.3'	-59.7'	172.6°	46°44.8'	-59.7'	172.7°	45°45.3'	-59.7'	172.9°	44°46.5'	-59.7'	173.0°	43°46.7'	-59.7'	173.1°	42°46.6'	-59.8'	173.2°	6
7	47°44.1'	-59.7'	172.6°	46°44.6'	-59.7'	172.7°	45°45.1'	-59.7'	172.9°	44°46.6'	-59.7'	173.0°	43°46.6'	-59.7'	173.1°	42°46.4'	-59.8'	173.2°	41°46.8'	-59.8'	173.3°	7
8	46°44.5'	-59.7'	172.8°	45°44.9'	-59.7'	172.9°	44°45.4'	-59.7'	173.0°	43°45.8'	-59.7'	173.1°	42°46.3'	-59.7'	173.2°	41°46.7'	-59.8'	173.4°	40°47.1'	-59.8'	173.5°	8
9	45°44.8'	-59.7'	172.9°	44°45.2'	-59.7'	173.0°	43°45.7'	-59.7'	173.2°	42°46.1'	-59.7'	173.3°	41°46.5'	-59.8'	173.4°	40°46.9'	-59.8'	173.5°	39°47.3'	-59.8'	173.6°	9
10	44°45.1'	-59.7'	173.1°	43°45.5'	-59.7'	173.2°	42°46.0'	-59.7'	173.3°	41°46.4'	-59.7'	173.4°	40°46.8'	-59.8'	173.5°	39°47.1'	-59.8'	173.6°	38°47.5'	-59.8'	173.7°	10
11	43°45.4'	-59.7'	173.2°	42°45.8'	-59.7'	173.3°	41°46.2'	-59.7'	173.4°	40°46.6'	-59.8'	173.5°	39°47.0'	-59.8'	173.6°	38°47.4'	-59.8'	173.7°	37°47.7'	-59.8'	173.8°	11
12	42°45.7'	-59.7'	173.3°	41°46.1'	-59.7'	173.4°	40°46.5'	-59.7'	173.5°	39°46.9'	-59.8'	173.6°	38°47.2'	-59.8'	173.7°	37°47.6'	-59.8'	173.8°	36°47.9'	-59.8'	173.9°	12
13	41°46.0'	-59.7'	173.5°	40°46.4'	-59.7'	173.6°	39°46.7'	-59.8'	173.7°	38°47.1'	-59.8'	173.7°	37°47.4'	-59.8'	173.8°	36°47.8'	-59.8'	173.9°	35°48.1'	-59.8'	174.0°	13
14	40°46.2'	-59.7'	173.6°	39°46.6'	-59.8'	173.7°	38°47.0'	-59.8'	173.8°	37°47.3'	-59.8'	173.9°	36°47.7'	-59.8'	173.9°	35°48.0'	-59.8'	174.0°	34°48.3'	-59.8'	174.1°	14
15	39°46.5'	-59.7'	173.7°	38°46.9'	-59.8'	173.8°	37°47.2'	-59.8'	173.9°	36°47.5'	-59.8'	174.0°	35°47.9'	-59.8'	174.0°	34°48.2'	-59.8'	174.1°	33°48.5'	-59.8'	174.2°	15
16	38°46.8'	-59.8'	173.8°	37°47.1'	-59.8'	173.9°	36°47.4'	-59.8'	174.0°	35°47.8'	-59.8'	174.1°	34°48.1'	-59.8'	174.1°	33°48.4'	-59.8'	174.2°	32°48.7'	-59.8'	174.3°	16
17	37°47.0'	-59.8'	173.9°	36°47.3'	-59.8'	174.0°	35°47.7'	-59.8'	174.1°	34°48.0'	-59.8'	174.2°	33°48.3'	-59.8'	174.2°	32°48.6'	-59.8'	174.3°	31°48.9'	-59.8'	174.4°	17
18	36°47.3'	-59.8'	174.1°	35°47.6'	-59.8'	174.1°	34°47.9'	-59.8'	174.2°	33°48.2'	-59.8'	174.3°	32°48.5'	-59.8'	174.3°	31°48.8'	-59.8'	174.4°	30°49.1'	-59.8'	174.5°	18
19	35°47.5'	-59.8'	174.2°	34°47.8'	-59.8'	174.2°	33°48.1'	-59.8'	174.3°	32°48.4'	-59.8'	174.4°	31°48.7'	-59.8'	174.4°	30°49.0'	-59.8'	174.5°	29°49.2'	-59.8'	174.5°	19
20	34°47.7'	-59.8'	174.3°	33°48.0'	-59.8'	174.3°	32°48.3'	-59.8'	174.4°	31°48.6'	-59.8'	174.5°	30°48.9'	-59.8'	174.5°	29°49.1'	-59.8'	174.6°	28°49.4'	-59.8'	174.6°	20
21	33°47.9'	-59.8'	174.4°	32°48.2'	-59.8'	174.4°	31°48.5'	-59.8'	174.5°	30°48.8'	-59.8'	174.6°	29°49.1'	-59.8'	174.6°	28°49.3'	-59.8'	174.7°	27°49.6'	-		

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

4° 356° LHA			Latitude CONTRARY to Declination						4° 356° LHA																
Dec°	35			36			37			38			39			40			41			Dec°			
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°				
0	54°48.0'	-59.7'	173.0°	53°48.5'	-59.7'	173.2°	52°48.9'	-59.8'	173.4°	51°49.3'	-59.8'	173.5°	50°49.7'	-59.8'	173.7°	49°50.0'	-59.8'	173.8°	48°50.4'	-59.8'	173.9°	0			
1	53°48.3'	-59.7'	173.2°	52°48.8'	-59.7'	173.4°	51°49.2'	-59.8'	173.5°	50°49.6'	-59.8'	173.7°	49°49.9'	-59.8'	173.8°	48°50.2'	-59.8'	173.9°	47°50.6'	-59.8'	174.0°	1			
2	52°48.6'	-59.7'	173.4°	51°49.0'	-59.8'	173.5°	50°49.4'	-59.8'	173.7°	49°49.7'	-59.8'	173.8°	48°50.1'	-59.8'	173.9°	47°50.4'	-59.8'	174.0°	46°50.8'	-59.8'	174.1°	2			
3	51°48.9'	-59.7'	173.5°	50°49.3'	-59.8'	173.7°	49°49.6'	-59.8'	173.8°	48°50.0'	-59.8'	173.9°	47°50.3'	-59.8'	174.0°	46°50.6'	-59.8'	174.2°	45°50.9'	-59.8'	174.3°	3			
4	50°49.1'	-59.8'	173.7°	49°49.5'	-59.8'	173.8°	48°49.8'	-59.8'	173.9°	47°50.2'	-59.8'	174.0°	46°50.5'	-59.8'	174.2°	45°50.8'	-59.8'	174.3°	44°51.1'	-59.8'	174.4°	4			
5	49°49.4'	-59.8'	173.8°	48°49.7'	-59.8'	173.9°	47°50.1'	-59.8'	174.1°	46°50.4'	-59.8'	174.2°	45°50.7'	-59.8'	174.3°	44°51.0'	-59.8'	174.4°	43°51.3'	-59.8'	174.5°	5			
6	48°49.6'	-59.8'	174.0°	47°49.9'	-59.8'	174.1°	46°50.3'	-59.8'	174.2°	45°50.6'	-59.8'	174.3°	44°50.9'	-59.8'	174.4°	43°51.1'	-59.8'	174.5°	42°51.4'	-59.8'	174.6°	6			
7	47°49.8'	-59.8'	174.1°	46°50.2'	-59.8'	174.2°	45°50.5'	-59.8'	174.3°	44°50.8'	-59.8'	174.4°	43°51.0'	-59.8'	174.5°	42°51.3'	-59.8'	174.6°	41°51.6'	-59.9'	174.7°	7			
8	46°50.1'	-59.8'	174.2°	45°50.4'	-59.8'	174.3°	44°50.6'	-59.8'	174.4°	43°50.9'	-59.8'	174.5°	42°51.2'	-59.8'	174.6°	41°51.5'	-59.8'	174.7°	40°51.7'	-59.9'	174.8°	8			
9	45°50.3'	-59.8'	174.3°	44°50.5'	-59.8'	174.4°	43°50.8'	-59.8'	174.5°	42°51.1'	-59.8'	174.6°	41°51.4'	-59.8'	174.7°	40°51.6'	-59.9'	174.8°	39°51.9'	-59.9'	174.9°	9			
10	44°50.5'	-59.8'	174.4°	43°50.7'	-59.8'	174.5°	42°51.0'	-59.8'	174.6°	41°51.3'	-59.8'	174.7°	40°51.5'	-59.8'	174.8°	39°51.8'	-59.9'	174.9°	38°52.0'	-59.9'	175.0°	10			
11	43°50.7'	-59.8'	174.6°	42°50.9'	-59.8'	174.6°	41°51.2'	-59.8'	174.7°	40°51.4'	-59.8'	174.8°	39°51.7'	-59.9'	174.9°	38°51.9'	-59.9'	175.0°	37°52.1'	-59.9'	175.0°	11			
12	42°50.8'	-59.8'	174.7°	41°51.1'	-59.8'	174.7°	40°51.3'	-59.8'	174.8°	39°51.6'	-59.8'	174.9°	38°51.8'	-59.9'	175.0°	37°52.0'	-59.9'	175.0°	36°52.3'	-59.9'	175.1°	12			
13	41°51.0'	-59.8'	174.8°	40°51.3'	-59.8'	174.8°	39°51.5'	-59.8'	174.9°	38°51.7'	-59.9'	175.0°	37°52.0'	-59.9'	175.1°	36°52.2'	-59.9'	175.1°	35°52.4'	-59.9'	175.2°	13			
14	40°51.2'	-59.8'	174.9°	39°51.4'	-59.8'	174.9°	38°51.7'	-59.8'	175.0°	37°51.9'	-59.9'	175.1°	36°52.1'	-59.9'	175.1°	35°52.3'	-59.9'	175.2°	34°52.5'	-59.9'	175.3°	14			
15	39°51.4'	-59.8'	175.0°	38°51.6'	-59.8'	175.0°	37°51.8'	-59.9'	175.1°	36°52.0'	-59.9'	175.2°	35°52.2'	-59.9'	175.2°	34°52.4'	-59.9'	175.3°	33°52.6'	-59.9'	175.3°	15			
16	38°51.5'	-59.8'	175.1°	37°51.7'	-59.8'	175.1°	36°52.0'	-59.9'	175.2°	35°52.1'	-59.9'	175.3°	34°52.4'	-59.9'	175.3°	33°52.6'	-59.9'	175.4°	32°52.8'	-59.9'	175.4°	16			
17	37°51.7'	-59.8'	175.2°	36°51.9'	-59.9'	175.2°	35°52.1'	-59.9'	175.3°	34°52.3'	-59.9'	175.3°	33°52.5'	-59.9'	175.4°	32°52.7'	-59.9'	175.4°	31°52.8'	-59.9'	175.5°	17			
18	36°51.8'	-59.8'	175.2°	35°52.0'	-59.9'	175.3°	34°52.2'	-59.9'	175.4°	33°52.4'	-59.9'	175.4°	32°52.6'	-59.9'	175.5°	31°52.8'	-59.9'	175.5°	30°53.0'	-59.9'	175.6°	18			
19	35°52.0'	-59.9'	175.3°	34°52.2'	-59.9'	175.4°	33°52.4'	-59.9'	175.4°	32°52.6'	-59.9'	175.5°	31°52.7'	-59.9'	175.5°	30°52.9'	-59.9'	175.6°	29°53.1'	-59.9'	175.6°	19			
20	34°52.1'	-59.9'	175.4°	33°52.3'	-59.9'	175.5°	32°52.5'	-59.9'	175.5°	31°52.7'	-59.9'	175.6°	30°52.9'	-59.9'	175.6°	29°53.0'	-59.9'	175.7°	28°53.2'	-59.9'	175.7°	20			
21	33°52.3'	-59.9'	175.5°	32°52.5'	-59.9'	175.6°	31°52.6'	-59.9'	175.6°	30°52.8'	-59.9'	175.6°	29°53.0'	-59.9'	175.7°	28°53.1'	-59.9'	175.7°	27°53.3'	-59.9'	175.8°	21			
22	32°52.4'	-59.9'	175.6°	31°52.6'	-59.9'	175.6°	30°52.8'	-59.9'	175.7°	29°52.9'	-59.9'	175.7°	28°53.1'	-59.9'	175.8°	27°53.3'	-59.9'	175.8°	26°53.4'	-59.9'	175.8°	22			
23	31°52.6'	-59.9'	175.7°	30°52.7'	-59.9'	175.7°	29°52.9'	-59.9'	175.8°	28°53.1'	-59.9'	175.8°	27°53.2'	-59.9'	175.8°	26°53.4'	-59.9'	175.9°	25°53.5'	-59.9'	175.9°	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°
	35			36			37			38			39			40			41						

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°	35			36			37			38			39			40			41			Dec°
	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	Hc°	d'	Z°	
0	54°53.2'	-59.8'	174.8°	53°53.5'	-59.8'	174.9°	52°53.8'	-59.9'	175.0°	51°54.0'	-59.9'	175.1°	50°54.2'	-59.9'	175.2°	49°54.4'	-59.9'	175.3°	48°54.6'	-59.9'	175.4°	0
1	53°53.4'	-59.8'	174.9°	52°53.7'	-59.9'	175.0°	51°53.9'	-59.9'	175.1°	50°54.1'	-59.9'	175.2°	49°54.3'	-59.9'	175.3°	48°54.5'	-59.9'	175.4°	47°54.7'	-59.9'	175.5°	1
2	52°53.5'	-59.9'	175.0°	51°53.8'	-59.9'	175.1°	50°54.0'	-59.9'	175.2°	49°54.2'	-59.9'	175.3°	48°54.4'	-59.9'	175.4°	47°54.6'	-59.9'	175.5°	46°54.8'	-59.9'	175.6°	2
3	51°53.7'	-59.9'	175.1°	50°54.0'	-59.9'	175.2°	49°54.2'	-59.9'	175.3°	48°54.4'	-59.9'	175.4°	47°54.5'	-59.9'	175.5°	46°54.7'	-59.9'	175.6°	45°54.9'	-59.9'	175.7°	3
4	50°53.9'	-59.9'	175.3°	49°54.1'	-59.9'	175.4°	48°54.3'	-59.9'	175.5°	47°54.4'	-59.9'	175.6°	46°54.6'	-59.9'	175.6°	45°54.8'	-59.9'	175.7°	44°55.0'	-59.9'	175.8°	4
5	49°54.0'	-59.9'	175.4°	48°54.2'	-59.9'	175.5°	47°54.4'	-59.9'	175.5°	46°54.6'	-59.9'	175.6°	45°54.8'	-59.9'	175.7°	44°55.0'	-59.9'	175.8°	43°55.1'	-59.9'	175.8°	5
6	48°54.2'	-59.9'	175.5°	47°54.3'	-59.9'	175.5°	46°54.5'	-59.9'	175.6°	45°54.7'	-59.9'	175.7°	44°54.9'	-59.9'	175.8°	43°55.0'	-59.9'	175.9°	42°55.2'	-59.9'	175.9°	6
7	47°54.3'	-59.9'	175.6°	46°54.5'	-59.9'	175.6°	45°54.6'	-59.9'	175.7°	44°54.8'	-59.9'	175.8°	43°55.0'	-59.9'	175.9°	42°55.1'	-59.9'	175.9°	41°55.3'	-59.9'	176.0°	7
8	46°54.4'	-59.9'	175.6°	45°54.6'	-59.9'	175.7°	44°54.7'	-59.9'	175.8°	43°54.9'	-59.9'	175.9°	42°55.0'	-59.9'	175.9°	41°55.2'	-59.9'	176.0°	40°55.3'	-59.9'	176.0°	8
9	45°54.5'	-59.9'	175.7°	44°54.7'	-59.9'	175.8°	43°54.8'	-59.9'	175.9°	42°55.0'	-59.9'	176.0°	41°55.1'	-59.9'	176.0°	40°55.3'	-59.9'	176.1°	39°55.4'	-59.9'	176.1°	9
10	44°54.6'	-59.9'	175.8°	43°54.8'	-59.9'	175.9°	42°54.9'	-59.9'	176.0°	41°55.1'	-59.9'	176.0°	40°55.2'	-59.9'	176.1°	39°55.4'	-59.9'	176.1°	38°55.5'	-59.9'	176.2°	10
11	43°54.7'	-59.9'	175.9°	42°54.9'	-59.9'	176.0°	41°55.0'	-59.9'	176.0°	40°55.2'	-59.9'	176.1°	39°55.3'	-59.9'	176.2°	38°55.4'	-59.9'	176.2°	37°55.6'	-59.9'	176.3°	11
12	42°54.8'	-59.9'	176.0°	41°55.0'	-59.9'	176.1°	40°55.1'	-59.9'	176.1°	39°55.3'	-59.9'	176.2°	38°55.4'	-59.9'	176.2°	37°55.5'	-59.9'	176.3°	36°55.6'	-59.9'	176.3°	12
13	41°54.9'	-59.9'	176.1°	40°55.1'	-59.9'	176.1°	39°55.2'	-59.9'	176.2°	38°55.3'	-59.9'	176.2°	37°55.5'	-59.9'	176.3°	36°55.6'	-59.9'	176.3°	35°55.7'	-59.9'	176.4°	13
14	40°55.0'	-59.9'	176.1°	39°55.2'	-59.9'	176.2°	38°55.3'	-59.9'	176.3°	37°55.4'	-59.9'	176.3°	36°55.6'	-59.9'	176.4°	35°55.7'	-59.9'	176.4°	34°55.8'	-59.9'	176.4°	14
15	39°55.1'	-59.9'	176.2°	38°55.3'	-59.9'	176.3°	37°55.4'	-59.9'	176.3°	36°55.5'	-59.9'	176.4°	35°55.6'	-59.9'	176.4°	34°55.7'	-59.9'	176.5°	33°55.9'	-59.9'	176.5°	15
16	38°55.2'	-59.9'	176.3°	37°55.4'	-59.9'	176.3°	36°55.5'	-59.9'	176.4°	35°55.6'	-59.9'	176.4°	34°55.7'	-59.9'	176.5°	33°55.8'	-59.9'	176.5°	32°55.9'	-59.9'	176.6°	16
17	37°55.3'	-59.9'	176.4°	36°55.4'	-59.9'	176.4°	35°55.6'	-59.9'	176.5°	34°55.7'	-59.9'	176.5°	33°55.8'	-59.9'	176.5°	32°55.9'	-59.9'	176.6°	31°56.0'	-59.9'	176.6°	17
18	36°55.4'	-59.9'	176.4°	35°55.5'	-59.9'	176.5°	34°55.6'	-59.9'	176.5°	33°55.7'	-59.9'	176.6°	32°55.8'	-59.9'	176.6°	31°56.0'	-59.9'	176.6°	30°56.1'	-59.9'	176.7°	18
19	35°55.5'	-59.9'	176.5°	34°55.6'	-59.9'	176.5°	33°55.7'	-59.9'	176.6°	32°55.8'	-59.9'	176.6°	31°55.9'	-59.9'	176.7°	30°56.0'	-59.9'	176.7°	29°56.1'	-59.9'	176.7°	19
20	34°55.6'	-59.9'	176.6°	33°55.7'	-59.9'	176.6°	32°55.8'	-59.9'	176.6°	31°55.9'	-59.9'	176.7°	30°56.0'	-59.9'	176.7°	29°56.1'	-59.9'	176.7°	28°56.2'	-59.9'	176.8°	20
21	33°55.7'	-59.9'	176.6°	32°55.8'	-59.9'	176.7°	31°55.9'	-59.9'	176.7°	30°56.0'	-59.9'	176.7°	29°56.1'	-59.9'	176.8°	28°56.1'						





**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**







