

Class 1 : General notes & Distances Measuring

General notes:

What is a star?

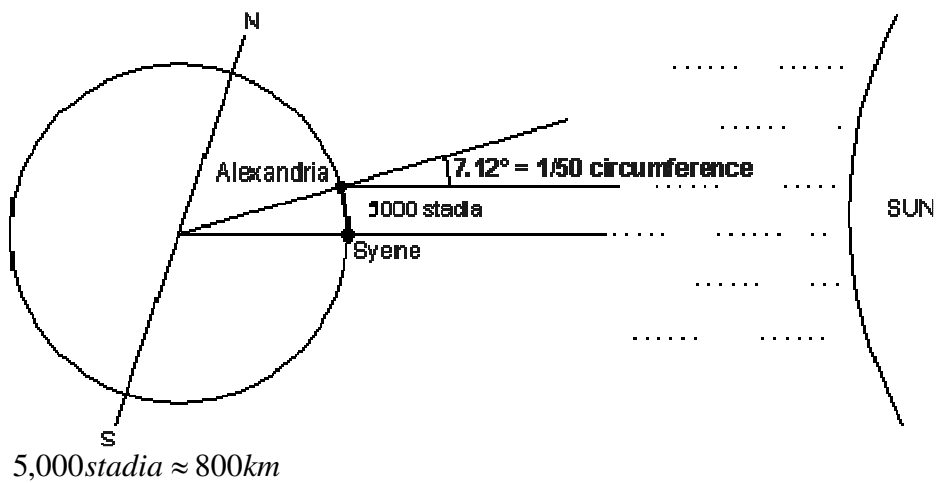
What is a planet?

What is a galaxy?

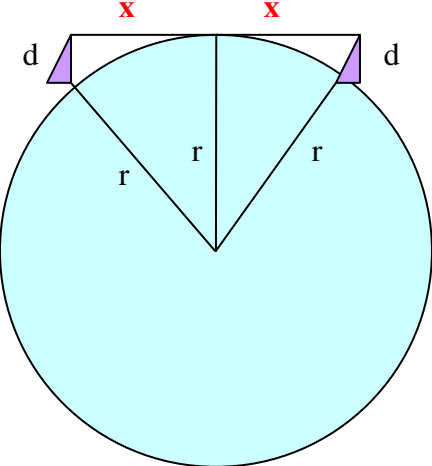
The universe ..

What are the constellations ?

Measuring the radius of the earth:



Ship at sea:



Some useful distances:

$$R_{\oplus} = 6.4 \times 10^8 \text{ cm}$$

$$R_{\odot} = 6.96 \times 10^{10} \text{ cm}$$

$$R_{\text{galaxy}} = 3 \times 10^{22} \text{ cm}$$

$$1 \text{ A.U.} = 1.5 \times 10^{13} \text{ cm}$$

$$1 \text{ pc} = ? \text{ cm}$$

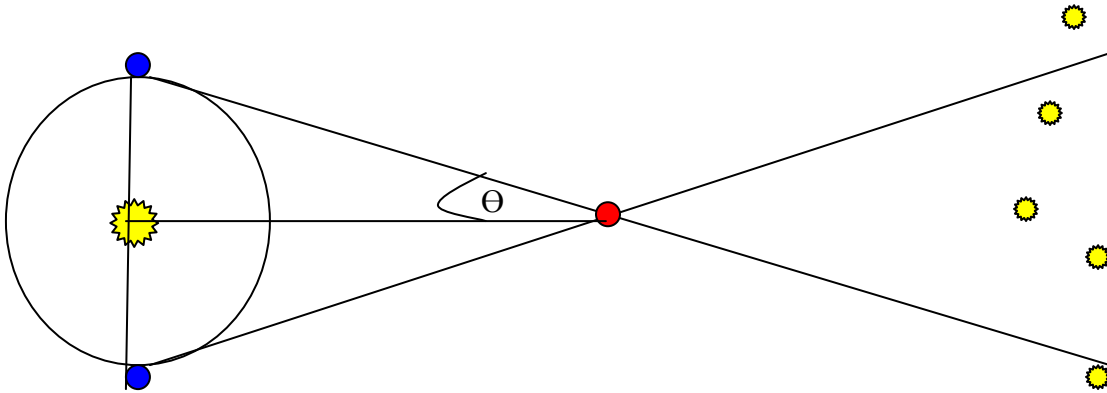
$$1 \text{ ly} = ? \text{ cm}$$

$$1 \text{ radian} = \frac{180^\circ}{\pi} = 2.063 \times 10^5 \text{ ''}$$

$$1'' = \frac{1^\circ}{3600 \text{ sec}} \frac{\pi}{180^\circ} = 1 \text{ arc sec. (in radians)}$$

Parallax method:

By measuring the shift across the sky (in arc. Sec.) and knowing the distance the earth has moved around the sun, we can calculate the distance to the star.



Example

Proxima Centauri, the nearest star (other than the sun), has an observed shift in position of 0.76 seconds of arc, much too small to be measured without a telescope.

$$d = \frac{R}{\sin(\theta_{rad})} \approx \frac{R}{\theta}$$

$$d = \frac{1AU}{\left(\frac{0.77}{3600} \frac{\pi}{180}\right)} = 4 \times 10^{18} cm$$