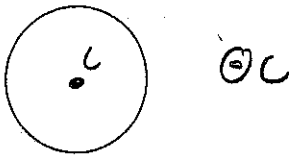
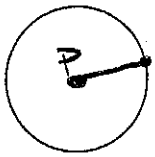
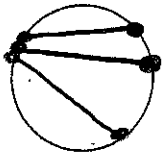
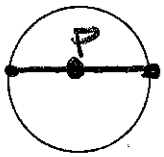
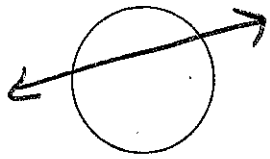
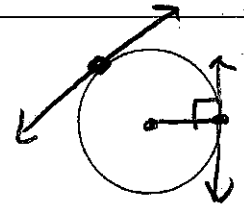
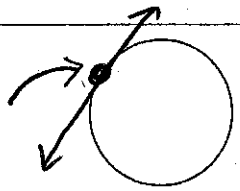
Name: Answer Key Date: _____ Period: _____

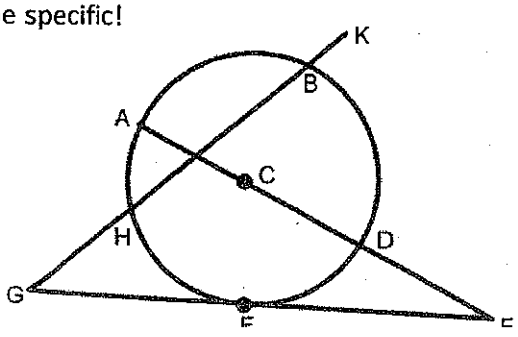
Unit 8: Properties of Circles

Circle Vocabulary and Tangents

Objective: Identify segments and lines related to circles.
Use properties of a tangent to a circle.

Word	Description	Drawing
Circle:	set of all pts equidistant from a given point called the center	
Radius:	Distance from center to point on the circle	
Chord:	A segment whose endpoints are on the circle	
Diameter:	Distance across circle through center - longest chord	
Secant:	intersects the circle at exactly two points	
Tangent:	- intersects the circle at exactly one point - forms 90° with radius	
Point of Tangency:	Point where the tangent intersects circle	

EXAMPLE 1: Tell whether the line or segment is best described as a chord, a secant, a tangent, a diameter, or a radius—be specific!



a. $\overline{AD}$ diameter b. $\overline{CD}$ radius

c. $\overline{EG}$ Tangent d. $\overline{HB}$ chord

e. $\overline{FB}$ none g. $\overline{FE}$ tangent

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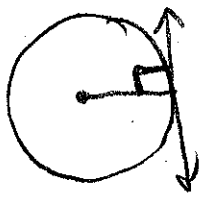
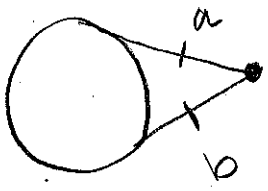
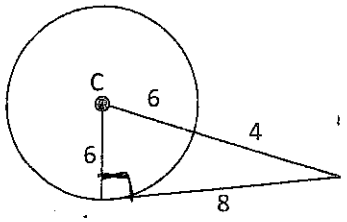
RULE: In a plane, a line is tangent to a circle if and only if the line is perpendicular to a radius of the circle at its endpoint on the circle		
RULE: Tangent segments from a common external point are congruent.		$a = b$

EXAMPLE 2: Verifying a Tangent to a Circle. (Use the Pythagorean Theorem Converse!)

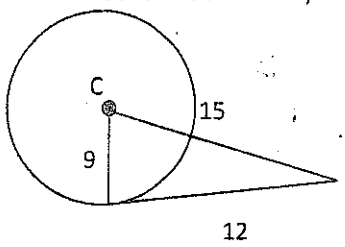
a.



$6^2 + 8^2 = 10^2$

$100 = 100$ ✓

b.

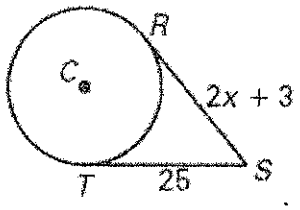


$9^2 + 12^2 = 15^2$

$225 = 225$ ✓

EXAMPLE 3: Using Properties of Tangents $\overline{SR}$ and $\overline{ST}$ are tangent to $\odot C$. Find the value of x.

a.

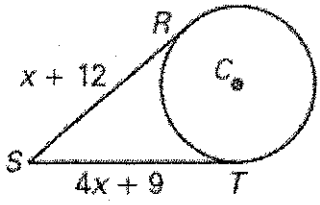


$2x + 3 = 25$

$2x = 22$

$x = 11$

b.



$x + 12 = 4x + 9$

$3 = 3x$

$x = 1$

Calc. # _____

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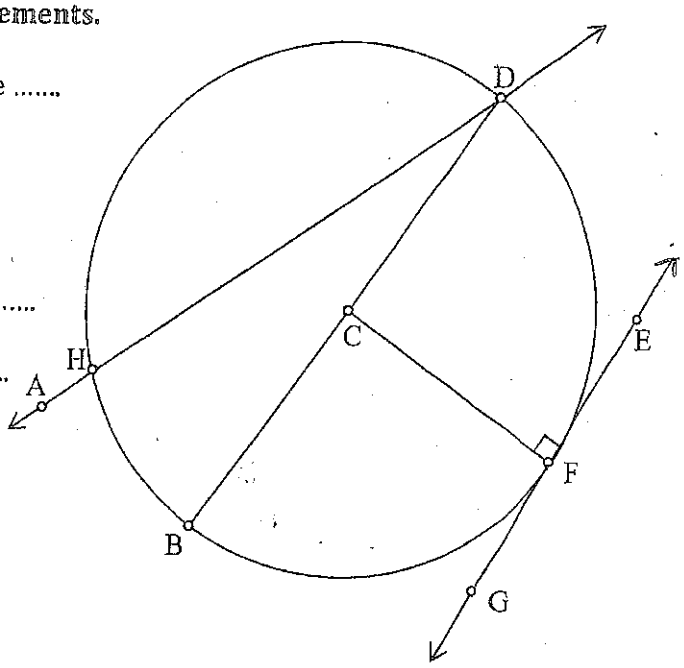
Worksheet - 11.1

Lines that Intersect Circles

Use the figure below to complete the following statements.



1) $\overline{CF}$, $\overline{CD}$, $\overline{CB}$ — 1. Three radii of the circle are .....

2) $\overline{BD}$ — 2. A diameter of the circle is .....

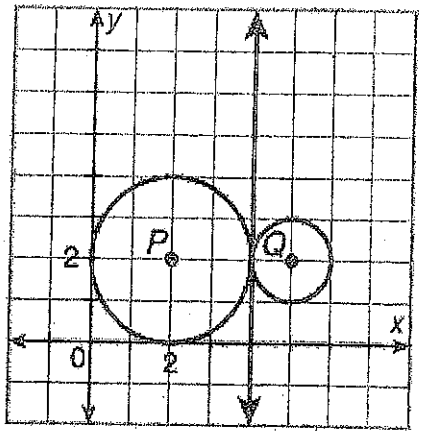
3) $\overleftrightarrow{GE}$ — 3. A tangent of the circle is.....

4) $\overline{HD}$ — 4. A chord of the circle is .....

5) $\overleftrightarrow{AD}$ — 5. A secant of the circle is .....

6) F — 6. A point of tangency is.....

Use the figure below to answer the exercise #7-10.



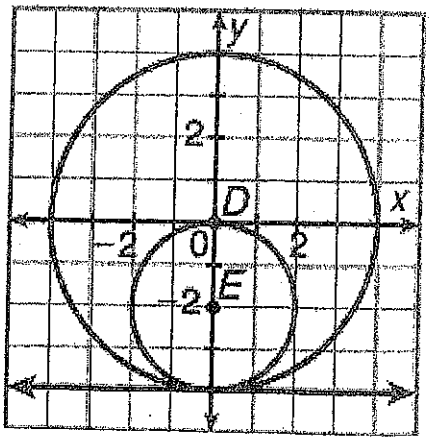
7) 2 — 7. Radius of ⊙P

8) 1 — 8. Radius of ⊙Q

9) (4, 2) — 9. Coordinates of the point of tangency

10) $x = 4$ — 10. Equation of the tangent line at the point of tangency

Use the figure below to answer the exercise #11-14.



11) 4 — 11. Radius of ⊙D

12) 2 — 12. Radius of ⊙E

13) (0, -4) — 13. Coordinates of the point of tangency

14) $y = -4$ — 14. Equation of the tangent line at the point of tangency

Fill in the blanks to complete each theorem.

15) tangent

15. If a line is perpendicular to a radius of a circle at a point on a circle, then the line is ___?___ to the circle.

16) Congruent

16. If two segments are tangent to a circle from the same external point, then the segments are ___?___.

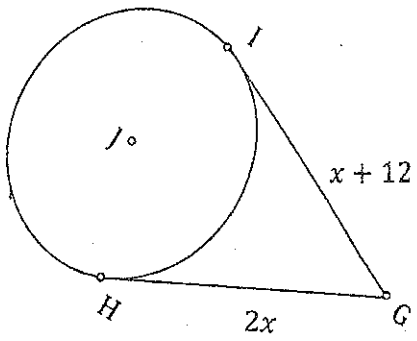
17) perpendicular

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

In exercises #18 - 21, $\overline{GH}$ and $\overline{GI}$ are tangents to ⊙ J. Find GH.

18) 12 (24)

18.

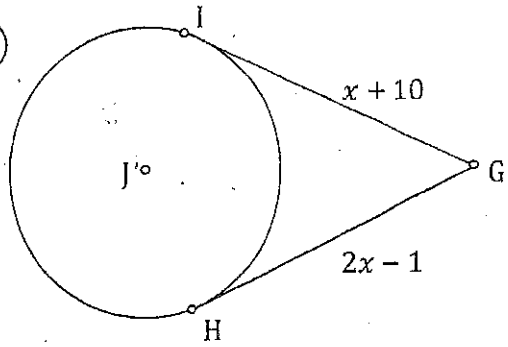


$2x = x + 12$

$x = 12$

19) 11 (21)

19.

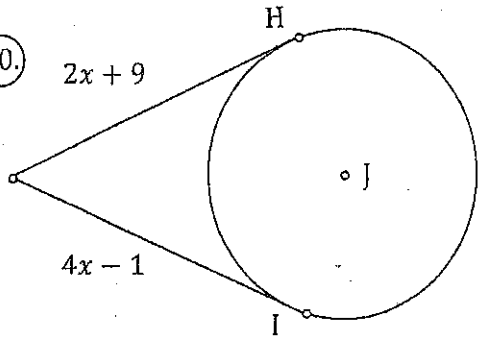


$x + 10 = 2x - 1$

$11 = x$

20) 5 (19)

20.



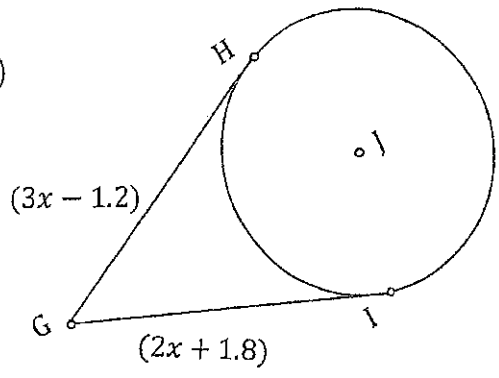
$2x + 9 = 4x - 1$

$10 = 2x$

$x = 5$

21) 3 (7.8)

21.



$3x - 1.2 = 2x + 1.8$

$x = 3$