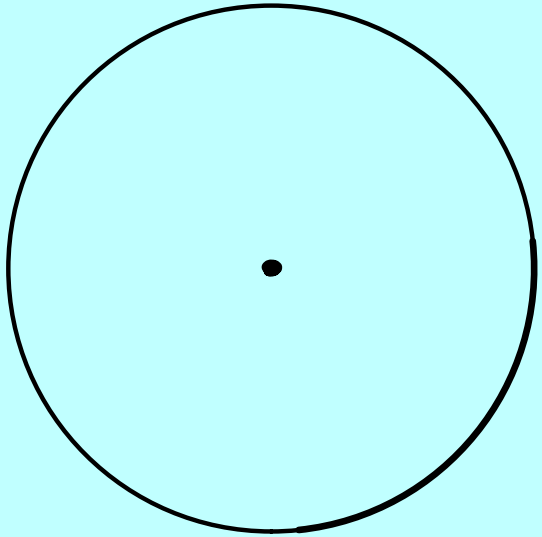
Geometry

Ch. 10 Handout 10.6

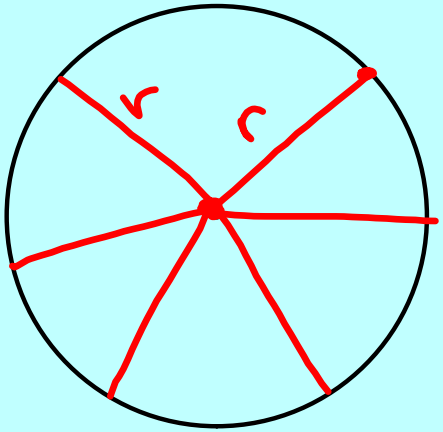
Circles and Arcs

A **circle** is the set of all points equidistant from a given point called the **center**.

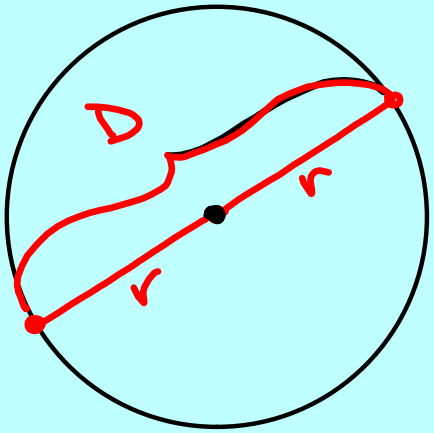


Pi (π) is the ratio of the circumference of a circle to its diameter.

A **radius** is a segment that has one endpoint at the center and the other endpoint on the circle.



A **diameter** is a segment that contains the center of a circle and has both endpoints on the circle.

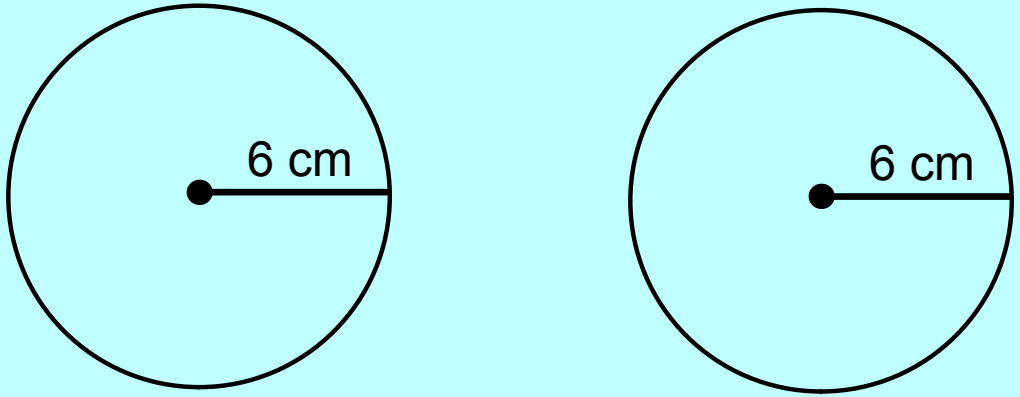


$D = 2r$

Circumference of a circle is the distance around the circle.

Pi (π) is the ratio of the circumference of a circle to its diameter.

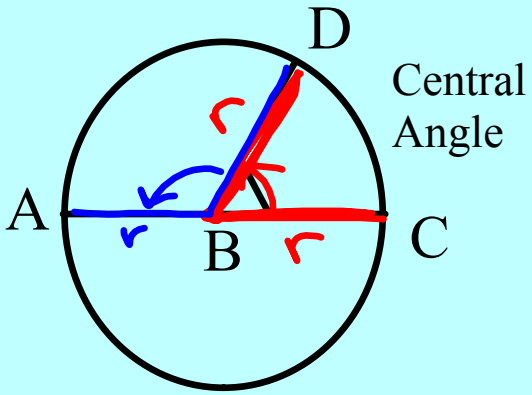
Congruent circles have congruent radii.



Circumference of a circle is the distance around the circle.

Pi (π) is the ratio of the circumference of a circle to its diameter.

A **central angle** is an angle whose vertex is the center of the circle.



Circumference of a circle is the distance around the circle.

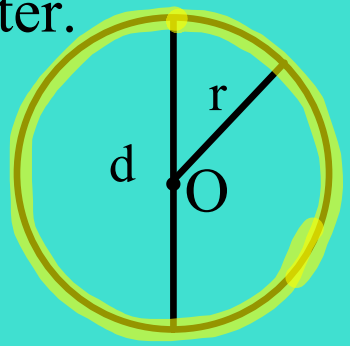
Pi (π) is the ratio of the circumference of a circle to its diameter.

A **circumference** is the distance around the circle.

Circumference of a Circle

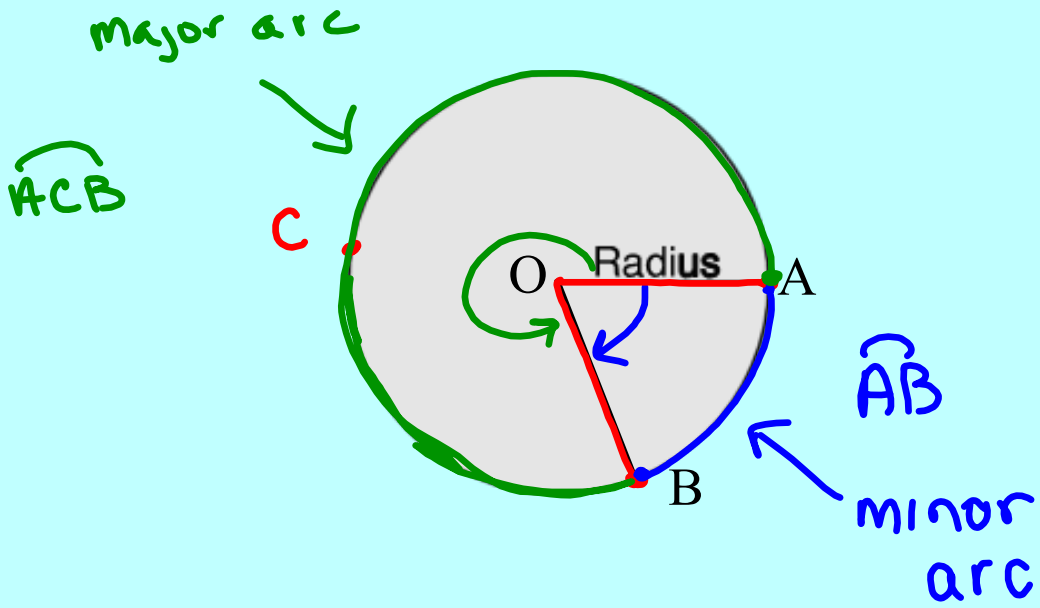
The circumference of a circle is π times the diameter.

$$C = \pi d \quad \text{or} \quad C = 2\pi r$$



(Pi (π) is the ratio of the circumference of a circle to its diameter.)

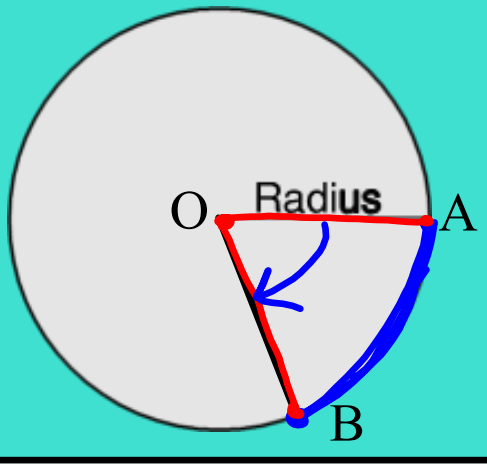
Arc Length-- The distance along the arc (part of the circumference of a circle, or any curve.



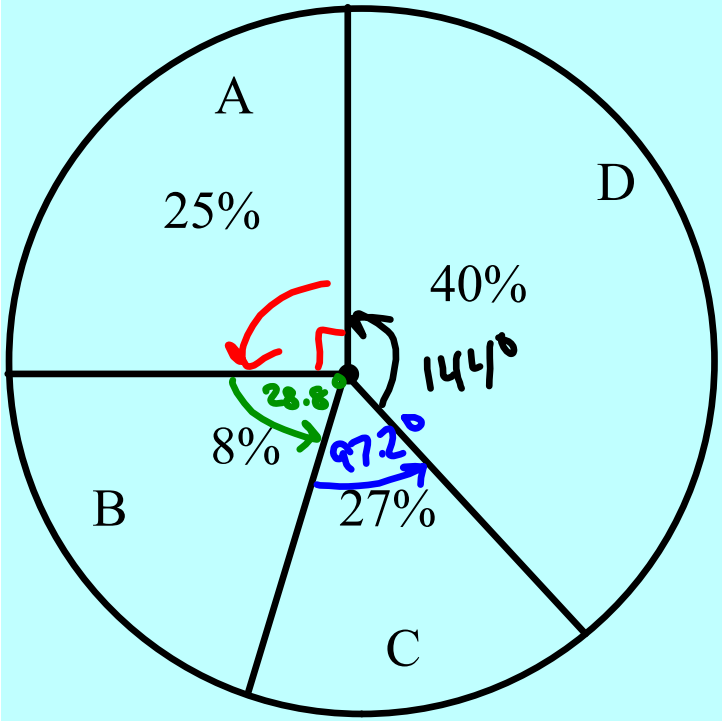
Arc Length

The length of an arc of a circle is the product of the ratio $\frac{measure\ of\ the\ arc}{360}$ and the circumference of the circle.

$$Length\ of\ \overset{\frown}{AB} = \frac{m\overset{\frown}{AB}}{360} \cdot 2\pi r$$



1. A researcher survey 2000 members of a club to find their ages. The graph shows the survey results. Find the measure of each central angle in the circle graph.



A ⟶ 65+ .25(360) = 90°
B ⟶ 45-64 .08(360) = 28.8°
C ⟶ 25-44 .27(360) = 97.2°
D ⟶ under 25 .40(360) = 144°

2. Find the circumference and area of a circle given the radius to be 7. $r = 7$

$C = 2\pi r$

$C = 2\pi(7)$

$C = 14\pi$ un

$C \approx 43.98$ un

$A = \pi r^2$

$A = \pi(7)^2$

$A = 49\pi$ un^2

$A \approx 153.9$ un^2

3. Find the circumference and area of a circle given diameter to be 26.

$d = 26$

$C = \pi d$

$C = \pi(26)$

$C = 26\pi$ un

$C \approx 81.7$ un

$r = 13$

$A = \pi r^2$

$= \pi(13)^2$

$A = 169\pi$ un^2

$A \approx 530.9$ un^2

4. A circular swimming pool 16 feet in diameter will be enclosed in a circular fence 4 ft from the pool. What length of fencing material is needed? Round your answer to the next whole number.

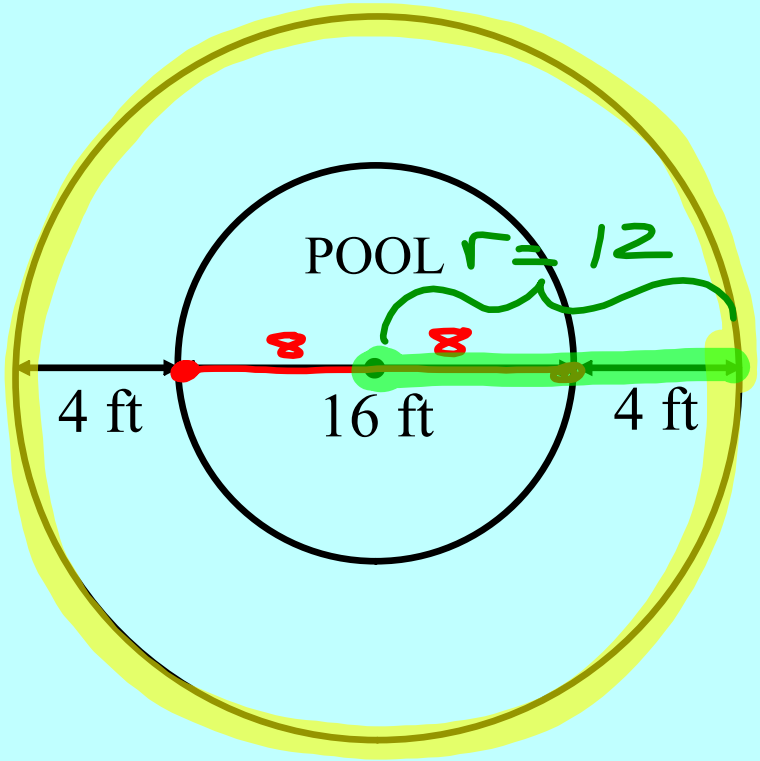
$r = 12$

$C = 2\pi r$

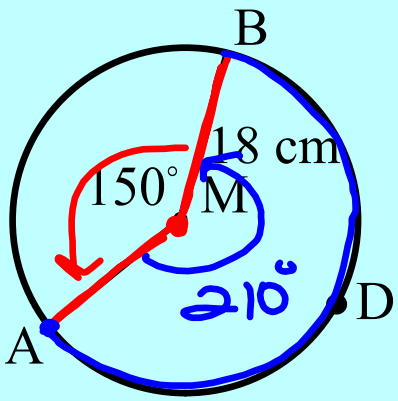
$C = 2\pi(12)$

$C = 24\pi$ ft

$C \approx 76$ ft



5. Find the length of $\overset{\frown}{ADB}$ in circle M in terms of π .



$$\text{Arc length} = \frac{\text{CA}}{360} \cdot 2\pi r$$

$$m\overset{\frown}{ADB} = \frac{210}{360} \cdot 2\pi(18)$$

$$= \frac{21}{36} \cdot \frac{36\pi}{1}$$

$$m\overset{\frown}{ADB} = 21\pi$$

$$\begin{array}{r} 360 \\ -\ 150 \\ \hline 210 \end{array}$$

6. Find the length of a semicircle with radius 1.3 m. in terms of π.

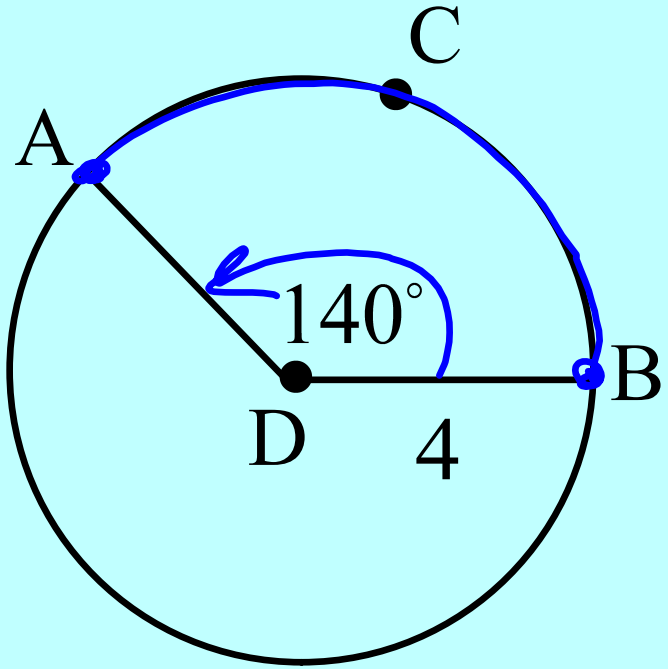
$$\text{Arc length} = \frac{CA}{360}(2\pi r)$$

$$= \frac{180}{360} \cdot 2\pi \cdot 1.3$$

$$= \frac{1}{2}(2.6\pi)$$

$$\text{Arc length} = 1.3\pi \text{ m}$$

7. Find the length of $\overset{\frown}{ACB}$ of circle D in terms of π.



$m\overset{\frown}{ACB} = \frac{CA}{360}(2\pi r)$

$m\overset{\frown}{ACB} = \frac{140}{360} \cdot 2\pi \cdot 4$

$= \frac{14}{36} \cdot 8\pi$

$= \frac{7}{18} \cdot 8\pi$

$m\overset{\frown}{ACB} = \frac{28\pi}{9}$ cm

Assignment:

pgs 569-571 1-8,27-39,52-56