Name _____ Date _____

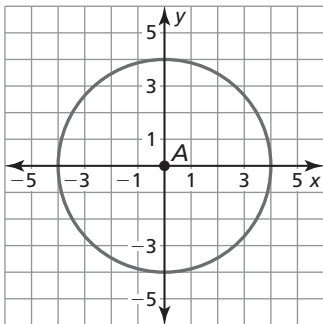# 11.1 Circumference and Arc Length

For use with Exploration 11.1

Essential Question How can you find the length of a circular arc?
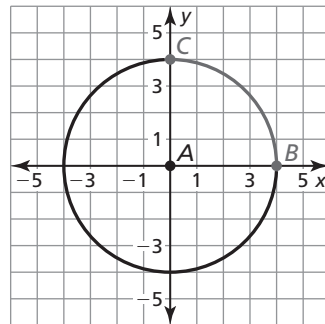
1 EXPLORATION: Finding the Length of a Circular Arc

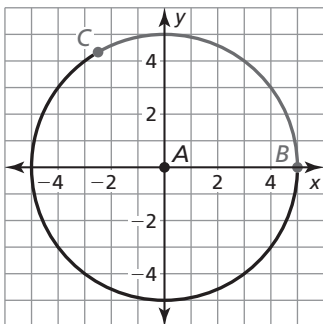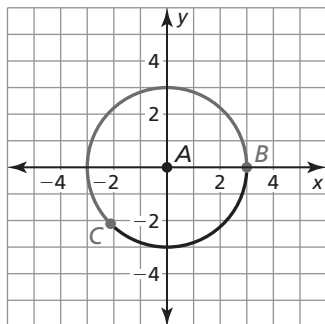**Work with a partner.** Find the length of each gray circular arc.

a. entire circle

b. one-fourth of a circle


c. one-third of a circle

d. five-eighths of a circle

11.1 **Circumference and Arc Length** (continued)

2 **EXPLORATION:** Writing a Conjecture

Work with a partner. The rider is attempting to stop with the front tire of the motorcycle in the painted rectangular box for a skills test. The front tire makes exactly one-half additional revolution before stopping. The diameter of the tire is 25 inches. Is the front tire still in contact with the painted box? Explain.

|———3 ft———|
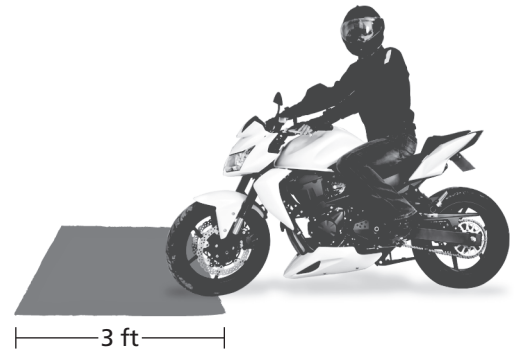
Communicate Your Answer

3. How can you find the length of a circular arc?

4. A motorcycle tire has a diameter of 24 inches. Approximately how many inches does the motorcycle travel when its front tire makes three-fourths of a revolution?

11.1 Notetaking with Vocabulary
For use after Lesson 11.1

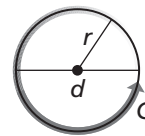**In your own words, write the meaning of each vocabulary term.**

circumference

arc length

radian

Core Concepts
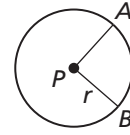
Circumference of a Circle

The circumference C of a circle is $C = \pi d$ or $C = 2\pi r$, where d is the diameter of the circle and r is the radius of the circle.

Notes:

$$C = \pi d = 2\pi r$$

11.1 **Notetaking with Vocabulary (continued)**

Arc Length

In a circle, the ratio of the length of a given arc to the circumference is equal to the ratio of the measure of the arc to 360°.

$$\frac{\text{Arc length of } \overset{\frown}{AB}}{2\pi r} = \frac{m\overset{\frown}{AB}}{360°}, \text{ or}$$

$$\text{Arc length of } \overset{\frown}{AB} = \frac{m\overset{\frown}{AB}}{360°} \cdot 2\pi r$$

Notes:

Converting Between Degrees and Radians

Degrees to radians

Multiply degree measure by

$$\frac{2\pi \text{ radians}}{360°}, \text{ or } \frac{\pi \text{ radians}}{180°}.$$
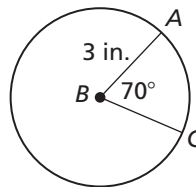
Radians to degrees

Multiply radian measure by

$$\frac{360°}{2\pi \text{ radians}}, \text{ or } \frac{180°}{\pi \text{ radians}}.$$

Notes:

11.1 **Notetaking with Vocabulary (continued)**

Extra Practice

In Exercises 1–5, find the indicated measure.

1. diameter of a circle with a circumference of 10 inches

2. circumference of a circle with a radius of 3 centimeters

3. radius of a circle with a circumference of 8 feet

4. circumference of a circle with a diameter of 2.4 meters

5. arc length of $\overset{\frown}{AC}$

In Exercises 6 and 7, convert the angle measure.

6. Convert 60° to radians.

7. Convert $\dfrac{5\pi}{6}$ radians to degrees.