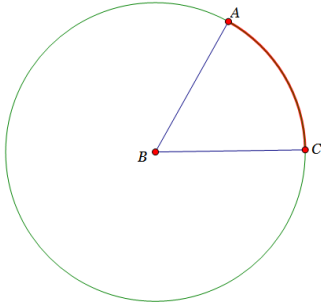# 11.1: Circumference and Arc Length

Essential Question

How can you find the length of a circular arc?
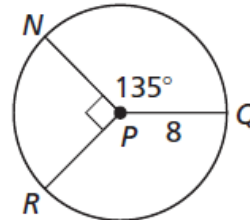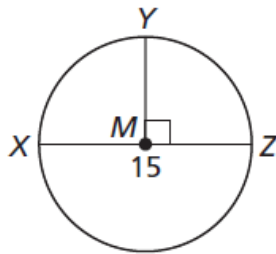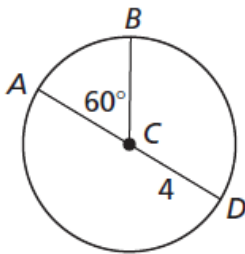
Arc measure=central angle measure

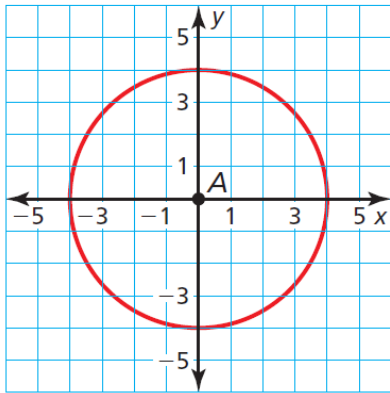Use the diagram to find the measure of the indicated angle and the circumference of the circle.
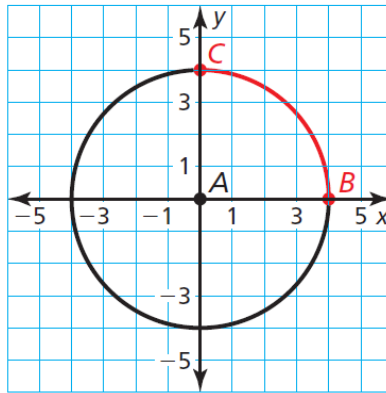
1. m∠BCD   2. m∠YMX   3. m∠RPQ

Work with a partner.   Find the length of each red circular arc.
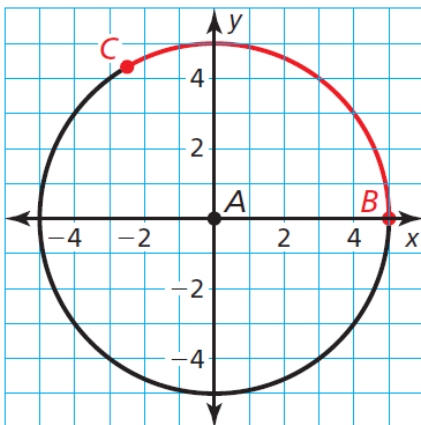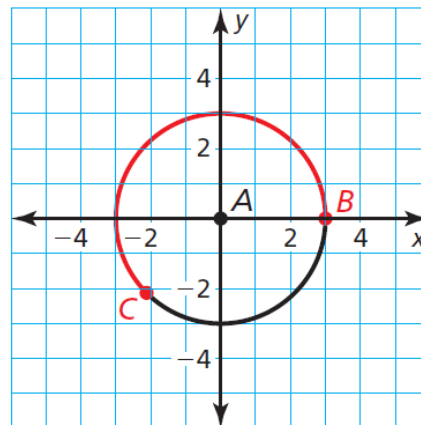
a. entire circle

b. one-fourth of a circle

c. one-third of a circle
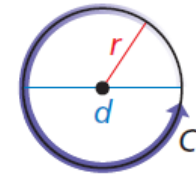

d. five-eighths of a circle

⟲ Core Concept

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.

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

Find each indicated measure.

a. circumference of a circle with a radius of 9 centimeters

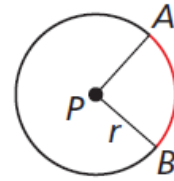b. radius of a circle with a circumference of 26 meters

Core Concept

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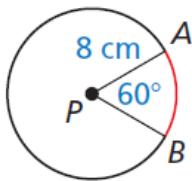
$$\frac{\text{Arc length of } \overset{\frown}{AB}}{2\pi r} = \frac{m\overset{\frown}{AB}}{360°}, \text{ or}$$

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

Find each indicated measure.

a. arc length of $\overset{\frown}{AB}$

b. circumference of ⊙Z

c. $m\overset{\frown}{RS}$

8 cm   60°   A   P   B

X   4.19 in.   Z   40°   Y

15.28 m   S   T   R   44 m
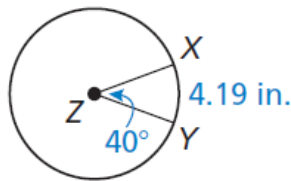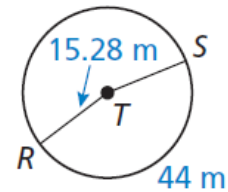
The dimensions of a car tire are shown. To the nearest foot, how far does the tire travel when it makes 15 revolutions?

5.5 in.

15 in.

5.5 in.

The curves at the ends of the track shown are 180° arcs of circles. The radius of the arc for a runner on the red path shown is 36.8 meters. About how far does this runner travel to go once around the track? Round to the nearest tenth of a meter.

44.02 m

36.8 m

├─84.39 m─┤