

Date	Declination (D)	Altitude at Meridian (A)	Sunset Position
Vernal (spring) equinox (March 21 st)	0°	46°	Due West
Mid-May (approximately)	12°	Z = 44 - 12 = 32 A = 90 - Z = 58	NoFW
Summer Solstice (June 21 st)	23°	Z = 44 - 23 = 21 A = 90 - Z = 69	NoFW
Autumnal equinox (September 22 nd)	0°	46°	W
Mid-November (approximately)	-12°	34°	SoFW
Winter Solstice (December 21 st)	-23°	Z = 44 + 23 = 67 A = 90 - Z = 23	South of West

For L and D, angles South of the equator are negative.

D = Sun's declination
L = Your latitude (St. Paul = 44°)

Z = Sun's zenith angle
A = Sun's altitude

$$Z = L - D \quad (\text{if } D \text{ is negative, } Z > L)$$

$$A = 90 - Z = 90 - (L - D) = 90 - L + D$$

