Lesson 11-10 Secant-Secant, Secant/Tangent Relationships in Circles

AGENDA:

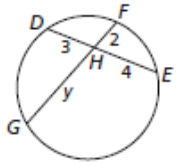
- Check & Review Homework 11-9
- Notes and Guided Practice

HOMEWORK:

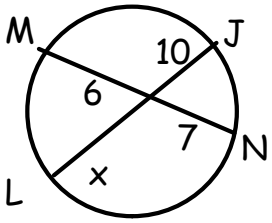
- p. 796 # 17-21, 25, 27

p. 796-797: #12,13, 22, 23, 25

12.



$y = 6$; $DE = 7$; $FG = 8$

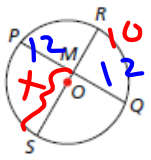


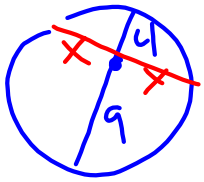
13. x =4.2 , LJ = 14.2, MN = 13

Use the diagram for Exercises 22 and 23.

22. M is the midpoint of $\overline{PQ}$. $RM = 10$ cm, and $PQ = 24$ cm.
    a. Find MS. 14.4 cm
    b. Find the diameter of $\odot O$. 24.4 cm

23. M is the midpoint of $\overline{PQ}$.The diameter of $\odot O$ is 13 in., and $RM = 4$ in.

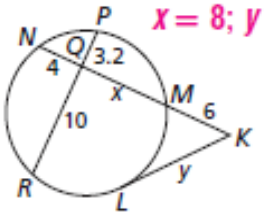




$x \cdot x = 9 \cdot 4$

$x = \pm 6$

25.



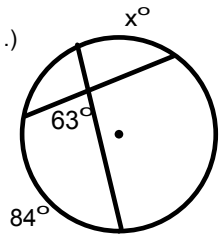
$x = 8$; $y = 6\sqrt{3}$

- Arc-angle relationships are measured in DEGREES.

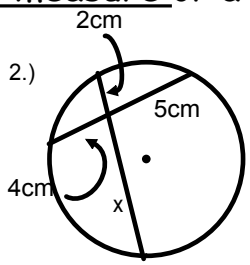
- Segments and chords are measured in LINEAR UNITS, such as inches or centimeters.

In each problem, identify whether you are asked to find an angle measure, an arc measure or a segment length.

1.)



2.)



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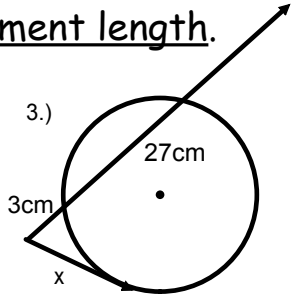

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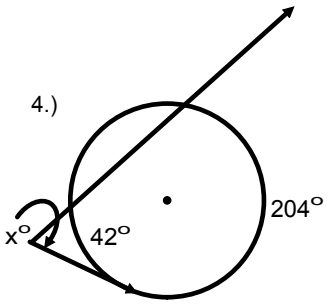
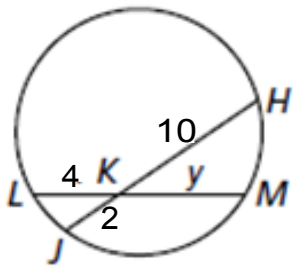


Try These:

2.



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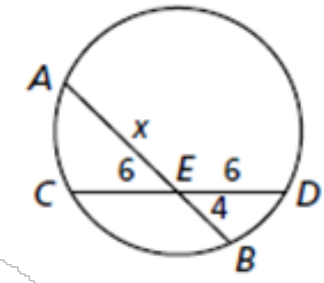
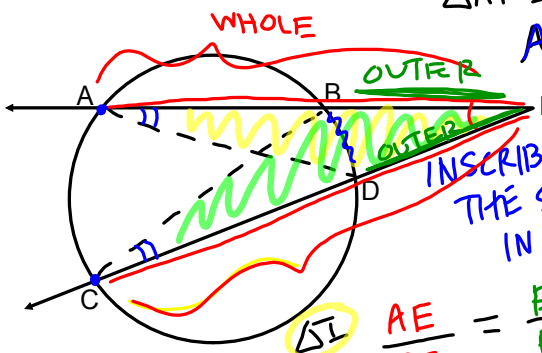


1. SECANT-SECANT PRODUCT THEOREM

Consider an exterior angle formed by two secants.
What relationship can you find among the chords and other segments?
Hint: Draw in other chords to form triangles ADE and CBE...
What could you prove about them?



$\triangle ADE \sim \triangle CBE$

A A ~ REFLEXIVE

INSCRIBED ∠'S FROM THE SAME ARC IN A ⊙ → ≅

$\frac{\Delta I}{\Delta II}$ $\frac{AE}{CE} = \frac{ED}{EB}$ ~Δ's → PROPORTION SIDES

$AE \cdot EB = CE \cdot ED$ CROSS PRODUCTS

WHOLE · OUTER = WHOLE · OUTER

$W_1O_1 = W_2O_2$

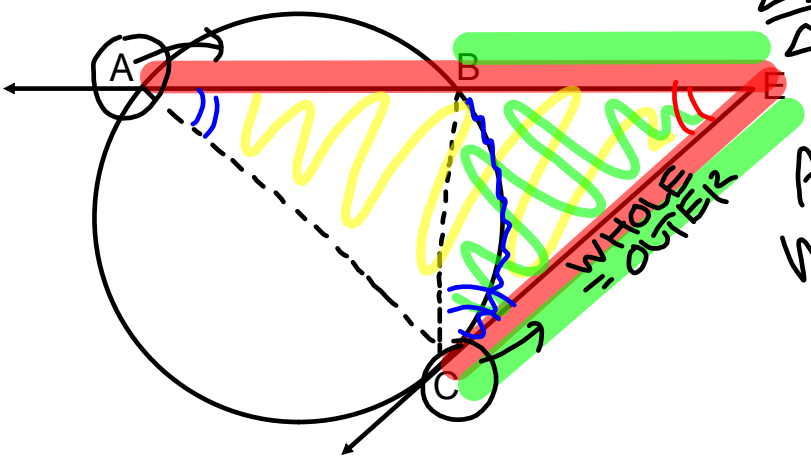
DON'T JUMP SECANTS

2. SECANT-TANGENT PRODUCT THEOREM

Consider an exterior angle formed by a secant and a tangent.
What relationship can you find among the chord and other segments?
Hint: Draw in other chords to form triangles ACE and CBE...
What could you prove about them?

$\triangle AEC \sim \triangle CEB$ AA ~

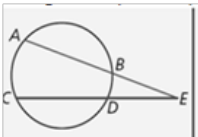
$\frac{\Delta I}{\Delta II}$: $\frac{AE}{CE} = \frac{EC}{EB}$



$AE \cdot EB = CE \cdot EC$

$W_1 \cdot O_1 = W_2 \cdot O_2$

2) SECANT-SECANT PRODUCT



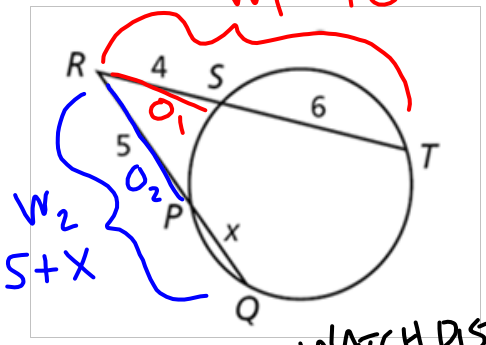
Secants $\overline{AE}$ and $\overline{CE}$ intersect at E.

$AE \cdot BE = CE \cdot DE$

If 2 secants intersect in the exterior of a circle, then product of the lengths of one secant and its external segment equals the product of the other secant and its external segment.

WHOLE

OUTER



$W_1 = 10$

W_2

$5+x$

O_1

O_2

$W_1O_1 = W_2O_2$

$(RT)(RS) = (RQ)(RP)$

$(10)(4) = (5+x)(5)$

WATCH DISTRIB!

$40 = 25 + 5x$

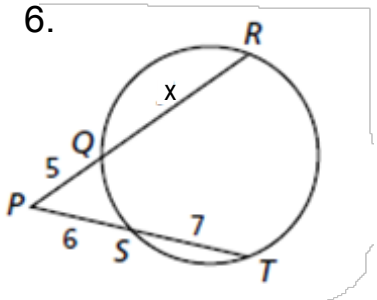
$15 = 5x$

$3 = x$

units

Extra Example

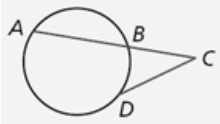
6.



3) SECANT – TANGENT PRODUCT THM:

If a secant & tangent intersect outside a circle, then the product of the lengths of the secant and its external segment = the length of tangent squared.

WHOLE OUTER



Secant $\overline{AC}$ and tangent $\overline{DC}$ intersect at C.

$AC \cdot BC = DC^2$

$W_1O_1 = W_2O_2$

$(SQ)(RQ) = (PQ)(PQ)$

$(9)(4) = (x)(x)$

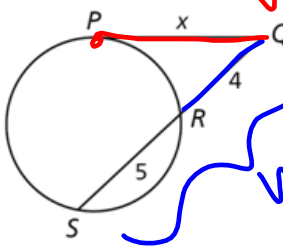
$36 = x^2$

$\pm\sqrt{36} = x$

6 units = x

PRACTICE: Find the Value of x:

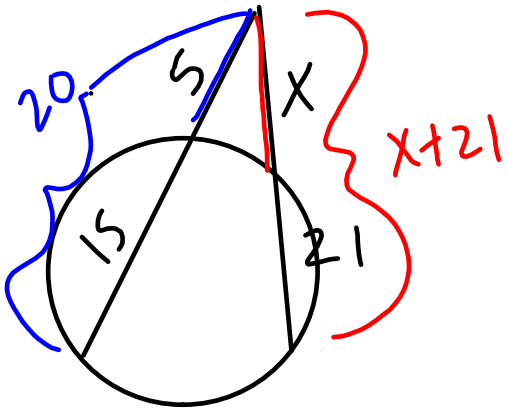
C)



$W_2 = O_2$

$W_1 = 9$

Practice 1 - Solve for x



$W_1O_1 = W_2O_2$

$(20)(5) = (x+21)(x)$

$100 = x^2 + 21x$

$0 = x^2 + 21x - 100$

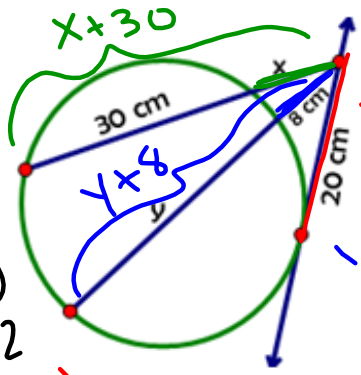
$0 = (x+25)(x-4)$

$x+25=0$ | $x-4=0$

$x=-25$ | $x=4$

units

2) Solve for x and y.



$W_2 = O_2$

X: $W_1O_1 = W_2O_2$

$(x+30)x = (20)(20)$

$x^2 + 30x = 400$

$x^2 + 30x - 400 = 0$

$(x + 40)(x - 10) = 0$

$x + 40 = 0$ | $x - 10 = 0$

$x = -40$ | $x = 10$ cm

Y: $W_1O_1 = W_2O_2$

$(y+8)8 = (20)(20)$

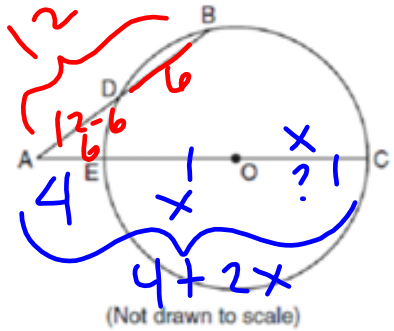
$8y + 64 = 400$

$8y = 336$

$y = 42$ cm

REGENTS QUESTIONS

In the diagram below of $\odot O$, $\overline{AB}$ intersects $\odot O$ at D, secant $\overline{AOC}$ intersects $\odot O$ at E. If AE=4, AB=12, and DB=6, find OC. $= x$



(Not drawn to scale)

$W_1O_1 = W_2O_2$

$(AB)(AD) = (AC)(AE)$

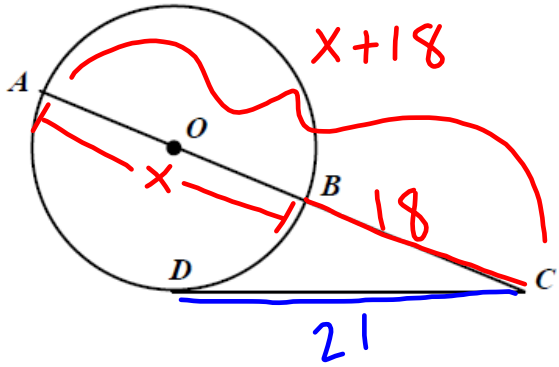
$(12)(6) = (4+2x)(4)$

$72 = 16 + 8x$

$56 = 8x$

$7 = x = OC$ units

Find the diameter of the circle (not drawn to scale). $BC = 18$, and $DC = 21$. Round your answer to the nearest tenth.



$W_1O_1 = W_2O_2$

$(AC)(BC) = (CD)(CD)$

$(x+18)(18) = (21)(21)$

$18x + 324 = 441$

$-324 \quad -324$

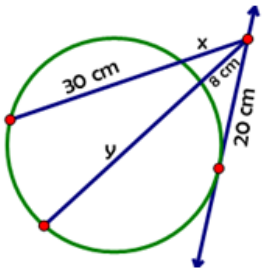
$18x = 117$

$x = \frac{117}{18}$

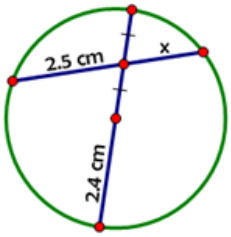
DIAM = 6.5 units

Want more? Try these:

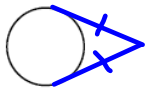
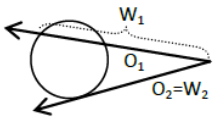
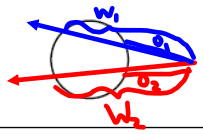
1) Solve for x & y:



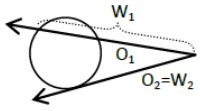
2) Solve for x:



Fill in your graphic organizer if you have not done so already:

Segment Length Relationships	Same External Point: 2 Tangents	Same External Point: Secant – Tangent	Same External Point: Secant - Secant	Same Internal Pt: Chord-Chord
Example				
Algebraic Equation	Tangent segment$_1$ = Tangent segment$_2$	$W_1O_1 = W_2O_2$	$W_1O_1 = W_2O_2$	$P_1R = P_2P_2$
Derived from	RHL $\cong$ + CPCTC	AA~	Similar Triangles (AA~)	AA~ ~ Δ's $\rightarrow$ PROPORTIONAL SIDES

Fill in your graphic organizer before beginning your homework:

Segment Length Relationships	Same External Point: 2 Tangents	Same External Point: Secant – Tangent	Same External Point: Secant - Secant	Same Internal Pt: Chord-Chord
Example				
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