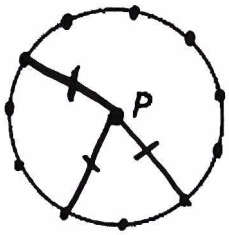
Name: Date: Period: 6

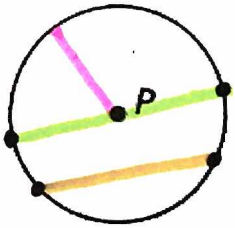
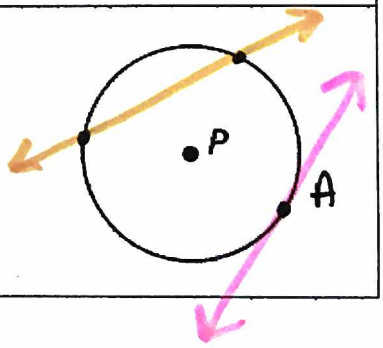
Lines and Segments that Intersect Circles

Lesson Objective SWBAT identify parts of a ⊙; use properties of tangent segments

Circle: A circle is the set of all points in a plane that are equidistant (radius) from a given point called the center of the circle.

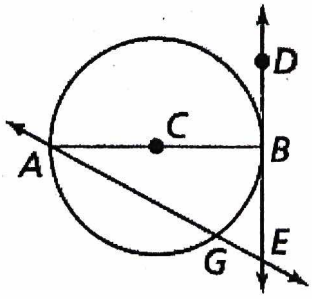


➔ A circle with center P is called "circle P" and can be written as ⊙P

Vocab Term	Definition	Picture
Radius	segment whose endpoints are the center and any point on ⊙	
Chord	segment whose endpoints are on the ⊙	
Diameter	the chord that contains (goes thru) the center of the ⊙	
Secant	a line (or segment) that intersects the ⊙ in 2 points	
Tangent	a line (or segment) in the plane of the ⊙ that intersects the ⊙ at exactly one point.	
Point of Tangency (A)	where the tangent intersects the ⊙	

Example

1. Tell whether the line, ray, or segment is best described as a *radius, chord, diameter, secant,* or *tangent* of ⊙ C



a. $\overline{AC}$ radius

b. $\overline{AB}$ diameter

c. $\overline{DE}$ tangent

d. $\overleftrightarrow{AE}$ secant

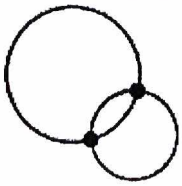
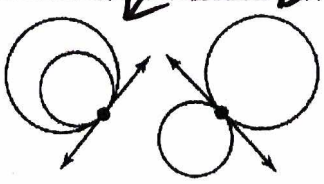
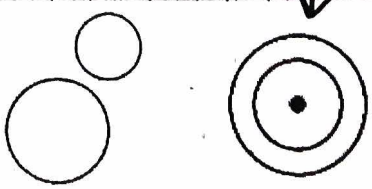
e. $\overline{AG}$ chord

Coplanar Circles and Common Tangents

In a plane, two circles can intersect in two points, one point, or no points.

tangent ⊙s

concentric ⊙s

Two points of intersection	*One point of intersection*	*No points of intersection*
		

Tangent Circles: Coplanar circles that intersect in one point are called tangent circles

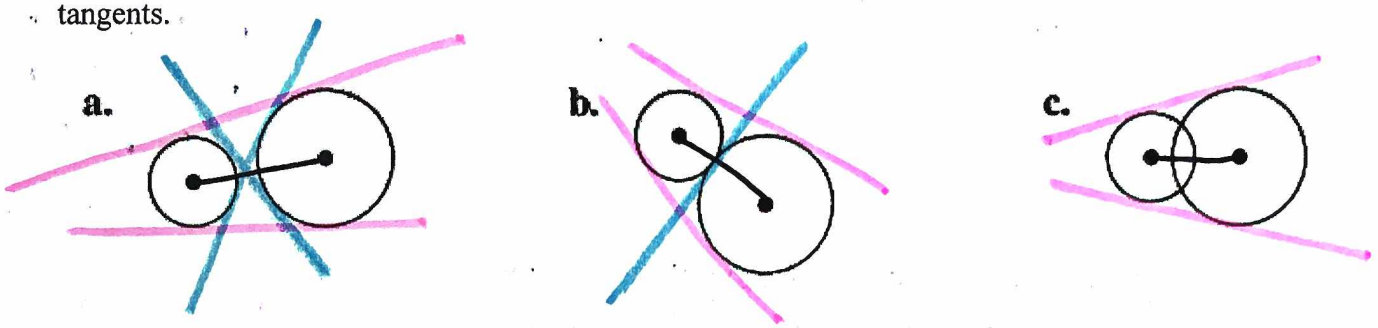
Concentric Circles: Two circles that have a common center are called concentric circles

Common Tangent: A line of segment that is tangent to two coplanar circles is called a common tangent.

- A common internal tangent intersects the segment that joins the centers of two circles
- A common external tangent does not intersect the segment that joins the centers of two circles

Example:

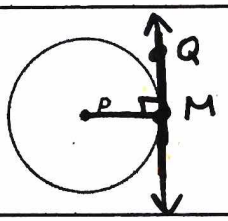
2. Use one color to draw any common external tangents, and a different color to draw any common internal tangents.



Tangent Line to Circle Theorem

In a plane, a line is tangent to a circle if and only if the line is ⊥ to a radius of the circle at its endpoint on the circle.

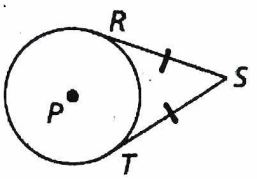
$\overline{QM} \perp \overline{PM}$



External Tangent Congruence Theorem

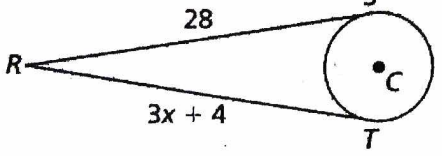
Tangent segments from the same external point are congruent.

$\overline{RS} \cong \overline{TS}$



Example:

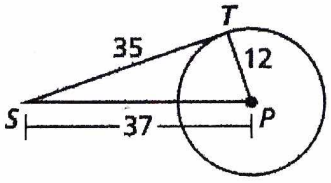
3. $\overline{RS}$ is tangent to ⊙ C at S, and $\overline{RT}$ is tangent to ⊙ C at T. Find the value of x.



$28 = 3x + 4$

$x = 8$

4. Is $\overline{ST}$ tangent to ⊙ P?



$12^2 + 35^2 = 37^2$

$1369 = 1369$

Yes! $\triangle STP$ is a right $\triangle$ w/ rt. $\angle$ @ T

$(a \cdot b)^2 = (a \cdot b)(a \cdot b)$

$= a \cdot a \cdot b \cdot b$

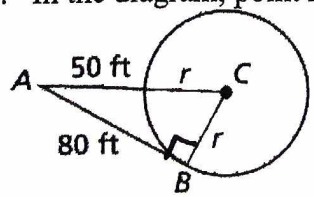
$(a \cdot b)^2 = a^2 \cdot b^2$

$(a+b)^2 = (a+b)(a+b)$

$= a^2 + ab + ab + b^2$

$(a+b)^2 = a^2 + 2ab + b^2$

5. In the diagram, point B is a point of tangency. Find the radius r of ⊙ C.



$r^2 + 80^2 = (50+r)^2$

~~$= 2500 + r^2$~~ $(50+r)(50+r)$

$r^2 + 6400 = 2500 + 100r + r^2 \rightarrow$ $r = 39$