Name: **Key**

MM2G3c Use the properties of circles to solve problems involving the length of an arc and the area of a sector.

MM2G3d Justify measurements and relationships in circles using geometric and algebraic properties.

Find the exact area of the circle. Then find the area to the nearest hundredth.

1. *(circle, 6 in radius)*

$A = \pi(6)^2$
$A = 36\pi \text{ in}^2$
or
$A = 113.10 \text{ in}^2$

2. *(circle, 10.5 ft radius)*

$A = \pi(10.5)^2$
$A = 110.25\pi \text{ ft}^2$
or
$A = 346.36 \text{ ft}^2$

3. *(circle, 24.8 cm)* $r = 12.4 \text{ cm}$

$A = (12.4)^2\pi$
$A = 153.76\pi \text{ cm}^2$
or
$A = 483.05 \text{ cm}^2$

Find the indicated measure.

$A = \pi r^2$

4. The area of a circle is 173 square inches. Find the radius. $173 = \pi r^2$ $\dfrac{173}{\pi} = r^2$ $r = 7.42 \text{ cm}$

5. The area of a circle is 290 square meters. Find the radius. $r = 9.61 \text{ m}$

6. The area of a circle is 52 square millimeters. Find the radius. $r = 4.07 \text{ mm}$

7. The area of a circle is 342 square yards. Find the diameter. $r = 10.43 \text{ yds}$ diameter $= 20.86 \text{ yd}$

8. The area of a circle is 654 square centimeters. Find the diameter. $r = 14.43 \text{ cm}$ diameter $= 28.86 \text{ cm}$

9. The area of a circle is 528 square feet. Find the diameter. $\sqrt{\dfrac{528}{\pi}}$ $r = 12.96 \text{ ft}$ 25.92 ft

Find the areas of the sectors formed by $\angle ACB$.

10. *(circle, C 65°, 4 in, A, B, D)*

Small
$\dfrac{S}{\pi(4)^2} = \dfrac{65}{360}$
$S = 9.08 \text{ in}^2$

large
$\dfrac{S}{\pi(4)^2} = \dfrac{295}{360}$
$S = 41.19 \text{ in}^2$

11. *(circle, 130°, B, C, D, 27 cm)*

Small
$\dfrac{S}{\pi(27)^2} = \dfrac{130}{360}$
$S = 827.02 \text{ cm}^2$

large
$\dfrac{S}{\pi(27)^2} = \dfrac{230}{360}$
$S = 1463.20 \text{ cm}^2$

12. *(circle, 209°, D, C 18 m, A, B)*

Small
$\dfrac{S}{\pi(18)^2} = \dfrac{151}{360}$
$S = 426.94 \text{ m}^2$

large
$\dfrac{S}{\pi(18)^2} = \dfrac{209}{360}$
$S = 590.93 \text{ m}^2$

Use the diagram to find the indicated measure.

13. Find the area of $\odot H$.

$\dfrac{S}{A} = \dfrac{m}{360}$
$\dfrac{23.79}{A} = \dfrac{80}{360}$
$A = 107.06 \text{ ft}^2$

(circle, E, G, H 80°, F) $A = 23.79 \text{ ft}^2$

14. Find the radius of $\odot H$.

(circle, G, E, H 98°, F) $A = 40.62 \text{ in}^2$

$\dfrac{40.62}{\pi r^2} = \dfrac{98}{360}$
$r = 6.89 \text{ in}$

15. Find the diameter of $\odot H$.

(circle, F, 51° H, 309°, E, G) $A = 31.47 \text{ m}^2$

$\dfrac{31.47}{\pi r^2} = \dfrac{309}{360}$
$r = 6.83 \text{ m}$

⑯ $295.52 = \pi r^2$
$r = 9.70$ in

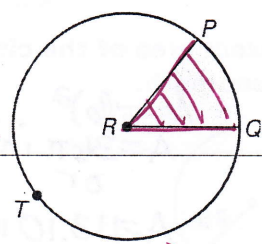⑰ $C = 2\pi r$
$C = 2\pi(9.7)$
$C = 60.94$ in

⑱ $\frac{A}{s} = \frac{m}{360}$
$\frac{55}{295.52} = \frac{m}{360}$
$m = 67°$

⑲ $\frac{\ell}{C} = \frac{m}{360}$
$\frac{\ell}{60.94} = \frac{67}{360}$
$\ell = 11.34$ in

Exercise Set A (continued)

The area of ⊙R is 295.52 square inches. The area of sector PRQ is 55 square inches. Find the indicated measure.

16. Radius of ⊙R = 9.70 in
17. Circumference of ⊙R = 60.94 in
18. $m\widehat{PQ}$ = 67°
19. Length of $\widehat{PQ}$ = 11.34 in
20. Perimeter of shaded region
$9.7 + 9.7 + 11.34 = 30.74$ in
21. Perimeter of unshaded region
$9.7 + 9.7 + (60.94 - 11.34)$
69.01 in

Find the area of the shaded region.

22. 86.08 cm²
6 cm 43°

23. 199.10 in²
13 in.

24. 236.40 m²
Big ⊙ - small ⊙ area area
3.5 m
9 m

25. 37.70 ft²
10 ft 2 ft
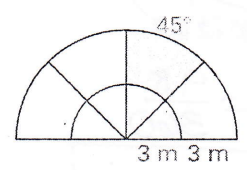
26. 19.27 in²
6 in.

27. 117.92 cm²
8 cm
4 cm
8√3 cm

28. **Fountain** A circular water fountain has a diameter of 42 feet. Find the area of the fountain. 1385.44 ft²
$r = 21$
$A = \pi(21)^2$

29. **Landscaping** The diagram below shows the area of a lawn covered by a water sprinkler.

135°
16 ft
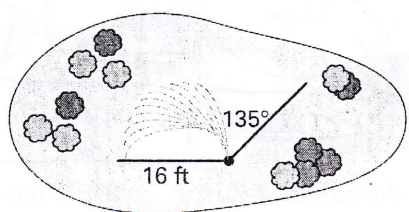
a. What is the area of the lawn that is covered by the sprinkler? 301.59 ft²
$\frac{S}{\pi(16)^2} = \frac{135}{360}$

b. The water pressure is lowered so that the radius is 10 feet. What is the area of lawn that will be covered? 117.81 ft²
$\frac{S}{\pi(10)^2} = \frac{135}{360}$

30. **Window Design** The window shown is in the shape of a semicircle. Find the area of the glass in the shaded region. 10.60 m²

45°
3 m 3 m

$\left(\frac{S}{\pi(6)^2} = \frac{45}{360}\right) - \left(\frac{S}{\pi(3)^2} = \frac{45}{360}\right)$