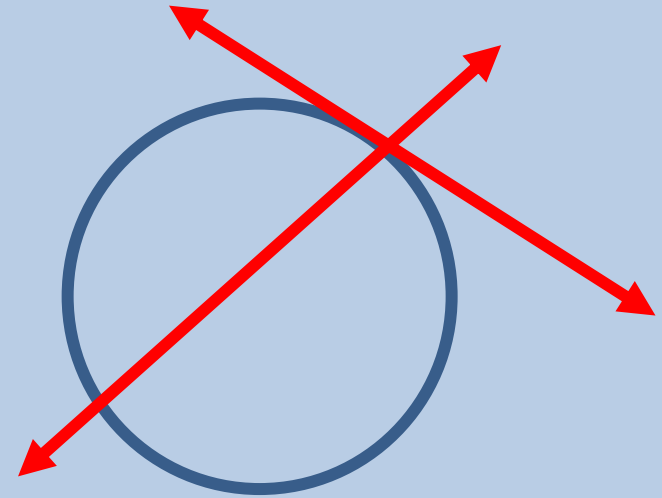
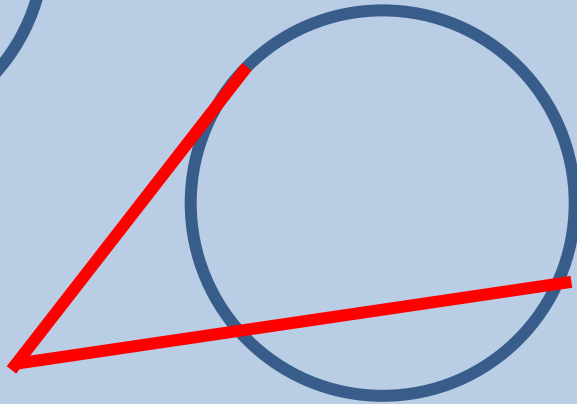
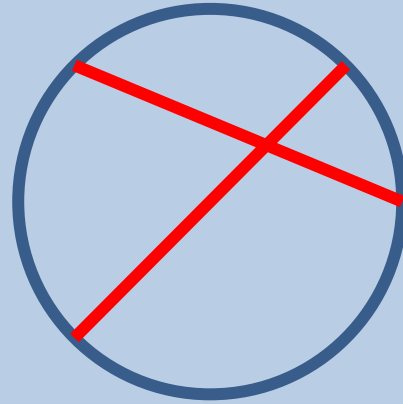
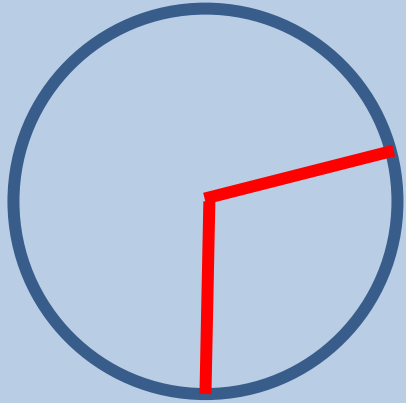




# WELCOME

**Chapter 10: Section 2-3**

**Warm-Up:** Name each type of angle in the circles and their angle relationships.



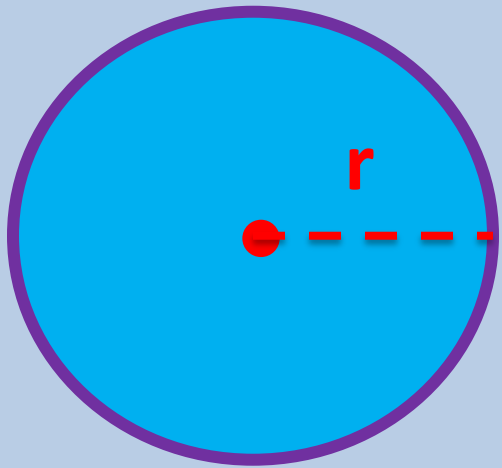
# **Chap 10: Sections 2 & 3**

## **Learning Targets**

- Calculate **Arc Length** of a Circle.
- Calculate **Area of a Sector** and **Segments** of a Circle.

# Circle

- A circle is a smooth curve with a constant radius.
- There are 360 degree in a full rotation of a circle
- We should know that the Circumference (perimeter) and Area can be found using the following formulas

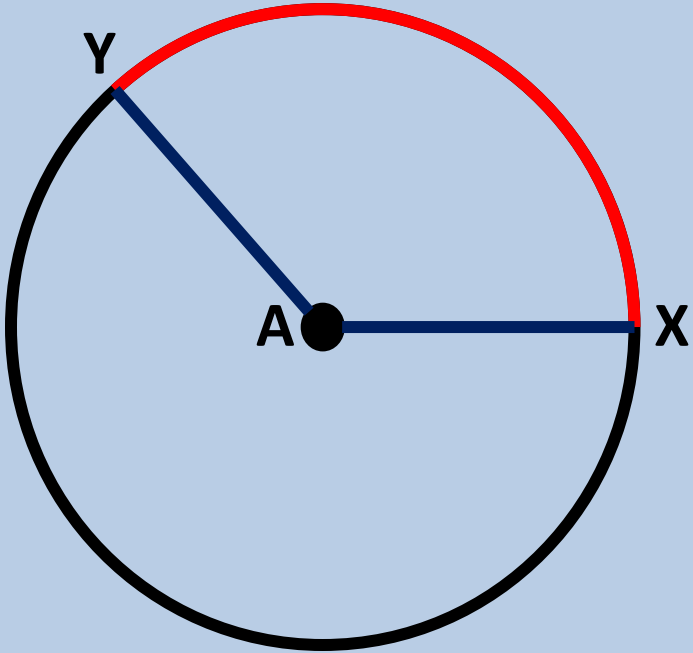


$$C = 2\pi r$$

$$A = \pi r^2$$

# Arc Length

A ratio of the arc length to the circumference is equal to a ratio of the arc measure to  $360^\circ$



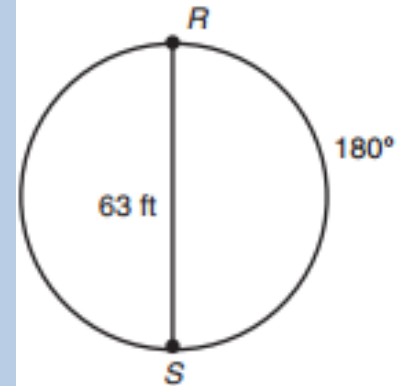
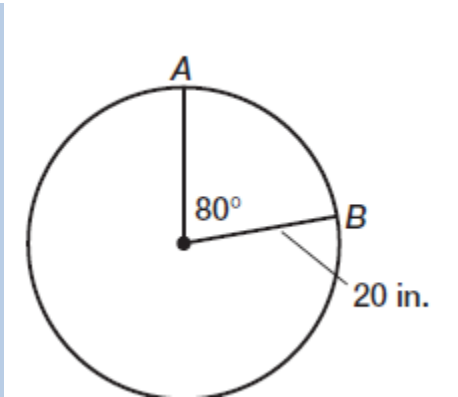
$$\frac{\text{length of } \widehat{XY}}{2\pi r} = \frac{m\widehat{XY}}{360^\circ}$$

So...

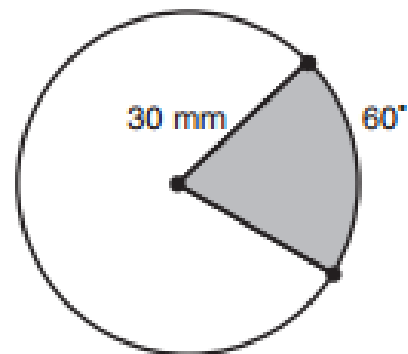
$$\text{length of } \widehat{XY} = \frac{m\widehat{XY}}{360^\circ} \cdot 2\pi r$$

# Arc Length

7. Calculate the arc length of each circle. Express your answer in terms of  $\pi$ .

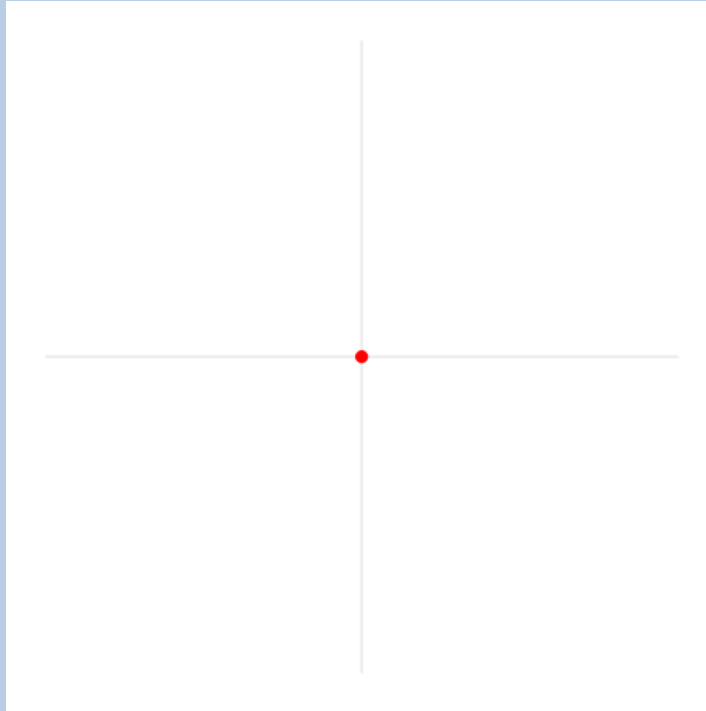


Determine the perimeter of the shaded region.



# Radians

One radian is defined as the measure of a central angle whose arc length is the same as the radius of the circle.

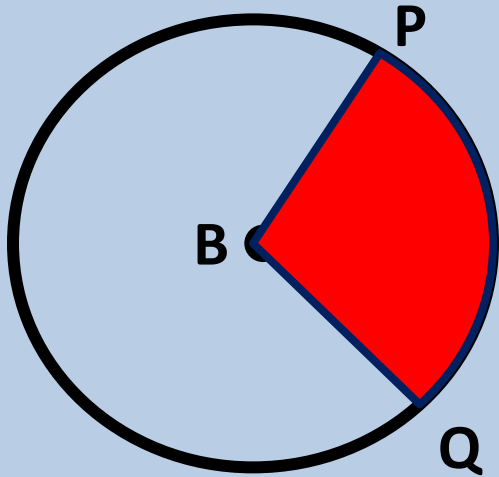


When converting degrees -> radians, multiply a degree measure by  $\frac{\pi}{180^\circ}$

When converting radians -> degrees, multiply a degree measure by  $\frac{180^\circ}{\pi}$

# Sector Area

A ratio of the sector area to the area of the circle is equal to a ratio of the arc measure to  $360^\circ$



$$\frac{\text{Area of Sector}}{\pi r^2} = \frac{m\widehat{XY}}{360^\circ}$$

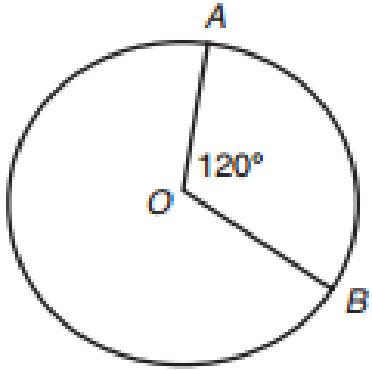
So...

$$\text{Area of Sector} = \frac{m\widehat{XY}}{360^\circ} \cdot \pi r^2$$

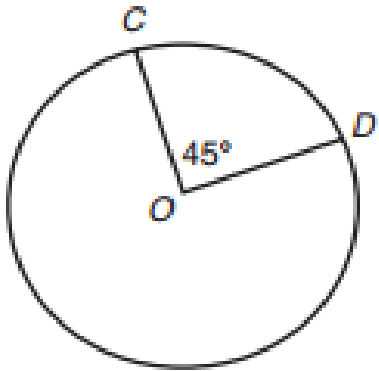
# Sector Area

Calculate the area of each sector. Write your answer in terms of  $\pi$ .

1. If the radius of the circle is 9 centimeters, what is the area of sector  $AOB$ ?



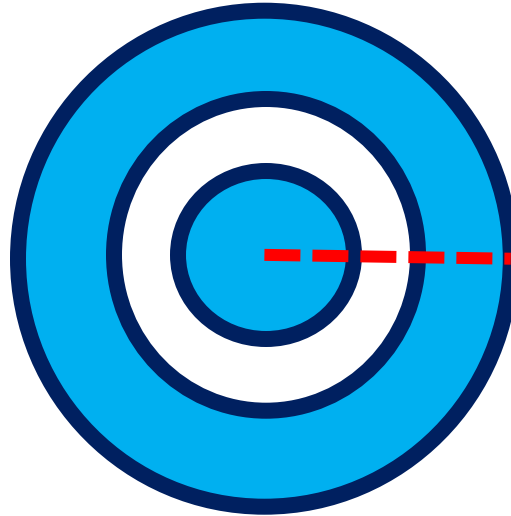
2. If the radius of the circle is 16 meters, what is the area of sector  $COD$ ?



# Concentric Circles

**Circles with sides that have no intersections**

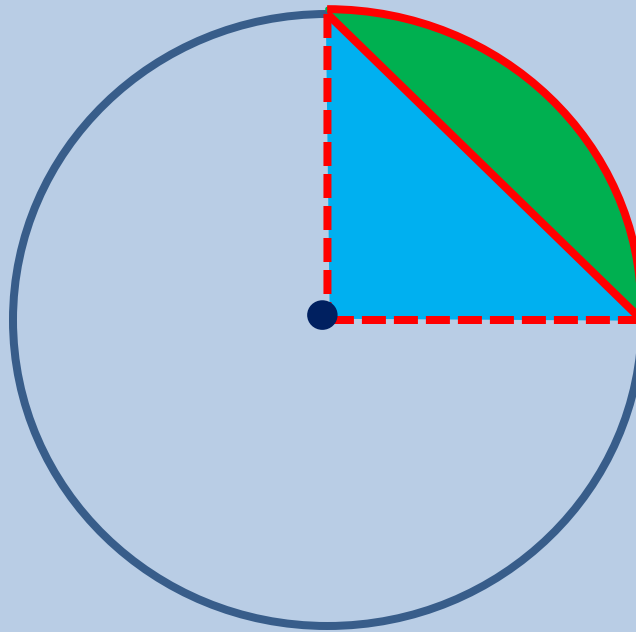
**“Concentric”**



**You can find the area of the shaded region by taking the area of each shaded circle and subtracting out nonshaded ones.**

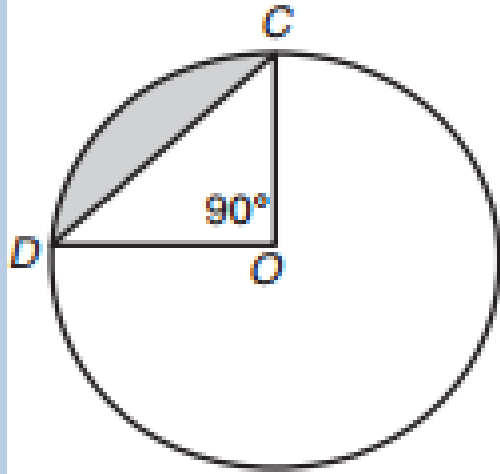
# Segment Area

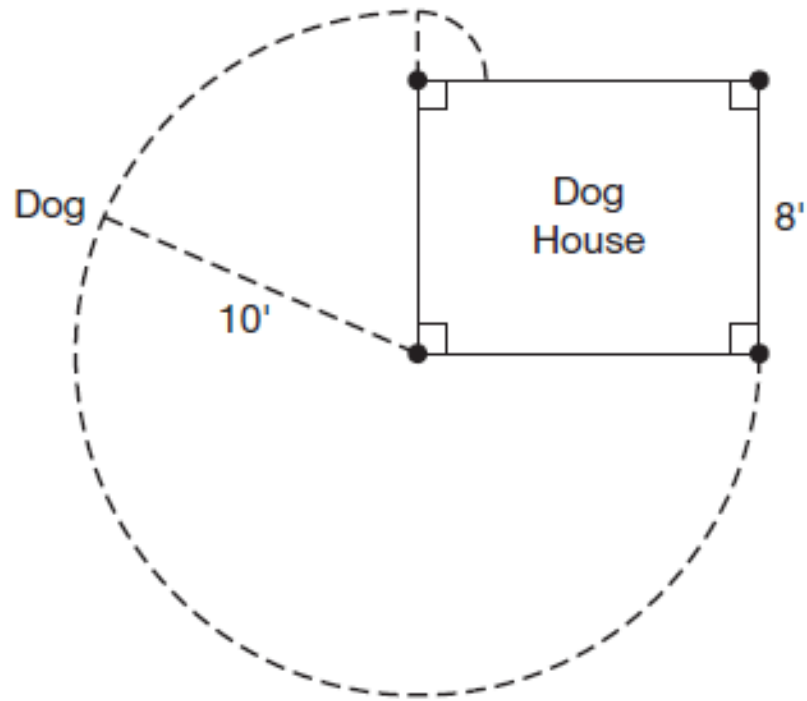
The segment of a circle is the region bound by a chord and the included arc.



$$\text{Segment Area} = \text{Sector Area} - \text{Triangle Area}$$

If the radius of the circle is 14 inches, what is the area of the shaded segment?





A dog is tethered to the corner of his rectangular dog house with 10' chain. The chain keeps the dog within 10' of the corner.

- A) If the dog were to walk the entire perimeter of the space that it can reach how far would it walk?
- B) What is the area of the yard that the dog has to move around in?