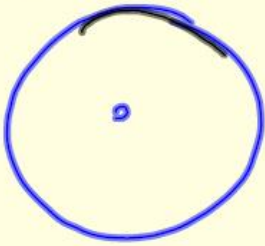


10-7: Areas of Circles, Sectors, and Segments.

$$C = 2\pi r$$

$$C = \pi d$$



$$A = \pi(r)^2$$

Objective: Find the area of circles, sectors, and segments.

Warm-up

1. In one revolution, how much further does a 29 in. mountain bike tire travel than a 26 in. mountain bike tire? (tires are measured by their diameter).
2. Over 1000 ft, how many more revolutions would the 26 in. tire make than the 29 in. tire.

Refresher

How do you find the circumference of a circle?

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

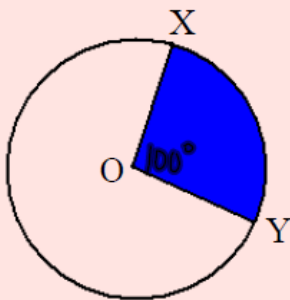
How do you find the area of a circle?

$$A = \pi r^2$$



New Vocabulary: SECTOR

A **sector** is a region bounded by two radii of a circle.



The blue shaded region is called sector XOY .

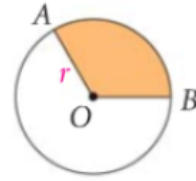
$$\frac{100}{360} (\pi r^2)$$

How can we find the area of a sector if we know the measure of $\angle XOY$?

Theorem 10-12 Area of a Sector of a Circle

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.

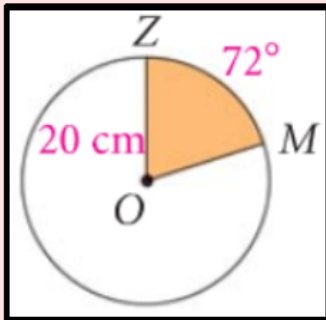
$$\text{Area of sector } AOB = \frac{m\widehat{AB}}{360} \cdot \pi r^2$$



AREA OF A SECTOR = FRACTION OF CIRCLE • AREA



Find the area of sector ZOM.



$$\frac{72}{360} (\pi (20)^2)$$

$$\frac{1}{5} (\pi (400))$$

$$\boxed{251.33 \text{ cm}^2}$$

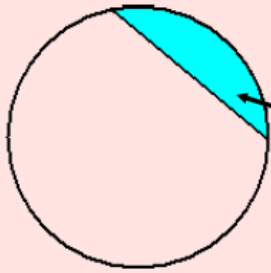
A circle has a diameter of 20 cm. What is the area of a sector bounded by a ~~208~~ 208° major arc?

$$\frac{208}{360} (\pi (10)^2)$$

$$\boxed{181.51 \text{ cm}^2}$$

New Vocabulary: SEGMENT

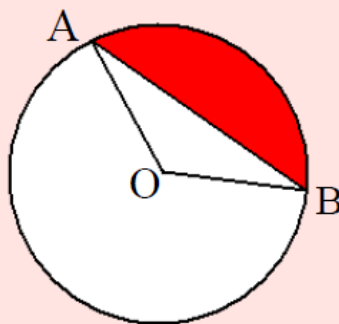
A part of a circle bounded by an arc and the segment joining its endpoints is a **segment** of a circle.



Segment of a circle.

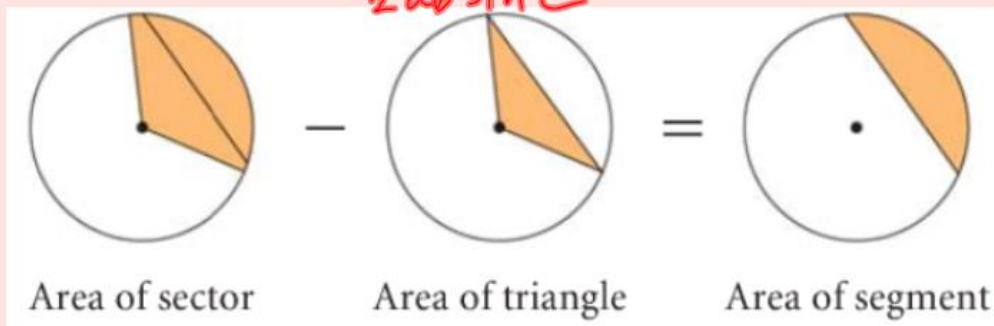


How do we find the area of segment AB given the measure of $\angle AOB$ and the radius ?

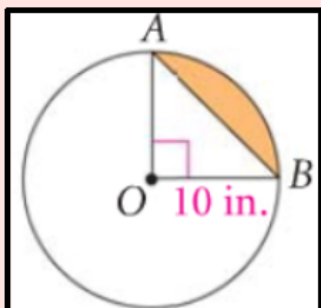
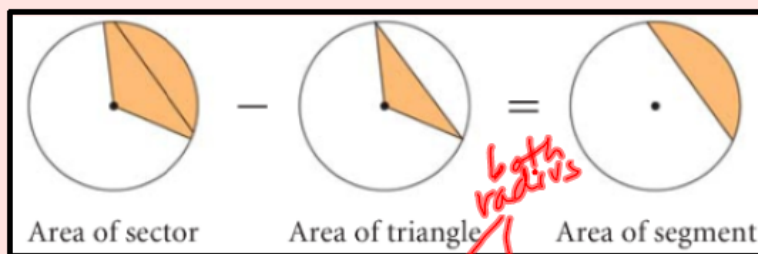


Area of a segment

$$\frac{1}{2} ab \sin C$$



Find the area of segment AB.



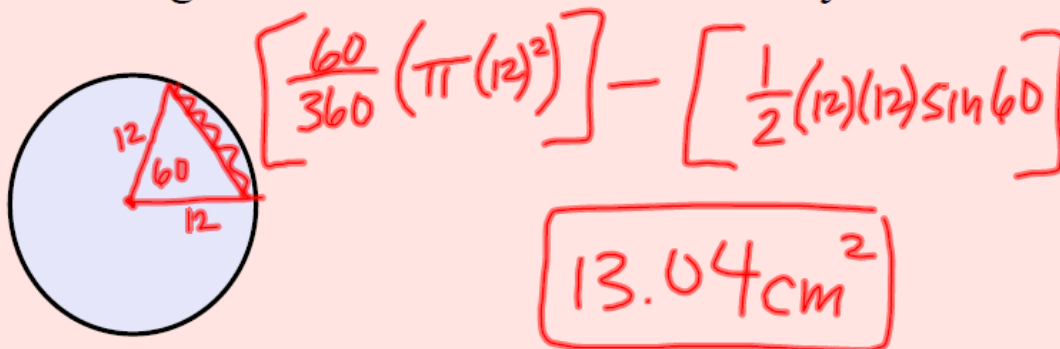
$$\left[\frac{90}{360} (\pi (10)^2) \right] - \left[\frac{1}{2} (10)(10) \sin 90 \right]$$

$$78.5398 - 50$$

$$\boxed{28.54 \text{ in.}^2}$$

Practice

A circle has a radius of 12 cm. Find the area of the smaller segment of the circle bounded by a 60° arc.



Challenge Problem

- Recreation** An 8 ft-by-10 ft floating dock is anchored in the middle of a pond. The bow of a canoe is tied to a corner of the dock with a 10-ft rope as shown in the picture below.
- Sketch a diagram of the region in which the bow of the canoe can travel.
 - Write a plan for finding the area.
 - Find the area. Round your answer to the nearest square foot.

