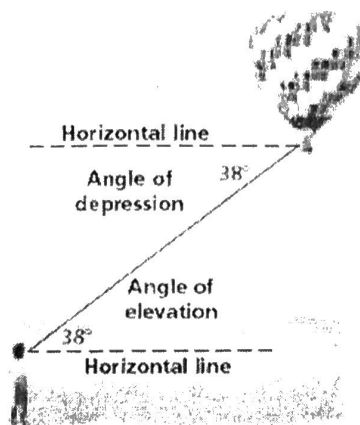


Angle of Elevation:

Person on the ground looks up at an object

Angle of Depression:

Person looks down at an object

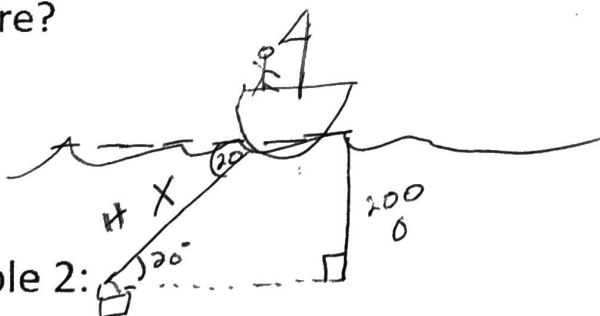
**Why are the two angles congruent?**

Transversal and parallel lines (alternate interior angles)

Angle of Elevation and Angle of Depression will be the same.

Example 1:

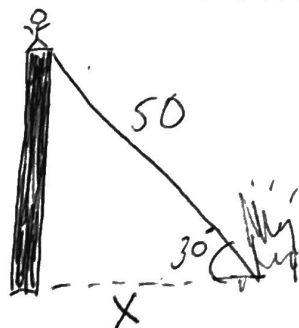
A person on a boat on the water spots a sunken treasure that is 200 feet below the water. He jumps out and swims directly to the treasure at an angle of 20° . How far will the diver have to swim to get to the treasure?



$$\begin{aligned} X \cdot \sin 20 &= \frac{200}{\sin 20} \cdot \sin 20 \\ &= \frac{200}{\sin 20} \\ &= 585 \text{ ft} \end{aligned}$$

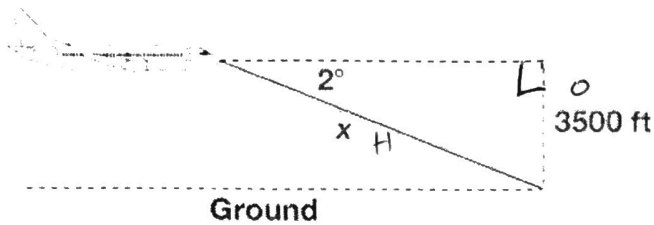
Example 2:

A man standing on a tower spots a fire that is 50 feet from his line of sight at the top of the tower. From the fire, there is an angle of 30° to the top of the tower. How far is the fire from the base of the tower?



$$\begin{aligned} \cos 30 &= \frac{X}{50} \\ 50 \cdot \cos 30 &= X \\ 43.30 &= X \end{aligned}$$

Example 3: An airplane flying 3500 ft above ground begins a 2° descent to land at an airport. How many miles from the airport is the airplane when it starts its descent?



$$5,280 \text{ ft in a mile}$$

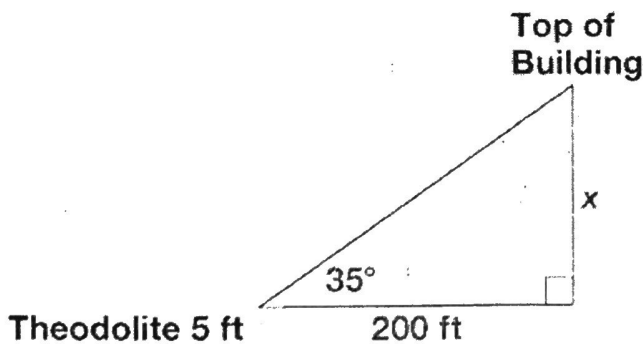
$$\sin 2^\circ = \frac{3500}{x}$$

$$x = \frac{3500}{\sin 2^\circ}$$

$$= 100,288 \text{ ft}$$

$$= 19 \text{ miles}$$

Example 4: A surveyor stands 200 ft from a building to measure its height with a 5-ft tall theodolite. The angle of elevation to the top of the building is 35° . How tall is the building?



$$\tan 35^\circ = \frac{x}{200}$$

$$x = 200 \cdot \tan 35^\circ$$

$$x = 140 \text{ ft}$$

$$+ 5$$

$$= 145 \text{ ft}$$