

Warm Up

Simplify the expression.

1. $\frac{45}{360} = \frac{1}{8}$

2. $\frac{120}{360} \times 9\pi = 3\pi$

3. $\frac{15\pi}{3} = 5\pi$

4. $\frac{60}{360} \times 15\pi = \frac{15\pi}{6}$

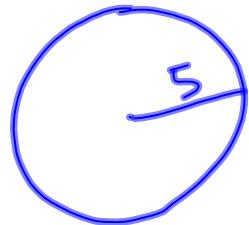
5. Solve: $\frac{3.8}{x} = \frac{120}{360}$

$$\frac{5\pi}{2}$$

$$120x = 1368 \quad x \approx 11.4$$

11-4 Circumference and Arc Length

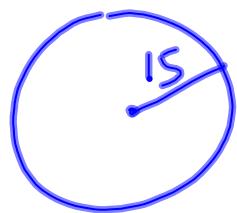
Circumference of a circle = $\pi \cdot d = 2 \cdot \pi \cdot r$



$$\pi = \frac{C}{d}$$

Definition of π

Ex 1 Find the circumference of a circle with radius 15 in.



$$C = 30\pi$$

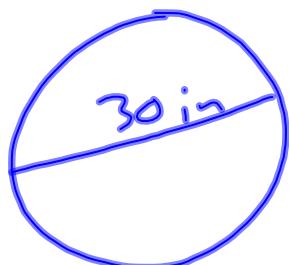
Find the radius of a circle with circumference 36 ft.

$$C = \pi \cdot d$$

$$36 = \pi \cdot d$$

$$11.4^2 \approx d \quad [r \approx 5.73] \text{ ft.}$$

Ex 2 The diameter of a bicycle tire is 30 inches. How far does the tire travel when it makes 100 revolutions?

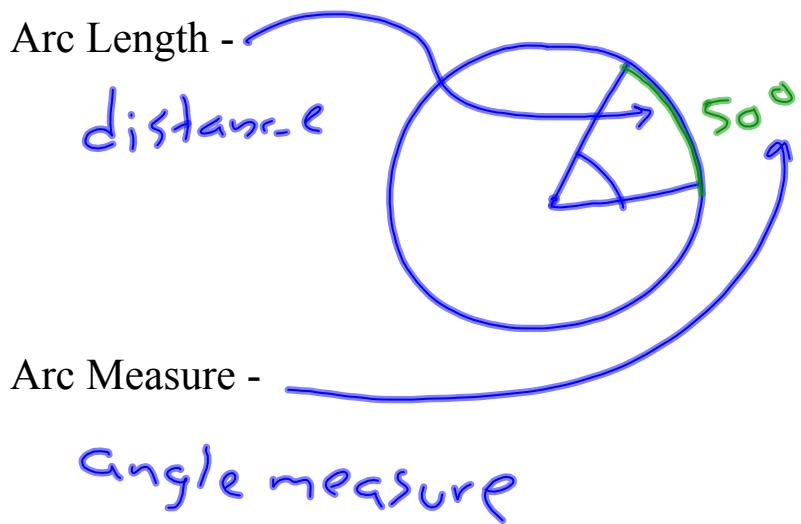


$$C = \pi \cdot d$$

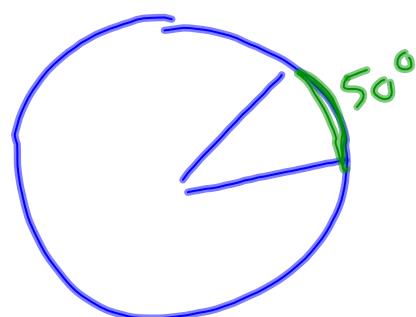
$$C = \pi \cdot 30$$

$$C \approx 94.25 \text{ in}$$

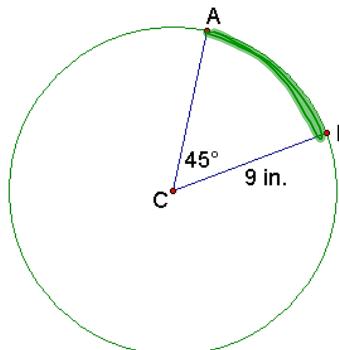
distance $\approx 9425 \text{ in}$



$$\frac{\text{arc length of } \widehat{AB}}{\text{circumference}} = \frac{m\widehat{AB}}{360^\circ}$$

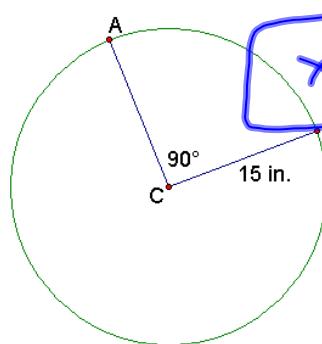
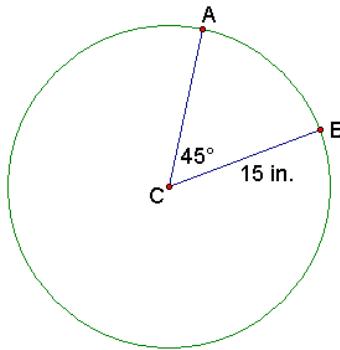


Ex 3 Find the length of each arc \widehat{AB}



$$\frac{x}{18\pi} = \frac{45^\circ}{360^\circ}$$

$x \approx 7.1 \text{ in}$

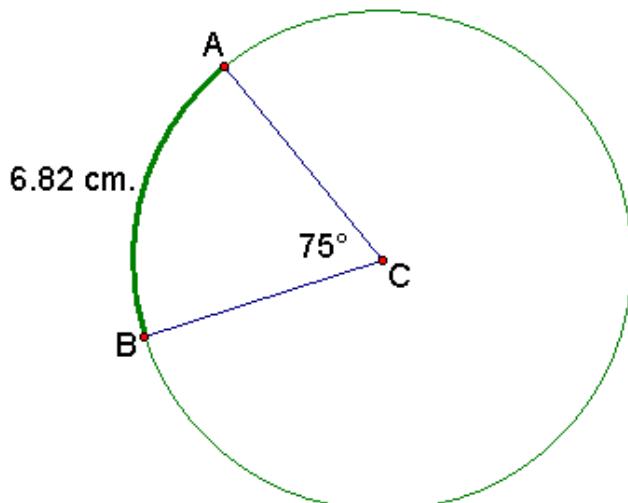


$$\frac{x}{30\pi} = \frac{45}{360}$$

$x \approx 23.5 \text{ in}$

$x \approx 11.77 \text{ in}$

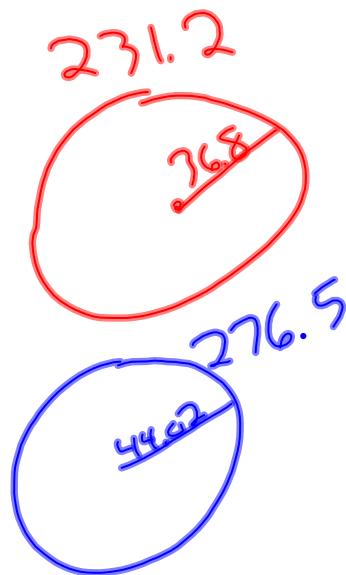
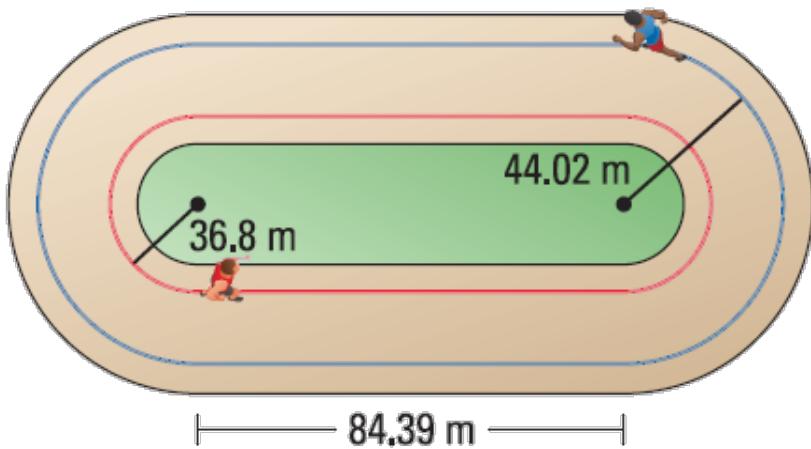
Ex 4 Find the circumference of the circle.



$$\frac{6.82 \text{ cm}}{c} = \frac{75}{360}$$

$$c \approx 32.7 \text{ cm}$$

- Ex. 5 Use the dimensions shown to find how far a runner travels on the red path around the track, and how far a runner travels around the black path around the track.



$$\text{Red} = 399.78 \text{ m}$$

$$\text{Blue} = 445.3 \text{ m}$$