

Warm-Up



1. Put your phones away

2. I'll be nice and NOT check EOC HW #5 today...

What am I learning today?

Learning Objective 4B.1

How to use the arc length formula.

What will I do to show that I have learned it?

I can...

- Use the diameter, radius, central angle, and length of an arc to solve for different pieces of the arc length formula

Circumference - The **LENGTH** AROUND a circle

**You can think of this as the PERIMETER of a circle

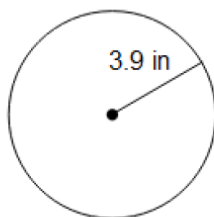
FORMULA:

$$\underset{\substack{\uparrow \\ \text{Circumference}}}{C} = 2\pi \underset{\substack{\uparrow \\ \text{radius}}}{r}$$

*Remember - Twinkle, twinkle, little star,
circumference equals 2 pi r.*

Find the circumference in terms of pi and a decimal rounded to the tenths.

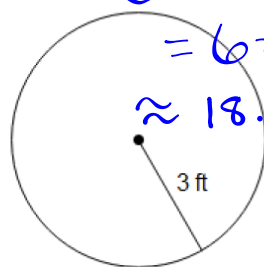
1)



$$C = 2\pi(3.9)$$

$$24.5 \text{ in.}$$

2)

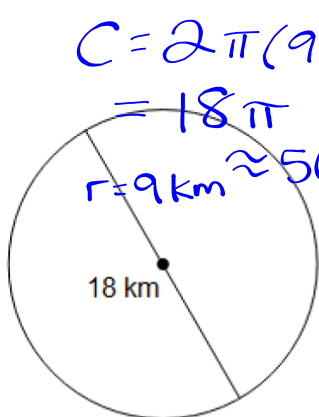


$$C = 2\pi(3)$$

$$= 6\pi$$

$$\approx 18.8 \text{ ft.}$$

3)



$$C = 2\pi(9)$$

$$= 18\pi$$

$$r = 9 \text{ km} \approx 56.5 \text{ km}$$

4) diameter = 14 cm

$$r = 7 \text{ cm}$$

$$C = 2\pi(7)$$

$$= 14\pi \text{ cm}$$

$$\approx 44 \text{ cm}$$

Find the radius for #7-#8 using the given circumference.

7) circumference = 71π in

$$C = 2\pi r$$

$$\frac{71\pi}{(2\pi)} = \frac{2\pi r}{2\pi}$$

$$35.5 = r$$

$$35.5 \text{ in.}$$

8) circumference = 59.1 km

$$C = 2\pi r$$

$$\frac{59.1}{(2\pi)} = \frac{2\pi r}{2\pi}$$

$$9.4 \text{ km} = r$$

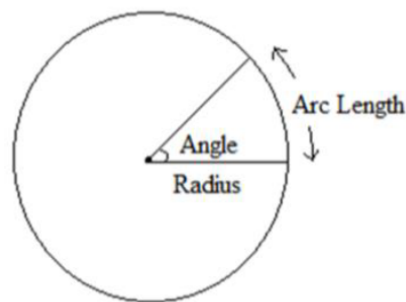
9) A circle has a circumference of 24π . What is the length of the diameter?

$$\begin{aligned}C &= 2\pi r \\ \frac{24\pi}{(2\pi)} &= \frac{2\pi r}{2\pi} \\ 12 &= r \\ 24 &= d\end{aligned}$$

Arc Length - The physical **LENGTH** of an arc

***Arc length DOES NOT equal arc
MEASURE!!***

***Arc length is just a piece of the
CIRCUMFERENCE!1***

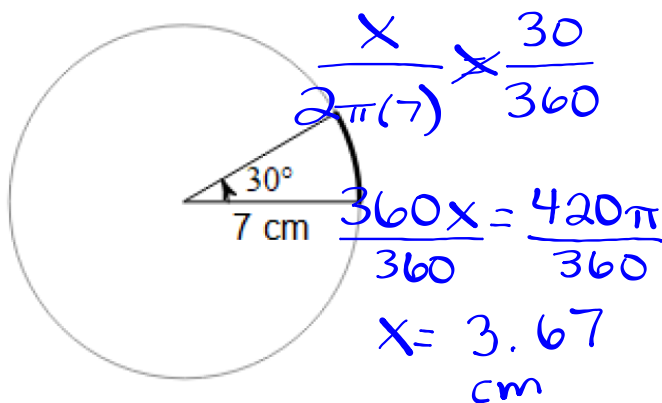
Funny way to remember:Arc Length = Pie crust**Formula:**

$$\frac{\text{piece Arc Length}}{\text{whole Circumference } (2\pi r)} = \frac{\text{Central Angle } (\theta)}{\text{Whole Circle in degrees } (360^\circ)}$$

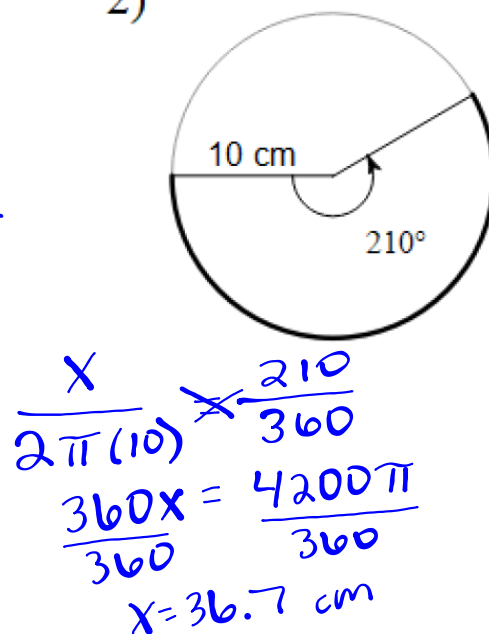
piece whole *piece whole*

Find the arc length of the wanted arc.

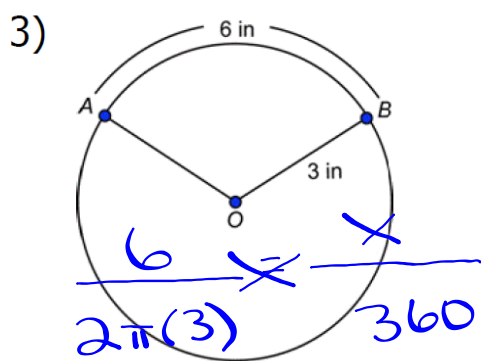
1)



2)



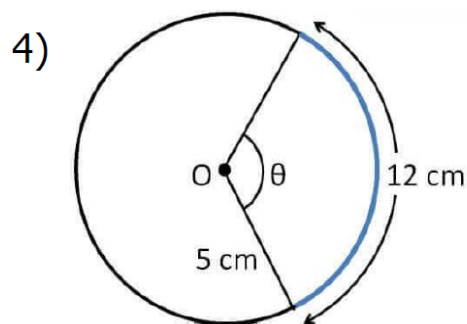
Find the angle of the given arc.



$$\frac{6}{2\pi(3)} = \frac{x}{360}$$

$$\frac{2160}{6\pi} = \frac{6\pi x}{6\pi}$$

$$114.6^\circ = x$$

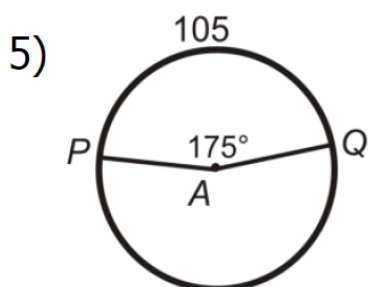


$$\frac{12}{2\pi(5)} = \frac{x}{360}$$

$$\frac{4320}{10\pi} = \frac{10\pi x}{10\pi}$$

$$137.5^\circ = x$$

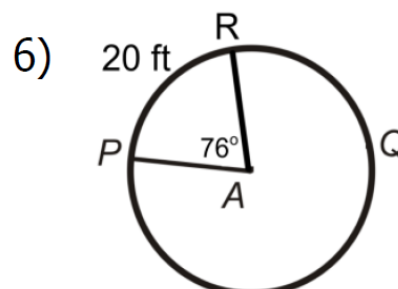
Find the radius of the given arc.



$$\frac{105}{2\pi x} = \frac{175^\circ}{360^\circ}$$

$$\frac{37800}{350\pi} = \frac{350\pi x}{350\pi}$$

$$34.4 = x$$



$$\frac{20}{2\pi x} = \frac{76^\circ}{360^\circ}$$

$$\frac{7200}{152\pi} = \frac{152\pi x}{152\pi}$$

$$15.1 \text{ ft.} = x$$

- 7) A circle has an arc whose measure is 80° and whose length is 88π . What is the diameter of the circle?

$$\frac{88\pi}{2\pi x} \times \frac{80^\circ}{360^\circ}$$

$$\begin{aligned} 31680\pi &= 160\pi x \\ 198 &= x \\ 396 &= d \end{aligned}$$

- 8) Find the measure of the central angle of a circle if its minor arc length is 14 cm and the radius is 18 cm.

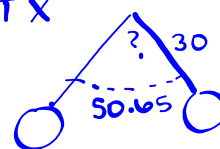
$$\frac{14}{2\pi(18)} \times \frac{x}{360^\circ}$$

$$\begin{aligned} \frac{5040}{36\pi} &= \frac{36\pi x}{36\pi} \\ 44.6^\circ &= x \end{aligned}$$

- 9) A pendulum is 30 inches long. When the pendulum swings it travels along the arc of a circle and covers a distance 50.65 inches. What is the angle that the pendulum is swinging?

$$\frac{50.65}{2\pi(30)} \times \frac{x}{360^\circ}$$

$$\begin{aligned} 18234 &= 60\pi x \\ 96.7^\circ &= x \end{aligned}$$

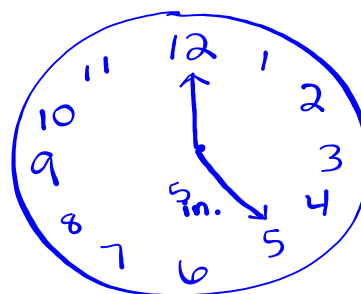


- 10) A clock is at 5 o'clock. If the radius of the hour hand is 5 inches long, what is the distance that the hour hand traveled?

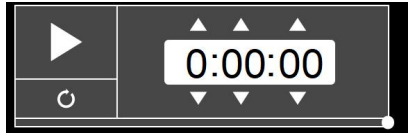
$$\frac{x}{2\pi(5)} \times \frac{150^\circ}{360^\circ}$$

$$360x = 1500\pi$$

$$x = 13.1 \text{ in.}$$



$$\frac{360^\circ}{12} = 30^\circ$$

Classwork:

Complete the classwork about using the arc length formula

HW: Finish classwork AND EOC HW #5 & #6

measure = degrees
length = distance