

8.9

Name (print first and last) \_\_\_\_\_

Per \_\_\_\_\_ Date: 4/4 due 4/7

8.9 Segment Lengths: Tangents and Radii

Geometry Regents 2013-2014 Ms. Lomac

SLO: I can solve problems involving tangents and radii.

(1)  Let's use what we learned in 8.8 about chords and diameters to see what happens when we translate the chord to the edge of the circle.

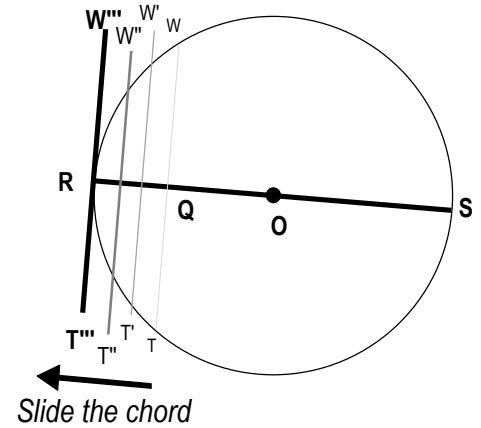
(a) Determine whether each segment is part of a secant or tangent  
Circle your choice.

$\overline{WT}$                       secant    tangent

$\overline{W'T'}$                       secant    tangent

$\overline{W''T''}$                       secant    tangent

$\overline{W'''T'''}$                       secant    tangent



(b) Determine whether each statement is true or false. Circle your choice.

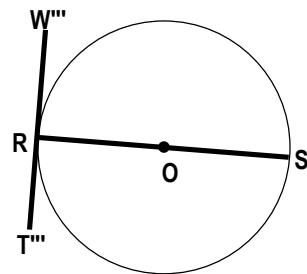
$\overline{WT} \perp \overline{RS}$                       true    false

$\overline{W'T'} \perp \overline{RS}$                       true    false

$\overline{W''T''} \perp \overline{RS}$                       true    false

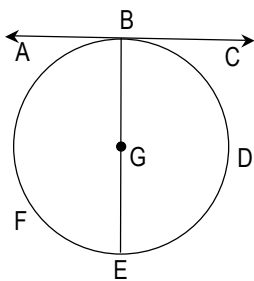
$\overline{W'''T'''} \perp \overline{RS}$                       true    false

(c) The **TANGENT RADIUS THEOREM** states that when a radius ( $\overline{OR}$ ) intersects a tangent line ( $\overline{W'''T'''}$ ) at the point of tangency, the radius and tangent are \_\_\_\_\_ (which means they form \_\_\_\_\_ angles.) Mark the diagram with this information.



(2)  Here is a way to justify the relationship:

For the diagram below, label each arc and angle with its measure. Justify your answer.



$\overleftrightarrow{AC}$  is a \_\_\_\_\_ because \_\_\_\_\_

$m\widehat{BFE}$  is \_\_\_\_\_° because \_\_\_\_\_

$m\widehat{BDE}$  is \_\_\_\_\_° because \_\_\_\_\_

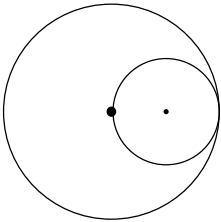
$m\angle ABE$  is \_\_\_\_\_° because \_\_\_\_\_

$m\angle CBE$  is \_\_\_\_\_° because \_\_\_\_\_

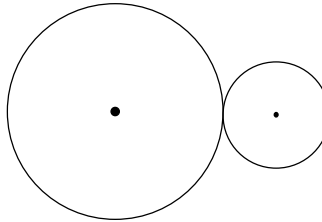
8.9

(3)  A **common tangent** is a line that is tangent to 2 or more circles. For each pair of circles below, draw as many **common tangents** as possible. Be prepared to defend your answer.

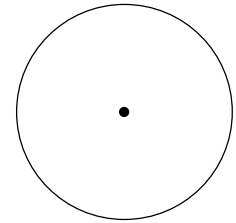
a)



b)



c)

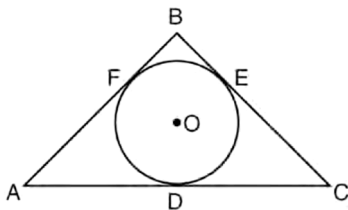


(4)  For each problem below, sketch and label diagrams and show work. Circle the correct answer for multiple choice questions..

- (a) 230 Line segment  $\overline{AB}$  is tangent to circle  $O$  at  $A$ . Which type of triangle is always formed when points  $A$ ,  $B$ , and  $O$  are connected?
- 1 right
  - 2 obtuse
  - 3 scalene
  - 4 isosceles

- (b) 231 Tangents  $\overline{PA}$  and  $\overline{PB}$  are drawn to circle  $O$  from an external point,  $P$ , and radii  $\overline{OA}$  and  $\overline{OB}$  are drawn. If  $m\angle APB = 40$ , what is the measure of  $\angle AOB$ ?
- 1  $140^\circ$
  - 2  $100^\circ$
  - 3  $70^\circ$
  - 4  $50^\circ$

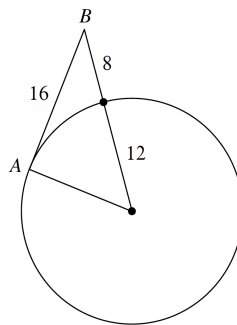
- (c) 250 In the diagram below,  $\overline{AB}$ ,  $\overline{BC}$ , and  $\overline{AC}$  are tangents to circle  $O$  at points  $F$ ,  $E$ , and  $D$ , respectively,  $AF = 6$ ,  $CD = 5$ , and  $BE = 4$ .



What is the perimeter of  $\triangle ABC$ ?

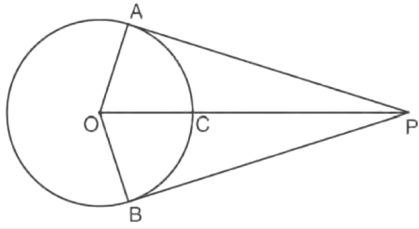
- 1 15
- 2 25
- 3 30
- 4 60

- (d) Find the measure of the radius

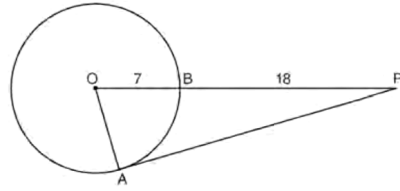


8.9

- (e) 374 In the diagram below,  $\overline{PA}$  and  $\overline{PB}$  are tangent to circle  $O$ ,  $\overline{OA}$  and  $\overline{OB}$  are radii, and  $\overline{OP}$  intersects the circle at  $C$ . Prove:  $\angle AOP \cong \angle BOP$



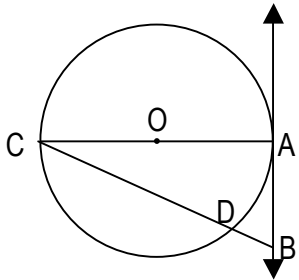
- (f) 233 In the diagram below of  $\triangle PAO$ ,  $\overline{AP}$  is tangent to circle  $O$  at point  $A$ ,  $OB = 7$ , and  $BP = 18$ .



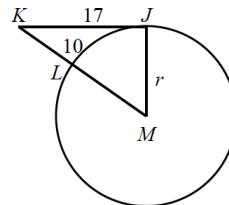
What is the length of  $\overline{AP}$ ?

- 1 10
- 2 12
- 3 17
- 4 24

- (g) Find the radius measure given:  $m\widehat{CB} = 10$ ,  $m\widehat{AB} = 6$



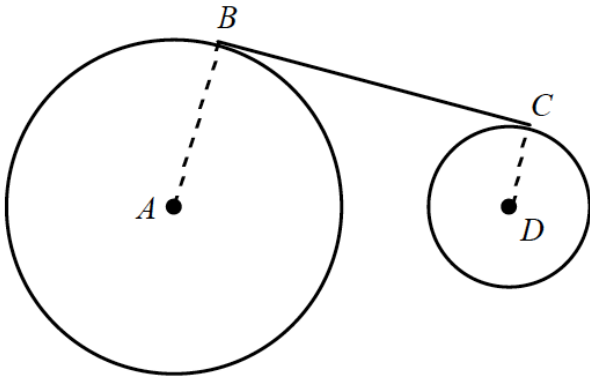
- (h)  $\overline{KJ}$  is tangent to  $\odot M$  at  $J$  (not drawn to scale). Find the length of the radius  $r$ , to the nearest tenth.



- [A] 18.9 [B] 9.4 [C] 10.8 [D] 19.7

8.9

- (i)  $\overline{BC}$  is tangent to  $\odot A$  at  $B$  and to  $\odot D$  at  $C$  (not drawn to scale). If  $AB = 12$ ,  $BC = 18$ , and  $DC = 3$ , find the length of  $\overline{AD}$ , to the nearest tenth.



- (j)  $\overline{AD}$  is tangent to both circles in the figure (not drawn to scale). If  $BA = 9$ ,  $AD = 23$ , and  $CD = 17$ , find the length of  $\overline{BC}$  to the nearest tenth.

[A] 32.5 [B] 18.8 [C] 24.7 [D] 24.4

