April 8, 2014

10.7 Special Segments in a Circle

Target: Use properties of chords and secants to find missing parts of a circle.

1 Segments Intersecting Inside a Circle When two chords intersect inside a circle, each chord is divided into two segments, called **chord segments**.

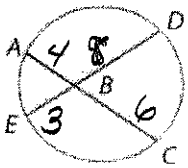
Theorem 10.15 Segments of Chords Theorem

Words If two chords intersect in a circle, then the products of the lengths of the chord segments are equal.

Example $AB \cdot BC = DB \cdot BE$

$4(6) = 3(8)$

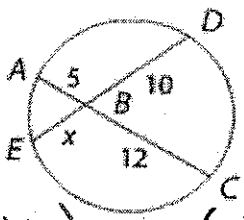
$24 = 24$



Example 1 Use the Intersection of Two Chords

Find x.

a.

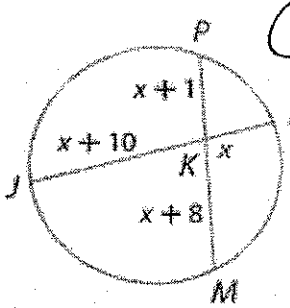


$5(12) = 10(x)$

$\frac{60}{10} = \frac{10x}{10}$

$\boxed{x = 6}$

b.



$(x+1)(x+8) = (x+10)x$

$x^2 + 8x + 1x + 8 = x^2 + 10x$

$9x + 8 = 10x$

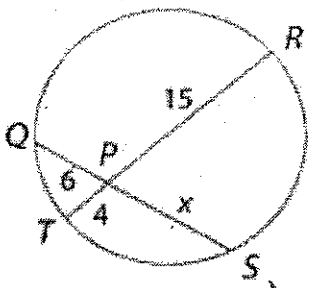
$-9x \quad -9x$

$8 = 1x$

$\boxed{x = 8}$

Guided Practice

1A.

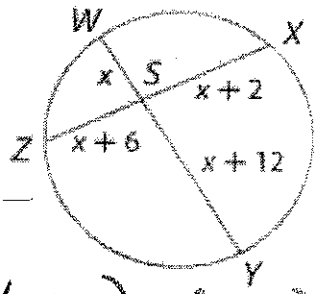


$6(x) = 15(4)$

$6x = 60$

$\boxed{x = 10}$

1B.



$x(x+12) = (x+6)(x+2)$

$x^2 + 12x = x^2 + 8x + 12$

$-x^2 \quad -x^2$

$12x = 8x + 12$

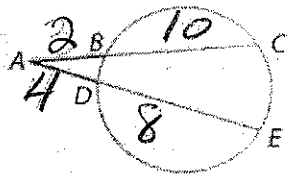
$-8x \quad -8x$

$4x = 12$

$\boxed{x = 3}$

Theorem 10.16 Secant Segments Theorem

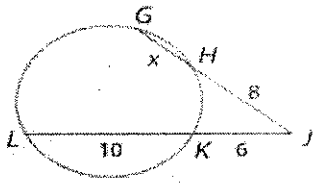
Words If two secants intersect in the exterior of a circle, then the product of the measures of one secant segment and its external secant segment is equal to the product of the measures of the other secant and its external secant segment.



Example $AC \cdot AB = AE \cdot AD$ $12(2) = 12(4)$ 24

Example 3 Use the Intersection of Two Chords

Find x.



$16(6) = 8 + x(8)$

$96 = 64 + 8x$

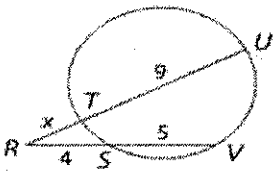
$-64 \quad -64$

$32 = 8x$

$\boxed{x = 4}$

Guided Practice

3A.



$9 + x(x) = 9(4)$

$9x + x^2 = 36$

$x^2 + 9x - 36 = 0$

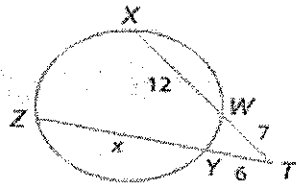
$(x+12)(x-3) = 0$

$\cancel{x = -12}$

$x = 3$

36
1, 36
2, 18
3, 12
4, 9
6, 6

3B.



$19(7) = x + 6(6)$

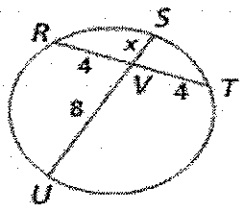
$133 = 6x + 36$

$-36 \quad -36$

$97 = 6x$ $x = 16.16$

Find x. Assume that segments that appear to be tangent are tangent.

1.

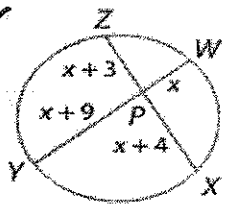


$4(4) = 8(x)$

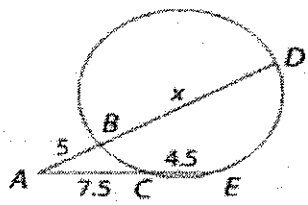
$16 = 8x$

$\boxed{x = 2}$

~~2.~~



3.



$x + 5(5) = 12(7.5)$

$5x + 25 = 90$

$-25 \quad -25$

$5x = 65$

$\boxed{x = 13}$