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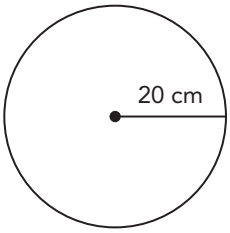
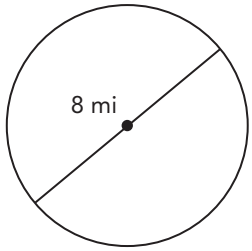
Lesson 11.2 Area of a Circle

Find the area of each circle. Use 3.14 as an approximation for π.

1.

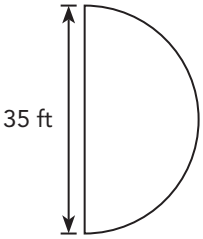


2.

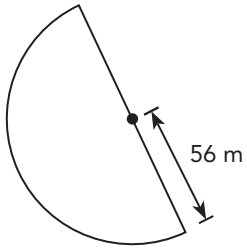


Find the area of each semicircle. Use $\frac{22}{7}$ as an approximation for π.

3.

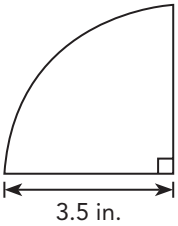


4.

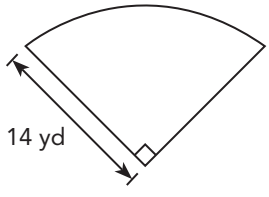


Find the area of each quadrant to the nearest tenth. Use 3.14 as an approximation for π.

5.



6.



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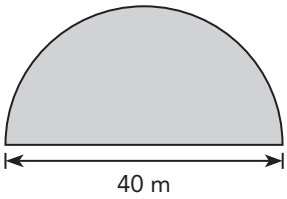
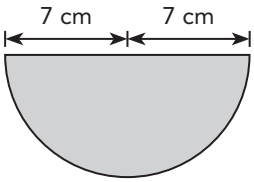
Solve. Show your work. Use $\frac{22}{7}$ as an approximation for π.

7. A park is in the shape of a semicircle. Find the area of the park.



8. The shape of a soap dish is a semicircle. Find the area of the soap dish.



9. A 6-inch pizza costs $3.50. A 12-inch pizza costs $11.

a) How much less is the area of the 6-inch pizza than the area of the 12-inch pizza? Express your answer to the nearest hundredth.

b) Which is the better deal? Explain your reasoning.

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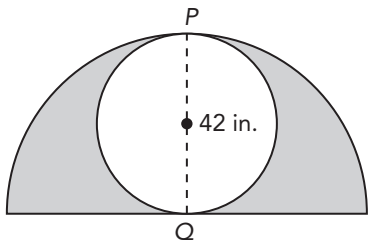
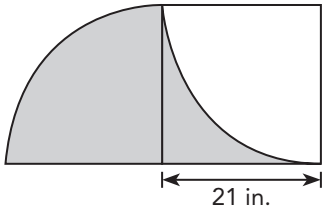
10. The figure shows a circular fishpond enclosed within a semicircular flowerbed. The diameter of the pond, $\overline{PQ}$, is 42 inches. Find the area of the shaded region.

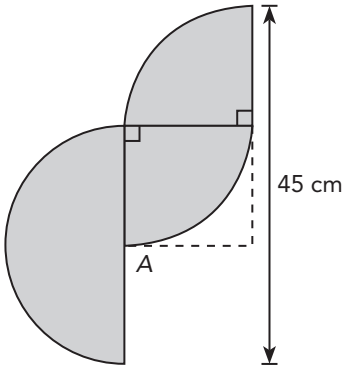


11. The figure is made up of two identical quadrants and a square. Find the area of the shaded region.



Solve. Show your work. Use 3.14 as an approximation for π.

12. The figure is made up of a semicircle and two identical quadrants. Point *A* is the center of the semicircle. Find the area of the figure.



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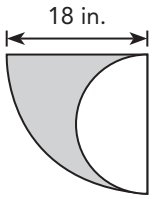
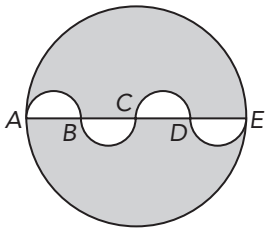
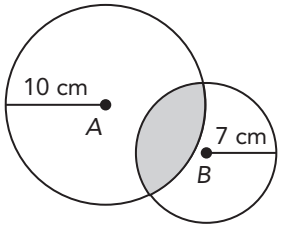
13. The figure is made up of a semicircle in a quadrant. Find the area of the shaded region.



14. The figure shows a circle and four identical semicircles inside it. Point C is the center of the circle and $\overline{AE}$ is the diameter. If $AE = 48$ centimeters, find the area of the shaded region.



15. The figure shows two circles. Points A and B are the centers of the circles. The area of the shaded region is $\frac{2}{7}$ the area of the smaller circle. Find the total area of the unshaded region of the figure.



4. Length of the semicircular arc
$\approx \frac{1}{2} \cdot \frac{22}{7} \cdot 1.54 = 2.42$ in.
Distance around the semicircle
$= 2.42 + 0.77 + 0.77 = 3.96$ inches

5. Length of the arc
$\approx \frac{1}{4} \cdot 2 \cdot 3.14 \cdot 10$
$= 15.7$ cm
Distance around the quadrant
$= 15.7 + 10 + 10$
$= 35.7$ centimeters

6. Length of the arc
$\approx \frac{1}{4} \cdot 2 \cdot 3.14 \cdot 21.4$
$= 33.598$ ft
Distance around the quadrant
$= 33.598 + 21.4 + 21.4$
$= 76.398$ feet

7. $2 \cdot \frac{22}{7} \cdot 1.9 = 11.94$ feet

8. $\frac{22}{7} \cdot 25 = 78.57$ inches

9. $\frac{22}{7} \cdot 18 = 56.57$ millimeters

10. $\frac{1}{2} \cdot \frac{22}{7} \cdot 25 = 39.29$ in.
Distance around the semicircle
$= 39.29 + 25$
$= 64.29$ inches

11. $\frac{1}{4} \cdot 2 \cdot \frac{22}{7} \cdot 11 = 17.29$ cm
Distance around the quadrant
$= 17.29 + 11 + 11$
$= 39.29$ centimeters

12. $\frac{3}{4}$ of the circle
$\approx \frac{3}{4} \cdot 2 \cdot 3.14 \cdot 18$
$= 84.78$ cm
Distance around the figure
$= 84.78 + 18 + 18$
$= 120.78$ centimeters

13. Length of the arcs of the 4 quadrants
$\approx 2 \cdot 3.14 \cdot 15$
$= 94.2$ in.
Distance around the figure
$= 94.2 + 15 + 15$
$= 124.2$ inches

14. Length of semicircular arc
$\approx \frac{1}{2} \cdot 3.14 \cdot 18 = 28.26$ yd
Distance around the shaded region
$= 28.26 + 18 \cdot 3$
$= 82.26$ yards

15. Length of the arc of the quadrant
$\approx \frac{1}{4} \cdot 2 \cdot 3.14 \cdot 20 = 31.4$ cm
Distance around the shaded region
$= 31.4 + 20 + 20$
$= 71.4$ centimeters

16. Length of the 2 semicircular arcs
$\approx \frac{22}{7} \cdot 7 = 22$ in.
Distance around the shaded region
$= 22 + 12 + 12 = 46$ inches

17. Length of the small semicircular arc
$\approx \frac{1}{2} \cdot \frac{22}{7} \cdot 140 = 220$ cm
Length of the big semicircular arc
$\approx \frac{1}{2} \cdot \frac{22}{7} \cdot (140 + 35 + 35) = 330$ cm
Distance around the shaded region
$= 220 + 330 + 35 + 35$
$= 620$ centimeters

18. Length of the arc of the 2 quadrants
$\approx \frac{1}{2} \cdot 2 \cdot \frac{22}{7} \cdot 7 = 22$ cm
Distance around the figure
$= 22 + 7 + 7 + 2 + 2$
$= 40$ centimeters

Lesson 11.2

1. $3.14 \cdot 20 \cdot 20$
$= 1{,}256$ square centimeters

2. $3.14 \cdot 4 \cdot 4$
$= 50.24$ square miles

3. $\frac{1}{2} \cdot \frac{22}{7} \cdot 17.5 \cdot 17.5$
$= 481.25$ square feet

4. $\frac{1}{2} \cdot \frac{22}{7} \cdot 56 \cdot 56$
$= 4{,}928$ square meters

5. $\frac{1}{4} \cdot 3.14 \cdot 3.5 \cdot 3.5$
≈ 9.6 square inches

6. $\frac{1}{4} \cdot 3.14 \cdot 14 \cdot 14$
≈ 153.9 square yards

7. $\frac{1}{2} \cdot \frac{22}{7} \cdot 20 \cdot 20$
≈ 628.57 square meters

8. $\frac{1}{2} \cdot \frac{22}{7} \cdot 7 \cdot 7 = 77$ square centimeters

9. a) Area of 6-inch pizza:
$\frac{22}{7} \cdot 3 \cdot 3 \approx 28.29$
Area of 12-inch pizza:
$\frac{22}{7} \cdot 6 \cdot 6 \approx 113.14$
$113.14 - 28.29$
$= 84.85$ square inches
The area of the 6-inch pizza is 84.85 square inches less than the area of the 12-inch pizza.

b) Cost of 6-inch pizza per square inch:
$\$3.5 \div 28.29 \approx \$0.12$
Cost of 12-inch pizza per square inch:
$\$11 \div 113.14 \approx \$0.10$
The 12-inch pizza is a better deal because it costs less per square inch than the 6-inch pizza.

10. Area of the semicircular flowerbed
$\approx \frac{1}{2} \cdot \frac{22}{7} \cdot 42 \cdot 42 = 2{,}772$ in.^{2}
Area of the circular fishpond
$\approx \frac{22}{7} \cdot 21 \cdot 21 = 1{,}386$ in.^{2}
Area of flowerbed without the pond
$\approx 2{,}772 - 1{,}386$
$= 1{,}386$ square inches

11. Area of the shaded region
$= 21 \cdot 21 = 441$ square inches
OR
Area of the quadrant
$\approx \frac{1}{4} \cdot \frac{22}{7} \cdot 21 \cdot 21 = 346.5$ in.^{2}
Area of shaded region in the square
$\approx 21 \cdot 21 - \frac{1}{4} \cdot \frac{22}{7} \cdot 21 \cdot 21$
$= 94.5$ in.^{2}
Total area of the shaded regions
$= 346.5 + 94.5 = 441$ square inches

12. Radius $= 45 \div 3 = 15$ cm
Area of the figure
$\approx 3.14 \cdot 15 \cdot 15$
$= 706.5$ square centimeters

13. Area of the quadrant
$\approx \frac{1}{4} \cdot 3.14 \cdot 18 \cdot 18$
$= 254.34$ in.^{2}
Area of the semicircle
$\approx \frac{1}{2} \cdot 3.14 \cdot 9 \cdot 9$
$= 127.17$ in.^{2}
Area of the shaded region
$= 254.34 - 127.17$
$= 127.17$ square inches

14. Radius of the circle
$= 48 \div 2 = 24$ cm
Area of the circle
$\approx 3.14 \cdot 24 \cdot 24$
$= 1{,}808.64$ cm^2
Radius of each semicircle
$= 48 \div 4 \div 2 = 6$ cm
Total area of the 4 semicircles
= area of 2 circles
$\approx 2 \cdot (3.14 \cdot 6 \cdot 6)$
$= 226.08$ cm^2
Area of the shaded region
$= 1{,}808.64 - 226.08$ cm^2
$= 1{,}582.56$ square centimeters

15. Area of the bigger circle
$\approx 3.14 \cdot 10 \cdot 10 = 314$ cm^2
Area of the smaller circle
$\approx 3.14 \cdot 7 \cdot 7 = 153.86$ cm^2
Area of the shaded region
$= \frac{2}{7} \cdot 153.86 = 43.96$ cm^2
Area of the unshaded region
$= 314 + 153.86 - 2 \cdot 43.96$ cm^2
$= 379.94$ square centimeters

Lesson 11.3

1. Area
$\approx 3.14 \cdot 36 \cdot 36$
$= 4{,}069.44$ square inches
Circumference
$\approx 3.14 \cdot 72 = 226.08$ inches

2. Area
$\approx 3.14 \cdot 1.2 \cdot 1.2$
$= 4.52$ square meters
Circumference
$\approx 3.14 \cdot 2.4 = 7.54$ meters

3. One round of the can
$\approx 2 \cdot \frac{22}{7} \cdot 9.8 = 61.6$ cm
100 rounds of the can
$= 61.6 \cdot 100$
$= 6{,}160$ cm $= 61.6$ m
The length of the piece of wire is 61.6 meters.

4. One revolution
$\approx \frac{22}{7} \cdot 0.7 = 2.2$ meters
$440 \div 2.2 = 200$
The wheel makes 200 revolutions if the bicycle travels 440 meters.