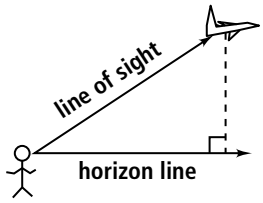
Name _____ Class _____ Date _____

Reteaching

Angles of Elevation and Depression

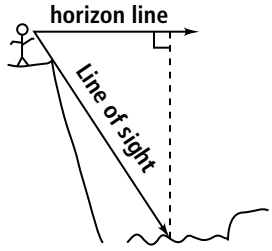
Angle of Elevation

Suppose you are looking up at an airplane. The angle formed by a horizontal line and your line of sight to the airplane is called the *angle of elevation.*



Angle of Depression

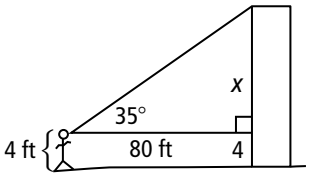
Now suppose you are standing on a cliff and looking down at a river below. The line stretches horizontally from your point of view on the cliff. Your angle of sight to the river below forms an *angle of depression* with the horizontal line.
You can use your knowledge of trigonometric ratios to determine distances and lengths using angles of elevation and depression.



Using the Angle of Elevation

Problem

Suppose you are looking up at the top of a building. The angle formed by your line of sight and a horizontal line is 35°. You are standing 80 ft from the building and your eyes are 4 ft above the ground. How tall is the building, to the nearest foot?



Look at the diagram and think about what you know. You can see that a right triangle is formed by a horizontal line, your line of sight, and the building. You know an angle and one length.

Remember: $\tan A = \dfrac{\text{opposite length}}{\text{adjacent length}}$

Let the opposite length be x.

$$\tan 35 = \frac{x}{80}$$

$$80 \tan 35 = x$$

$$x \approx 56 \text{ ft}$$

Your eyes are 4 ft above the ground, so add 4 to the value of x to find the total height of the building: 56 ft + 4 ft = 60 ft.

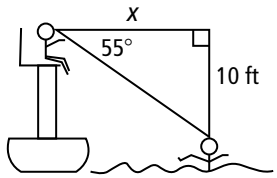
Name _____ Class _____ Date _____

Reteaching (continued)

Angles of Elevation and Depression

Using the Angle of Depression

Problem



Suppose you are a lifeguard looking down at a swimmer in a swimming pool. Your line of sight forms a 55° angle with a horizontal line. You are 10 ft up in your seat. How far is the swimmer from the base of the lifeguard stand?

Look at the diagram and think about what you know. You can see that a right triangle is formed by the horizon line, your line of sight, and a vertical distance that is the same as your height in the seat. You know an angle and one length.

Remember: $\tan A = \frac{\text{opposite length}}{\text{adjacent length}}$

Let the unknown side length be x.

$$\tan 55 = \frac{10}{x}$$

$$x = \frac{10}{\tan 55}$$

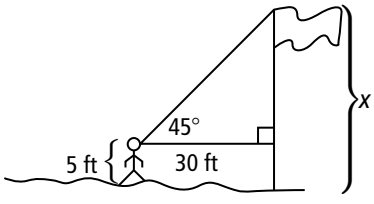
$$x \approx 7 \text{ ft}$$

The swimmer is 7 ft from the base of the lifeguard stand.

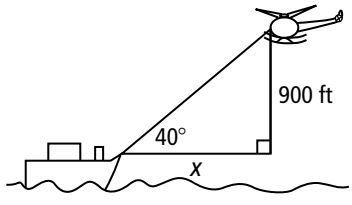
Exercises

Find the value of x. Round the lengths to the nearest tenth of a unit.

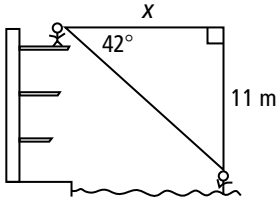
1.



2.



3.



4.