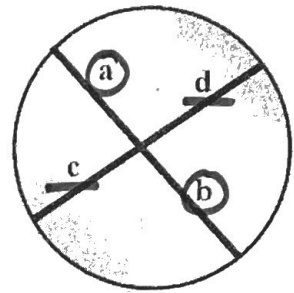
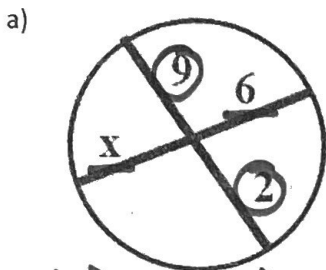


Type 1: Two chords intersect
INSIDE the circle

Formula: $part(part) = part(part)$
 $ab = cd$



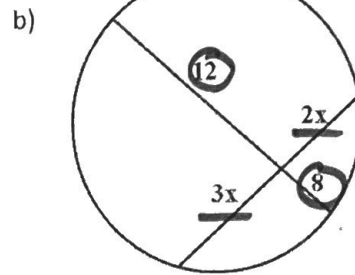
Examples: Solve for x.



$$9(2) = 6(x)$$

$$\frac{18}{6} = \frac{6x}{6}$$

$$\boxed{x = 3}$$



$$12(8) = 3x(2x)$$

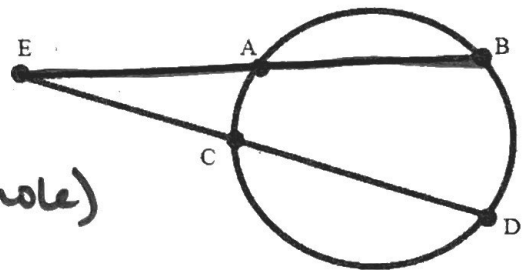
$$\frac{96}{6} = \frac{6x^2}{6}$$

$$\sqrt{16} = \sqrt{x^2}$$

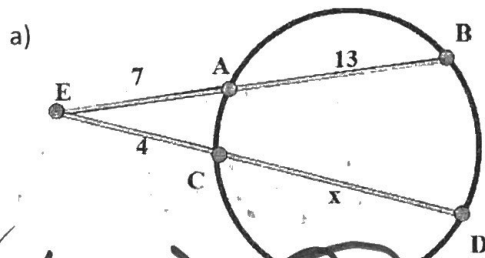
$$\boxed{x = 4}$$

Type 2: Two secants intersect
OUTSIDE the circle.

Formula: $outside(whole) = outside(whole)$
 $EA(EB) = EC(ED)$
(add to get whole) (add to get whole)



Examples: Solve for x.



$$7(7+13) = 4(4+x)$$

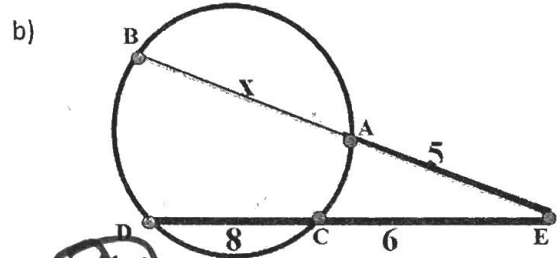
$$7(20) = 16 + 4x$$

$$140 = 16 + 4x$$

$$\begin{array}{r} 140 \\ -16 \\ \hline 124 = 4x \end{array}$$

$$\frac{124}{4} = \frac{4x}{4}$$

$$\boxed{x = 31}$$



$$5(5+x) = 6(6+8)$$

$$25 + 5x = 6(14)$$

$$25 + 5x = 84$$

$$\begin{array}{r} 25 + 5x \\ -25 \\ \hline 5x = 59 \end{array}$$

$$\frac{5x}{5} = \frac{59}{5}$$

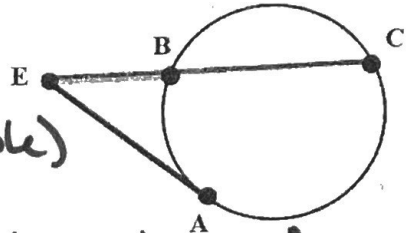
$$\boxed{x = 11.8}$$

Type 2 (with a twist): **Secant & Tangent intersect outside the circle.**

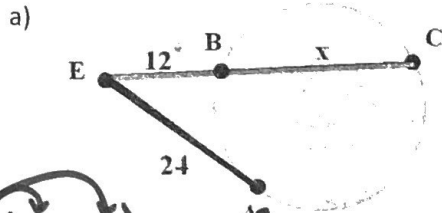
Formula: **outside(whole) = outside(whole)**

$$EB(EC) = EA(EA)$$

$$EB(EC) = EA^2 \longleftrightarrow \text{outside(whole)} = \text{tan}^2$$



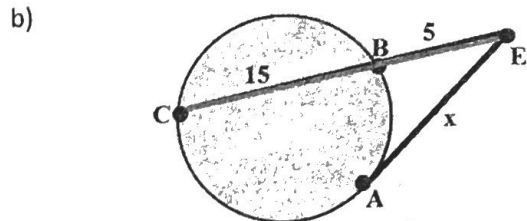
Examples: Solve for x.



$$12(12+x) = 24^2$$

$$144 + 12x = 576$$

$$\begin{array}{r} 144 + 12x = 576 \\ -144 \quad -144 \\ \hline 12x = 432 \\ \frac{12x}{12} = \frac{432}{12} \\ \boxed{x = 36} \end{array}$$



$$5(5+15) = x^2$$

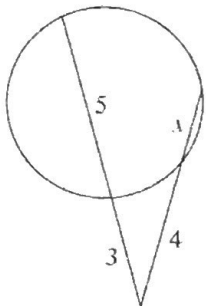
$$5(20) = x^2$$

$$\sqrt{100} = \sqrt{x^2}$$

$$\boxed{x = 10}$$

Individual Practice:

1) Solve for x.



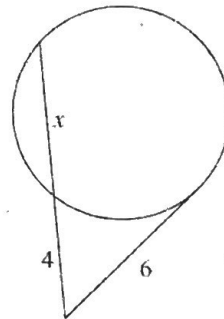
$$3(3+5) = 4(4+x)$$

$$3(8) = 16 + 4x$$

$$24 = 16 + 4x$$

$$\begin{array}{r} 24 = 16 + 4x \\ -16 \quad -16 \\ \hline 8 = 4x \\ \frac{8}{4} = \frac{4x}{4} \\ \boxed{x = 2} \end{array}$$

2) Solve for x.

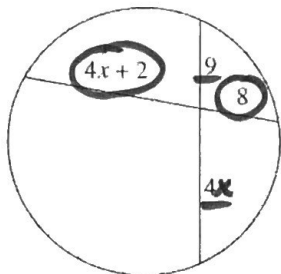


$$4(4+x) = 6^2$$

$$16 + 4x = 36$$

$$\begin{array}{r} 16 + 4x = 36 \\ -16 \quad -16 \\ \hline 4x = 20 \\ \frac{4x}{4} = \frac{20}{4} \\ \boxed{x = 5} \end{array}$$

3) Solve for x.

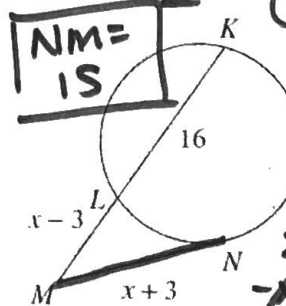


$$8(4x+2) = 9(4x)$$

$$32x + 16 = 36x$$

$$\begin{array}{r} 32x + 16 = 36x \\ -32x \quad -32x \\ \hline 16 = 4x \\ \frac{16}{4} = \frac{4x}{4} \\ \boxed{x = 4} \end{array}$$

4) Find NM.



$$NM = 15$$

$$4x = 48$$

$$\boxed{x = 12}$$

$$(x-3)(x-3+16) = (x+3)^2$$

$$(x-3)(x+13) = (x+3)(x+3)$$

$$x^2 + 13x - 3x - 39 = x^2 + 3x + 3x + 9$$

$$x^2 + 10x - 39 = x^2 + 6x + 9$$

$$\begin{array}{r} x^2 + 10x - 39 = x^2 + 6x + 9 \\ -x^2 \quad -x^2 \\ \hline 10x - 39 = 6x + 9 \\ -6x \quad -6x \\ \hline 4x - 39 = 9 \\ +39 \quad +39 \\ \hline 4x = 48 \\ \frac{4x}{4} = \frac{48}{4} \\ \boxed{x = 12} \end{array}$$