Math 3

6.7 Tangent Lines of Circles

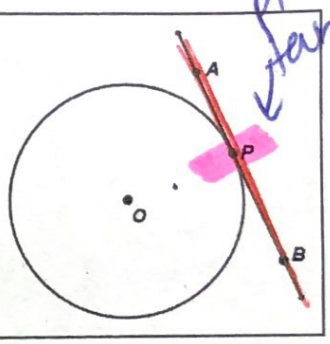
Unit 6

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

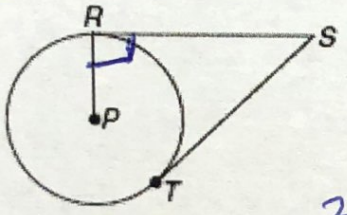
tangent line

pt of tangency

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.* AB
Point of Tangency	The point where a circle and a tangent intersect. **Ex:** *Point P is a point of tangency on Circle O.* P



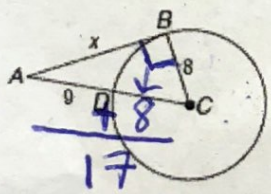
Tangent Theorem 1:	**In My Own Words...**
If a line is tangent to a circle, then it is perpendicular to the radius drawn to the point of tangency. 90°	tangent line forms 90° ∠ with our radius



Example: If RS is tangent, then PR ⊥ RS.

Example 1: Find the measure of x.

a)



hyp

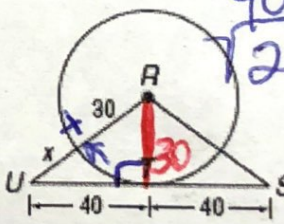
$a^2+b^2=c^2$

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

$x^2+64=289$

$\sqrt{x^2}=\sqrt{225}$

$x=15$



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

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

$\sqrt{2500}=\sqrt{(30+x)^2}$

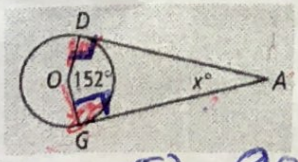
$50=30+x$

$-30 \quad -30$

$x=20$

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

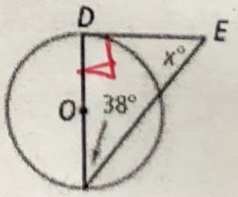
a)



$360-152-90-90=x$

$x=28$

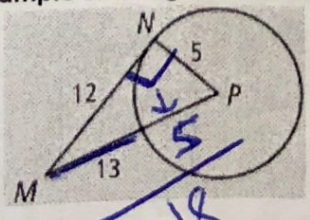
b)



$180-38-90=x$

$x=52$

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



hypo

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

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

$144+25=324$

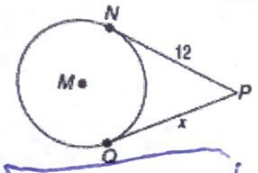
$169 \stackrel{?}{=} 324$

NO

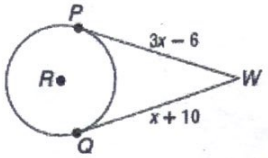
Does not hold true, so it's not tangent.

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



$3x - 6 = x + 10$

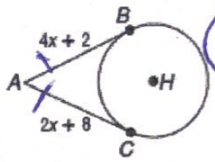
$3x = x + 16$

$-x \quad -x$

$2x = 16$

$x = 8$

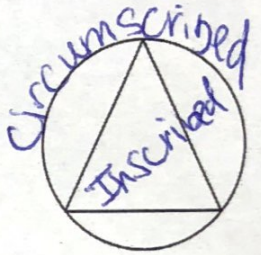
$4x + 2 = 2x + 8$



$x = 3$

Circumscribed vs. Inscribed

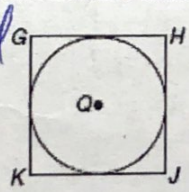
To ***circumscribe*** is when you draw a figure around another, touching it at points as possible.	To ***inscribe*** is to draw a figure within another so that the inner figure lies entirely within the boundary of the outer.
My Own Words: Around	***My Own Words:*** Inside

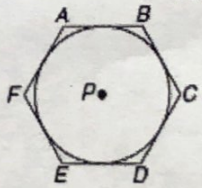


Tangent Theorem 3: (Circumscribed Polygons)	When a polygon is circumscribed about a circle, all of the sides of the polygon are tangent to the circle.

Circumscribed: Square

Inscribed: Circle

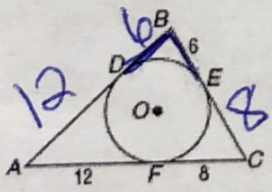




C: Hexagon

I: Circle

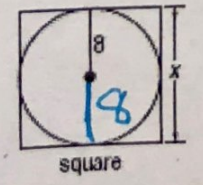
Example 5: Triangle ABC is circumscribed about ⊙O. Find the perimeter of triangle ABC.



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

$P = 52$

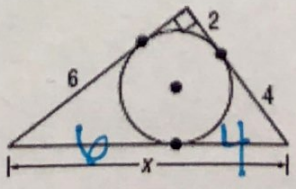
You Try! Find x. Assume that segments that appear to be tangent are tangent.



$x = 8(2)$

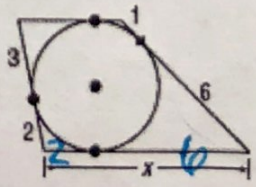
$x = 8 + 8$

$x = 16$



$x = 6 + 4$

$x = 10$



$x = 2 + 6$

$x = 8$