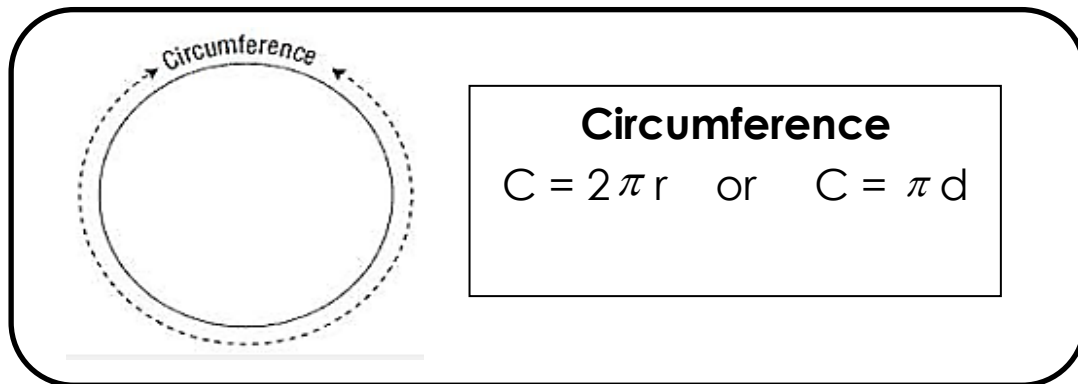
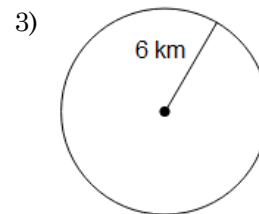
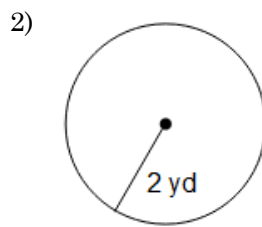
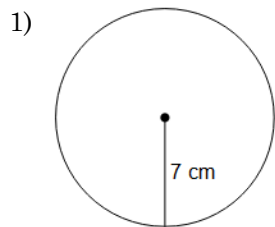


Notes - Lengths of Circle Arcs

The distance around a circle is called the **Circumference**. This can be found by using this equation:



Find the Circumference of the following circles: *Leave your answers in terms of π as well as a decimal.*



Practice reviewing how to calculate the circumference or radius/diameter of a circle below. **Leave your answers in terms of pi.** Find the circumference, radius, or diameter.

A. $r = 6$ ft

B. $d = 15$ in

C. $C = 16\pi$ cm

D. $C = 40\pi$ m

ARC LENGTH

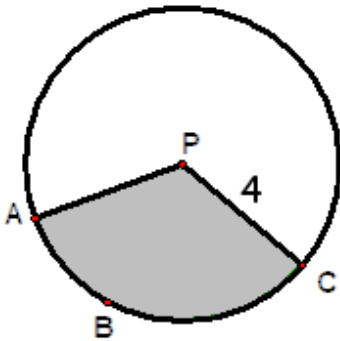
Arc Length is a fraction of the circle's circumference and is measured in linear units. Arc length can be calculated using the following proportion or EQUATION

Arc Length	
$\frac{\text{arc measure of angle}}{360^\circ}$	$= \frac{\text{arc length}}{\text{circumference } (2\pi r)}$

$$\text{Arc Length} = \frac{m}{360} 2\pi r$$

WE DO: Leave in terms of π

Given: $\odot P$ and $m\angle APC = 120^\circ$



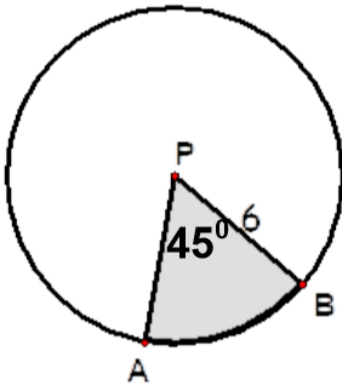
b. Find the arc length of \widehat{AC}

$$\text{length } \widehat{AC} = \frac{120}{360} 2\pi(4)$$

$$\text{length } \widehat{AC} = \frac{1}{3} 8\pi$$

$$\text{length } \widehat{AC} = \frac{8\pi}{3} \text{ units} \approx 8.4 \text{ units}$$

YOU DO: Leave in terms of π



b. Finding the length of arc \widehat{AB}

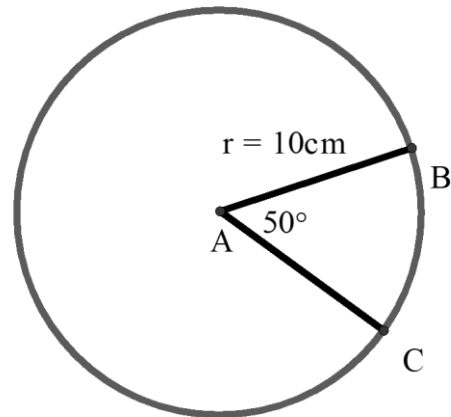
$$\text{Length } \widehat{AB} =$$

$$\text{Arc Length} = \frac{m}{360} 2\pi r$$

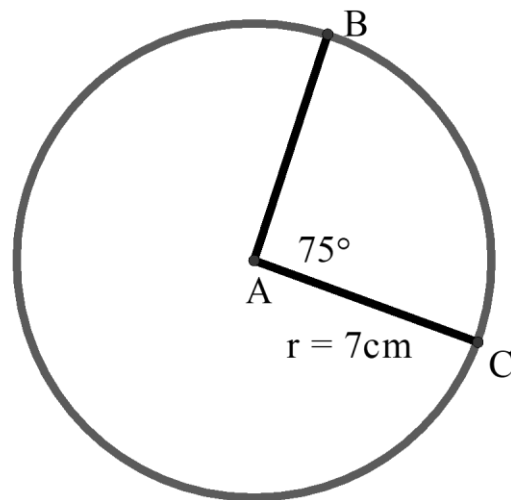
ARC LENGTH

$$\frac{\text{Arc Measure}}{360^\circ} = \frac{\text{Arc Length}}{\text{Circumference}}$$

WE DO: Finding the length of arc \widehat{BC}



YOU DO: Finding the length of arc \widehat{BC}

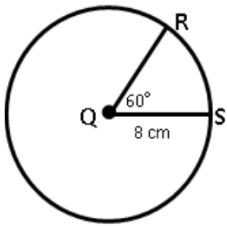


Arc Length Guided Practice

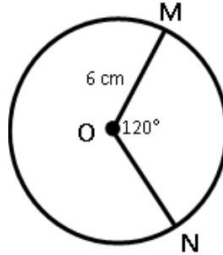
$$\text{Arc Length} = \frac{m}{360} 2\pi r$$

Find the arc lengths for problems 2 and 3.

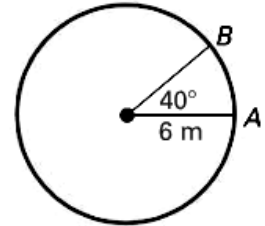
1. Length of arc RS =
(exact answer)



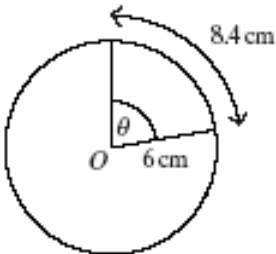
2. Length of arc MN =
(approx. answer)



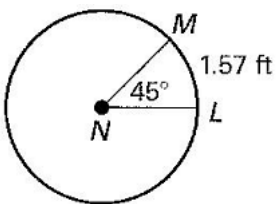
3. Length of arc AB =
(exact answer)



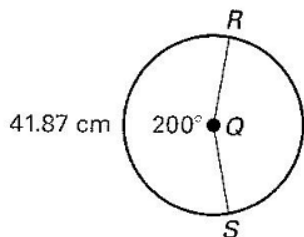
4. A circle has a radius of 6 cm. A sector has an arc length of 8.4 cm. The angle at the center of the sector is θ . Calculate the value of θ .



5. Find the radius of circle N.



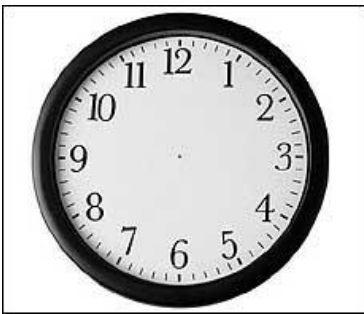
6. Find the circumference of circle Q.



7. A clock has a pendulum 22 centimeters long. If it swings through an angle of 32 degrees, how far does the bottom of the pendulum travel in one swing?



For questions 8-9, use the figure below:



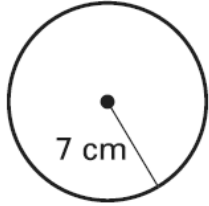
8) How many degrees does the minute hand move in 15 minutes? 40 minutes? 55 minutes?

9) If the minute hand is 4 inches long, what is the arc length covered by the minute hand in 40 minutes?

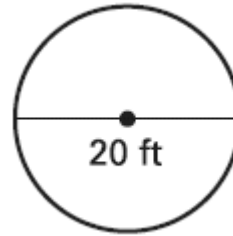
Skills Practice: Calculating Arc Length and Circumference

Use the diagram to find the indicated measure. Leave answers in term of pi.

1. Find the circumference.

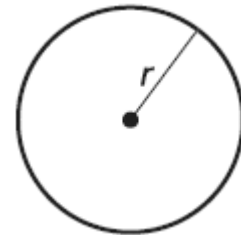


2. Find the circumference.



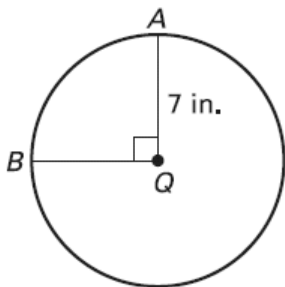
3. Find the radius. Find the indicated measure.

- a. The exact radius of a circle with circumference 36 meters
- b. The exact diameter of a circle with circumference 29 feet
- c. The exact circumference of a circle with diameter 26 inches
- d. The exact circumference of a circle with radius 15 centimeters

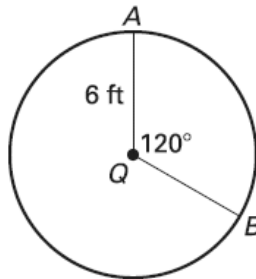


4. Find the length of AB .

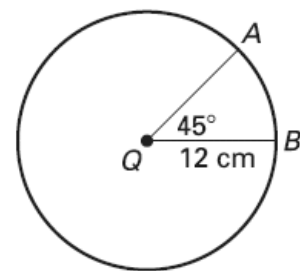
a.



b.



c.



5. In $\odot D$ shown below, $\angle ADC \cong \angle BDC$. Find the indicated measure

a. mCB

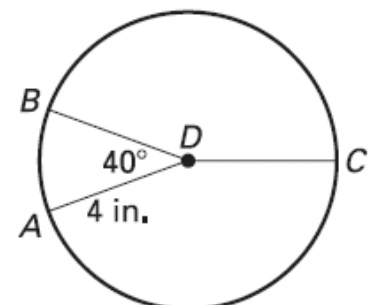
b. $mACB$

c. Length of CB

d. Length of ABC

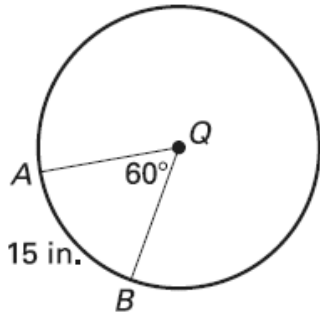
e. $mBAC$

f. Length of ACB

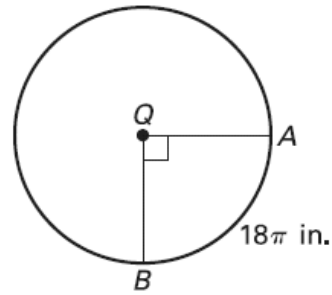


6. Find the indicated measure.

a. The radius of circle Q

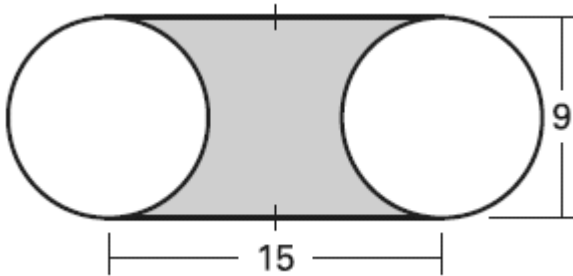


b. Circumference of $\odot Q$ and Radius of $\odot Q$



Find the perimeter of the region. Round to the nearest hundredth.

7.

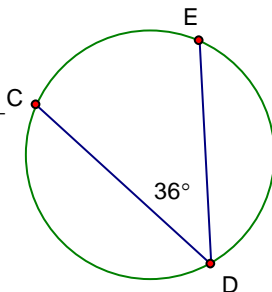


8. **Birthday Cake** A birthday cake is sliced into 8 equal pieces. The arc length of one piece of cake is 6.28 inches as shown. Find the diameter of the cake.



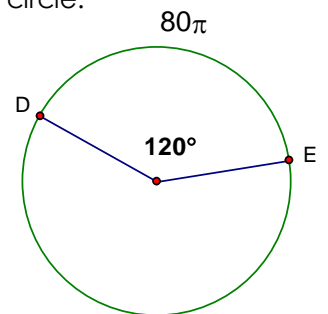
9. Radius = 5 in

Length of Arc CE = _____



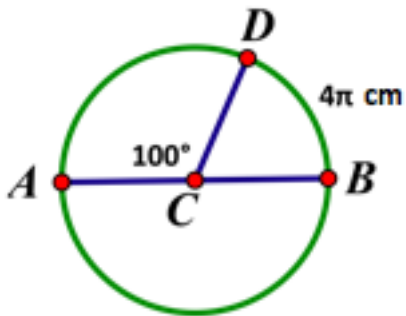
10. Find the radius of the circle.

$r =$ _____

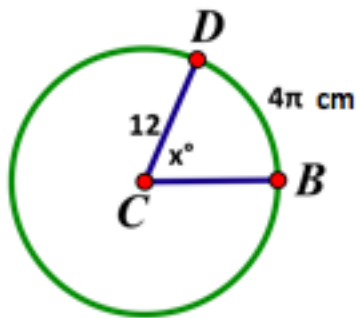


For #11-13, solve for the requested variable. C is the center of each circle.

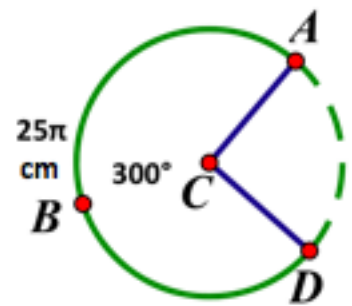
11. $r =$ _____



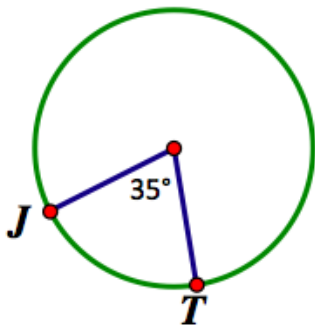
12. $x^\circ =$ _____



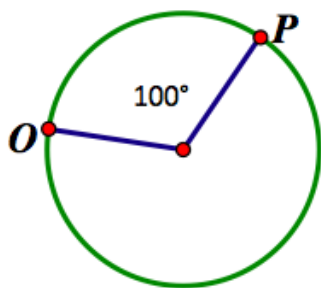
13. $d =$ _____



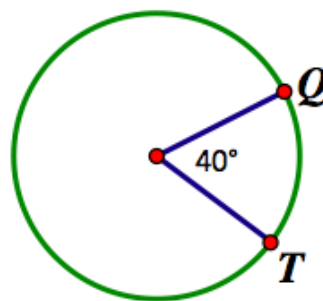
14. Circumference = 10 m; Find the arc length of $\widehat{JT} =$ _____



15. The arc length of $\widehat{OP} = 10\pi$ inches;
 $r =$ _____



16. The arc length of $\widehat{QT} = 22$ cm.;
 $d =$ _____ (to the tenth)

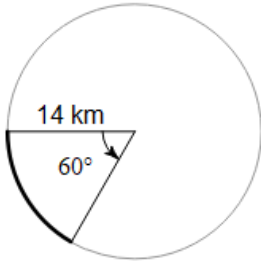


Skills Practice – Arc Length

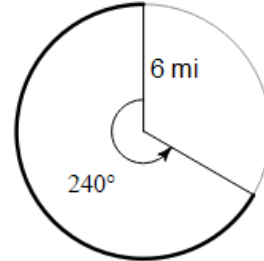
$$\text{Arc Length} = \frac{m}{360} 2\pi r$$

Practice: Find the length of each bold arc. Write your answers in terms of π as well as a decimal rounded to one decimal place.

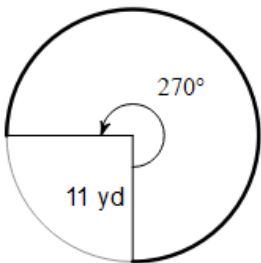
1)



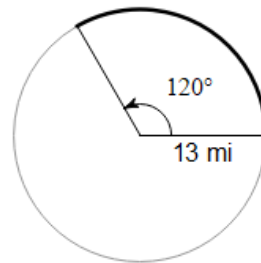
2)



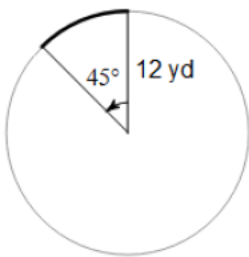
3)



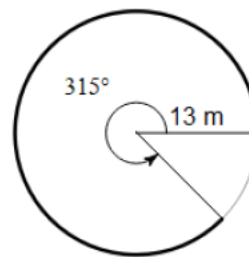
4)



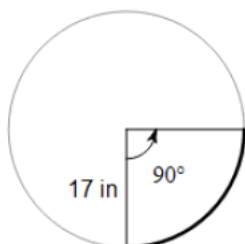
5)



6)



7)



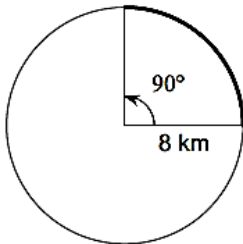
8)



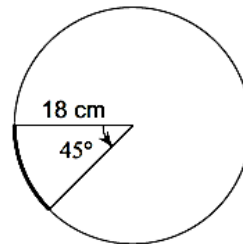
Practice: Find the length of each bold arc. Write your answers in terms of π as well as a decimal rounded to one decimal place.

Find the length of each arc.

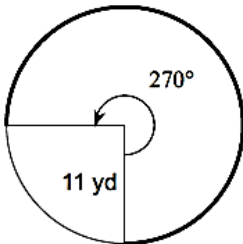
1)



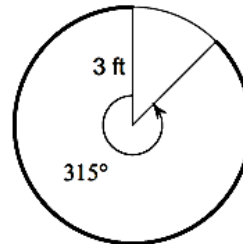
2)



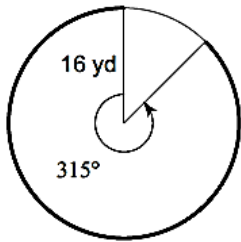
3)



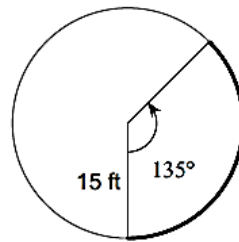
4)



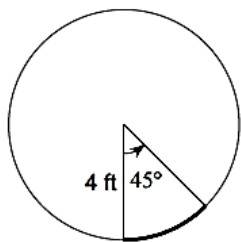
5)



6)



7)



8)

