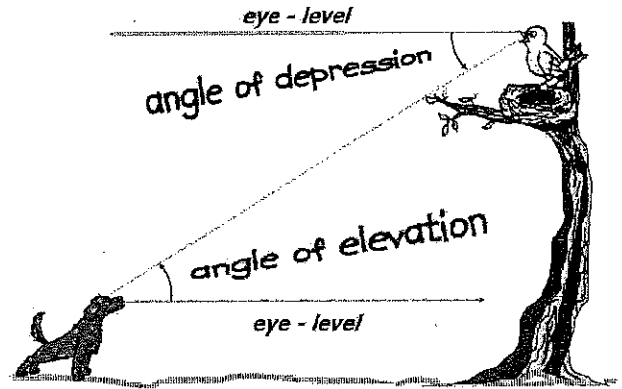


Trig – Application

Name: _____

Angle of Elevation and Angle of Depression:

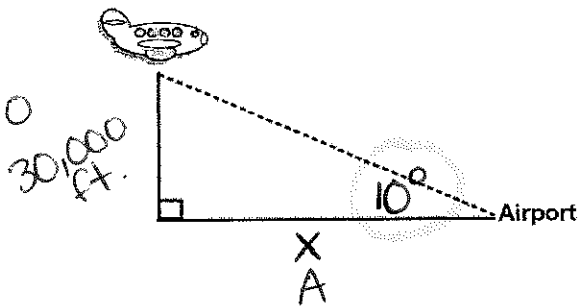
Both are angles with one side that is a horizontal line. When the second side of the angle is below the Horizontal, the angle formed is an angle of depression. When the second side of the angle is above the Horizontal line, the angle formed is an angle of elevation.



1. Decide if each of the following forms an angle of elevation or an angle of depression:

- A. The line of sight of a person standing on top of a building looking at the street. *depression*
- B. The line of sight of a person standing on top of a building looking at an airplane in the sky. *elevation*
- C. The angle formed by a guy wire anchored to the ground. *elevation*

2. An airplane flying at an *height* altitude of 30,000 feet is headed toward an airport. To guide the airplane to a safe landing, the airport's landing system sends radar signals from the runway to the airplane at a 10° angle of elevation. How far is the airplane from the airport runway (measured along the ground)?



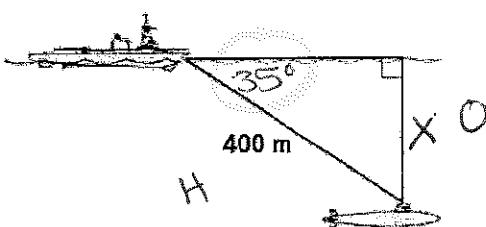
$$\tan \theta = \frac{O}{A}$$

$$\tan 10 = \frac{30000}{X}$$

$$X = \frac{30000}{\tan 10}$$

$$X = 170,138.455 \text{ ft}$$

3. A sonar operator on a ship detects a submarine at a distance of 400 meters and an angle of depression measuring 35°. How deep is the submarine?

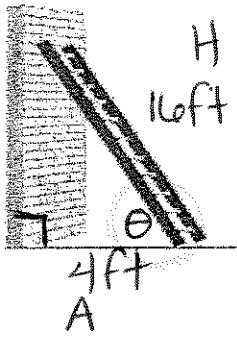


$$\sin \theta = \frac{O}{H}$$

$$(400) \sin 35 = \frac{X}{400} (400)$$

$$229.431 \text{ m} = X$$

4. You lean a 16 foot ladder against the wall. If the base of the ladder is 4 feet from the wall, what angle does the ladder make with the ground?



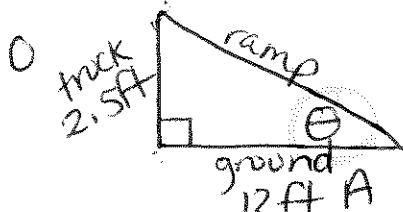
$$\cos \theta = \frac{A}{H}$$

$$\cos \theta = \frac{4}{16}$$

$$\theta = \cos^{-1}\left(\frac{4}{16}\right)$$

$$\theta = 75.522^\circ$$

5. A moving truck is equipped with a ramp that extends from the back of the truck to the ground. When the ramp is fully extended, it touches the ground 12 feet from the back of the truck. The height of the ramp is 2.5 feet. Calculate the measure of the angle formed by the ramp and the ground.

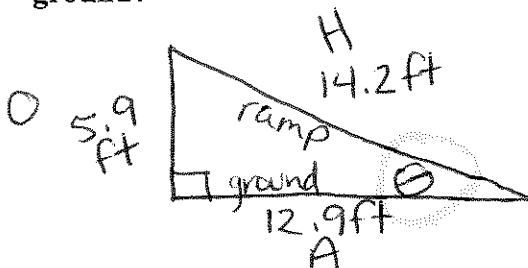


$$\tan \theta = \frac{O}{A}$$

$$\tan \theta = \frac{2.5}{12}$$

$$\theta = \tan^{-1}\left(\frac{2.5}{12}\right) = 11.768^\circ$$

6. A park has a skateboard ramp with a length of 14.2 feet and a length along the ground of 12.9 feet. The height of the ramp is 5.9 feet. Calculate the measure of the angle formed by the ramp and the ground?

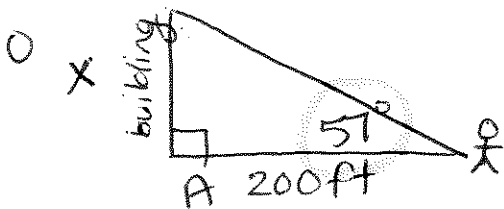


$$\cos \theta = \frac{A}{H}$$

$$\cos \theta = \frac{12.9}{14.2}$$

$$\theta = \cos^{-1}\left(\frac{12.9}{14.2}\right) = 24.708^\circ$$

7. Charlie is standing 200 feet from the base of a tall building. If he determines that the angle of elevation from the ground to the top of the building is 57° , how tall is the building?

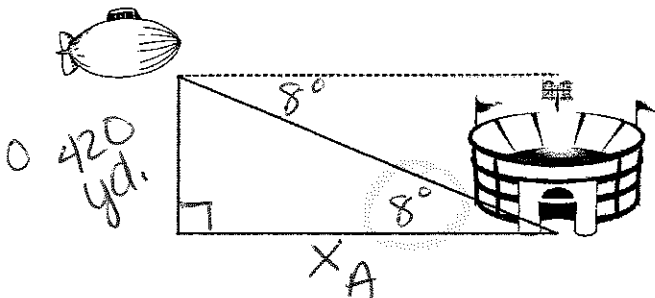


$$\tan \theta = \frac{O}{A}$$

$$(200) \tan 57 = \frac{X}{200} (200)$$

$$(307.973 \text{ ft}) = X$$

8. A blimp is flying to cover a football game. The pilot sights the stadium at an 8° angle of depression. The blimp is flying at an altitude of 420 yards. How many yards is the blimp from the stadium? (Measure along the ground)



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

$$\tan 8 = \frac{420}{X}$$

$$X = \frac{420}{\tan 8} = 2988.455 \text{ yd}$$