

ESSENTIAL QUESTION: How can the area of a circle's sector (pizza slice) be found?

QUESTIONS:

**Vocabulary:** Sector of a Circle \* pizza slice

The region bounded by two radii of the circle and their intercepted arc



**Theorem 11.9: Area of a Circle**

The area of a circle is  $\pi r^2$

$$A = \pi r^2$$

where  $r$  is the radius of the circle.

**A1. Find the indicated circle measure.**

a. Area, if the radius = 25 cm

$$A = \pi(25)^2 = 625\pi \text{ cm}^2$$

$$\approx 1963.50 \text{ cm}^2$$

b. Radius, if the Area = 100 m<sup>2</sup>

$$100 = \pi r^2$$

$$\frac{100}{\pi} = r^2$$

$$\sqrt{31.83} = \sqrt{r^2} \quad r \approx 5.64 \text{ m}$$

**Theorem 11.10: Area of a Sector**

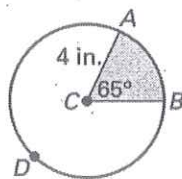
In a circle, the ratio of the area of a sector to the area of the entire circle is equal to the ratio of the measure of the intercepted arc to 360°.

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

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

**A2. Find the sector area formed by the given arc.**

a.  $\widehat{AB}$

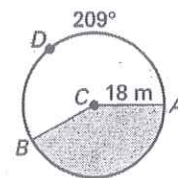


$$A = \frac{65}{360} \cdot (\pi 4^2)$$

$$= (.18055)(50.265)$$

$$A \approx 9.08 \text{ in}^2$$

b.  $\widehat{BDA}$



$$\frac{209}{360} (\pi 18^2)$$

$$\approx 590.93 \text{ m}^2$$

SUMMARY:

Area of a sector is a portion of the circle's area.  
The portion is the measure of the arc to 360°

$$A = \frac{m\widehat{AB}}{360} (\pi r^2)$$

QUESTIONS:

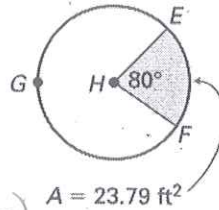
**A3. Find the indicated measure.**

a. Area of  $\odot H$

$$23.79 = \frac{80}{360} (\pi r^2)$$

$$\frac{23.79}{.222} = \pi r^2$$

$$\boxed{107.055} = \pi r^2 = \text{Area}$$



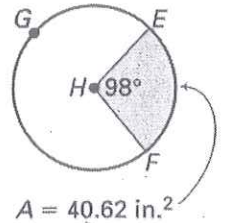
b. Radius  $\overline{HE}$

$$40.62 = \frac{98}{360} (\pi r^2)$$

$$\frac{40.62}{.8552} = r^2$$

$$47.497 = r^2$$

$$r = \sqrt{47.497} \approx \boxed{6.89}$$



**Corollary: Perimeter of a Sector**

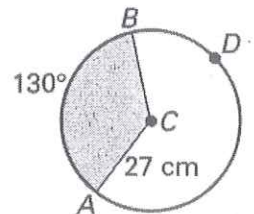
The perimeter of a circle's sector is the sum of two times the radius and the sector's arc length.

$$P = 2(\text{radius}) + \text{arc length} = 2r + s$$

**A4. Find the perimeter of the shaded sector.**

$$\text{Arc length} = \frac{130}{360} (2\pi \cdot 27) = 61.26$$

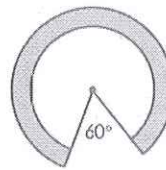
$$P = 2(27) + 61.26 = \boxed{115.26 \text{ cm}}$$



**A5. Find the area of the shaded region using the given information.**

$R = 12 \text{ cm}, r = 9$

$$\frac{300}{360} = .833 \text{ portion}$$



Area large  $\odot$  - Area small  $\odot$

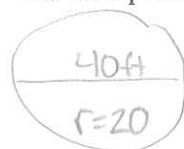
$$\pi(12)^2 - \pi(9)^2$$

$$452.39 - 254.47$$

$$= 197.92$$

$$\frac{300}{360} (197.92) = \boxed{164.93 \text{ cm}^2}$$

**A6. Central High School is making a super-sized pizza with a diameter of 40 ft. It is sliced in to ten equal slices. How many cans of pizza sauce would be needed to cover one of the slices if one can covers three square feet?**



$$A = \pi(20)^2 \approx 1256.64 \text{ ft}^2$$

$$\frac{1256.64 \text{ ft}^2}{3 \text{ ft}^2} = 418.88$$

**Need 419 cans**