

# Chapter 10: Circles

## Parts of a Circle

Mar 21-8:28 PM

### Definitions

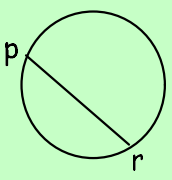
**CIRCLE:** the set of all points in a plane that are equidistant from a given point, called the center. *same distance*

\*Two circles are congruent if they have the same radius. *Radius : Distance from center to any point on the circle*

\***DIAMETER** distance across the circle through the center = 2 radius

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A **CHORD** is a segment whose endpoints are points on the circle. (ex:  $\overline{pr}$ )



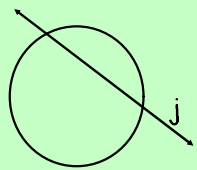
may or may not pass through center...

A radius is not a chord

A diameter is a chord

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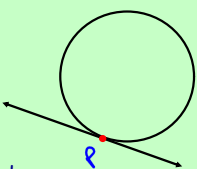
A **SECANT** is a line that intersects a circle at two points. ex: line j



may or may not pass through center...

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A **TANGENT** is a line that intersects the circle in exactly one point



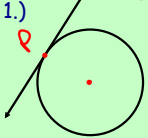
P if called the point of tangency

they touch at P

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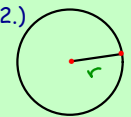
Tell whether the line or segment is best described as a chord, secant, tangent, diameter, or radius.

1.)



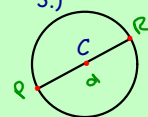
P is the point of tangency

2.)



r is the radius

3.)



C is the center of the circle  
d is the diameter  
PR is the diameter

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

a.  $\overline{AC}$  radius      b.  $\overline{AB}$  diameter

c.  $\overleftrightarrow{DE}$  Tangent line      d.  $\overline{AE}$  secant

e.  $\overline{AG}$  chord      f.  $\overline{CB}$  radius

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Tell whether the segment is best described as a *chord*, a *secant*, a *tangent*, a *diameter*, or a *radius*.

a.  $\overline{AH}$  tangent line      b.  $\overline{EI}$  diameter

c.  $\overline{DF}$  chord      d.  $\overline{CE}$  radius

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Identify a radius, diameter, chord, secant, and tangent.

Sample answers:

Radius : WY, YK, YV,

Diameter : VX

Tangent : W

Secant : VW, WX

Chord : VW, VX, WX

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In a plane, two circles can intersect in two, one, or no points. Coplanar circles that intersect in one point are called **tangent circles**. Coplanar circles that have a common center are called **concentric circles**.

2 points of intersection

1 point of intersection (tangent circles)

no points of intersection

concentric circles

Feb 1-7:57 AM

Tangent Line to Circle Theorem

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.

Line  $m$  is tangent to  $\odot Q$  if and only if  $m \perp \overline{QP}$ .

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Triangle QPR is a Right Triangle.

$a^2 + b^2 = c^2$

Line  $m$  is tangent to  $\odot Q$  if and only if  $m \perp \overline{QP}$ .

We can use Pythagorean Theorem to solve for side lengths in the triangle.

\*Remember  $c$  is the side length across from the right angle

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Our work ...

$$4^2 + x^2 = 5^2$$

$$16 + x^2 = 25$$

$$x^2 = 9 \text{ square root}$$

$$x = 3$$

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Find the Length of the Radius of each circle.

1.

$$r^2 + 12^2 = 13^2$$

$$r^2 + 144 = 169$$

$$r^2 = 25$$

$$r = 5$$

2.

$$r^2 + r^2 = 18^2$$

$$2r^2 = 324$$

$$r^2 = 162$$

$$r = 12.73$$

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3.

WOW!!

$$r^2 + 8^2 = (r + 4)^2$$

$$r^2 + 64 = (r + 4)(r + 4)$$

Combine like terms  $r^2 + 64 = r^2 + 8r + 16$

$$48 = 8r$$

$$r = 6$$

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Homework

Pg. 534, #5-10, 19,20,  
23,24,30

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