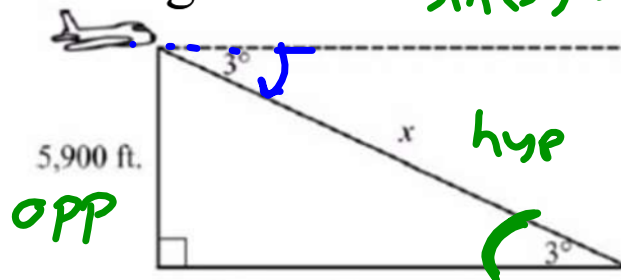


$\angle \text{center} = \widehat{\text{arc}}$

An airplane is at an altitude of 5900 feet.
 The airplane descends at an angle of 3° .
 About how far will the airplane travel in
 the air until reaches the ground?

$$\sin(3) = \frac{5900}{x}$$

$$\begin{bmatrix} \sin 3^\circ = 0.0523 \\ \cos 3^\circ = 0.9986 \\ \tan 3^\circ = 0.0524 \end{bmatrix}$$



Note: Figure not drawn to scale.

A. 5908 ft.

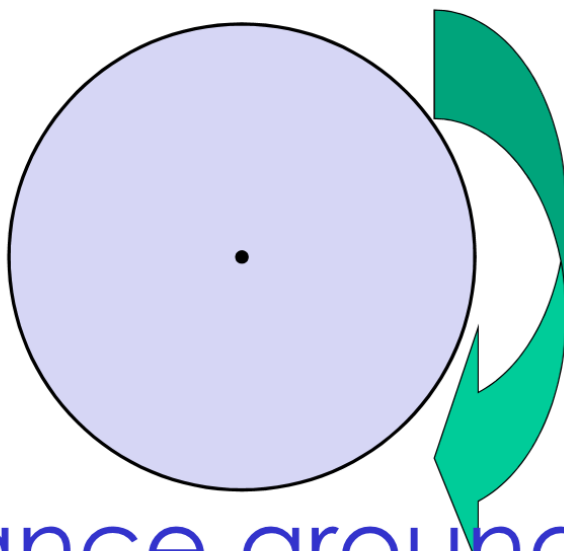
B. 6238 ft.

C. 102,578 ft.

D. 112,733 ft.

$$x = \frac{5900}{\sin(3)} = \frac{5900}{0.0523}$$

Circumference



Distance around the
circle

Circumference

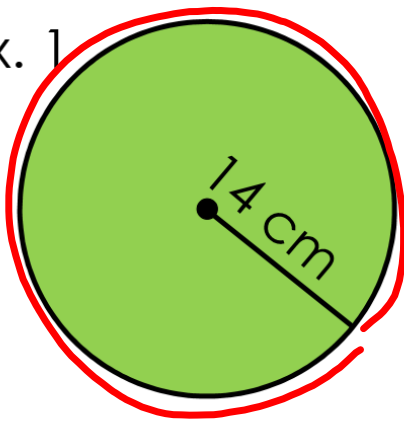
$$C = \pi d$$

OR

$$C = 2\pi r$$

Find the circumference in terms of pi and to the nearest tenth

Ex. 1

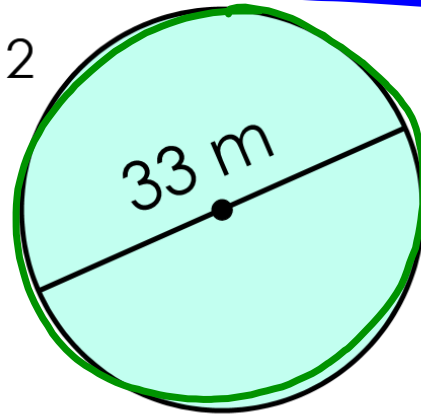


radius

$$C = 2\pi r$$
$$= 2\pi(14)$$

$$= 87.96 \text{ cm} \approx 88.0 \text{ cm}$$

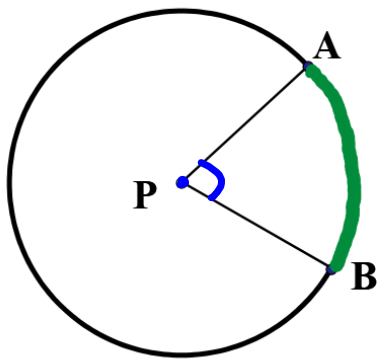
Ex. 2



$$C = \pi d$$
$$= \pi(33)$$
$$= 103.67 \text{ m} \approx 103.7 \text{ m}$$

Arc Length

Portion of the circumference

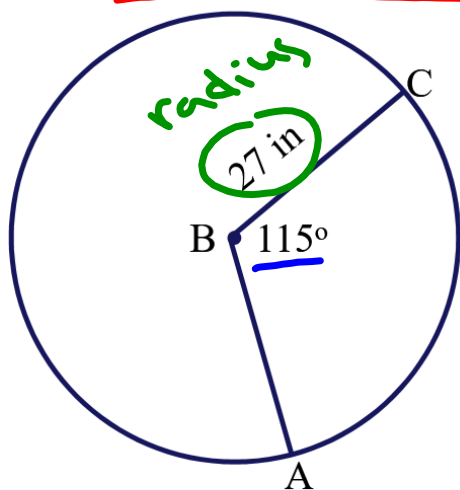


$$\text{arc length} = \frac{2\pi r \theta}{360}$$

$$\frac{\text{Part}}{\text{whole}} = \frac{\text{Part}}{\text{whole}}$$

$$\frac{\text{arc length}}{\text{circumference}} = \frac{\text{central angle } \theta}{360^\circ}$$

Ex. 3 Find the arc length of \widehat{CA} .
 In terms of π and rounded to the tenths place.



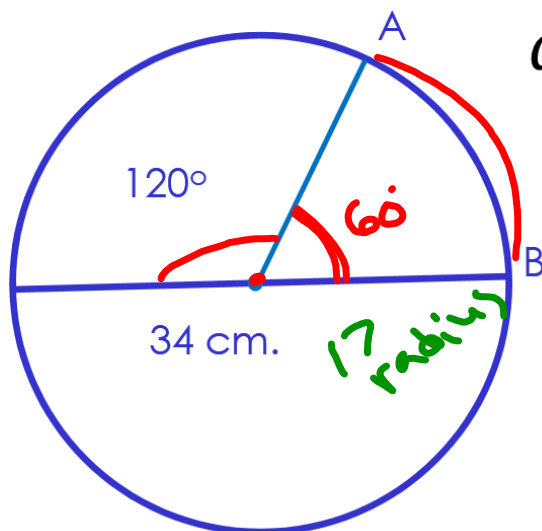
$$\text{arc length} = \frac{2\pi r \theta}{360}$$

$$\text{A.L.} = \frac{2\pi(27)(115)}{360}$$

$$= 54.2 \text{ in}$$

$$\text{exact} = \frac{69\pi}{4}$$

Ex. 4 Find the length of \widehat{AB} . Leave answer in terms of π and rounded to the nearest hundredth.



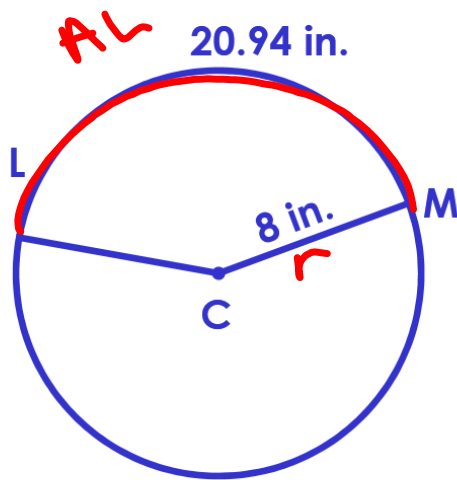
$$\text{arc length} = \frac{2\pi r\theta}{360}$$

$$= \frac{2\pi(17)(60)}{360}$$

$$= 17.8 \text{ cm}$$

$$\text{exact} = \frac{17\pi}{3} \text{ cm}$$

Ex 5: Find the $m \widehat{LM}$ given the arc length of \widehat{LM} . Round answer to the nearest degree.



$$\text{arc length} = \frac{2\pi r\theta}{360}$$

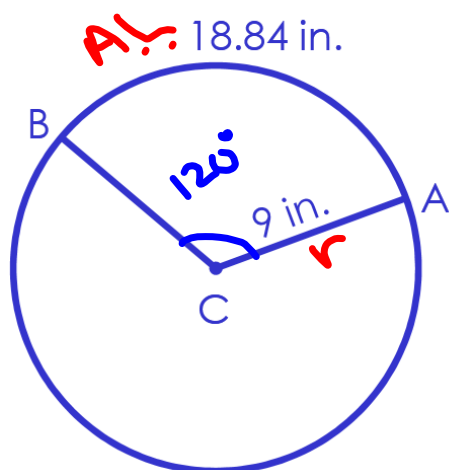
$$20.94 = \frac{2(\pi)(8)x}{360}$$

$$x = \frac{20.94(360)}{2(\pi)(8)} \approx 149.97$$

$$\approx 150^\circ$$

Your Turn: Find the $m \widehat{AB}$.

Round your answer to the nearest degree.



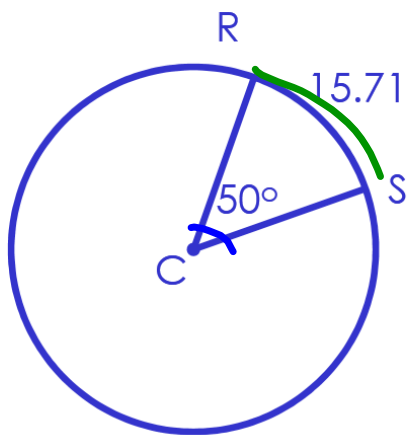
$$A.L. = \frac{2\pi r \theta}{360}$$

$$18.84 = \frac{2\pi(9)\theta}{360}$$

$$\theta = \frac{18.84(360)}{2\pi(9)} \approx 120^\circ$$

$$C = 2\pi r \quad \text{radius} = 2\pi(18)$$

Ex 6: Find the circumference of circle C.
Round to the hundredths place.



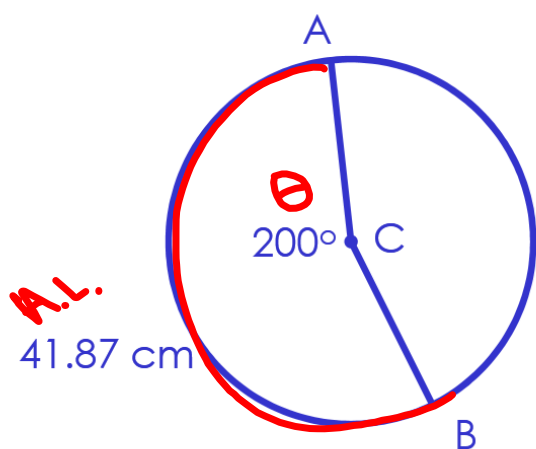
$$360 \cdot \frac{A.L.}{\theta} = \frac{2\pi r \theta}{360}$$

$$\frac{15.71(360)}{50} = 113.11 \text{ cm}$$

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

$$r = \frac{15.71(360)}{2\pi(50)} = 18$$

Your Turn: Find the circumference of circle C.
Round to the nearest hundredth.



A.L.

41.87 cm

$$\left(\frac{360}{200}\right) 41.87 = C \left(\frac{200}{360}\right) \left(\frac{360}{200}\right)$$

$$\text{arc length} = \frac{2\pi r \theta}{360}$$

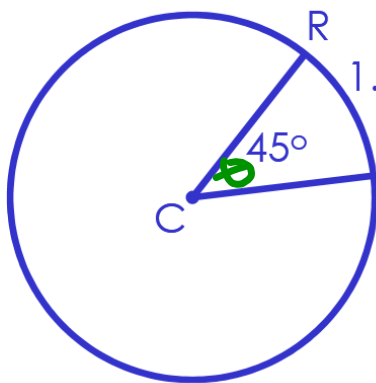
$$C = 75.366$$

$$C \approx 75.37 \text{ cm}$$

Your Turn: Find the radius of circle C.

Round the nearest foot.

READ the directions carefully!!!



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

$$\overset{A.L.}{1.57} = \frac{2\pi r (45)}{360}$$

$$r = \frac{360(1.57)}{2\pi(45)}$$

$$r = 2 \text{ feet}$$


Geometry: Arc Length

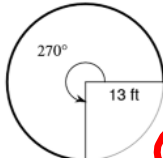
Name _____

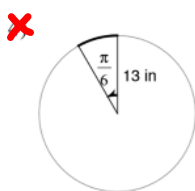
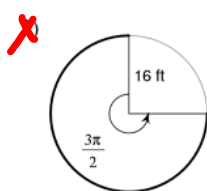
Arc Length and Sector Area

Date _____ Period _____

Find the length of each arc. Round your answers to the nearest tenth.

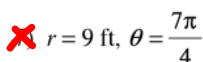
1)  $A.L. = \frac{2\pi r \theta}{360}$
 $= \frac{2\pi(11)(315)}{360}$
 $= 60.5 \text{ ft}$

2)  61.3 ft

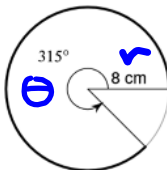


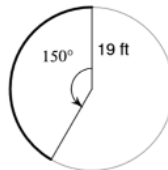
5) $r = 18 \text{ cm}, \theta = 60^\circ$ $A.L. = \frac{2\pi r \theta}{360}$
 $= \frac{2\pi(18)(60)}{360}$
 $= 18.8 \text{ cm}$

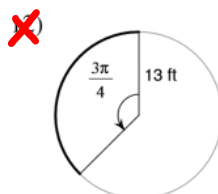
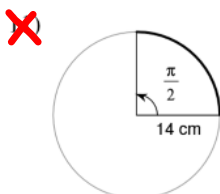
6) $r = 16 \text{ m}, \theta = 75^\circ$ 20.9 m



Find the length of each arc. Do not round.

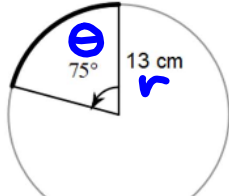
9)  $A.L. = \frac{2\pi r \theta}{360}$
 $A.L. = \frac{2\pi(8)(315)}{360}$
 $= 14\pi \text{ cm}$

10)  $\frac{95}{6}\pi \text{ ft}$



Find the arc length of each arc. Leave your answer in terms of π (exact), then round to the nearest tenth.

13.

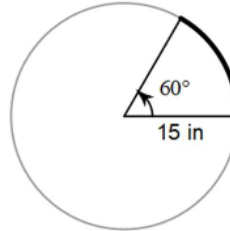


$$A.L. = \frac{2\pi r \theta}{360}$$

$$A.L. = \frac{2\pi(13)(75)}{360}$$

Exact: $\frac{65\pi}{12}$ cm
 Rounded: 17.0 cm

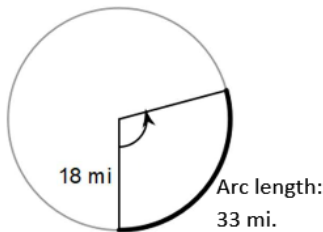
14.



Exact: 5π in.
 Rounded: 15.7 in.

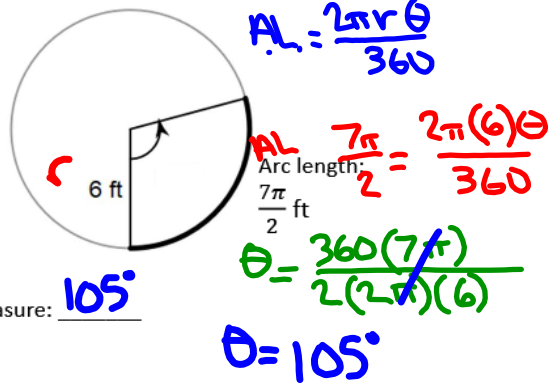
Find the measure (not the length) of each arc. Round your answer to the nearest degree.

15.



Measure: 105°

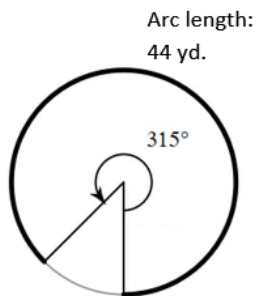
16.



Measure: 105°

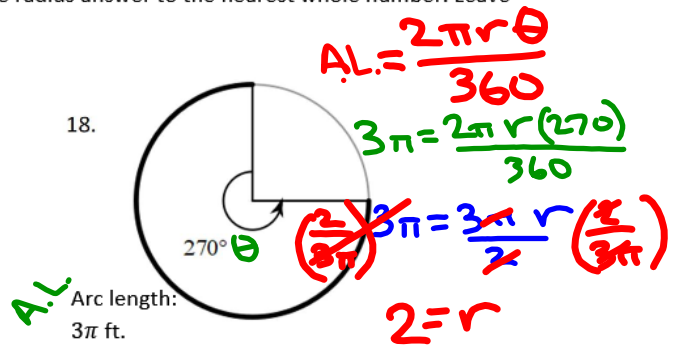
Find the radius and circumference of the circle. Round the radius answer to the nearest whole number. Leave circumference in terms of π .

17.



Radius: 8 yd.
 Circumference: 16π yd.

18.



Radius: 2 ft
 Circumference: 4π ft
 $2\pi r$
 $2\pi(2)$