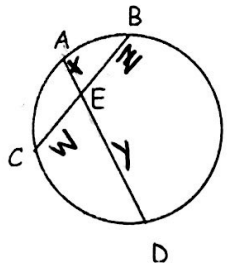
[redacted] Notes

11.4 Special Segment Lengths

Theorem 10.15

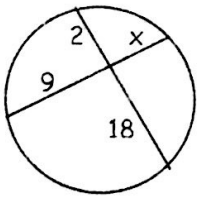
If two segments intersect in the interior of a circle, then the product of the lengths of the segments of one chord is equal to the product of the lengths of the segments of the other chord.



$x \cdot y = w \cdot z$

Examples
Solve for x.

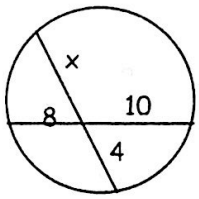
1.



$9x = 2(18)$

$x = 4$

2.

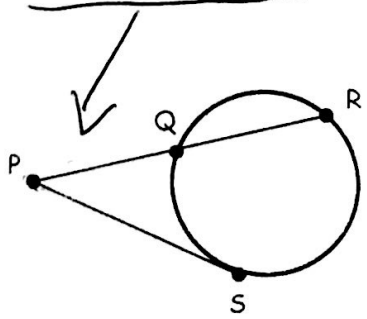


$4x = 8(10)$

$x = 20$

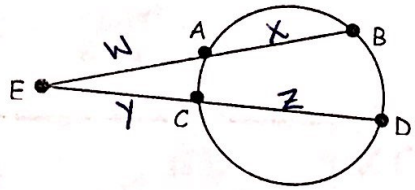
Vocabulary:

In the figure below, $\overline{PS}$ is called a tangent segment because it is tangent to a circle at an endpoint. Similarly, $\overline{PR}$ is a secant segment and $\overline{PQ}$ is the external segment of $\overline{PR}$.



Theorem 10.16

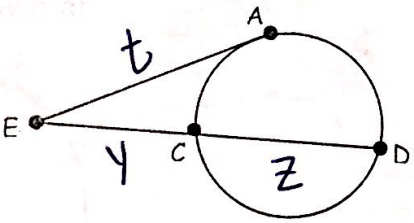
If two Secant segments share the same endpoint outside of a circle, then the Product of the length of one secant segment and the length of its external segment equals the product of the length of the other secant segment and the length of its external segment.



$W(X+W) = Y(Z+Y)$

Theorem 10.17

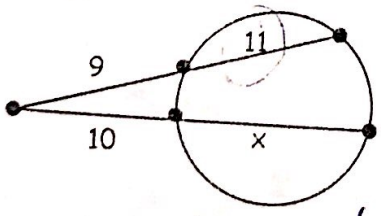
If a tangent segment and a Secant segment share an endpoint outside a circle, then the product of the length of the secant segment, and the length of its external segment equals the Square of the length of the tangent segment.



$Y(Y+Z) = t^2$

Examples
Solve for x.

1.



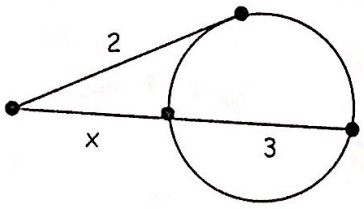
$9(9+11) = 10(X+10)$

$9(20) = 10(X+10)$

$18 = X+10$

$X = 8$

2.



$X(X+3) = 4$

$X^2+3X-4=0$

$(X+4)(X-1) = 0$

$X = -4, 1$

[redacted] Notes Name: _____

7.6 Circumference and Arc Length of Circles

Recall:

Minor Arc: less than 180° (name with 2 letters)
Major Arc: more than 180 (3 letters)
Semicircle: 180°

Central angle: vertex at center
Inscribed angle: vertex on circle

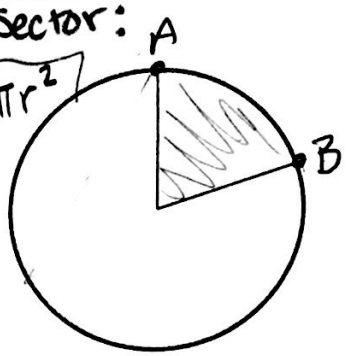
Theorem 11.6 Circumference of a Circle -

$C = 2\pi r$ or $C = \pi d$

Arc Length Corollary

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

Area of a sector: $\frac{m\overset{\frown}{AB}}{360} \cdot \pi r^2$



Note:

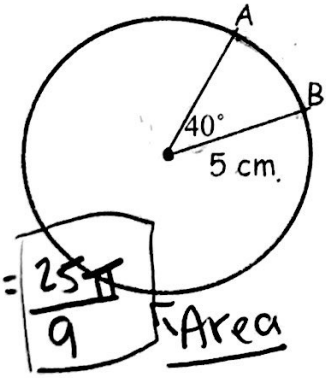
Arc Length is given in units of distance

Measure of an Arc is given in degrees or radians

Try:

Find the length of each arc.

1.



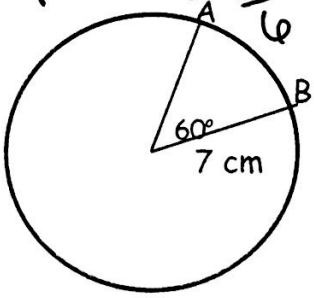
$\frac{40}{360} \cdot \frac{2\pi 5}{1}$ (length)

$\frac{400}{360}\pi = \frac{10}{9}\pi$

$\frac{40 \cdot \pi(5)^2}{360}$ (Area)

$\frac{1000\pi}{360} = \frac{25\pi}{9}$

2.



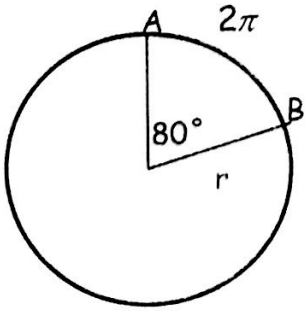
$\frac{60}{360} \cdot 2\pi 7 = \frac{1}{6} \cdot 2\pi(7) = \frac{14\pi}{6}$ (length)

$\frac{60}{360} \cdot \pi(7)^2$ (Area)

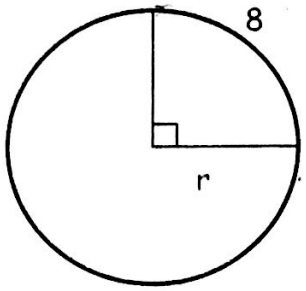
$\frac{2940\pi}{360} = \frac{49}{6}\pi$

Find the radius.

3.



4.



$\frac{90}{360} \cdot 2\pi r = 8$

$\frac{2\pi r}{4} = \frac{8}{1}$

$32 = 2\pi r$

$16/\pi$