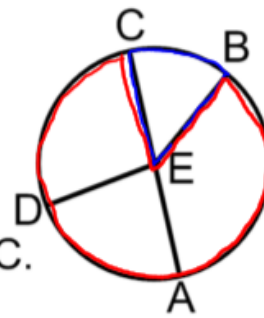


Warm-Up

1. Name a central angle in the following circle.

$\angle BEC, \angle BEA, \angle BED, \angle DEA, \angle DEC$



2. Name the minor arc formed by central angle $\angle BEC$.

\widehat{BC}

3. Name the major arc formed by central angle $\angle BEC$

\widehat{BAC}

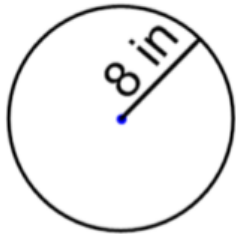
Let's apply this central angle property to finding some new things about circles.

Circles Properties

What does the circumference of a circle measure?

The distance around a circle.

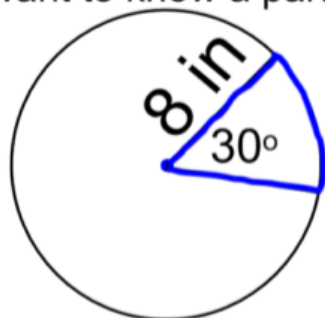
Find the circumference of the following circle.



$$C = 2\pi(8)$$

$$C = 16\pi \text{ in.}$$

What if you only want to know a part of the circumference?



Arc Length - the distance along an arc of a circle.

Denoted as 'S'

Ex. 10 Find the Arc Length of \widehat{AB} .
How many degrees are in a circle?

$$360^\circ$$

Find the $m\widehat{AB}$

$$158^\circ$$

Find the circumference of this circle.

$$C = 2\pi(5) = 10\pi \text{ in.}$$

Find the Arc Length of \widehat{AB} .

$$\frac{158}{360} \times \frac{S}{10\pi}$$

$$1580\pi = 360S$$

$$S = \frac{1580\pi}{360} = \frac{79\pi}{18}$$

Try one more together Circles Properties

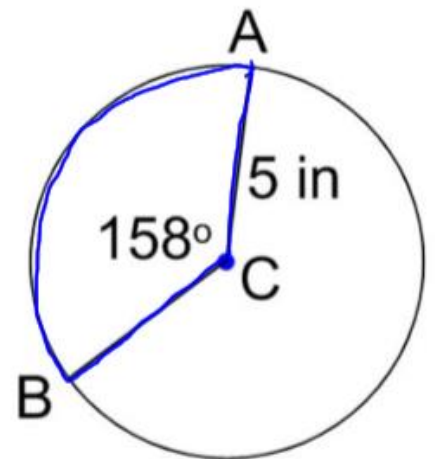
EX. 11 Find the Arc Length of \widehat{HIJ}

$$\frac{230}{360} = \frac{S}{2\pi(11)}$$

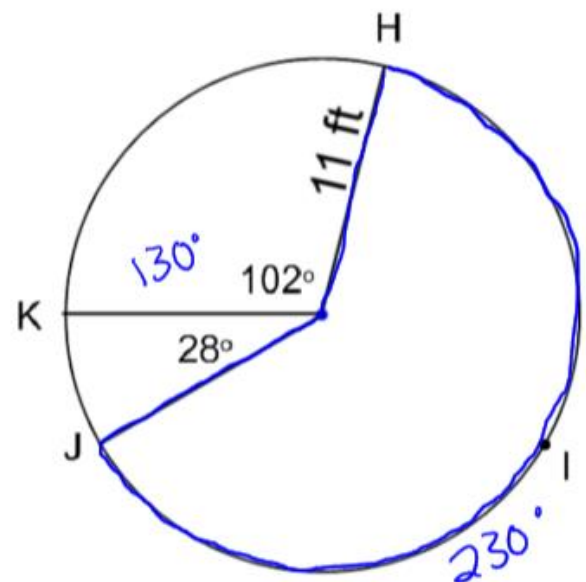
$$\frac{5060\pi}{360} = S = \frac{253\pi}{18}$$

To find Arc Length

1. Setup proportions Part/Whole = Part/Whole
2. Solve for missing piece. (cross multiply)



To find Arc Length

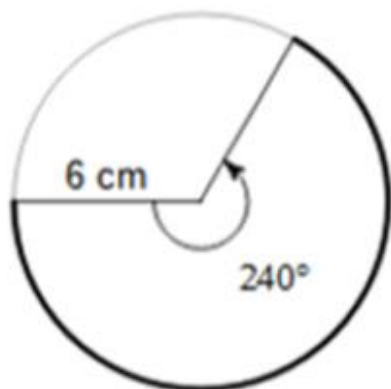


Circles Properties

YOU DO

Find Arc Length in terms of π

1)



$$\frac{240}{360} = \frac{S}{2\pi(6)}$$

$$\frac{2}{3} = \frac{S}{12\pi}$$

$$24\pi = 3S$$

$$S = 8\pi \text{ cm}$$

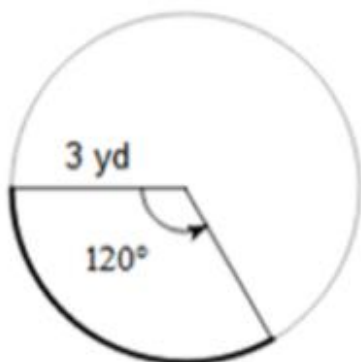
Put answer on White Board

Circles Properties

YOU DO

Find Arc Length, round answers to the nearest hundredth.

3)



$$\frac{120}{360} = \frac{S}{2\pi(3)}$$

$$\frac{1}{3} = \frac{S}{6\pi}$$

$$3S = 6\pi$$

$$S = 2\pi \text{ yds}$$

Put answer on White Board

Circles Properties

YOU DO

7) If $S = 4\pi$ ft and $\theta = 120^\circ$, what is the radius?

$$\frac{120}{360} = \frac{4\pi}{2\pi r}$$

$$\frac{1}{3} = \frac{2}{r}$$

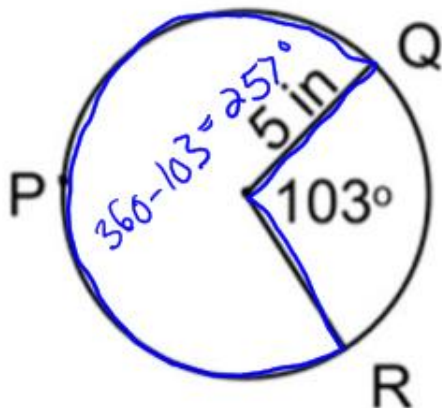
$$r = 6 \text{ ft}$$

Put answer on White Board

Circles Properties

YOU DO

9. Find the length of \widehat{RPQ} .



$$\frac{257}{360} = \frac{S}{2\pi(5)}$$

$$360 \cdot S = 2570\pi$$

$$S = \frac{2570\pi}{360}$$

$$S = \frac{257\pi}{36} \text{ in.}$$

Put answer on White Board

What does the area of a circle measure?

The space in 2 dimensions a circle takes up.

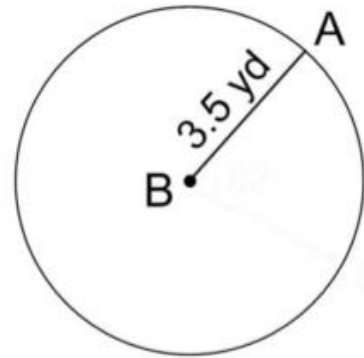
What is the equation for the area of a circle?

$$A = \pi r^2$$

What is the area of the circle to the right?

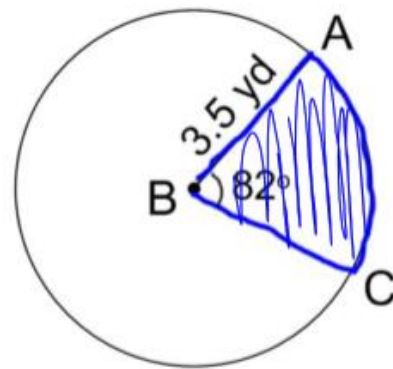
$$A = \pi (3.5)^2$$

$$A = 12.25\pi \text{ yd}^2$$



What if you want to find the area of part of the circle?

Sector Area - the area between two radii and the connecting arc of a circle.



Find sector area subtended by $\angle ABC$.

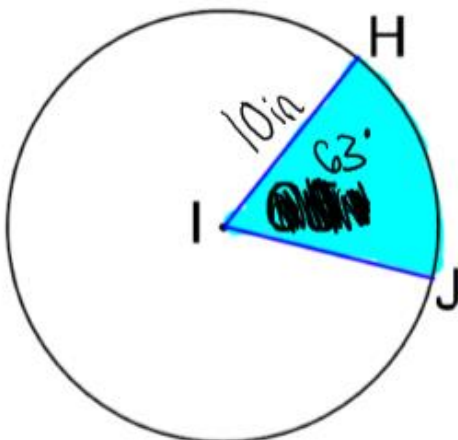
$$\frac{82}{360} = \frac{A_{\text{sector}}}{\pi (3.5)^2}$$

$$360A_{\text{sector}} = 1004.5\pi$$

$$\frac{82}{360} \Rightarrow \frac{A}{12.25\pi}$$

$$A_{\text{sector}} = 8.766 \text{ yd}^2$$

Ex. 12 The following circle has a sector with central angle 63° . Find the area of the sector.



Handwritten work for Ex. 12:

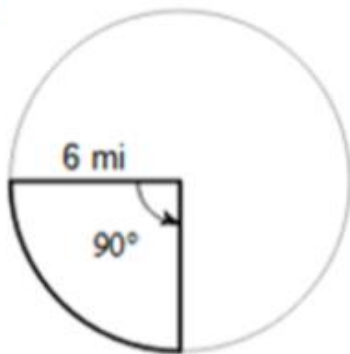
$$\frac{63}{360} = \frac{A}{\pi(10)^2}$$
~~$$\frac{1}{60} = \frac{A}{100\pi}$$~~

$$60A = 700\pi$$

$$A = \frac{700\pi}{60} = \frac{70\pi}{6} = \frac{35\pi}{2} \text{ in}^2$$

Your Turn Circles Properties

1)



$$\frac{90}{360} = \frac{A}{\pi(6)^2}$$

$$\frac{1}{4} = \frac{A}{36\pi}$$

$$4A = 36\pi$$

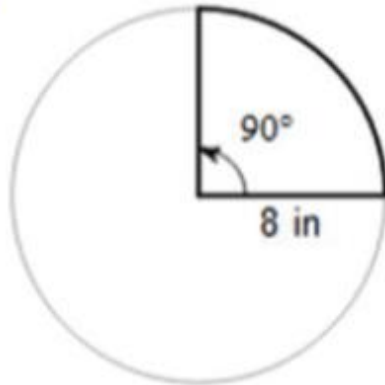
$$A = 9\pi \text{ mi}^2$$

Put answer on white board

Your Turn

Circles Properties

3)



$$\frac{90}{360} = \frac{A}{\pi(8)^2}$$

$$\frac{1}{4} = \frac{A}{64\pi}$$

$$4A = 64\pi$$

$$A = 16\pi \text{ in}^2$$

Put answer on white board

Your Turn

Circles Properties

7) If $A_{\text{sector}} = 16\pi \text{ in}^2$ and $\theta = 45^\circ$, what is the radius?

$$\frac{45}{360} = \frac{16\pi}{\pi r^2}$$

$$\frac{1}{8} = \frac{16\pi}{\pi r^2}$$

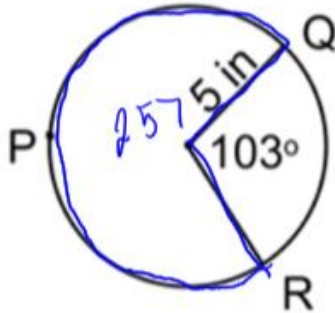
$$\sqrt{r^2} = \sqrt{128}$$

$$r = 8\sqrt{2}$$

Put answer on white board

Your Turn Circles Properties

9. Find the area of the sector formed by \widehat{RPQ} .



$$\frac{257'}{360^\circ} = \frac{A}{\pi(5)^2}$$

Put answer on white board

Review Circles Properties

1. Find the Arc Length of \widehat{AK} .

\overline{AJ} is a diameter of $\odot C$.

$$\frac{31}{360} = \frac{s}{2\pi(5)}$$

$$360s = 310\pi$$

$$s = \frac{310\pi}{360} = \frac{31\pi}{36} \text{ in.}$$

2. Find the sector area subtended by central angle $\angle LCB$.

$$\frac{97}{360} = \frac{A_{\text{sector}}}{\pi(5)^2}$$

$$360A = 2425\pi$$

$$A = \frac{2425\pi}{360} = \frac{485\pi}{72}$$

