

Geometry

Practice/Homework – Arc Length and Area of a Sector

Name: Key

Date: _____

Formulas to KNOW!

- Circumference of a Circle

$$C = 2\pi r \text{ or } C = \pi d$$

- Area of a Circle

$$A = \pi r^2$$

- Arc Length

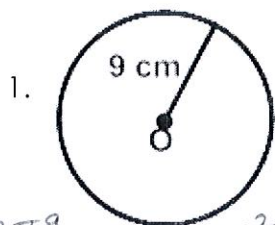
$$AL = \frac{\theta}{360} \cdot 2\pi r$$

- Area of a Sector

$$A = \frac{\pi r^2 \theta}{360}$$

Practice Problems

Find the circumference and area for each circle below. Leave answers in terms of π .

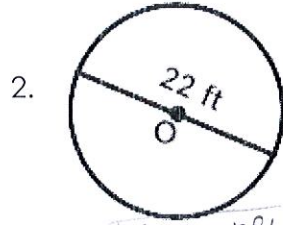


$$C = 2\pi \cdot 9$$

$$C = 18\pi \text{ cm}$$

$$A = \pi \cdot 9^2$$

$$A = 81\pi \text{ cm}^2$$



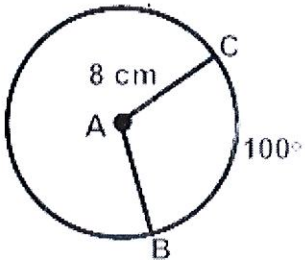
$$C = 22\pi \text{ ft}$$

$$A = \pi \cdot 11^2$$

$$A = 121\pi \text{ ft}^2$$

5. Find the length of \widehat{BC} .

Leave your answer in terms of π .

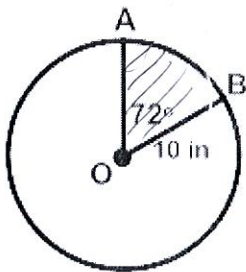


$$AL = \frac{100}{360} \cdot 2\pi \cdot 8$$

$$AL = \frac{40\pi}{9} \text{ cm}$$

7. Find the area of sector AOB.

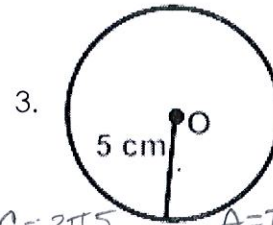
Leave answer in terms of π .



$$A = \frac{\pi \cdot 10^2 \cdot (72)}{360}$$

$$A = 20\pi \text{ in}^2$$

Find the circumference and area for each circle below. Round to the nearest hundredth.

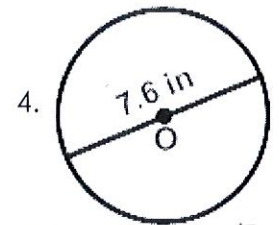


$$C = 2\pi \cdot 5$$

$$C \approx 31.42 \text{ cm}$$

$$A = \pi \cdot 5^2$$

$$A \approx 78.54 \text{ cm}^2$$



$$C = 7.6\pi$$

$$C \approx 23.88 \text{ in}$$

$$A = \pi \cdot \left(\frac{7.6}{2}\right)^2$$

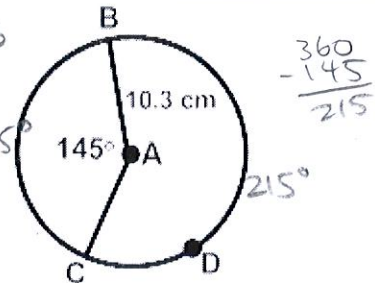
$$A \approx 45.36 \text{ in}^2$$

6. Find the length of \widehat{BDC} .

Round to the nearest hundredth.

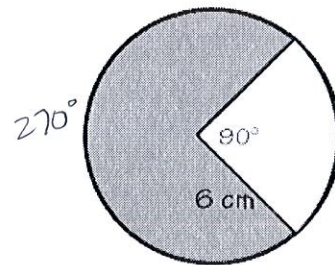
$$AL = \frac{215}{360} \cdot 2\pi \cdot 10.3$$

$$AL \approx 38.65 \text{ cm}$$



8. Find the area of the shaded region.

Round to the nearest hundredth.



$$A = \frac{\pi \cdot 6^2 \cdot (270)}{360}$$

$$A = 27\pi \text{ cm}^2$$

9. The free throw lane of a basketball court, sometimes called the key, is topped by a semicircle that has a diameter of 12 feet. To the nearest foot, find the arc length of the semicircle and to the nearest square foot, find the area of the semicircle.



$$AL = \frac{180}{360} \cdot 2\pi \cdot 6$$

$$AL \approx 19 \text{ feet}$$

$$\text{Area} = \frac{\pi \cdot 6^2 \cdot (180)}{360}$$

$$A \approx 57 \text{ feet}^2$$

10. Find the radius of a circle with a circumference of 20π meters.

$$C = 2\pi r \quad \frac{20\pi}{2\pi} = \frac{2\pi r}{2\pi} \quad \boxed{r = 10 \text{ m}}$$

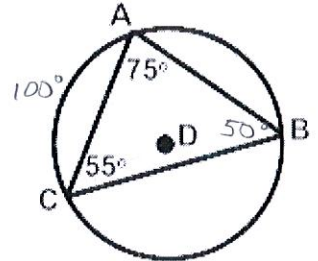
11. What is the diameter of a circle with area 64π square meters?

$$A = \pi r^2 \quad \frac{64\pi}{\pi} = \frac{\pi r^2}{\pi} \quad r^2 = 64 \quad r = 8 \quad \boxed{\text{Diameter} = 16 \text{ m}}$$

12. Circle D has a radius of 12 cm. What is the length of \widehat{AC} ? Leave your answers in terms of π .

$$AL = \frac{100}{360} \cdot 2\pi \cdot 12$$

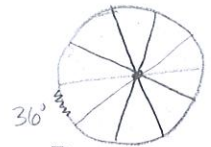
$$AL = \boxed{\frac{20\pi}{3} \text{ cm}}$$



13. A circular pizza with a diameter of 12 inches is cut into 10 equal slices. What is the area of one slice? Leave your answers in terms of π .

$$A = \frac{\pi r^2 \theta}{360} = \frac{\pi (6)^2 (36)}{360} = \boxed{\frac{18\pi}{5} \text{ in}^2}$$

$$\frac{360}{10} = 36^\circ$$

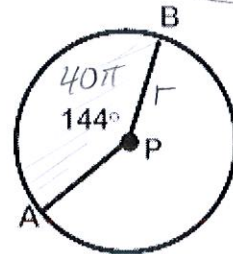


14. Find the radius of circle P if the area of sector APB is 40π square feet.

$$A = \frac{\pi r^2 \theta}{360} \quad 40\pi = \frac{\pi r^2 (144)}{360}$$

$$\frac{14400\pi}{144\pi} = \frac{\pi r^2 144}{144\pi}$$

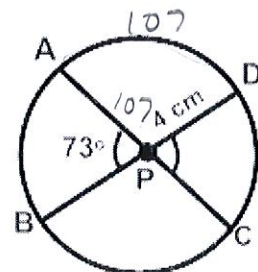
$$100 = r^2 \quad \boxed{r = 10 \text{ feet}}$$



15. For circle P, find the length of \widehat{AD} . Leave your answer in terms of π .

$$AL = \frac{107}{360} \cdot 2\pi \cdot 4$$

$$AL = \boxed{\frac{107\pi}{45} \text{ cm}}$$



16. Find the area of the shaded region of a circle if the central angle of the segment is 90° and the radius is 10. Express your answer to the nearest tenth of a square unit.

$$A_{\text{sector}} = \frac{\pi 10^2 \cdot 90}{360} \approx \boxed{78.5 \text{ m}^2}$$

$$A_{\text{Triangle}} = \frac{1}{2}bh = \frac{1}{2}(10)(10) = \boxed{50 \text{ m}^2}$$

$$A_{\text{shaded}} = 78.5 - 50 = \boxed{28.5 \text{ m}^2}$$

