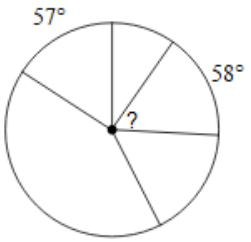
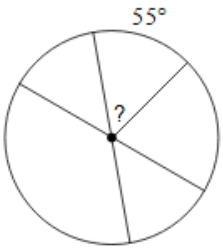
Find the measure of the arc or central angle indicated. Assume that lines which appear to be diameters are actual diameters.

1)



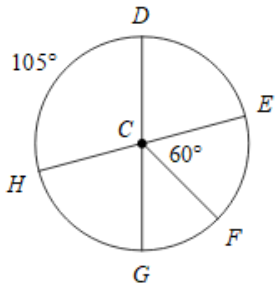
58°

2)



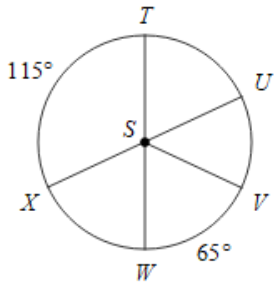
55°

3) $m\angle DCE$



75°

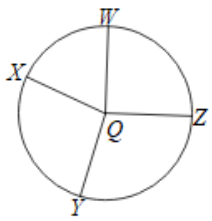
4) $m\angle WSX$



65°

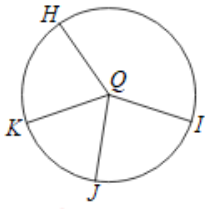
Name the arc made by the given angle.

5) $\angle ZQY$



$\overset{\frown}{ZY}$

6) Major arc for $\angle JQK$



$\overset{\frown}{JHK}$

Learning Goal: Today I will learn how to find the length of an arc and the area of a sector.

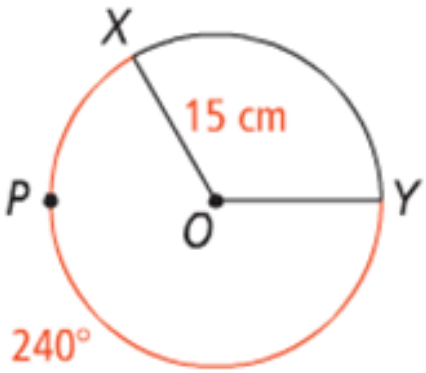
Success Criteria: I am able to calculate the length of an arc and the sector area.

10-7 Area of Circles and Sectors

*Arc Length

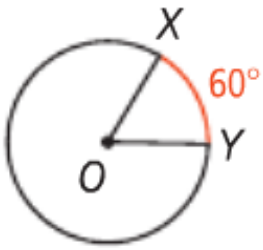
ys

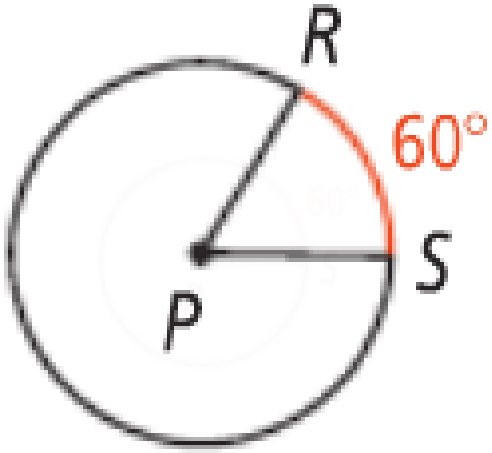
A **fraction** of a circle's **circumference.**



Congruent arcs ys

Arcs that have the **same** measure **and** are in the **same** circle or in **congruent** circles.





Have the same len
measure. (Circles must be congruent)

Theorem 10-9 Circumference of a Circle

gs

The circumference of a circle is **two** times the **radius and pi**.

$$C = 2\pi r$$

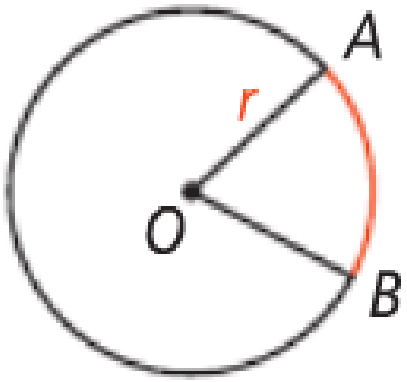
Theorem 10-10 Arc Length

gs

The length of an arc of a circle is the **product** of the ratio $\frac{\text{measure of the arc}}{360}$ and the **circumference** of the **circle**.

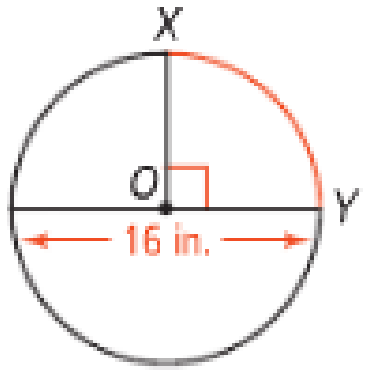
$$\text{length of } \overset{\frown}{AB} = \frac{m\overset{\frown}{AB}}{360} \cdot 2\pi r$$

$$= \frac{m\overset{\frown}{AB}}{360} \cdot \pi d$$



What is the length of each arc shown in red? Leave your answer in terms of π.

A



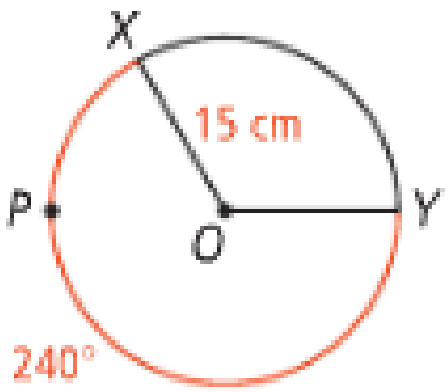
$$\text{length of } \overset{\frown}{XY} = \frac{m\overset{\frown}{XY}}{360} \cdot \pi d \qquad \text{Use a formula for arc length.}$$

$$= \frac{90}{360} \cdot \pi(16) \qquad \text{Substitute.}$$

$$= 4\pi \text{ in.} \qquad \text{Simplify.}$$

What is the length of each arc shown in red? Leave your answer in terms of π.

B



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

$$= \frac{240}{360} \cdot 2\pi(15)$$

$$= 20\pi \text{ cm}$$

*Sector of a Circle ys

A region bounded by an **arc** of the circle and the **2 radii** to the arc's endpoints.

Sector *RPS*

Theorem 10-11 Area of a Circle

gs

The area of a circle is the product of **pi** and the **radius** of the **circle**.

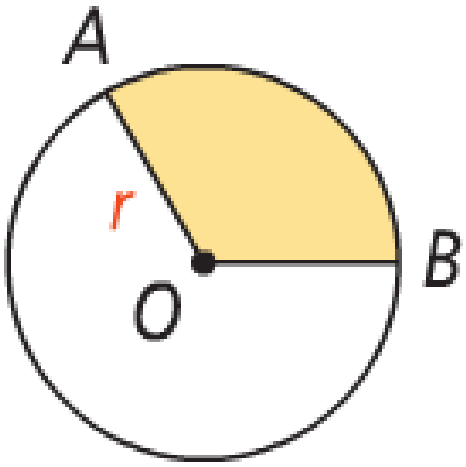
$$A = \pi r^2$$

Theorem 10-12 Area of a Sector

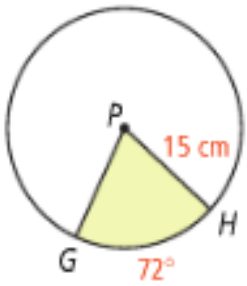
gs

The area of a sector of a circle is the **product** of the ratio $\frac{\text{measure of the arc}}{360}$ and the **area** of the **circle.**

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



What is the area of sector *GPH*? Leave your answer in terms of π.



$$\text{area of sector } GPH = \frac{m\overset{\frown}{GH}}{360} \cdot \pi r^2$$

$$= \frac{72}{360} \cdot \pi(15)^2 \quad \text{Substitute 72 for } m\overset{\frown}{GH} \text{ and 15 for } r.$$

$$= 45\pi \quad \text{Simplify.}$$

The area of sector *GPH* is 45π cm^2.

Got It? **2.** A circle has a radius of 4 in. What is the area of a sector bounded by a 45° minor arc? Leave your answer in terms of π.

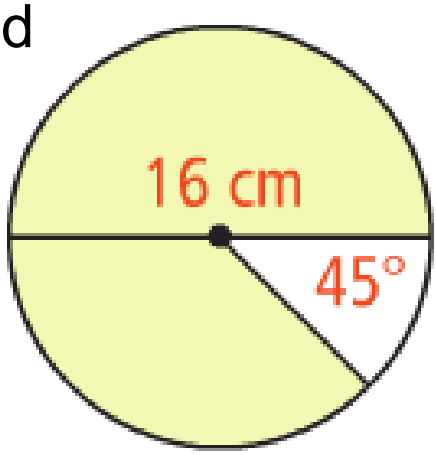
$\frac{45}{360}\pi(4)^2$

$\frac{45}{360}(16)\pi$

area $= 2\pi$ in^2

Area of Circles and Sectors

What is the area of the shaded sector?

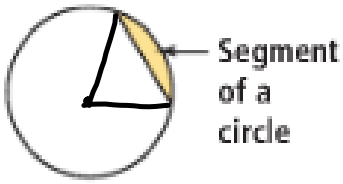


$\frac{315}{360} \cdot \pi(8)^2$

$56\pi \text{ cm}^2$

175.9 cm^2

How could you find a segment of a circle?



take note

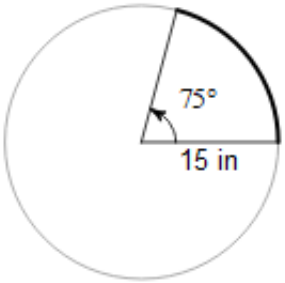
Key Concept Area of a Segment

A part of a circle bounded by an arc and the segment joining its endpoints

Closure: Today I learned how to find the area of a sector.

Find the length of each arc. Round your answers to the nearest tenth.

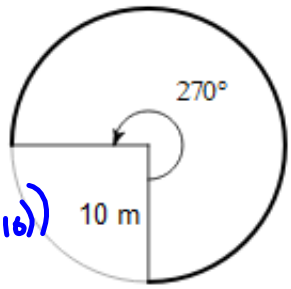
1)



$\frac{75}{360}(2\pi(15))$

19.6 in

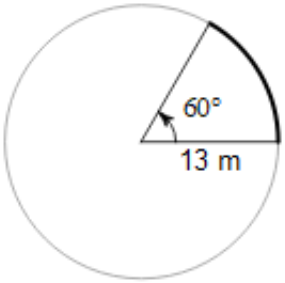
2)



$\frac{270}{360} \cdot (2\pi(10))$

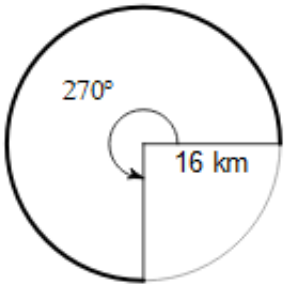
47.1 m

3)



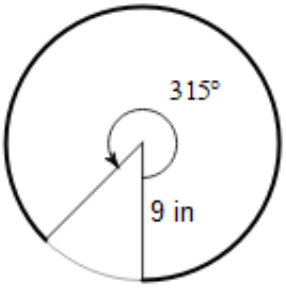
13.6 m

4)



75.4 km

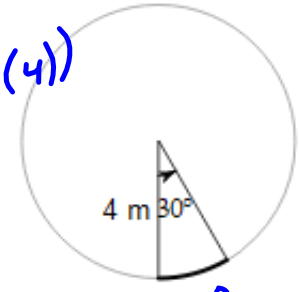
5)



$\frac{315}{360}(2\pi(19))$

49.5 in

6)



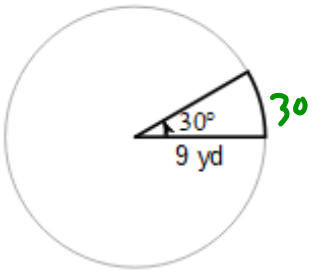
$\frac{30}{360}(2\pi(4))$

2.1 m

30

Find the area of each sector. Round your answers to the nearest tenth.

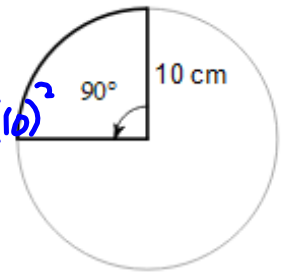
7)



$\frac{30}{360}(\pi(9)^2)$

21.2 yd²

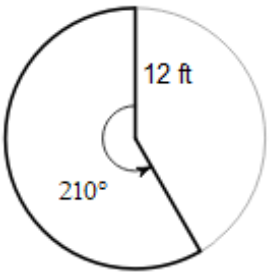
8)



$\frac{90}{360}\pi(10)^2$

78.5 cm²

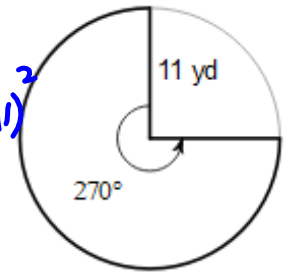
9)



$\frac{210}{360}\pi(12)^2$

263.9 ft²

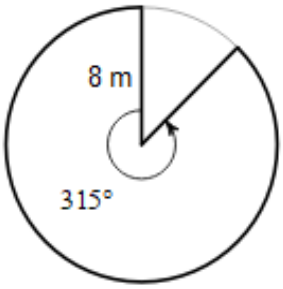
10)



$\frac{270}{360}\pi(11)^2$

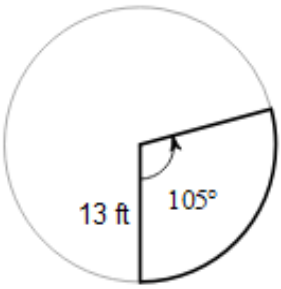
285.1 yd²

11)



175.9 m^2

12)



154.9 ft^2