GEOM - §10-1 NOTES

GEOMETRY NOTES

10.1 Tangents to Circles

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

Definitions

Circle - A circle is a set of points in the plane that are equidistant from a specific point called the center

Radius – the distance from the center of the circle to a point on the circle

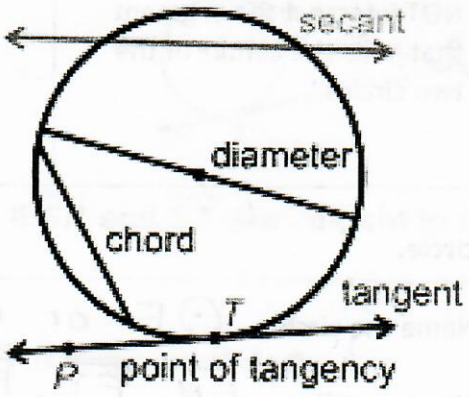
Diameter – the distance across the circle, through the center

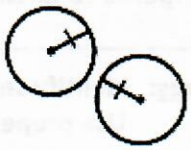
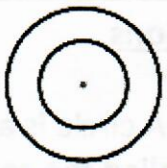
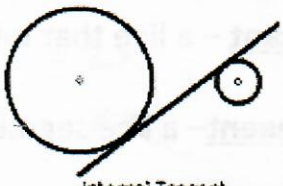
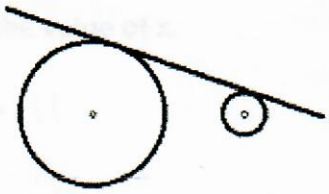
Chord – a line segment whose endpoints are on a circle

Secant – a line that intersects a circle in two points

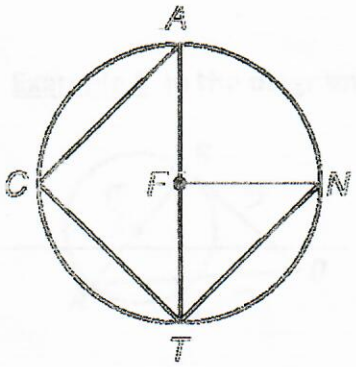
Tangent– a line segment that intersects a circle in exactly one point

Point of Tangency – the point where a tangent line touches the circle



Vocabulary	Definition	Example
Congruent Circles	Two or more circles with the same radius but different centers	 congruent circles
Concentric Circles	Two or more circles that have the same center, but different radii	 concentric circles
Tangent Circles	Two or more circles that intersect at one point	 tangent circles
Common Internal Tangent	A common tangent that intersects the segment that joins the center of the two circles.	 Internal Tangent
Common External Tangent	A common tangent that does NOT intersect the segment that joins the center of the two circles.	 External Tangent

<u>Example 1</u> Identify parts of the circle.



a. Name the circle. ⊙F or circle F

b. Name a radius. $\overline{FN}$, $\overline{FT}$, $\overline{FA}$

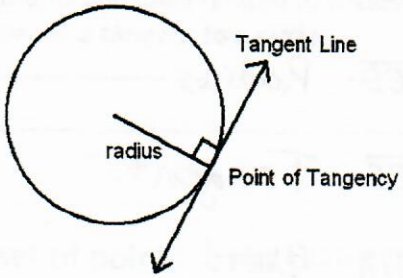
c. Name a chord. $\overline{AC}$, $\overline{AT}$, $\overline{TN}$

d. Name a diameter. $\overline{AT}$

Theorem 10.1

IF a line is tangent to a circle,

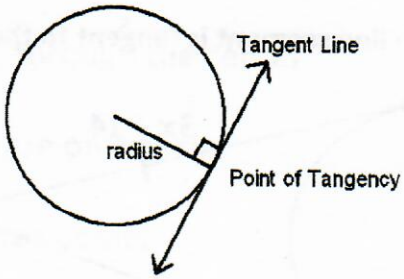
THEN it is perpendicular to the radius drawn to the point of tangency.



Theorem 10.2 (Converse of Thm 10.1)

IF a line is perpendicular to a radius of a circle at its endpoints on the circle,

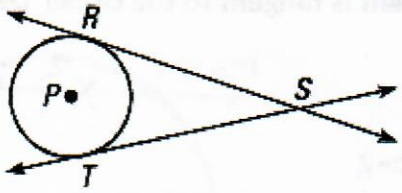
THEN the line is tangent to the circle.



Theorem 10.3

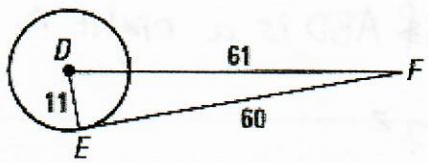
IF two segments from the same exterior point are tangent to a circle,

THEN they are congruent.



If $\overleftrightarrow{SR}$ and $\overleftrightarrow{ST}$ are tangent to $\odot P$, then $\overline{SR} \cong \overline{ST}$.

Example 2 **Determine if $\overline{EF}$ is tangent to circle D.**



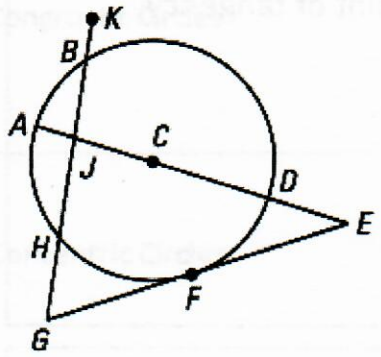
$11^2 + 60^2 \stackrel{?}{=} 61^2$

$121 + 3600 \stackrel{?}{=} 3721$

$3721 = 3721$ ✓

Yes, $\overline{EF}$ is tangent to circle D.

Example 3 Determine whether the line or segment is best described as a chord, a secant, a tangent, a diameter, or a radius of circle C.



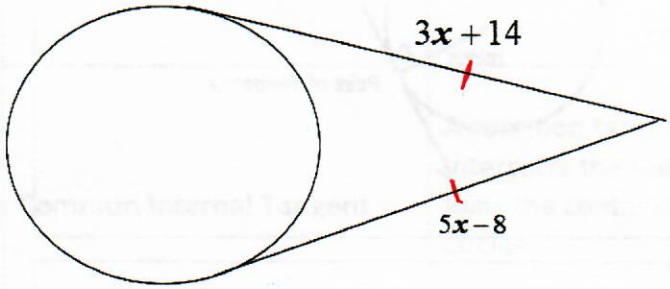
a. $\overline{AD}$ Diameter

b. $\overline{CD}$ Radius

c. $\overleftrightarrow{EG}$ Tangent

d. $\overline{HB}$ Chord

Example 4 Each line segment is tangent to the circle. Determine the value of x.



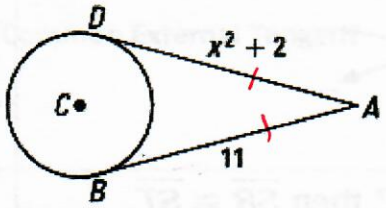
$3x + 14 = 5x - 8$

$14 = 2x - 8$

$22 = 2x$

$11 = x$

Example 5 Each line segment is tangent to the circle. Determine the value of x.

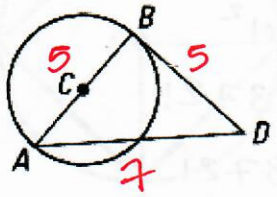


$x^2 + 2 = 11$

$x^2 = 9$

$x = 3$

Example 6 In the diagram AB = BD = 5 and AD = 7. Is $\overleftrightarrow{BD}$ tangent to circle C? Explain.



It is tangent if ABD is a right △.

$5^2 + 5^2 \neq 7^2$

$25 + 25 \neq 49$

$50 \neq 49$

BD is NOT tangent