

Objectives:

- Students will know properties of lines that are tangent to circles and know how to use these properties.
- Students will apply the Pythagorean Theorem in solving for side lengths.

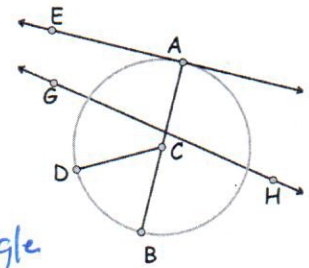
Warm-Up: Do you remember how to multiply two binomials?

$(x+7)(x-2)$ $x^2 - 2x + 7x - 14$ $x^2 + 5x - 14$	$(2x-5)(x-4)$ $2x^2 - 8x - 5x + 20$ $2x^2 - 13x + 20$	$(4x+3)^2$ $(4x+3)(4x+3)$ $16x^2 + 12x + 12x + 9$ $16x^2 + 24x + 9$
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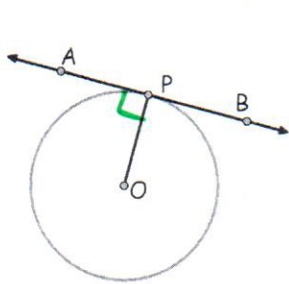
Review of Vocabulary:

- Radius: $\overline{DC}, \overline{AC}, \overline{BC}$
- Diameter: \overline{AB}
- Chord: \overline{AB}

- Tangent Line: \overleftrightarrow{EA}
- *Point of Tangency: $\bullet A$
- Secant Line: \overleftrightarrow{GH}

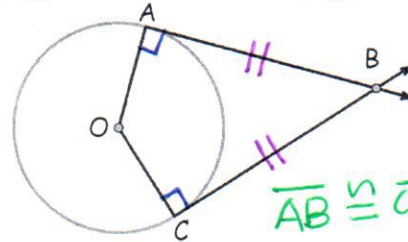


Properties of Tangent Lines:



\overleftrightarrow{AB} Tangent line
 \overline{OP} Radius
 • P point of tangency

$\angle ABC$ circumscribed angle



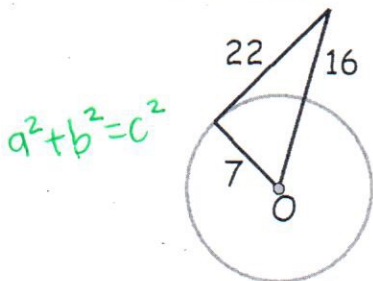
$\overline{AB} \cong \overline{CB}$

$\overleftrightarrow{AB}, \overleftrightarrow{CB}$ tangent lines
 $\overline{OA}, \overline{OC}$ radii

The tangent line to a circle and the radius are always perpendicular (make 90°)!

Example Sets:

1. Determine if the line which appears to be tangent is tangent to the circle.

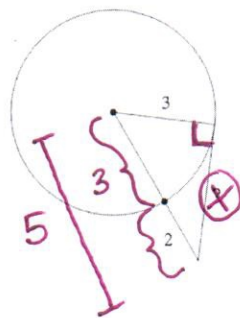


$a^2 + b^2 = c^2$

$7^2 + 22^2 \stackrel{?}{=} 16^2$
 X

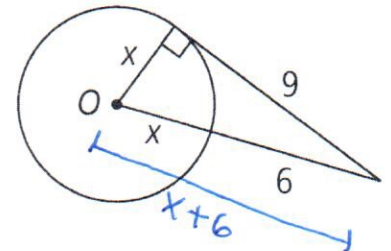
Not a tangent line

2. Find the segment length indicated. Assume that lines that appear tangent are tangent.



$3^2 + x^2 = 5^2$
 $9 + x^2 = 25$
 $-9 \quad -9$
 $\sqrt{x^2} = \sqrt{16}$
 $x = 4$

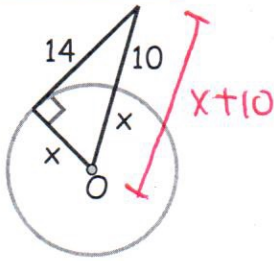
3. Solve for x:



$x^2 + 9^2 = (x+6)^2$
 $= (x+6)(x+6)$
 $= x^2 + 6x + 6x + 36$
 $x^2 + 81 = x^2 + 12x + 36$
 $-x^2 \quad -x^2$
 $81 = 12x + 36$
 $-36 \quad -36$
 $45 = 12x$
 $\frac{45}{12} = \frac{12x}{12}$
 $x = 3.75$

Practice Problems: Solve for x

1.



$$x^2 + 14^2 = (x+10)^2$$

$$= (x+10)(x+10)$$

$$= x^2 + 10x + 10x + 100$$

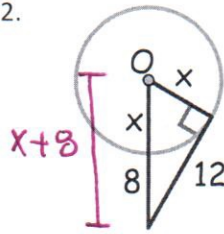
$$\cancel{x^2} + 196 = \cancel{x^2} + 20x + 100$$

$$\begin{array}{r} 196 = 20x + 100 \\ -100 \quad -100 \\ \hline 96 = 20x \end{array}$$

$$\frac{96}{20} = \frac{20x}{20}$$

$$x = 4.8$$

2.



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

$$= (x+8)(x+8)$$

$$= x^2 + 8x + 8x + 64$$

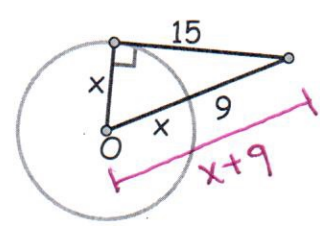
$$\cancel{x^2} + 144 = \cancel{x^2} + 16x + 64$$

$$\begin{array}{r} 144 = 16x + 64 \\ -64 \quad -64 \\ \hline 80 = 16x \end{array}$$

$$\frac{80}{16} = \frac{16x}{16}$$

$$x = 5$$

3.



$$x^2 + 15^2 = (x+9)^2$$

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

$$\cancel{x^2} + 225 = \cancel{x^2} + 18x + 81$$

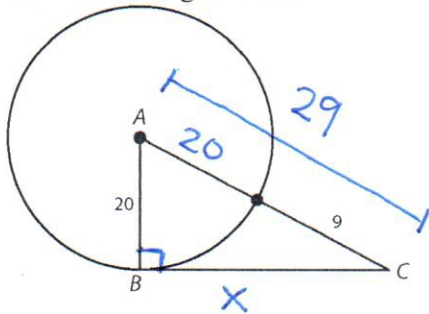
$$\begin{array}{r} 225 = 18x + 81 \\ -81 \quad -81 \\ \hline 144 = 18x \end{array}$$

$$\frac{144}{18} = \frac{18x}{18}$$

$$x = 8$$

Assume that lines that appear to be tangent to the circle are tangent.

4. What is the length of \overline{BC} ?



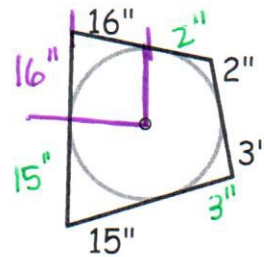
$$20^2 + x^2 = 29^2$$

$$\begin{array}{r} 400 + x^2 = 841 \\ -400 \quad -400 \\ \hline \sqrt{x^2} = \sqrt{441} \end{array}$$

$$x = 21$$

$$m\overline{BC} = 21$$

5. What is the perimeter of the polygon?



$$P = 16 + 16 + 2 + 2 + 3 + 3 + 15 + 15$$

$$\text{Perimeter} = 72 \text{ inches}$$