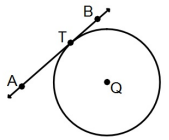
Wednesday, May 6, 2020

Finish: Sec 12-4: Angle Measures and Segment Lengths.

Tangent Line:

A line that intersects a circle exactly once.

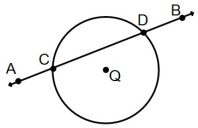
$\overleftrightarrow{AB}$ is tangent to ⊙Q at point T



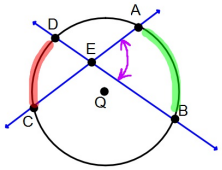
Secant Line:

A line that intersects a circle at two points.

$\overleftrightarrow{AB}$ is a secant of ⊙Q because it intersects the circle at points C and D.



To review yesterday:

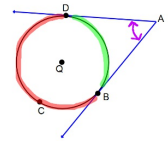


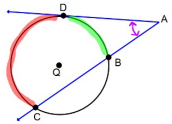
$m\angle AEB = \frac{1}{2}$ (Green arc + Red arc)

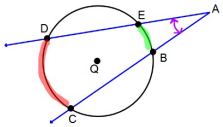
Angle formed by two secants intersecting inside the circle is the average of the intercepted arcs.

When the intersection is outside the circle for:

2 Tangents:	1 Tangent & 1 Secant:	2 Secants:







$m\angle A = \frac{1}{2}$ (red arc - green arc)

The measure of the angle formed is half the positive difference of the two intercepted arcs.

Finding segment lengths involving circles, chords, tangents, and secants.

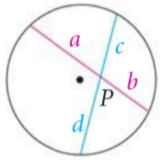
Theorem 12-12

For a given point and circle, the product of the lengths of the two segments from the point to the circle is constant along any line through the point and circle.

I. II. III.

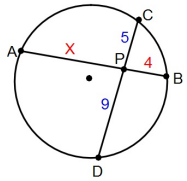
Two Chords:

I.



$a \cdot b = c \cdot d$

The product of the two pieces of one Chord equals the product of the two pieces of the other Chord.



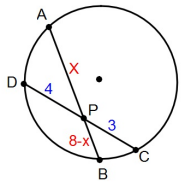
(5)(9) = (4)(X)

45 = 4X

45 = 4X
÷4 ÷4

X = 11.25

Given AB = 8 find the value of X.



$(3)(4) = (x)(8-x)$

$12 = 8x - x^2$

$12 - 8x + x^2 = 8x - x^2$
$-8x \quad +x^2$

$x^2 - 8x + 12 = 0$

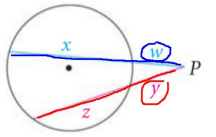
Factor this quadratic:
$(x-6)(x-2)=0$

If the entire length of $\overline{AB}$ is 8 and one piece of it is x, then the other piece must be what is left of the 8 after removing the x: 8 - x

X = either 2 or 6.
Both are possible because you can't tell from the diagram if X is the bigger or the smaller piece.
In other words, the two pieces of $\overline{AB}$ are 2 and 6

Two Secants:

II.

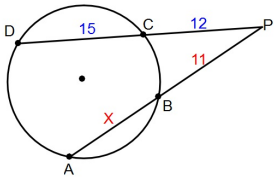


$(w + x)w = (y + z)y$

In words:

(whole secant) X (piece outside the circle) = (whole secant) X (piece outside the circle)

Find the value of X.



$(15+12)(12) = (x+11)(11)$

$324 = (x+11)(11)$

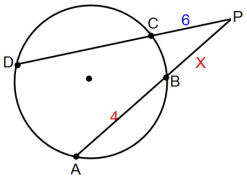
$324 = (x+11)(11)$
$\div 11 \qquad \div 11$

$324/11 = x+11$

$324/11 \quad = x+11$
$-11 \qquad -11$

X = 18.45

Find the value of X given DP = 16.



$(16)(6) = (x+4)(x)$

$96 = x^2 + 4x$

$96 = x^2 + 4x$
$-96 \qquad -96$

$x^2 + 4x - 96 = 0$

Factor this quadratic:
$(x+12)(x-8) = 0$

X = -12, 8

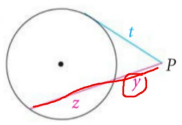
X = 8

X can't be negative in this problem.

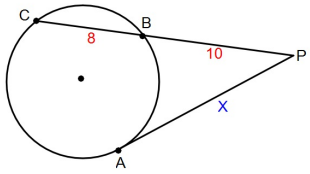
One Secant and 1 Tangent:

(whole secant) X (piece outside the circle) = (tangent)^2

III.



$(y + z)y = t^2$

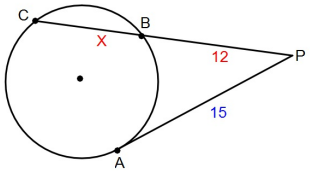


$(10+8)(10) = x^2$

$180 = x^2$

$\sqrt{180} = \sqrt{x^2}$

X = 13.42



$(12 + x)(12) = 15^2$

$(12 + x)(12) = 225$

$(12 + x)(12) = 225$

$\div 12 \quad \div 12$

$12 + x = 18.75$

$12 + x = 18.75$

$-12 \quad -12$

X = 6.75

You can now do the first few problems of Practice #24.

We'll finish the remainder of the material tomorrow.

Practice #24 will be due on Saturday, May 9 by 10:00pm.