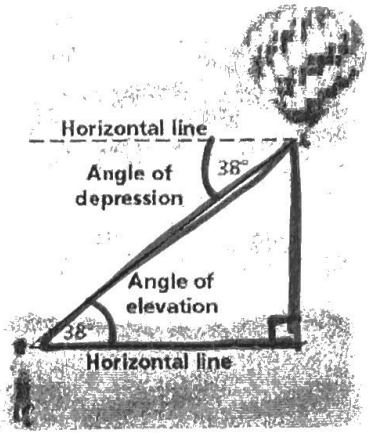
6.10 Notes Angle of Elevation and Depression Name: Key

Date: _____ Period: _____

Angle of Elevation:
Person on the ground looks up at an object
(inside Δ)

Angle of Depression:
Person looks down at an object
(outside Δ)

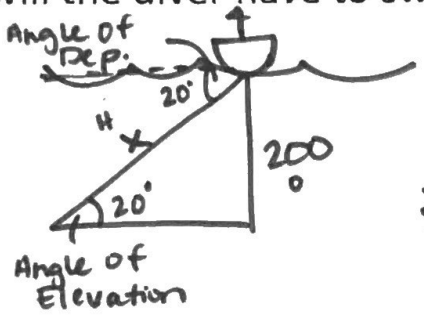


Why are the two angles congruent?

Transversal and parallel lines (alternate interior angles)

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?

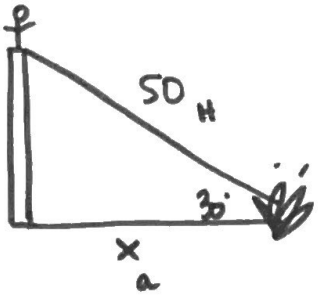


$\sin 20 = \frac{200}{x}$

$\frac{200}{\sin 20} = 584.76 \text{ ft}$

Example 2:

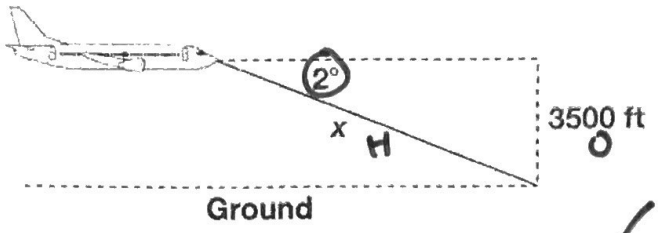
A man standing on a tower spots a fire that is 50 feet from his line of sight at the top of the tower. From the fire, there is an angle of 30° to the top of the tower. How far is the fire from the base of the tower?



$\cos 30 = \frac{x}{50}$

$50 \cos 30 = 25\sqrt{3} = 43.30 \text{ ft}$

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?

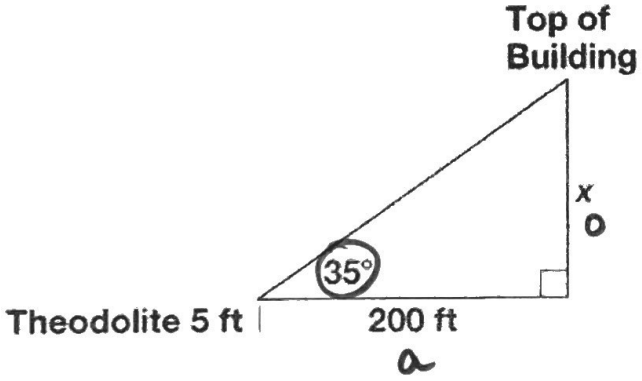


convert to miles

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

$x = \frac{3500}{\sin 2} = \frac{100,287.98\text{ ft}}{5,280} = \boxed{18.99\text{ mi}}$

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?



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

was measured 5 ft off ground, so have to add back in!

$200\tan 35 = 140.04 + 5 = \boxed{145.04\text{ ft}}$