Lesson 10-7

Special Segments in a Circle

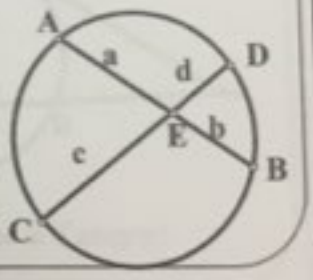
Intersecting Chords Theorem

Interior segments are formed by two intersecting chords.

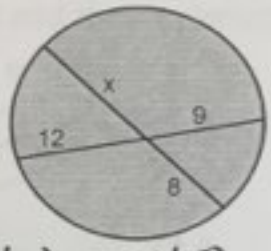
Theorem:

If two chords intersect within a circle, then the product of the lengths of the parts of one chord is equal to the product of the lengths of the parts of the second chord.

$$a \cdot b = c \cdot d$$



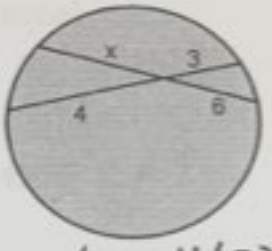
Solve for x



$12(9) = x(8)$

$108 = 8x$

$13.5 = x$



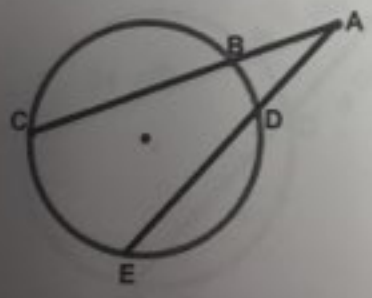
$6x = 4(3)$

$6x = 12$

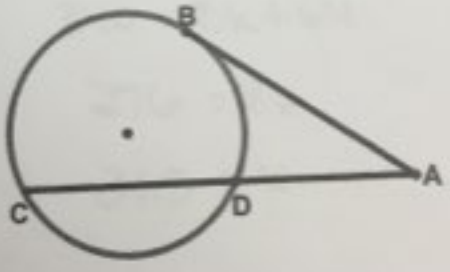
$x = 2$

Intersecting Secants/Tangents

Exterior segments are formed by two secants, or a secant and a tangent.



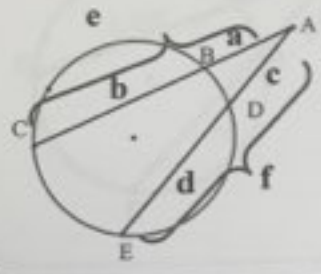
Two Secants



Secant and a Tangent

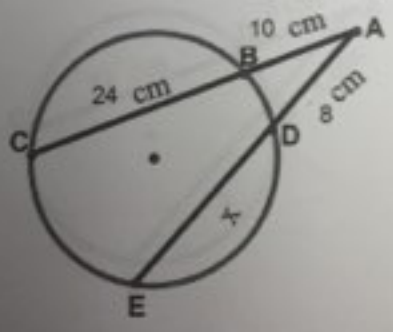
Intersecting Secants Theorem

If two secant segments are drawn to a circle from an external point, then the products of the lengths of the secant and their exterior parts are equal.



$$a \cdot e = c \cdot f$$

Example:



$10(34) = 8(x+8)$

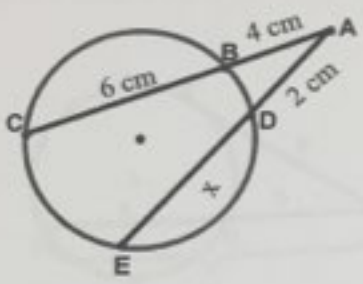
$340 = 8x + 64$

$276 = 8x$

$34.5 = x$

Example:

In the figure; if $\overline{BC} = 6cm$, $\overline{AD} = 2cm$, $\overline{AB} = 4cm$. *Find x.*



$AB \bullet AC = AD \bullet AE$

$4 \bullet 10 = 2 \bullet (2+x)$

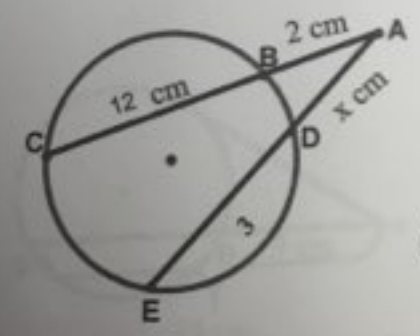
$40 = 4 + 2x$

$36 = 2x$

X = 18 cm

Example:

In the figure; if $\overline{BC} = 6cm$, $\overline{AD} = 2cm$, $\overline{AB} = 4cm$. *Find x.*



$2(14) = x(x+3)$

$28 = x^2 + 3x$

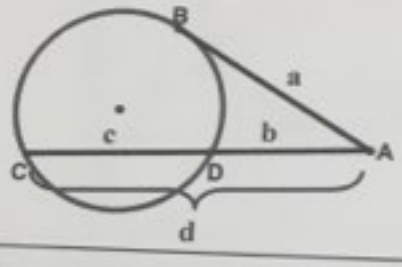
$x^2 + 3x - 28 = 0$

$(x-4)(x+7) = 0$

$x = 4$ ~~$x = -7$~~ — can not be negative

Secant and Tangent Theorem:

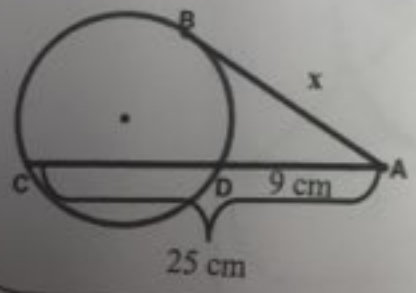
The square of the length of the tangent equals the product of the length of the secant and its exterior segment.



$$a^2 = b \bullet d$$

Example:

In the figure if $\overline{AD} = 9\,cm$, *and* $\overline{AC} = 25\,cm$. *Find* x.



$$AB^2 = AD \bullet AC$$

$$x^2 = 9 \bullet 25$$

$$x = \sqrt{225} = 15\ cm$$