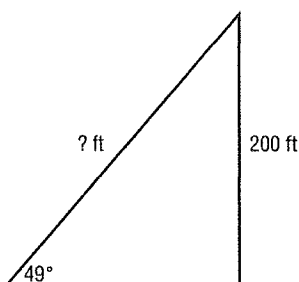


8-4 Word Problem Practice

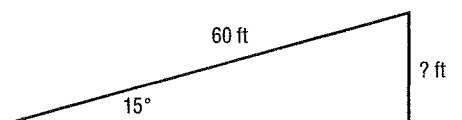
Trigonometry

1. **RADIO TOWERS** Kay is standing near a 200-foot-high radio tower.



Use the information in the figure to determine how far Kay is from the top of the tower. Express your answer as a trigonometric function.

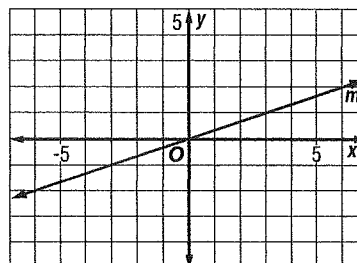
2. **RAMPS** A 60-foot ramp rises from the first floor to the second floor of a parking garage. The ramp makes a 15° angle with the ground.



How high above the first floor is the second floor? Express your answer as a trigonometric function.

3. **TRIGONOMETRY** Melinda and Walter were both solving the same trigonometry problem. However, after they finished their computations, Melinda said the answer was $52 \sin 27^\circ$ and Walter said the answer was $52 \cos 63^\circ$. Could they both be correct? Explain.

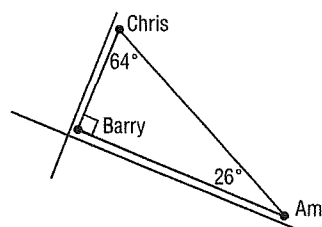
4. **LINES** Jasmine draws line m on a coordinate plane.



What angle does m make with the x -axis? Round your answer to the nearest degree.

NEIGHBORS For Exercises 5–7, use the following information.

Amy, Barry, and Chris live on the same block. Chris lives up the street and around the corner from Amy, and Barry lives at the corner between Amy and Chris. The three homes make a right triangle.

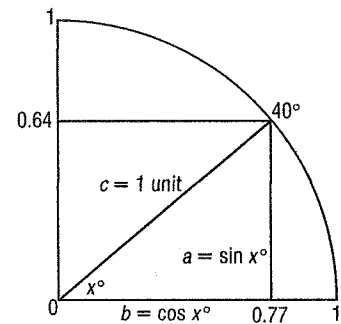
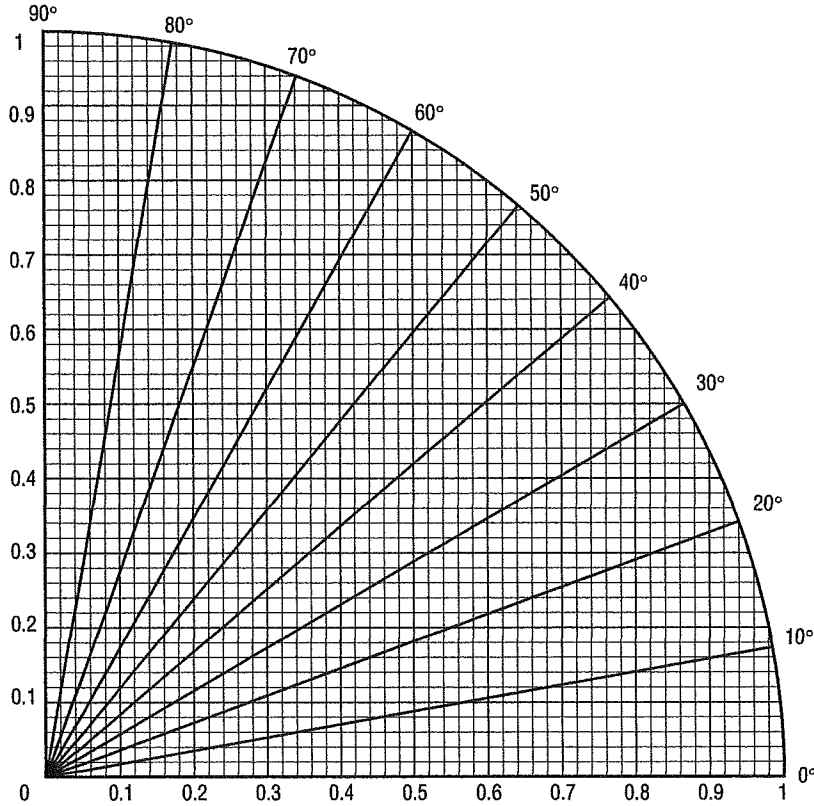


- Give two trigonometric expressions for the ratio of Barry's distance from Amy to Chris' distance from Amy.
- Give two trigonometric expressions for the ratio of Barry's distance from Chris to Amy's distance from Chris.
- Give a trigonometric expression for the ratio of Amy's distance from Barry to Chris' distance from Barry.

8-4 Enrichment

Sine and Cosine of Angles

The following diagram can be used to obtain approximate values for the sine and cosine of angles from 0° to 90°. The radius of the circle is 1. So, the sine and cosine values can be read directly from the vertical and horizontal axes.



Example Find approximate values for $\sin 40^\circ$ and $\cos 40^\circ$. Consider the triangle formed by the segment marked 40° , as illustrated by the shaded triangle at right.

$$\sin 40^\circ = \frac{a}{c} \approx \frac{0.64}{1} \text{ or } 0.64 \quad \cos 40^\circ = \frac{b}{c} \approx \frac{0.77}{1} \text{ or } 0.77$$

1. Use the diagram above to complete the chart of values.

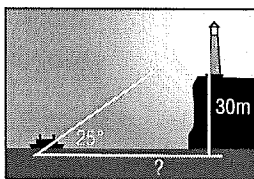
x°	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°
$\sin x^\circ$					0.64					
$\cos x^\circ$					0.77					

2. Compare the sine and cosine of two complementary angles (angles with a sum is 90°). What do you notice?

8-5 Word Problem Practice

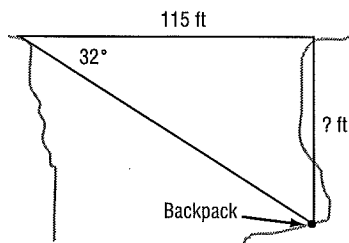
Angles of Elevation and Depression

1. **LIGHTHOUSES** Sailors on a ship at sea spot the light from a lighthouse. The angle of elevation to the light is 25° .



The light of the lighthouse is 30 meters above sea level. How far from the shore is the ship? Round your answer to the nearest meter.

2. **RESCUE** A hiker dropped his backpack over one side of a canyon onto a ledge below. Because of the shape of the cliff, he could not see exactly where it landed.



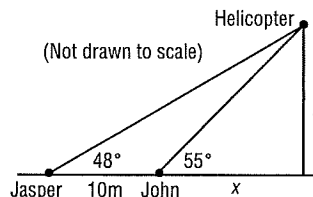
From the other side, the park ranger reports that the angle of depression to the backpack is 32° . If the width of the canyon is 115 feet, how far down did the backpack fall? Round your answer to the nearest whole number.

3. **AIRPLANES** The angle of elevation to an airplane viewed from the control tower at an airport is 7° . The tower is 200 feet high and the pilot reports that the altitude is 5200 feet. How far away from the control tower is the airplane? Round your answer to the nearest foot.

4. **PEAK TRAM** The Peak Tram in Hong Kong connects two terminals, one at the base of a mountain, and the other at the summit. The angle of elevation of the upper terminal from the lower terminal is about 15.5° . The distance between the two terminals is about 1365 meters. About how much higher above sea level is the upper terminal compared to the lower terminal? Round your answer to the nearest meter.

HELICOPTERS For Exercises 5–7, use the following information.

Jermaine and John are watching a helicopter hover above the ground.



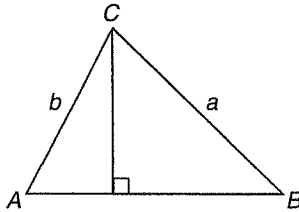
Jermaine and John are standing 10 meters apart.

- Find two different expressions that can be used to find the h , height of the helicopter.
- Equate the two expressions you found for Exercise 5 to solve for x . Round your answer to the nearest hundredth.
- How high above the ground is the helicopter? Round your answer to the nearest hundredth.

8-6 Word Problem Practice

The Law of Sines

1. **ALTITUDES** In triangle ABC , the altitude to side AB is drawn.



Give two expressions for the length of the altitude in terms of a , b , and the sine of the angles A and B .

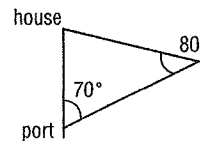
2. **MAPS** Three cities form the vertices of a triangle. The angles of the triangle are 40° , 60° , and 80° . The two most distant cities are 40 miles apart. How close are the two closest cities? Round your answer to the nearest tenth of a mile.

3. **PHOTOS** Greg took a photograph of the view from his city apartment. The building on the left is the Rocket Tower and the building on the right is the Cloud Scratcher.



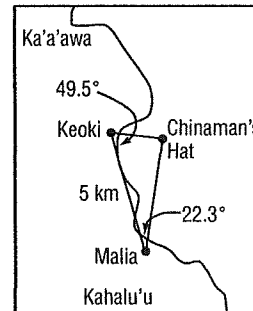
Greg's camera has a 60° viewing angle. Greg knows that he is 2 miles from the Cloud Scratcher and that the Rocket Tower is 3 miles from the Cloud Scratcher. How far is Greg from the Rocket Tower? Round your answer to the nearest hundredth.

4. **BOATING** A boat heads out to sea from a port that sits along a straight shoreline. The boat heads in a direction that makes a 70° angle with the shoreline. After sailing for 3 miles, the skipper looks back at the shore and sees his house. The house, like the port, also sits on the shore. The lines of sight to the port and to his home make an 80° angle. How far is the skipper's home from the port? Round your answer to the nearest tenth of a mile.



ISLANDS For Exercises 5 and 6, use the following information.

Oahu is a Hawaiian Island. Off of the coast of Oahu, there is a very tiny island known as Chinaman's Hat. Keoki and Malia are observing Chinaman's Hat from locations 5 kilometers apart.



Use the information in the figure to answer the following questions.

5. How far is Keoki from Chinaman's Hat? Round your answer to the nearest tenth of a kilometer.
6. How far is Malia from Chinaman's Hat? Round your answer to the nearest tenth of a kilometer.