

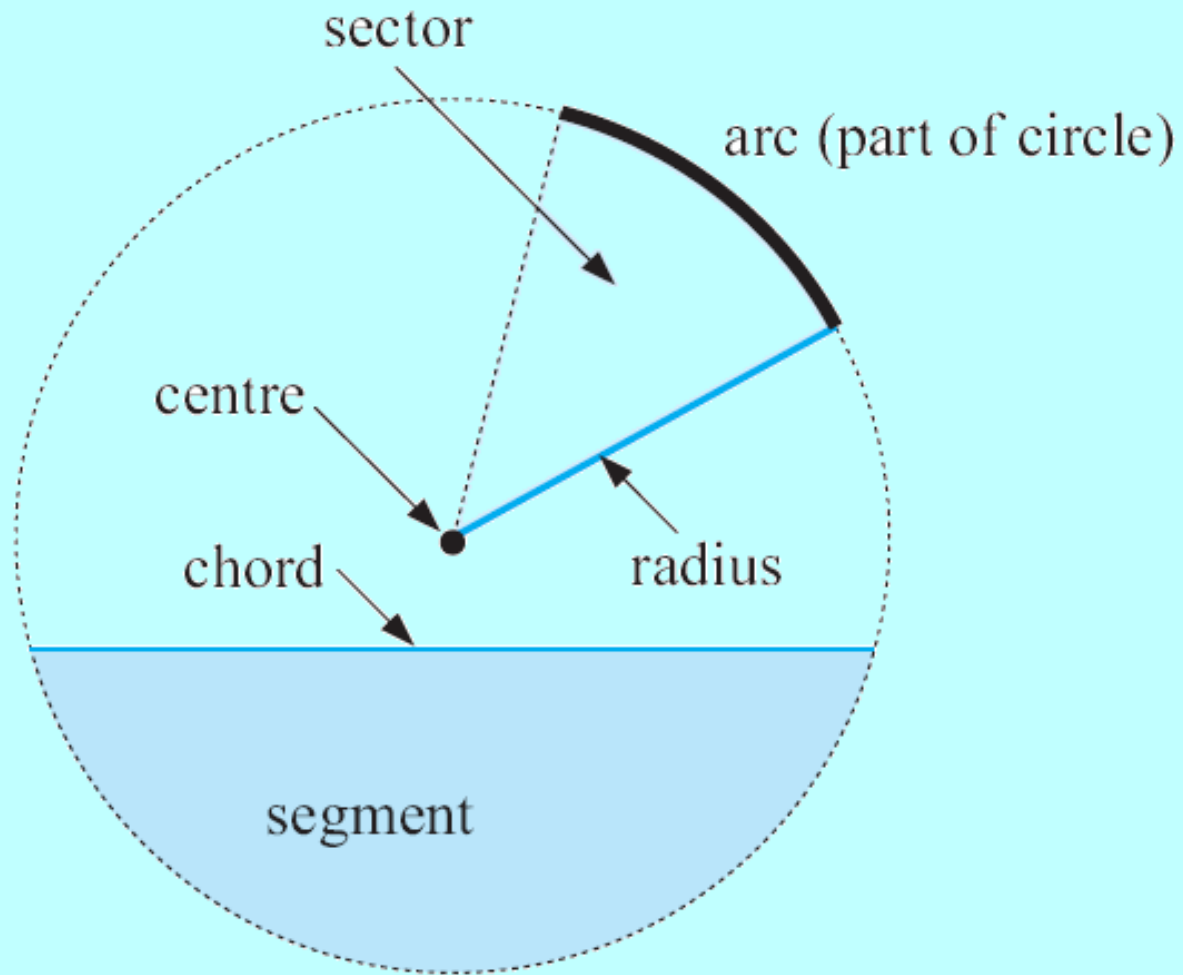
SAT Question

A special lottery is to be held to select the student who will live in the only deluxe room in a dormitory. There are 100 seniors, 150 juniors, and 200 sophomores who applied. Each senior's name is placed in the lottery 3 times; each junior's name, 2 times; and each sophomore's name, 1 time. What is the probability that a senior's name will be chosen?

Answer Choices

- (A) $1/8$
- (B) $2/9$
- (C) $2/7$
- (D) $3/8$
- (E) $1/2$

4.1 b and c



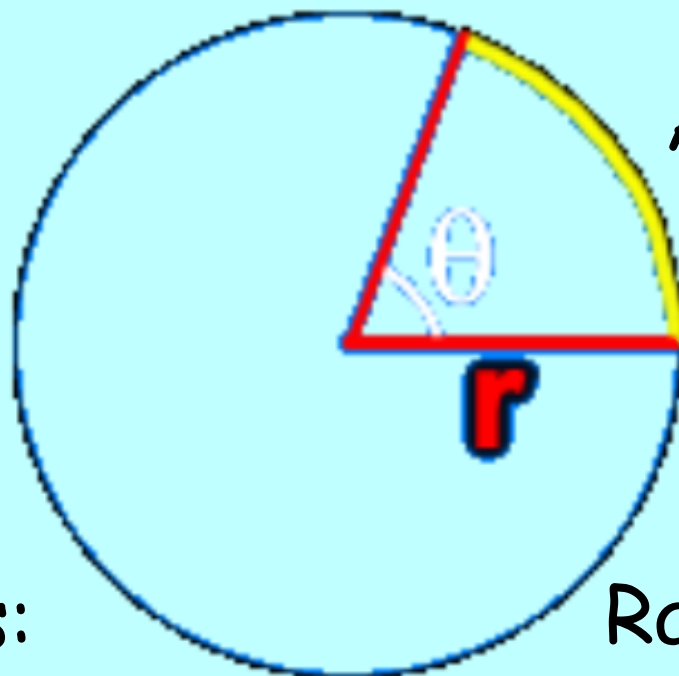
4.1bc Central Angles and Arcs

$$C = 2\pi r$$
$$\frac{2\pi r \theta}{360}$$

Degrees:

$$l = \frac{2\pi r \theta}{360}$$

$$l = \frac{\pi r \theta}{180}$$



Arc length

Radians:

$$l = \theta r$$

Ex.1

$$\theta = 42^\circ$$

$$r = 8$$

$$l = \frac{2\pi r\theta}{360}$$

$$l = 5.86$$

Ex.2

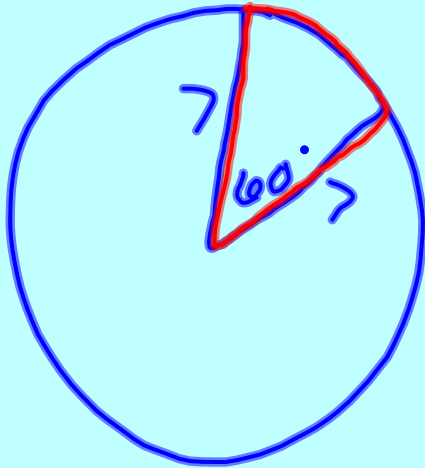
$$\theta = \frac{\pi}{2}$$

$$r = 2$$

$$l = r\theta$$

$$= \pi$$

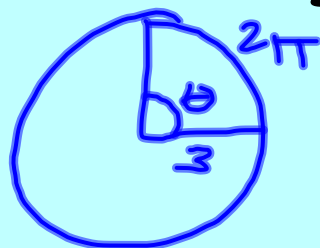
Find the perimeter of a 60° slice of pizza whose diameter is 14 inches.



$$l = \frac{2\pi(7)(60)}{360}$$
$$= 7.33$$

$$P = 7 + 7 + 7.33$$
$$= 21.33 \text{ in.}$$

A sector has an arc length of 2π and a radius of 3.



Find the central angle in degrees and radians.

$$l = \theta r$$

$$2\pi = \theta(3)$$

$$\frac{2\pi}{3} = \theta$$

$$\frac{2\pi}{3} \cdot \frac{180}{1} = 120^\circ$$

A sector has an arc length of $5\pi/2$ and a central angle of $\pi/4$.

Find the radius of the circle.

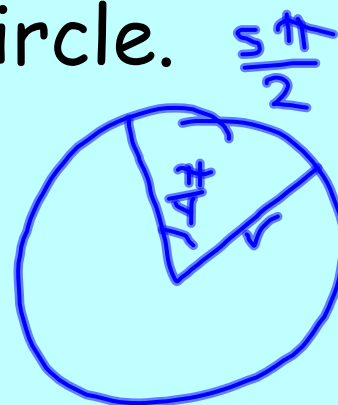
$$\frac{5\pi/2}{\pi/4} = r$$

$$\frac{20\pi}{2\pi} = r$$

$$l = \theta r$$

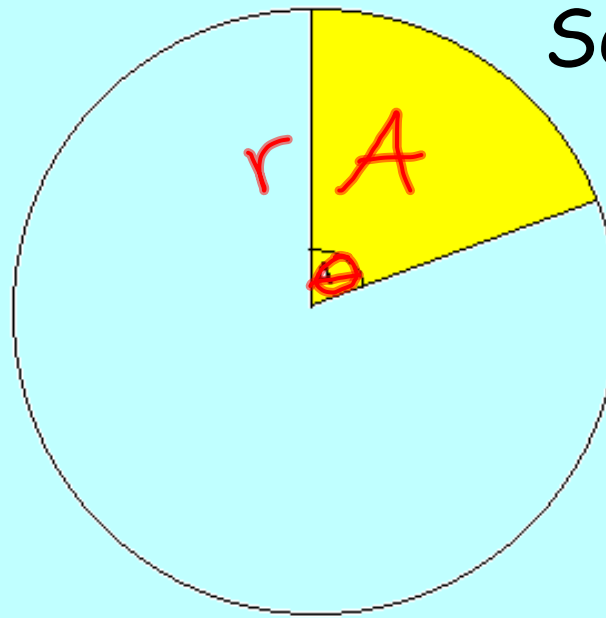
$$\frac{5\pi}{2} = \frac{\pi}{4} r$$

$$r = 10$$



4.1bc Central Angles and Arcs

$$\frac{\pi r^2 \theta}{2\pi}$$



Sector area

Degrees

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

Radians:

$$A = \frac{1}{2} \theta r^2$$

Ex. 1

$$\theta = 50^\circ$$

$$r = 12 \text{ cm}$$

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

$$= 62.8 \text{ cm}^2$$

Ex. 2

$$\theta = \frac{5\pi}{4}$$

$$r = 4 \text{ ft.}$$

$$A = \frac{1}{2} \theta r^2$$

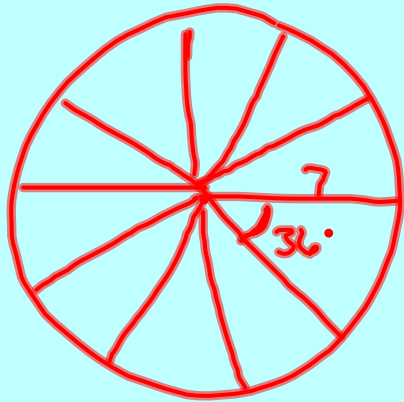
$$= \frac{1}{2} \left(\frac{5\pi}{4} \right) (4)^2$$

$$= \frac{50\pi}{4} (16)$$

$$= \frac{800\pi}{4} = 100\pi \text{ ft}^2$$

Find the area of one slice of pizza if the pizza has 10 slices and the diameter is 14 inches.

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



$$A = \frac{1}{2} \theta r^2$$

$$= \frac{1}{2} \left(\frac{\pi}{5} \right) (7^2)$$

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

$$r = 7$$

$$\theta = \frac{2\pi}{10} = \frac{\pi}{5}$$

$$= \frac{49\pi}{10}$$

$$= 4.9\pi$$

A sector has an area of 51.3 cm^2 and a radius of 14 cm .

Find the central angle in degrees and radians.



$$A = \frac{1}{2} \theta r^2$$

$$51.3 = \frac{1}{2} \theta (14)^2$$

$$\theta = \underline{.523} \div \pi = 0.166\pi$$

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

$$= 30^\circ$$

$$= \frac{\pi}{6}$$

A sector has an area of 37.7 ft^2 and a central angle of $\pi/6$.

$$\frac{\pi}{6} = 30^\circ$$

Find the radius of the circle.

$$37.7 = \frac{30}{360} \pi r^2$$

$$= \frac{1}{12} \pi r^2$$

$$144.00 = r^2$$

$$12 := r$$

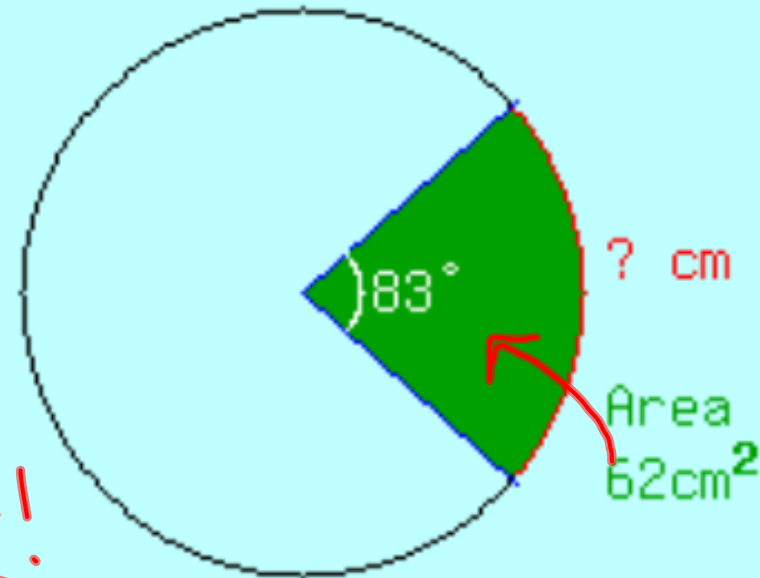
$$37.7 = \frac{1}{2} \left(\frac{\pi}{6} \right) r^2$$

$$75.4 = \frac{\pi}{6} r^2$$

$$\frac{452.4}{\pi} = r^2$$

$$R = r$$

The diagram shows a sector of 83° with an area of 62 cm^2 . Find the corresponding arc length. *Must find r!*



$$62 = \frac{83}{360} \cdot \pi r^2$$

$$r = 9.25 \text{ cm}$$

(ANS)

$$l = \frac{\pi(9.25)83}{180}$$

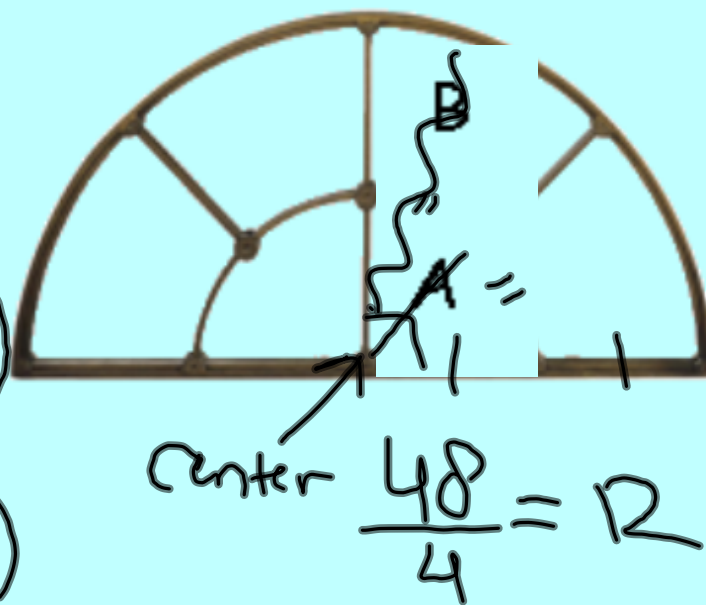
$$l = 13.4 \text{ cm}$$

4.1bc Central Angles and Arcs

The window has a diameter of 48 inches. Find the area of regions A and B.

$$\begin{aligned} \text{Area}_A &= \frac{90}{360} \pi (12^2) \\ &= \frac{1}{4} \pi (144) \\ &= 113 \text{ in}^2 \end{aligned}$$

$$\begin{aligned} \text{Area}_B &= \left(\frac{1}{8} \pi 24^2\right) - \left(\frac{1}{8} \pi 12^2\right) \\ &= (72\pi) - 56.5 \\ &= 226 - 56.5 \\ &= 169.69 = 170 \text{ cm}^2 \end{aligned}$$



Homework Assignment:
WS 4.1 b and c