
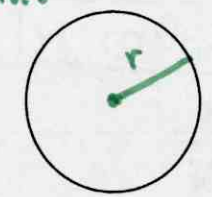
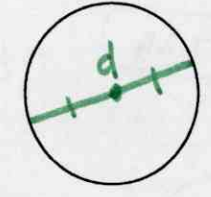
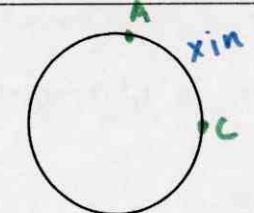
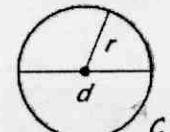


Circumference and Arc Length

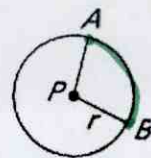
VOCABULARY	DEFINITION	EXAMPLE
CIRCUMFERENCE	The circumference of a circle is the distance around the circle.	 <p>$C = \text{circumference}$ $\frac{C}{d} = \pi$</p>
(Ch. 10) RADIUS and DIAMETER of a CIRCLE	<p>The radius of a circle is a segment from the center of a circle to any point on the circle.</p> <p>The length of the diameter is <u>2</u> times the length of the radius</p>	<p>$r = \text{radius}$</p>  <p>$r = \frac{d}{2}$ or $\frac{1}{2}(d)$</p> <p>$d = \text{diameter}$</p>  <p>$d = 2r$</p>
ARC LENGTH	An arc length is a portion of the circumference of a circle.	 <p>Arc length $\widehat{AC} = \underline{\hspace{2cm}}$ in</p>
THEOREM 11.8 CIRCUMFERENCE of a CIRCLE	<p>$\pi = \frac{C}{d}$</p> <p>The circumference C of a circle is $C = \underline{2\pi r}$ or $C = \underline{\pi d}$, where d is the diameter of the circle and r is the radius of the circle.</p> <p>$d = 2r$</p>	<p>Find the indicated measure.</p> <p>a. Circumference of a circle with radius 11 meters</p>  <p>$C = 2\pi r$ $r = 11$ $C = 2\pi(11)$ $C = \underline{22\pi \text{ m}}$ or 69.1m</p> <p>b. Radius of a circle with circumference 18 yards</p> <p>$C = 2\pi r$ $C = 18$ $18 = 2\pi r$ $\frac{18}{2\pi} = \frac{2\pi r}{2\pi}$ $r = \underline{\frac{9}{\pi} \text{ yds}}$ or 2.9 yds</p>

ARC LENGTH COROLLARY

In a circle, the ratio of the length of a given arc to the circumference is equal to the ratio of the measure of the arc to 360°

$$\frac{\text{Arc Length}}{C} = \frac{\text{Central } \angle}{360^\circ}$$

\downarrow
 $2\pi r \text{ or } \pi d$



$$\frac{\text{Arc length of } \widehat{AB}}{2\pi r} = \frac{m\widehat{AB}}{360^\circ}, \text{ or}$$

$$\text{Arc length of } \widehat{AB} = \frac{m\widehat{AB}}{360^\circ} \cdot 2\pi r$$

Arc length of $\widehat{AB} = 3.1 \text{ m}$

$r = 2 \text{ m}$
 $m\widehat{AB} = 88^\circ$

$$\frac{x}{2\pi(2)} = \frac{88}{360}$$

$$\frac{360x}{360} = \frac{88(4\pi)}{360}$$

EXAMPLES:

Find the circumference of a circle with diameter 23 inches.

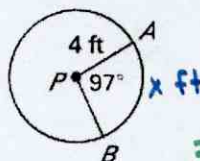
$$C = \pi d$$

$$d = 23$$

Exact

$$C = 23\pi \text{ in} \text{ or } 72.3 \text{ in}$$

Arc length of \widehat{AB}

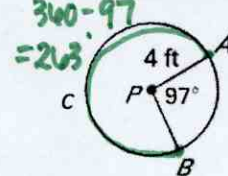


$$\frac{x}{2\pi(4)} = \frac{97}{360}$$

$$\frac{360x}{360} = \frac{97(8\pi)}{360}$$

$$\text{Arc Length } \widehat{AB} = 6.8 \text{ ft}$$

Length of \widehat{ACB}



$$\frac{x}{2\pi(4)} = \frac{360 - 97}{360}$$

$$\frac{360x}{360} = \frac{263(8\pi)}{360}$$

$$\text{Arc Length } \widehat{ACB} = 18.4 \text{ ft}$$

Find the diameter of a circle with a circumference of 12π inches and then find the radius.

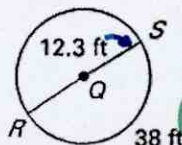
$$C = \pi d \text{ or } C = 2\pi r$$

$$C = 12\pi \text{ in}$$

$$\frac{12\pi}{2\pi} = \frac{2\pi r}{2\pi}$$

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

$m\widehat{RS}$

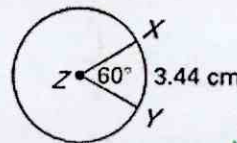


$$\frac{38}{2\pi(12.3)} = \frac{x}{360}$$

$$\frac{(24.6\pi)x}{(24.6\pi)} = \frac{38(360)}{(24.6\pi)}$$

$$m\widehat{RS} = 177^\circ$$

Circumference of $\odot Z$



$$\frac{3.44}{x} = \frac{60}{360}$$

$$\frac{60x}{60} = \frac{360(3.44)}{60}$$

$$C = 20.64 \text{ cm}$$

$$\frac{20.64}{2\pi} = \frac{2\pi r}{2\pi}$$

$$r = 3.3 \text{ cm}$$