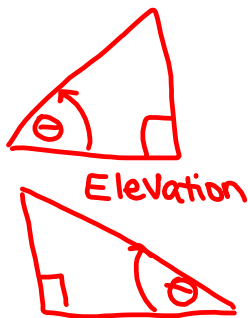


Applications using Right Triangles

*** Angles of **ELEVATION** and **DEPRESSION**

always originate from horizontal. ***



1. A safety regulation states that the maximum angle of elevation for a rescue ladder is 72°. If a fire department's ladder is 110 feet long, what is the maximum safe rescue height?

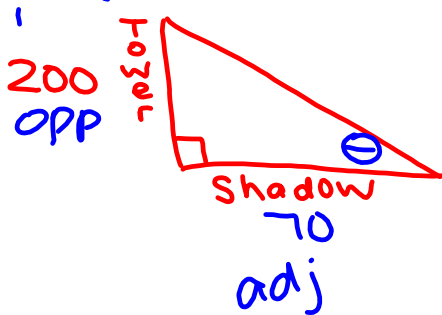


$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$110 \cdot \sin 72^\circ = \frac{x}{110} \cdot 110$$

$$\boxed{104.6 \text{ ft}} = x$$

2. The length of the shadow of a 200 foot tower is 70 feet. Find the angle of elevation to the sun.



$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

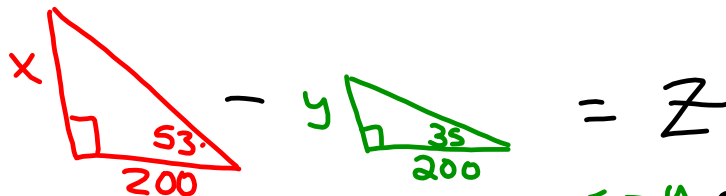
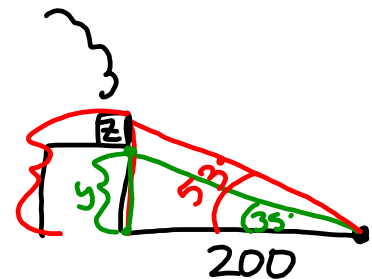
$$\tan \theta = \frac{200}{70}$$

$$\theta = \tan^{-1}\left(\frac{200}{70}\right)$$

$$\theta = 70.7^\circ$$

3. At the point 200 feet from the base of a building, the angle of elevation to the bottom of a smokestack on top of the building is 35° and the angle of elevation to the top of the same smokestack is 53° .

Find the height of the smokestack.



$$200 \cdot \tan 53^\circ = \frac{x}{200} \cdot 200 \quad 200 \cdot \tan 35^\circ = \frac{y}{200} \cdot 200$$

$$265.4 = x$$

$$140.0 = y$$

$$265.4 - 140 = 125.4 \text{ ft}$$