Name _____ Date _____

8.2 Areas of Circles and Sectors

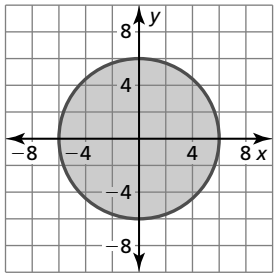
For use with Exploration 8.2

Essential Question How can you find the area of a sector of a circle?

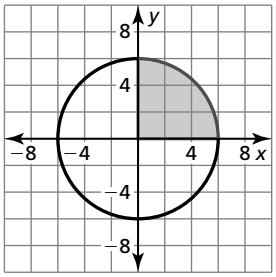
1 EXPLORATION: Finding the Area of a Sector of a Circle

Work with a partner. A **sector of a circle** is the region bounded by two radii of the circle and their intercepted arc. Find the area of each shaded circle or sector of a circle.

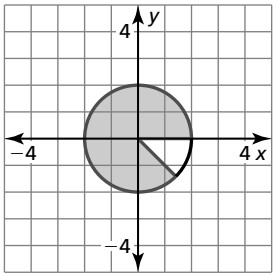
a. entire circle



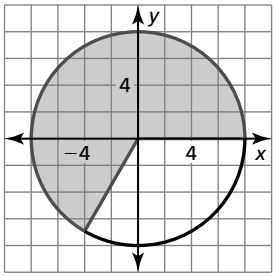
b. one-fourth of a circle



c. seven-eighths of a circle



d. two-thirds of a circle

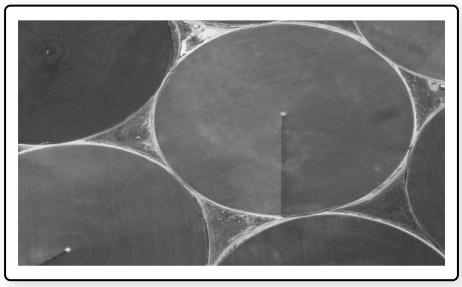


Name_____ Date _____

8.2 Areas of Circles and Sectors (continued)

2 EXPLORATION: Finding the Area of a Circular Sector

Work with a partner. A center pivot irrigation system consists of 400 meters of sprinkler equipment that rotates around a central pivot point at a rate of once every 3 days to irrigate a circular region with a diameter of 800 meters. Find the area of the sector that is irrigated by this system in one day.



Communicate Your Answer

3. How can you find the area of a sector of a circle?

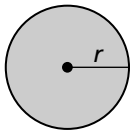
4. In Exploration 2, find the area of the sector that is irrigated in 2 hours.

Name _____ Date _____

8.2 Practice
For use after Lesson 8.2

Core Concepts

Area of a Circle



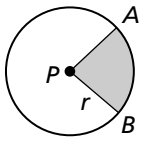
The area of a circle is

$$A = \pi r^2$$

where r is the radius of the circle.

Notes:

Area of a Sector



The ratio of the area of a sector of a circle to the area of the whole circle $\left(\pi r^2\right)$ is equal to the ratio of the measure of the intercepted arc to 360°.

$$\frac{\text{Area of sector } APB}{\pi r^2} = \frac{m\overset{\frown}{AB}}{360°}, \text{ or}$$

$$\text{Area of sector } APB = \frac{m\overset{\frown}{AB}}{360°} \cdot \pi r^2$$

Notes:

Worked-Out Examples

Example #1

Find the indicated measure.

radius of a circle with an area of 89 square feet

$$A = \pi r^2$$
$$89 = \pi r^2$$
$$\frac{89}{\pi} = r^2$$
$$5.32 \approx r$$

The circle has a radius of about 5.32 feet.

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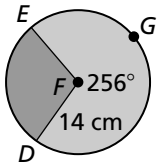
8.2 Practice (continued)

Example #2

Find the areas of the sectors formed by ∠DFE

$$\text{Area of sector} = \frac{360° - 256°}{360°} \cdot 14^2 \cdot \pi$$
$$= \frac{104}{360} \cdot 196 \cdot \pi$$
$$\approx 177.88$$



The area of the red sector is about 177.88 square centimeters.

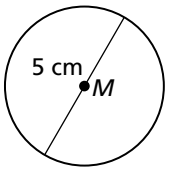
$\text{Area of sector} = \frac{256°}{360°} \cdot 14^2 \cdot \pi \approx 437.87$

The area of the blue sector is about 437.87 square centimeters.

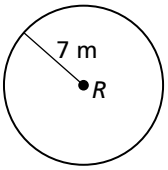
Practice A

In Exercises 1–2, find the indicated measure.

1. area of $\odot M$



2. area of $\odot R$



In Exercises 3–8, find the indicated measure.

3. area of a circle with a diameter of 1.8 inches

4. diameter of a circle with an area of 10 square feet

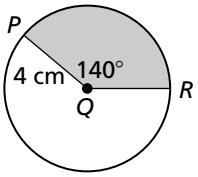
Name _____ Date _____

8.2 Practice (continued)

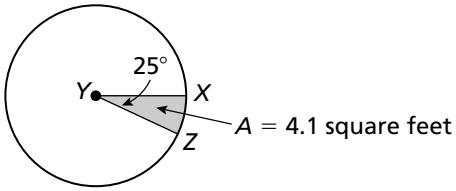
5. radius of a circle with an area of 65 square centimeters

6. area of a circle with a radius of 6.1 yards

7. areas of the sectors formed by $\angle PQR$

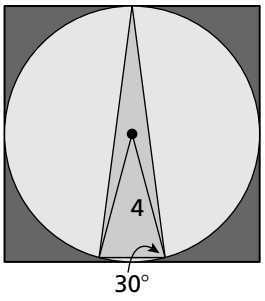


8. area of $\odot Y$



9. You throw a dart at the board shown. Your dart is equally likely to hit any point inside the square board.

a. What is the probability your dart lands in the smallest triangle?



b. What is the probability your dart does not land anywhere in the circle?

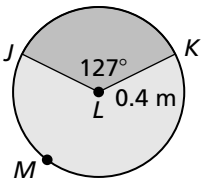
Name _____ Date _____

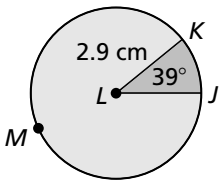
Practice B

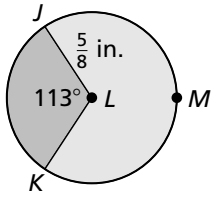
In Exercises 1–4, find the indicated measure.

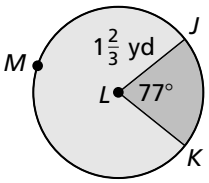
1. area of a circle with a radius of 6.75 inches
2. area of a circle with a diameter of $\frac{3}{10}$ mile
3. radius of a circle with an area of 63.7 square kilometers
4. diameter of a circle with an area of 1040.62 square yards

In Exercises 5–8, find the areas of the sectors formed by $\angle JLK$.

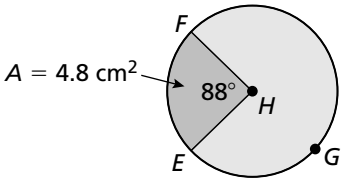
5. 

6. 

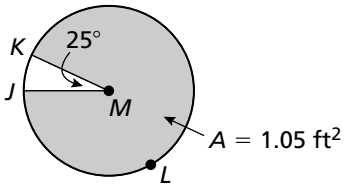
7. 

8. 

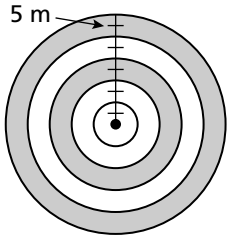
9. Find the radius of $\odot H$.

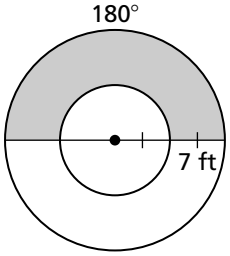


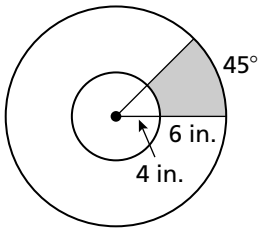
10. Find the radius of $\odot M$.



In Exercises 11–13, find the area of the shaded region.

11. 

12. 

13. 

14. A tire is hung from a tree. The outside diameter is 34 inches and the inside diameter is 14 inches. You throw a baseball toward the opening of the tire. Your baseball is equally likely to hit any point on the tire or in the opening of the tire. What is the probability that you will throw the baseball through the opening in the tire?