

13-3 Objectives

- ▼ To use radian measure for angles (p. 726)
- ▼ To find the length of an arc of a circle (p. 728)

A **central angle** of a circle is an angle whose vertex is at the center of a circle. An **intercepted arc** is the portion of the circle whose endpoints are on the sides of the angle and whose remaining points lie in the interior of the angle. A **radian** is the measure of a central angle that intercepts an arc equal in length to a radius of the circle.

To convert degrees to radians, multiply by $\frac{\pi \text{ radians}}{180^\circ}$. To convert radians to degrees, multiply by $\frac{180^\circ}{\pi \text{ radians}}$. When the measure of an angle θ is in radians and r is the radius, the length s of the intercepted arc is $s = r\theta$.

The measure θ of an angle in standard position is given.

- a. Write each degree measure in radians and each radian measure in degrees rounded to the nearest degree.
- b. Find the exact values of $\cos \theta$ and $\sin \theta$ for each angle measure.

12. 60°

13. -45°

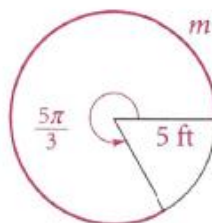
14. 180°

15. 2π radians

16. $\frac{5\pi}{6}$ radians

17. $-\frac{3\pi}{4}$ radians

18. Use the circle to find the length of the indicated arc. Round your answer to the nearest tenth.



Find the measure of an angle between 0° and 360° coterminal with the given angle.

3. -32°

4. -229°

5. 375°

● Lesson 13-2 Sketch each angle in standard position.

4. 15°

5. -230°

6. 400°

7. -145°

8. 280°

9. -750°

● Lesson 13-3 Write each measure in radians. Express the answer in terms of π and as a decimal rounded to the nearest hundredth.

10. 100°

11. 270°

12. -45°

13. -550°

14. 425°

15. 10°

● Lesson 13-3 Write each measure in degrees. When necessary, round your answer to the nearest degree.

16. 5π radians

17. -2 radians

18. $\frac{5\pi}{6}$ radians

19. -3π radians

20. $-\frac{13\pi}{10}$ radians

21. 9 radians

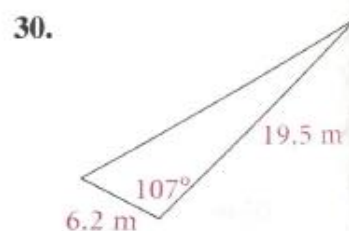
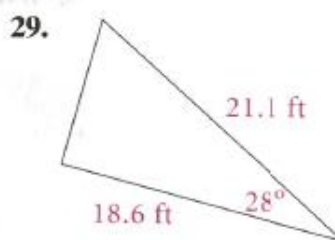
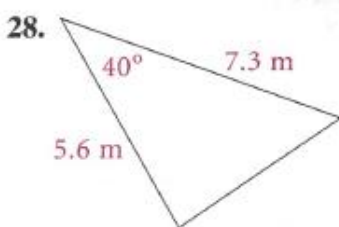
14-4 Objectives

- ▼ To find the area of any triangle and to use the Law of Sines (p. 801)

You can find missing measures of any triangle if you know the measures of two angles and any side or if you know the measures of two sides and the angle opposite one of them by using the **Law of Sines**.

The Law of Sines states that for $\triangle ABC$, if a , b , and c represent the lengths of the sides opposite $\angle A$, $\angle B$, and $\angle C$, respectively, then $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$.

Find the area of each triangle. Round your answers to the nearest hundredth.



- **Lesson 14-3** In $\triangle ABC$, $\angle C$ is a right angle. Find the remaining sides and angles. Round your answer to the nearest tenth.

18. $m\angle A = 29^\circ$, $b = 8$

19. $a = 7$, $c = 9$

20. $m\angle B = 52^\circ$, $b = 10$

21. $a = 2$, $b = 4$

22. $m\angle A = 37^\circ$, $c = 12$

23. $b = 5$, $c = 8$

- **Lesson 14-3** In $\triangle RST$, $\angle S$ is a right angle, $RS = 24$, and $\cos R = \frac{12}{13}$. Draw a diagram and find each value in fraction and decimal form.

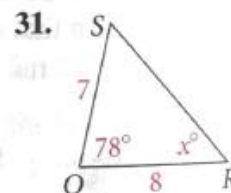
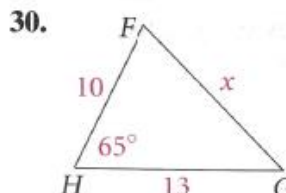
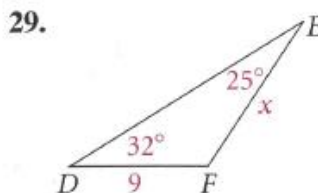
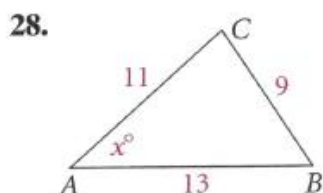
24. $\sin R$

25. $\sin T$

26. $\cos T$

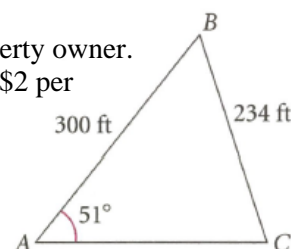
27. $\cot R$

- **Lessons 14-4 and 14-5** Use the Law of Sines or the Law of Cosines. Find the measure x to the nearest tenth.



51. Two buildings on level ground are 200 feet apart. From the top edge of the shorter building, the angle of elevation to the top of the taller building is 24° , and the angle of depression to the bottom of the taller building is 35° . How tall is each building? (Round to the nearest...foot...tenth...hundredth...-- be able to round!)

54. A landscaping company received a rough sketch of a triangular property from the property owner. The sketch is not to scale. The owner is asking for a price quote to sod the land. Sod costs \$2 per square foot. Can the landscaper estimate the cost of the job using the info provided? If so, find the estimate. If not, explain what info is missing.



55. Two spotters are observing a hot-air balloon. The spotters are 1.2 mi apart and the balloon is between them. One spotter reports an angle of elevation of 68° , and the other spotter reports an angle of elevation of 84° . What is the altitude of the balloon? Round....