

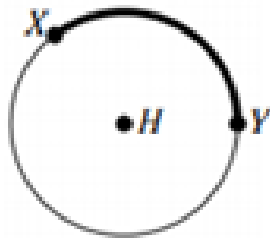
Given two points on a circle:

- a. An arc length is a portion of the Circumference of a circle.
- b. The minor arc is the shortest arc linking both points. The major arc is the longest and often defined using another point on the arc, and use all three points to define it.
- c. The ratio of the length of an arc to the Circumference is equal to the ratio of the measure of arc to 360°.

minor $< 180^\circ$

Semicircle = 180°

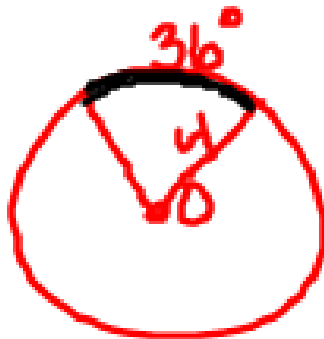
major $> 180^\circ$



$$\frac{\widehat{XY}}{2\pi r} = \frac{m\widehat{XY}}{360^\circ}$$

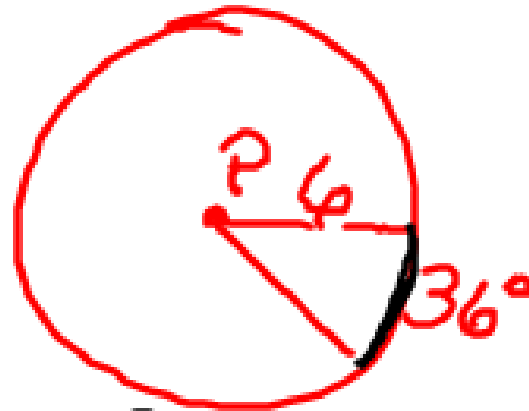
Practice:

Suppose circles O and P have the same center with radii of 4 and 6 centimeters, respectively. \widehat{RE} is a minor arc in circle O and \widehat{MI} is a minor arc in circle P. Both arcs have an angle measure of 36° . Are their arc lengths the same? Justify your answer.



$$C = 8\pi$$

$$\frac{x}{8\pi} = \frac{36}{360}$$



$$C = 12\pi$$

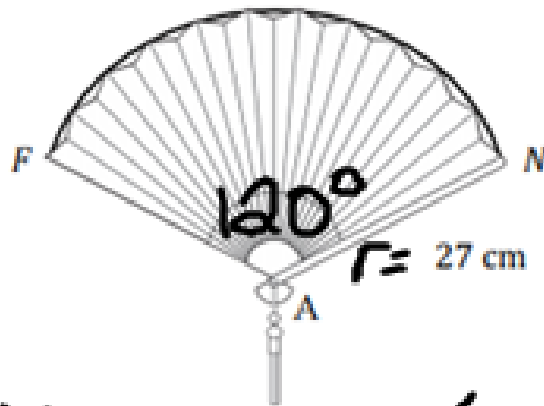
$$\frac{x}{12\pi} = \frac{36}{360}$$

No, Circumference is different

Your turn:

Estimate the length of \widehat{FN} if $m\angle FAN = 120^\circ$. Use 3.14 for π .

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



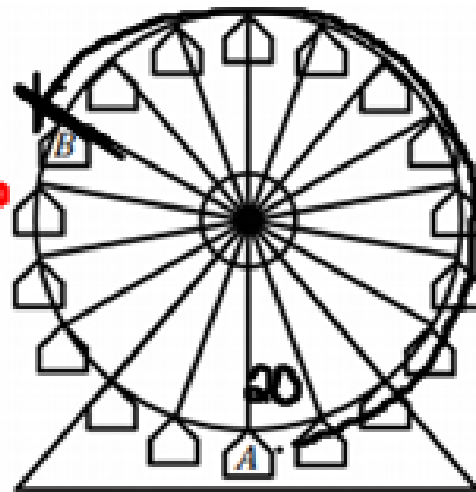
$$\frac{x}{54\pi} = \frac{120}{360}$$
$$36x = 12(54)(3.14)$$
$$\frac{36x}{36} = \frac{2,034.72}{36}$$
$$x = 56.52 \text{ cm}$$

Informal Assessment:

Dominic is riding the Ferris Wheel at the county fair. The Ferris wheel has a radius of 60 ft and rotates counter clockwise. Seats are equidistant from each other.

$$r = 60$$
$$d = 120$$

$$20(12) = 240^\circ$$



$$\frac{360}{18} = 20^\circ$$

- a. After the ride begins from point a, it pauses at point B.
How many feet has Dominic traveled when his seat pauses at point B?

$$\frac{x}{120\pi} = \frac{240}{360}$$

$$360x = 24(120)\pi$$
$$360x = 9047.789$$
$$x = 251.3274$$

- b. About how many feet has Dominic traveled if the full ride is 4 revolutions?

$$120\pi(4) = 1507.9644$$

Practice for a Circle:

A circle has a diameter of 18 inches. Find the exact ^{$r = 9 \text{ in}$} ~~area~~ ^{area} using π and approximate area rounded to the nearest hundredth.

$$A = \pi r^2$$
$$= 81\pi \approx 254.47$$

$$A = \pi r^2$$

Dale is spreading grass seed over the putting green on a golf course. The circular green has a radius of 30 feet. If each bag of grass seed covers an area of 315 ft². How many bags of grass seed does Dale need?

$$A = 30^2 \pi$$
$$= 900\pi$$
$$\approx 2827.4334$$

$$\frac{2827.4334}{315} = 8.98$$

9 bags

Most road and racing bicycles today use 3,038.58 square centimeter rims, though 2,560.52 square centimeter rims are popular with smaller riders and triathletes. What is the difference between the diameters of the rims?

$$A = \pi r^2$$

$$\frac{3,038.58}{\pi} = \frac{\pi r^2}{\pi}$$

$$\sqrt{967.2101} = \sqrt{r^2}$$

$$31.10 = r$$

$$\times 2$$

$$\frac{\quad}{62.20} = d$$

$$\frac{2,560.52}{\pi} = \frac{\pi r^2}{\pi}$$

$$\sqrt{815.0388} = \sqrt{r^2}$$

$$28.55 = r$$

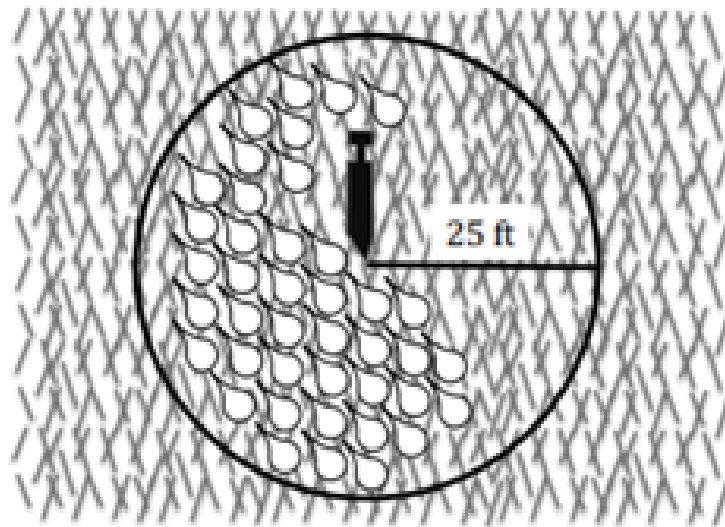
$$\times 2$$

$$\frac{\quad}{57.10} = d$$

$$5.10 \text{ cm}$$

Informal Assessment:

A sprinkler rotates in a circular pattern and sprays water over a distance of 25 feet.



$$A = \pi r^2$$
$$25^2 = 625$$
$$A = \pi (625)$$
$$A \approx 1963.5$$

What is the approximate area of the circular region covered by the sprinkler?

- (A) 490.9 square feet
- (B) 1,963.5 square feet
- (C) 4,417.9 square feet
- (D) 7,853.9 square feet