Astronomy Exercise 1

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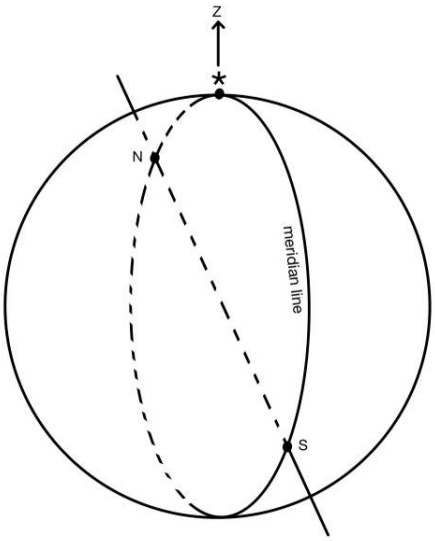
1. Coordinate system

a) Define **zenith**, **nadir**, the **celestial north** and **south poles**, and the **meridian line**. Draw the meridian plane of an observer, including the position of the observer (*), the zenith (Z), the meridian line, and the north (N) and south (S) poles.

- **zenith**: Point which is directly over the observer on a celestial sphere
- **nadir**: Point which is directly under the observer on a celestial sphere
- **celestial north pole**: Northern point of the Earth's rotation axis
- **celestial south pole**: Southern point of the Earth's rotation axis
- **meridian line**: Great circle that passes through the celestial poles



b) An observer located in the Earth's Northern Hemisphere observers the top and bottom culminations of circumpolar star. Measuring $h_i = 20^\circ\, 22'\, 32.4"$; $A_i = 180^\circ$ for the hight and Azimuth of the bottom culmination and $h_s = 50^\circ\, 23'\, 08.2"$; $A_s = 180^\circ$ for the upper culmination. What is the observer's latitude ϕ?

c) Determine the maximum height in the sky that the globular cluster ωCen (declination $\delta = -47^\circ\, 29'$) reaches when observed from the Inter-American Observatory of Cerro Tololo, Chile (latitude $\phi = -30 degree\, 10'\, 20.9"$)