

Name: \_\_\_\_\_  
 Period: \_\_\_\_\_

Date: \_\_\_\_\_  
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Aim: How can we find arc length?

Do Now:

In the diagram below of circle  $O$ , diameter  $\overline{AB}$  and radii  $\overline{OC}$  and  $\overline{OD}$  are drawn. The length of  $\overline{AB}$  is 12 and the measure of  $\angle COD$  is 20 degrees.

$r = 6$

$A_{\text{sector}} = \frac{80}{360} \cdot \pi (6)^2$   
 $8\pi \text{ units}^2$

If  $\overline{AC} \cong \overline{BD}$ , find the area of sector  $BOD$  in terms of  $\pi$ .

How can we determine the length of each highlighted arc?

1.  $C = \pi d$   $C = 2\pi r$   
 $C = 2\pi 6$   
 $C = 37.7 \text{ cm}$

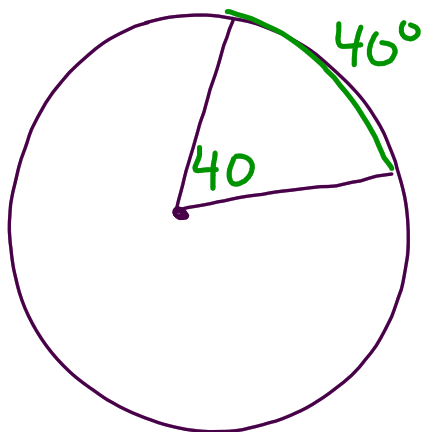
2.  $\frac{120}{360}$   
 $\frac{1}{3} \cdot 37.7$   
 $12.6 \text{ cm}$

Arc Length - a portion of the circumference

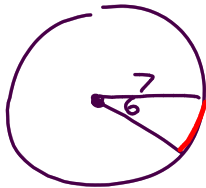
$$\text{Arc Length} = \frac{n}{360} \cdot \text{circumference}$$

3. Find the length of minor arc AB.

$\frac{80}{360} \cdot 2\pi r$   
 $\frac{80}{360} \cdot 2\pi(3)$   
 $4.2 \text{ ft}$



4. For a circle of radius 7 feet, find the arc length cut off by a central angle of  $6^\circ$  to the nearest tenth.



$$\frac{6}{360} \cdot 2\pi(7)$$

$$\boxed{.7 \text{ ft}}$$

5. For a circle of radius 7 feet, find the arc length of a central angle of  $30^\circ$ . Leave your answer in terms of pi.

6. The circumference of a circle is  $116\pi$  cm. Find the diameter, the radius, and the length of an arc of  $50^\circ$ .

7. A circle has center  $(0, 0)$  and radius 6. The vertices of regular hexagon  $ABCDEF$  are on the circle. How long is  $\widehat{AB}$ ? Leave your answer in terms of pi.

8. An electron travels along a circular path with a radius of 4.6 miles. What is the number of miles the electron traveled during an interval when the central angle formed by the electron's path was  $220^\circ$ ?

9. A circle is drawn to represent a pizza with a 12 inch diameter. The circle is cut into eight congruent pieces. What is the length of the outer edge of any one piece of this circle?

10. Ileana buys a large circular pizza that is divided into eight equal slices. She measures along the outer edge of the crust from one piece and finds it to be 5.5 inches. What is the diameter of the pizza to the nearest inch?

11. The accompanying diagram shows the path of a cart traveling on a circular track of radius 2.40 meters. The cart starts at point A and stops at point B, moving in a counterclockwise direction. What is the length of minor arc AB, over which the cart traveled, to the nearest tenth of a meter?

