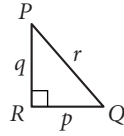


Lesson 12.1 • Trigonometric Ratios

Name _____ Period _____ Date _____

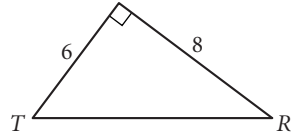
In Exercises 1–6, give each answer as a fraction in terms of p , q , and r .

1. $\sin P =$ _____ 2. $\cos P =$ _____
 3. $\tan P =$ _____ 4. $\sin Q =$ _____
 5. $\cos Q =$ _____ 6. $\tan Q =$ _____



In Exercises 7–12, give each answer as a decimal accurate to three places.

7. $\sin T =$ _____ 8. $\cos T =$ _____
 9. $\tan T =$ _____ 10. $\sin R =$ _____
 11. $\cos R =$ _____ 12. $\tan R =$ _____



For Exercises 13–16, solve for x . Express each answer accurate to two decimal places.

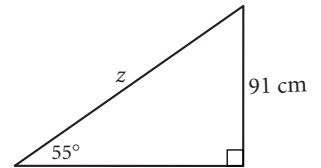
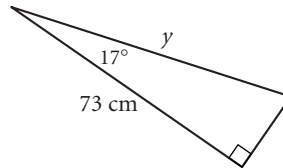
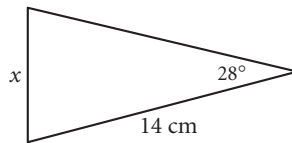
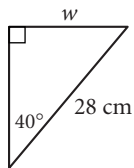
13. $\cos 64^\circ = \frac{x}{28}$ 14. $\sin 24^\circ = \frac{12.1}{x}$ 15. $\cos 17^\circ = \frac{143}{x}$ 16. $\tan 51^\circ = \frac{x}{14.8}$

For Exercises 17–20, find the measure of each angle to the nearest degree.

17. $\sin A = 0.9455$ 18. $\tan B = \frac{4}{3}$ 19. $\cos C = 0.8660$ 20. $\tan D = \frac{4}{10}$

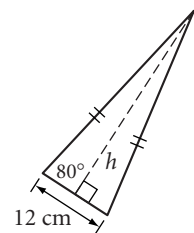
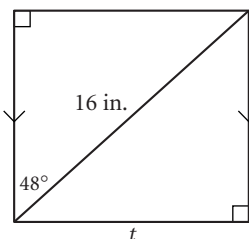
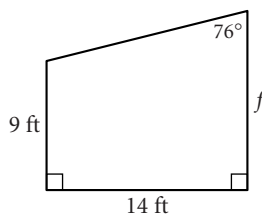
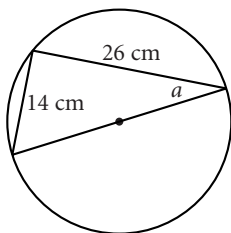
For Exercises 21–24, write a trigonometric equation you can use to solve for the unknown value. Then find the value to one decimal place.

21. $w \approx$ _____ 22. $x \approx$ _____ 23. $y \approx$ _____ 24. $z \approx$ _____



For Exercises 25–32, find the value of each unknown to the nearest tenth of a unit.

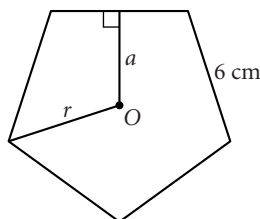
25. $a \approx$ _____ 26. $f \approx$ _____ 27. $t \approx$ _____ 28. $h \approx$ _____



29. Regular pentagon with center O

apothem \approx _____

radius \approx _____

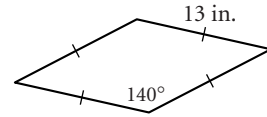
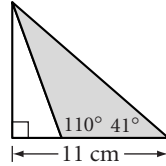
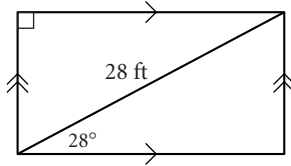
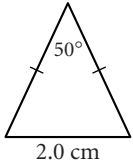


Lesson 12.2 • Problem Solving with Right Triangles

Name _____ Period _____ Date _____

For Exercises 1–4, find the area of each figure to the nearest square unit.

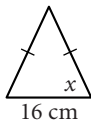
1. area \approx _____ 2. area \approx _____ 3. shaded area \approx _____ 4. area \approx _____



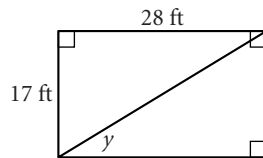
For Exercises 5–10, find each unknown to the nearest tenth of a unit.

5. area = 88 cm²

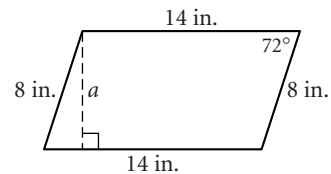
$x \approx$ _____



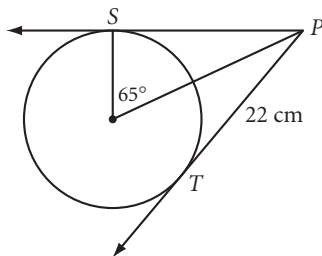
6. $y \approx$ _____



7. $a \approx$ _____

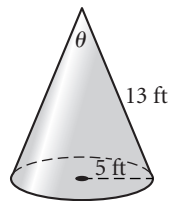


8. diameter \approx _____

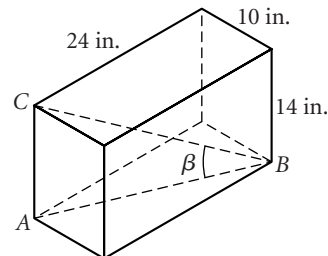


9. Right cone

$\theta \approx$ _____

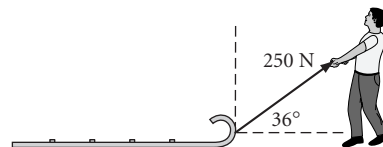


10. $m\angle ABC = \beta \approx$ _____



In Exercises 11–16, give each answer to the nearest tenth of a unit.

11. A ladder 7 m long stands on level ground and makes a 73° angle with the ground as it rests against a wall. How far from the wall is the base of the ladder?
12. A monument is 116 m high and casts a shadow of 196 m. What is the angle of elevation of the sun?
13. Ben is pulling on a toboggan rope with a force of 250 newtons. The rope makes a 36° angle with the ground. What force is actually working to move the toboggan to the right?
14. To site the top of a building 1000 feet away, you look up 24° from the horizontal. What is the height of the building?
15. If a boat going 6 mi/hr in still water suddenly encounters a crosscurrent of 4 mi/hr, at what angle will the boat veer?
16. A guy wire is anchored 12 feet from the base of a pole. The wire makes a 58° angle with the ground. How long is the wire?

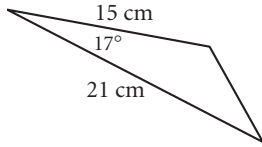


Lesson 12.3 • The Law of Sines

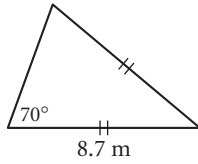
Name _____ Period _____ Date _____

In Exercises 1–4, find the area of each figure to the nearest square unit.

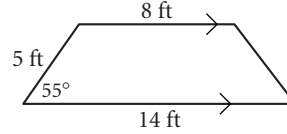
1. area \approx _____



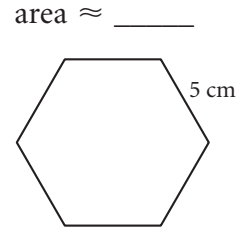
2. area \approx _____



3. area \approx _____

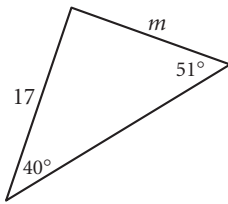


4. Regular hexagon

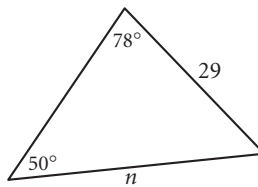


In Exercises 5–8, find each length to the nearest centimeter. All measures are in centimeters.

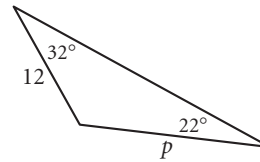
5. $m \approx$ _____



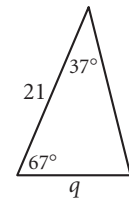
6. $n \approx$ _____



7. $p \approx$ _____



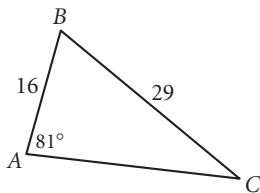
8. $q \approx$ _____



In Exercises 9–12, find the measure of each angle to the nearest degree.

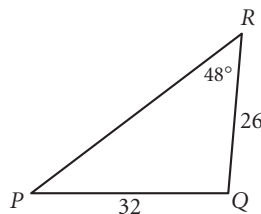
9. $m\angle B \approx$ _____

$m\angle C \approx$ _____



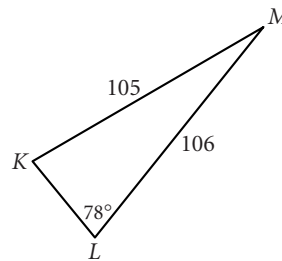
10. $m\angle P \approx$ _____

$m\angle Q \approx$ _____



11. $m\angle K \approx$ _____

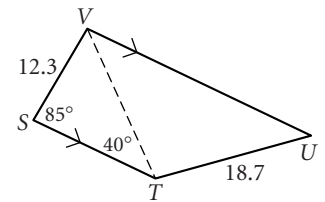
$m\angle M \approx$ _____



12. $m\angle STU \approx$ _____

$m\angle U =$ _____

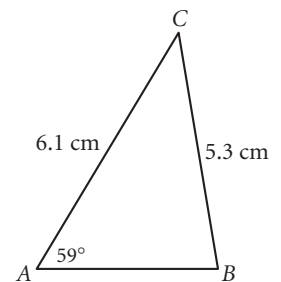
$m\angle SVU =$ _____



13. Find $m\angle B$ and $m\angle C$ to the nearest degree. Find the area of $\triangle ABC$ to one decimal place.

14. A large helium balloon is tethered to the ground by two taut lines. One line is 100 feet long and makes an 80° angle with the ground. The second line makes a 40° angle with the ground. How long is the second line, to the nearest foot? How far apart are the tethers?

15. Two angles of a triangle have measures 24° and 69° . The longest side of the triangle is 14.7 m. Find the lengths of the other two sides.

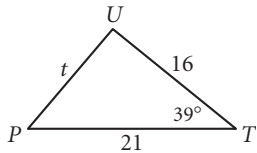


Lesson 12.4 • The Law of Cosines

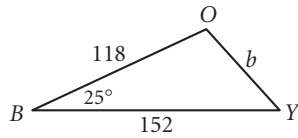
Name _____ Period _____ Date _____

In Exercises 1–4, find each length to the nearest centimeter. All lengths are in centimeters.

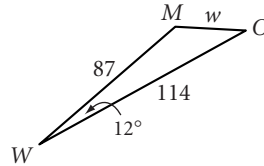
1. $t \approx$ _____



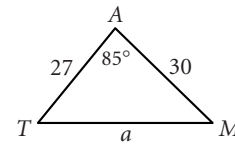
2. $b \approx$ _____



3. $w \approx$ _____



4. $a \approx$ _____

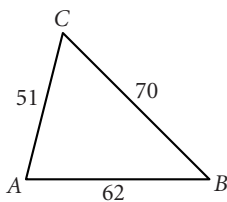


In Exercises 5–7, find each angle measure to the nearest degree.

5. $m\angle A \approx$ _____

$m\angle B \approx$ _____

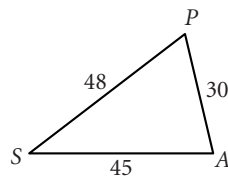
$m\angle C \approx$ _____



6. $m\angle A \approx$ _____

$m\angle P \approx$ _____

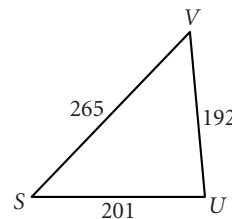
$m\angle S \approx$ _____



7. $m\angle S \approx$ _____

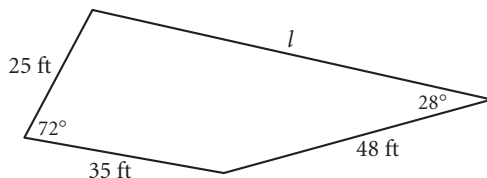
$m\angle U \approx$ _____

$m\angle V \approx$ _____



8. A circle with radius 12 in. has radii drawn to the endpoints of a 5 in. chord. What is the measure of the central angle?
9. A parallelogram has side lengths 22.5 cm and 47.8 cm. One angle measures 116° . What is the length of the shorter diagonal?
10. The diagonals of a parallelogram are 60 in. and 70 in. and intersect at an angle measuring 64° . Find the length of the shorter side of the parallelogram.
11. A triangular lot faces two streets that meet at an angle measuring 80° . The sides of the lot facing the streets are each 150 feet long. Find the perimeter of the lot.

12. Find l .

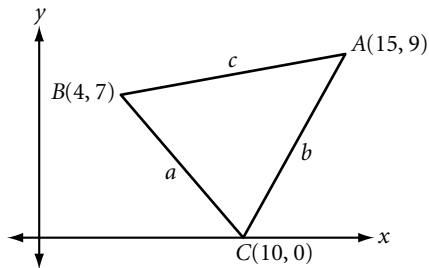


13. In a geometry game, a person with eyes closed starts at “home” and walks 5.0 m in a straight line, turns 130° counterclockwise, and walks 7.6 m in a straight line. How far is the person from “home”? Through what counterclockwise angle would the person turn to face “home”?

Lesson 12.5 • Problem Solving with Trigonometry

Name _____ Period _____ Date _____

1. While floating down a river with a 2.75 mi/hr current, Alicia decides to swim toward the river bank. She can swim 0.75 mi/hr in still water. What is the actual speed at which she moves toward the bank? At what angle will she approach the bank, measured with respect to the bank?
2. Find the measure of each angle to two decimal places.



3. Two fire watchtowers 8.4 km apart spot a fire at the same time. Tower 1 reports the fire at a 36° angle measure from its line of site to Tower 2. Tower 2 reports a 68° angle measure between the fire and Tower 1. How far is the fire from each tower?
4.
 - a. Express the cosine of angle A in terms of the sine of angle A.
 - b. Use your answer to part a to find $\cos A$ without first finding the measure of $\angle A$. If $\sin A = 0.6820$, then $\cos A = \underline{\hspace{2cm}}$.
5. Two airplanes leave O'Hare Airport in Chicago at the same time. One plane flies 280 mi/hr at bearing 55° . The other plane flies 350 mi/hr at bearing 128° . How far apart are the two planes after 2 hours 15 minutes?
6. On the 240-yard 4th hole of his municipal golf course, Lion Timber hits a tee shot 165 yards but 10° off the line to the flag. The cup is at the center of a circular green with a 30-foot radius. Find the range of distances Lion can hit the ball to land his second shot on the green.
7. Carla needs to fence her triangular plot of land. The angle between the two shorter sides measures 83° . The shortest side is 122 ft and the longest is 215 ft. How much fencing does Carla need? What is the area of her plot of land?