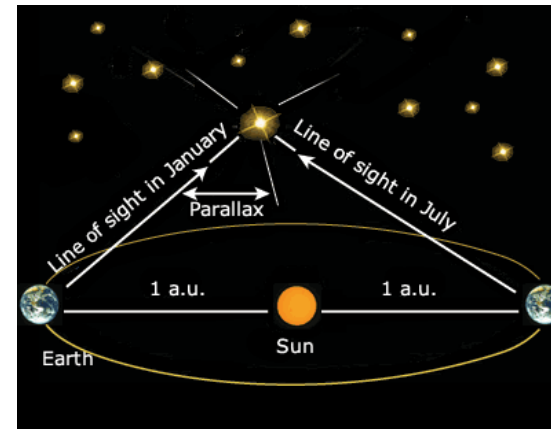
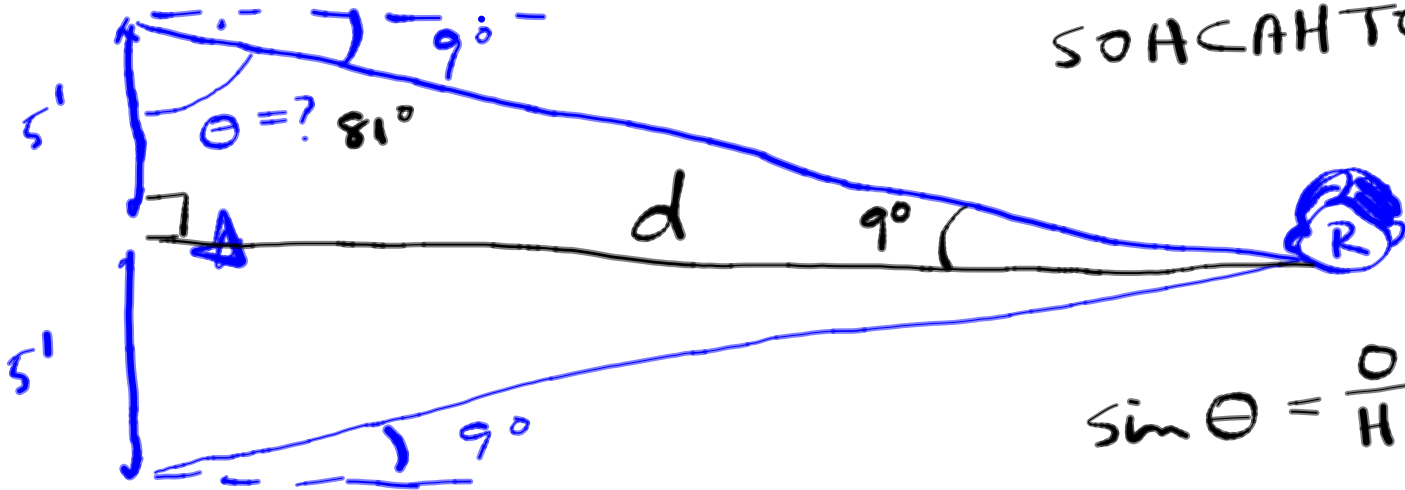
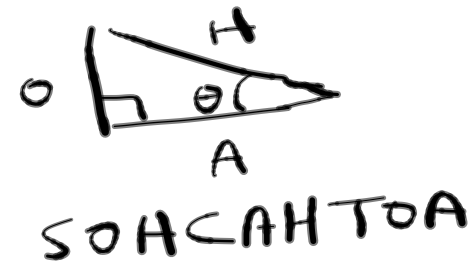


get your clicker

L&D: So...how do we know how far away things are?
What's the evidence?



LO05: Give an example of how simple geometric reasoning can be used to measure the distances and sizes of otherwise inaccessible objects



$$\sin \theta = \frac{O}{H}$$

$$\cos \theta = \frac{A}{H}$$

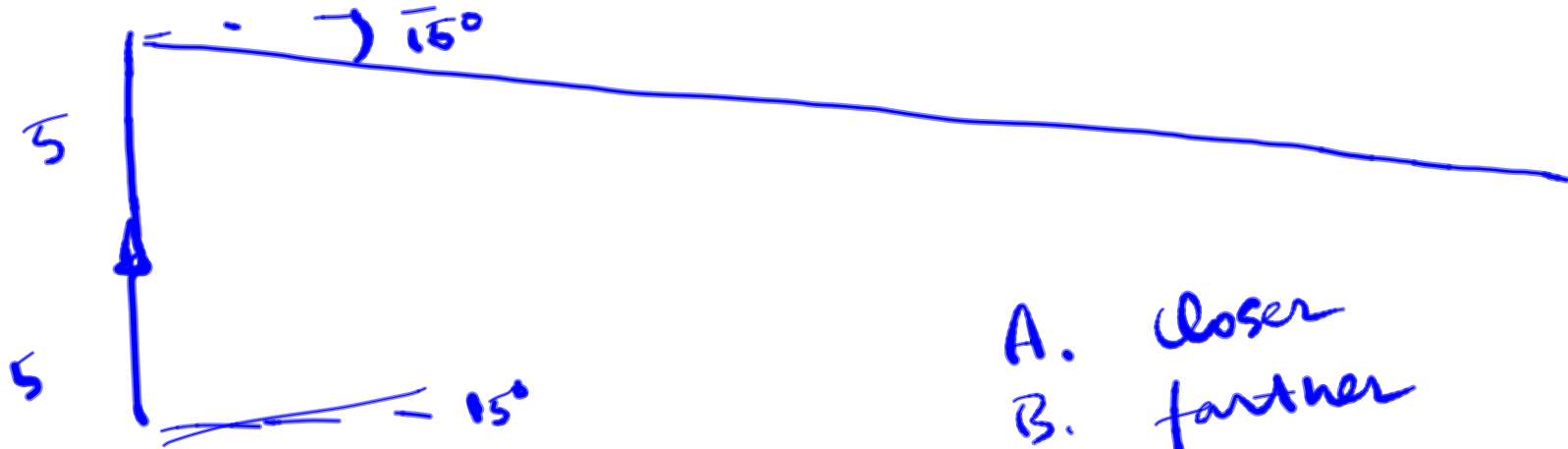
$$\tan \theta = \frac{O}{A}$$



$$\frac{5}{d} = \tan 90^\circ$$

$$d = \frac{5}{\tan 90^\circ}$$

This method is called: Stellar Parallax

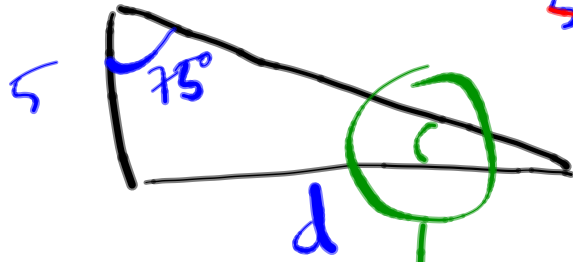


- A. closer
- B. farther
- C. same

A small right-angled triangle with a vertical side of length 5, a horizontal side of length d, and an angle of 15° at the bottom right. The hypotenuse is the distance to the star.

$$d \times \frac{5}{d} = \tan 15^\circ \times d$$
$$\frac{5}{\tan 15^\circ} = d \frac{\tan 15^\circ}{\tan 15^\circ}$$

$$d = \frac{5}{\tan 15^\circ}$$



$$\cancel{5} + \frac{d}{\cancel{5}} = \tan 75^\circ \times 5$$

$$d = 5 \tan 75^\circ$$

this is the
angle used
in real life
measurements

REAL LIFE UNITS

FOR REAL STARS

$$\begin{array}{l} \text{A } \theta < 9^\circ \\ \text{B } \theta > 9^\circ \end{array}$$

IN FACT, ANGLES ARE SO SMALL...

WE USE "ARCSECONDS"

$$1 \text{ arcsecond} = \frac{1}{3600} \text{ degree}$$

AND FOR DISTANCE?

$$\text{"PARSEC"} = 3.26 \text{ ly}$$

AN OBJECT W/ $\theta = 1 \text{ arcsec}$
(FROM EARTH)

IS 1 PARSEC AWAY