

RISING, SETTING, AND TIME IN THE SKY

a)³⁰ For object at **declination δ** & observer at **latitude λ** :

RISE AND SETTING POSITIONS

$$A_{\text{rise}} = \cos^{-1} \left(\frac{\sin \delta}{\cos \lambda} \right) \text{ degrees} \quad A_{\text{set}} = 360 - A_{\text{rise}} \text{ degrees}$$

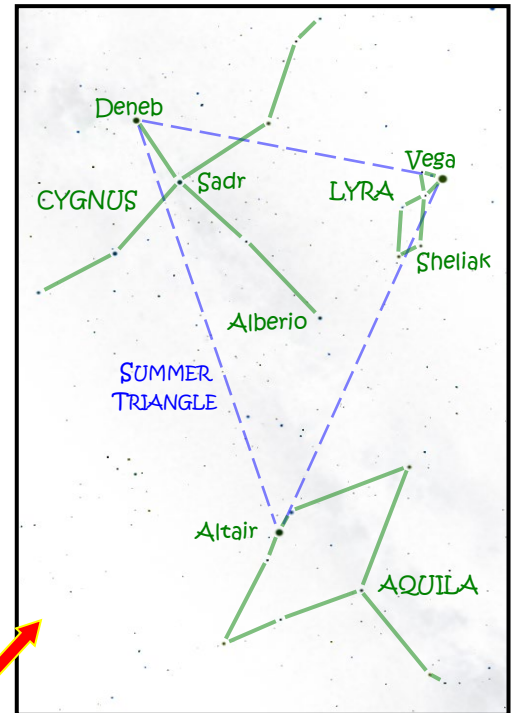
MAXIMUM ALTITUDE (AT TRANSIT)

$$\text{Alt}_{\text{Max}} = \text{Alt}_{\text{CE}} + \delta = (90 - \lambda) + \delta \text{ degrees}$$

TIME ABOVE THE HORIZON

$$\Delta t = \frac{2}{15} \cos^{-1} (-\tan \lambda \tan \delta) \text{ hours}$$

b)⁹ Label stars (in table), constellations, & Summer Triangle:



STAR	OTHER NAME	α	δ		CANTON, NY ($\lambda = 44^\circ 36' = 44.6^\circ$)			
			deg min	degrees	A_{RISE} (deg)	A_{SET} (deg)	MAX ALT.	Δt (h)
α Lyr	Vega	18 ^h 37 ^m	+38°47'	38.8°	28.4°	331.6°	84.2°	19.0
β Lyr	Sheliak	18 ^h 50 ^m	+33°22'	33.4°	39.4°	320.6°	78.8°	17.4
α Cyg	Deneb	20 ^h 41 ^m	+45°16'	45.3°	3.9°	356.1°	90.7°	23.3
β Cyg	Alberio	19 ^h 31 ^m	+27°58'	28.0°	48.8°	311.2°	73.4°	16.2
α Aql	Altair	19 ^h 51 ^m	+8°52'	8.9°	77.5°	282.5°	54.3°	13.2

c)⁵ Show the approximate rising path of each star below (they all rise parallel to the CE at an angle of 45.4° in Canton)

