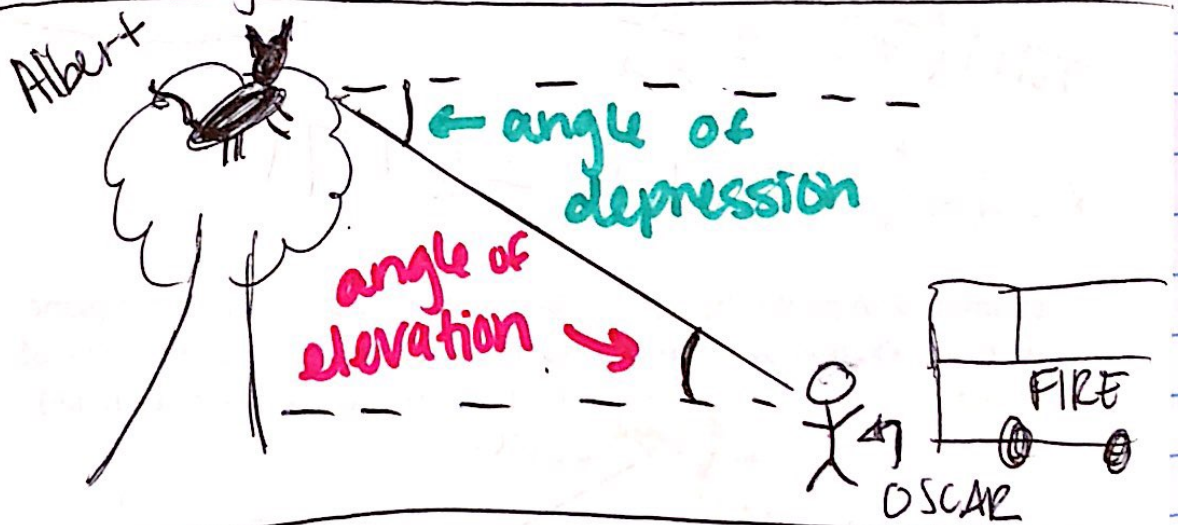


Angles of Elevation & Depression

Angle of Elevation: angle formed by a horizontal line and the line of sight looking UP.

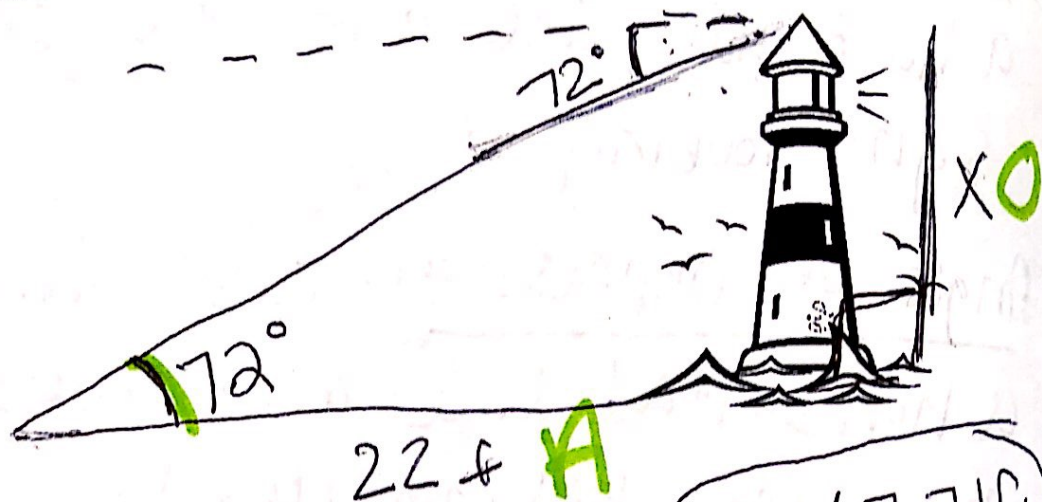
Angle of Depression: angle formed by a horizontal line and the line of sight looking DOWN.



Because the horizontals are parallel, the angles of elevation and the angles of depression are always congruent.

Why? Alt. Int Angles

Example 1: At 2 pm, the shadow of a lighthouse is 22 feet long and the angle of depression of the sun is 72° . Find the height of the lighthouse.

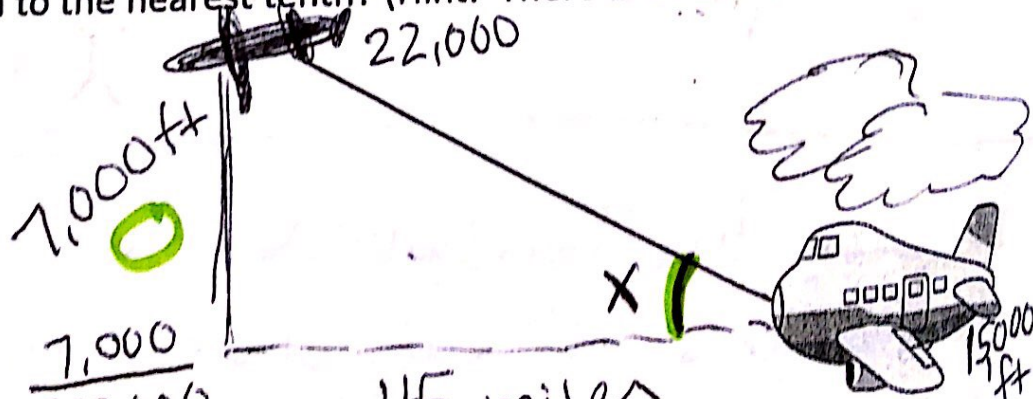


$$X = 67.71 \text{ ft}$$

$$\tan(72^\circ) = \frac{X}{22}$$

$$X = 22 (\tan(72)) = 67.71$$

Example 2: A pilot is flying at 15,000 feet and wants to take the plane up to 22,000 feet over the next 45 miles. What should be his angle of elevation to the nearest tenth? (Hint: There are 5280 feet in a mile.)



$$\tan(x) = \frac{7,000}{237,600}$$

$$x = \tan^{-1}\left(\frac{7,000}{237,600}\right)$$

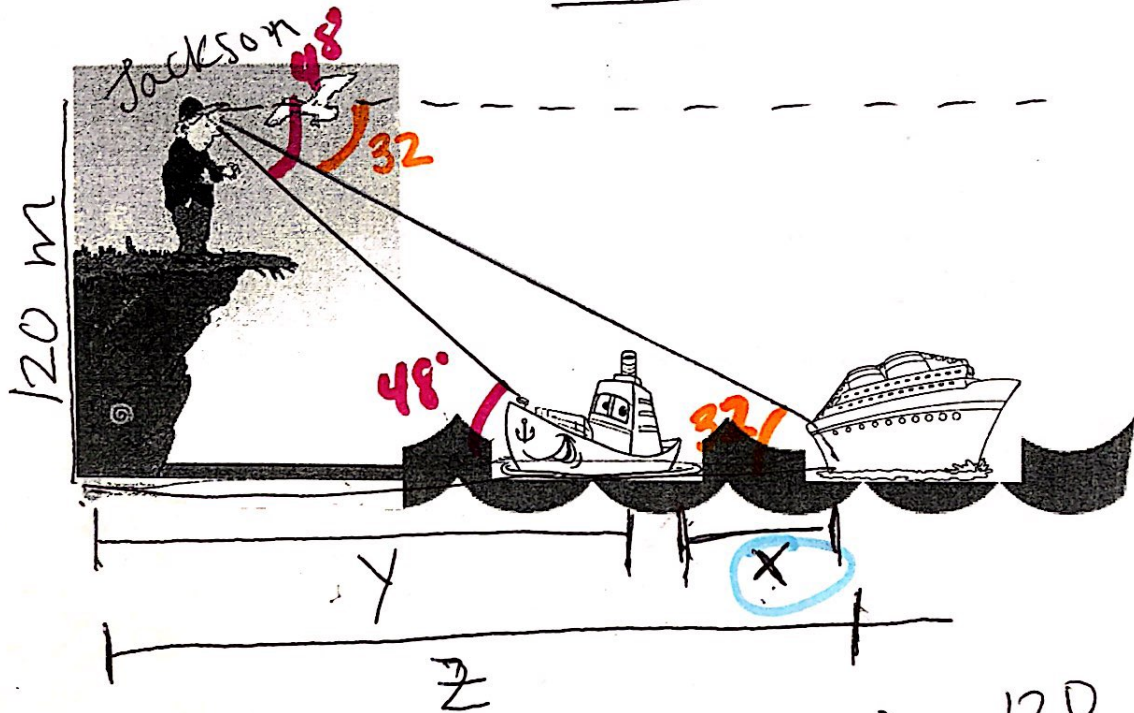
$$x = 1.69$$

45 miles
(237,600 ft) A

$1.7^\circ = \text{Angle of elevation}$

Angles of Elevation & Depression

Example 3: An observer on a cliff, 120 meters above sea level sights two ships due east. The angle of depression of the ships are 48° and 32° . Find, to the nearest meter, the distance between the ships.



$$\tan(48) = \frac{120}{y}$$

$$\tan(32) = \frac{120}{z}$$

$$y = 120 / \tan(48)$$

$$z = 120 / \tan(32)$$

$$y = 108.05$$

$$z = 192.04$$

$$x = z - y$$

$$x = 192.04 - 108.05 = 83.99$$

84m