Chapter 12: Circles

SECTION 1: LINES THAT INTERSECT CIRCLES

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I Can

- ❑ Identify tangents, secants and chords
- ❑ Use properties of tangents to solve problems

Circles

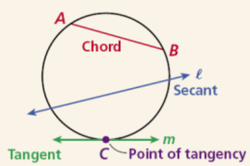
REMEMBER: A circle is the set of all points in a plane that are equidistant from a given point, called the center of the circle.

A circle with center *C* is called circle *C*, or ⊙*C*.

The **interior of a circle** is the set of all points inside the circle. The **exterior of a circle** is the set of all points outside the circle.

Lines & Segments

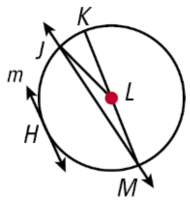
Lines and Segments That Intersect Circles

TERM	DIAGRAM
A **chord** is a segment whose endpoints lie on a circle.	
A **secant** is a line that intersects a circle at two points.	
A **tangent** is a line in the same plane as a circle that intersects it at exactly one point.	
The point where the tangent and a circle intersect is called the **point of tangency**.	

Identifying Lines & Segments

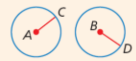
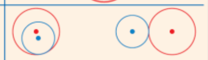
Identify each line or segment that intersects ⊙*L*.

chords:
secant:
tangent:
diameter:
radii:



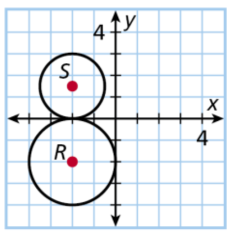
Pairs of Circles

Pairs of Circles

TERM	DIAGRAM
Two circles are **congruent circles** if and only if they have congruent radii.	 ⊙$A \cong$ ⊙B if $\overline{AC} \cong \overline{BD}$. $\overline{AC} \cong \overline{BD}$ if ⊙$A \cong$ ⊙B.
Concentric circles are coplanar circles with the same center.	
Two coplanar circles that intersect at exactly one point are called **tangent circles**.	 Internally tangent circles; Externally tangent circles

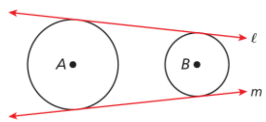
Example

Find the length of each radius. Identify the point of tangency and write the equation of the tangent line at this point.

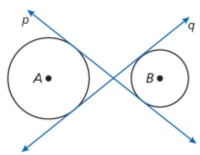


More Lines

A **<u>common tangent</u>** is a line that is tangent to two circles.



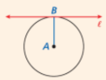
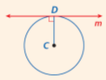
Lines ℓ and m are common external tangents to ⊙A and ⊙B.



Lines p and q are common internal tangents to ⊙A and ⊙B.

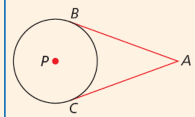
Theorems

Theorems

THEOREM	HYPOTHESIS	CONCLUSION
11-1-1 If a line is tangent to a circle, then it is perpendicular to the radius drawn to the point of tangency. (line tangent to ⊙ → line ⊥ to radius)	 ℓ is tangent to ⊙*A*	$\ell \perp \overline{AB}$
11-1-2 If a line is perpendicular to a radius of a circle at a point on the circle, then the line is tangent to the circle. (line ⊥ to radius → line tangent to ⊙)	 *m* is ⊥ to $\overline{CD}$ at *D*	*m* is tangent to ⊙*C*.

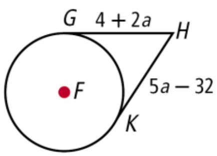
Theorems

Theorem 11-1-3

THEOREM	HYPOTHESIS	CONCLUSION
If two segments are tangent to a circle from the same external point, then the segments are congruent. (2 segs. tangent to ⊙ from same ext. pt. → segs. ≅)	 $\overline{AB}$ and $\overline{AC}$ are tangent to ⊙*P*.	$\overline{AB} \cong \overline{AC}$

Example

$\overline{HK}$ **and** $\overline{HG}$ **are tangent to ⊙*F*. Find *HG*.**



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