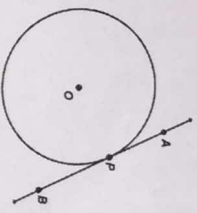


SWBAT solve for unknown variables using theorems about tangent lines of circles.

6.7 Tangent Lines of Circles

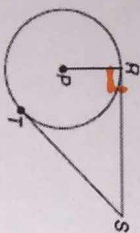
Tangent to a Circle Ex: (AB)	A line in the plane of the circle that intersects the circle in exactly one point. Ex: Segment AB is a tangent to Circle O.	
Point of Tangency	The point where a circle and a tangent intersect. Ex: Point P is a point of tangency on Circle O.	

Tangent Theorem 1:

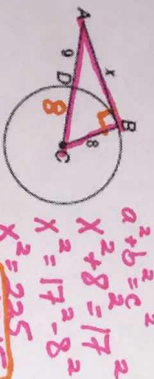
If a line is tangent to a circle, then it is perpendicular to the radius drawn to the point of tangency.

Converse Theorem 1:

If a line is perpendicular to the radius of a circle at its endpoint on a circle, then the line is tangent to the circle.

Example: If RS is tangent, then $PR \perp RS$.

Example 1: Find the measure of x.



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

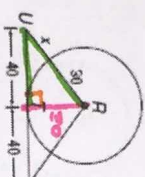
$$x^2 + 8^2 = 17^2$$

$$x^2 = 17^2 - 8^2$$

$$x^2 = 225$$

$$x = 15$$

b)



$$30^2 + 40^2 = (x + 30)^2$$

$$900 + 1600 = (x + 30)(x + 30)$$

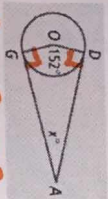
$$2500 = x^2 + 60x + 900$$

$$x^2 + 60x - 1600 = 0$$

$$(x + 80)(x - 20) = 0$$

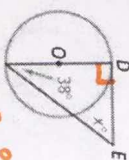
$$x = 20$$

Example 2: Find x. All segments that appear tangent are tangent to Circle O.



$$90^2 + 90^2 + 15^2 + x^2 = 360^2$$

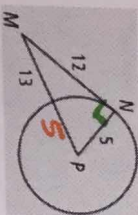
$$x = 28$$



$$90^2 + 38^2 + x^2 = 180^2$$

$$x = 53$$

Example 3: Is segment MN tangent to Circle O at P? Explain.



means \perp or 90°

$$13^2 \stackrel{?}{=} 5^2 + 12^2$$

$$18^2 \stackrel{?}{=} 5^2 + 12^2$$

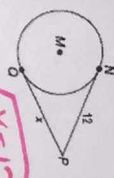
$$324 \neq 25 + 144$$

NOT true.
NOT Tangent

Tangent Theorem 2:

If two tangent segments to a circle share a common endpoint outside the circle, then the two segments are congruent.

Example 4: Solve for x.



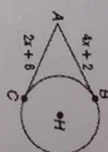
$$x = 12$$



$$3x - 6 = x + 10$$

$$2x = 16$$

$$x = 8$$



$$4x + 2 = 2x + 8$$

$$2x = 6$$

$$x = 3$$

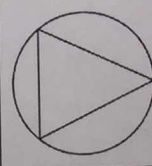
Circumscribed vs. Inscribed

To circumscribe is when you draw a figure around another, touching it at points as possible.

Ex: The circle is circumscribed about the triangle.

To inscribe is to draw a figure within another so that the inner figure lies entirely within the boundary of the outer.

Ex: The triangle is inscribed in the circle.

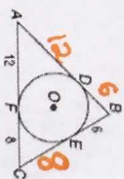


Tangent Theorem 3: (Circumscribed Polygons)

When a polygon is circumscribed about a circle, all of the sides of the polygon are tangent to the circle.



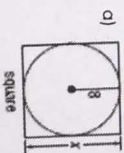
Example 5: Triangle ABC is circumscribed about circle O. Find the perimeter of triangle ABC.



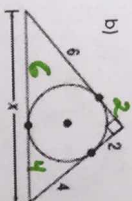
$$P = 6 + 6 + 8 + 8 + 12 + 12$$

$$P = 50$$

You Try! Find x. Assume that segments that appear to be tangent are tangent.



$$x = 16$$



$$x = 6 + 4$$

$$x = 10$$



$$x = 2 + 6$$

$$x = 8$$