

## Warm Up

1. A right triangle has legs with lengths 5 inches and 12 inches. Find the length of the hypotenuse.

$$\begin{aligned}
 5^2 + 12^2 &= x^2 \\
 25 + 144 &= x^2 \\
 169 &= x^2 \\
 x &= 13 \text{ in.}
 \end{aligned}$$

2. Solve:  $6x + 15 = 33$

$$\begin{aligned}
 6x &= 18 \\
 x &= 3
 \end{aligned}$$

3. Solve:  $(x + 18)^2 = x^2 + 576$

$$\begin{aligned}
 (x + 18)^2 &= x^2 + 576 \\
 x^2 + 36x + 324 &= x^2 + 576 \\
 36x &= 252 \\
 x &= 7
 \end{aligned}$$

## 10.1 Properties of Tangents

Circle -

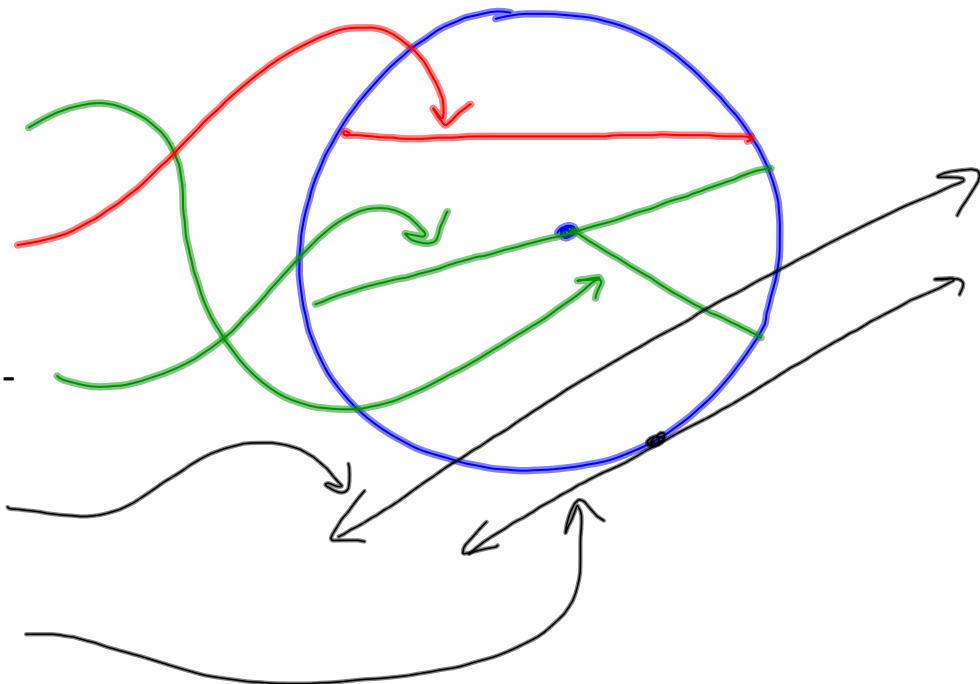
Radius -

Chord -

Diameter -

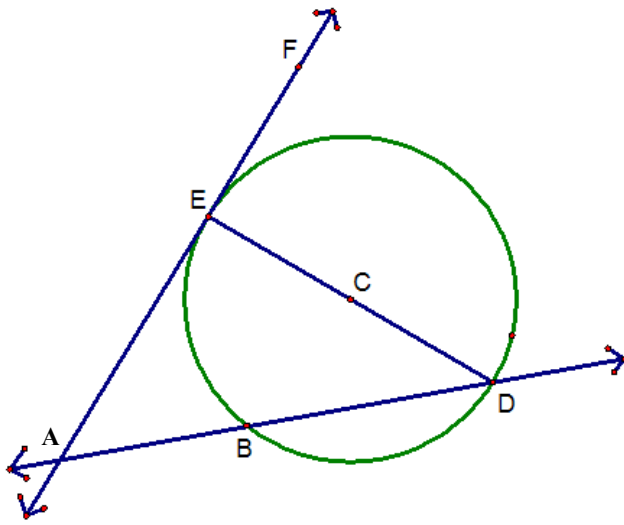
Secant -

Tangent -



## Example 1:

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

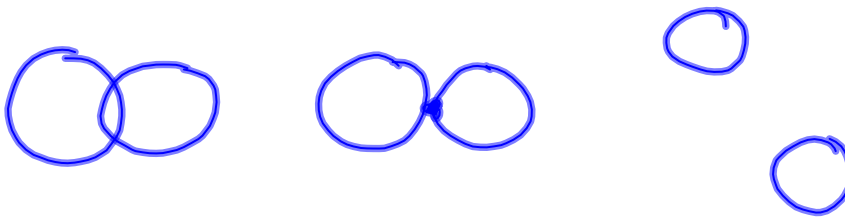


- a.  $\overline{DC}$  radius
- b.  $\overline{BD}$  chord
- c.  $\overline{DE}$  diameter
- d.  $\overleftrightarrow{AE}$  tangent

## Coplanar Circles

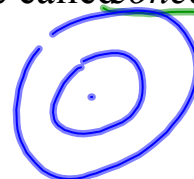
Two circles can intersect in:

two points, one point, or no points.

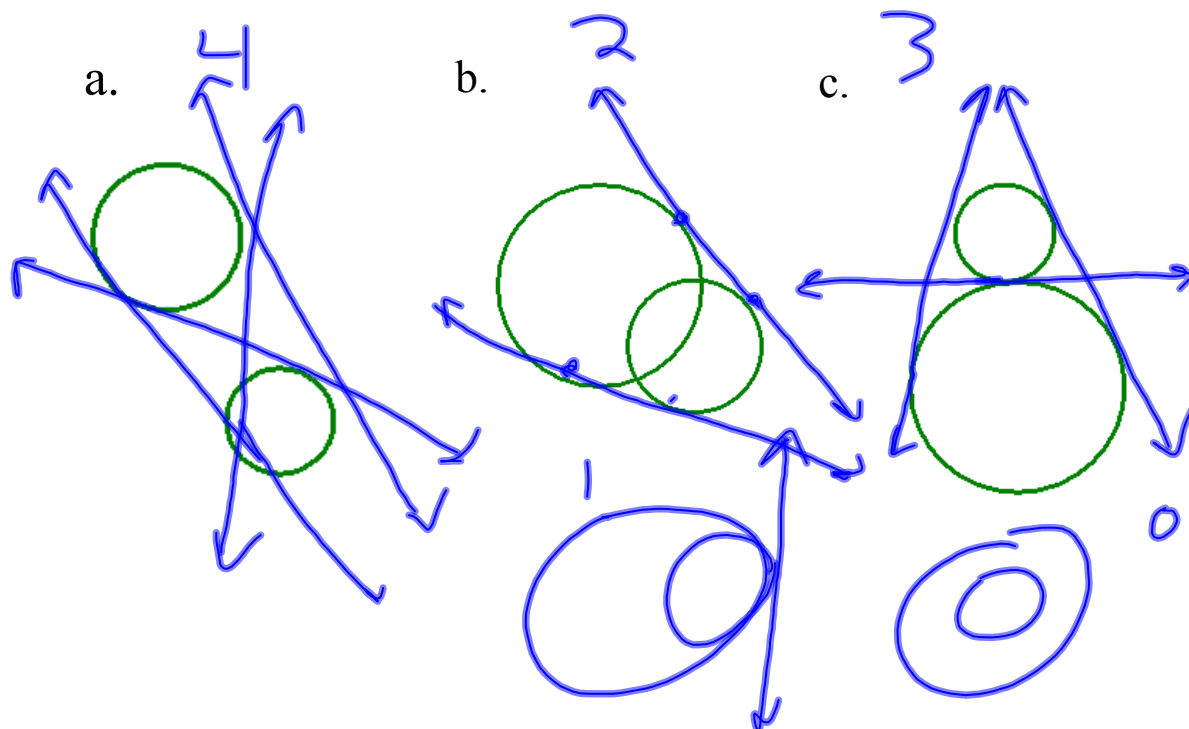


Coplanar circles that intersect in one point are called tangent circles.

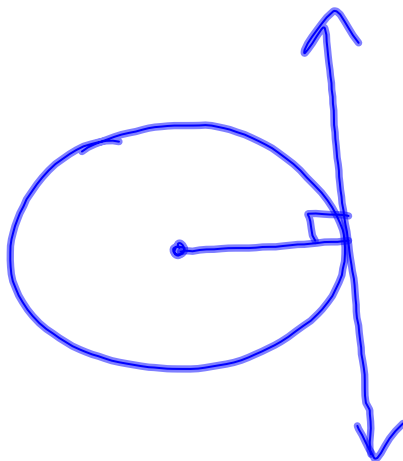
Coplanar circles that have a common center are called concentric.



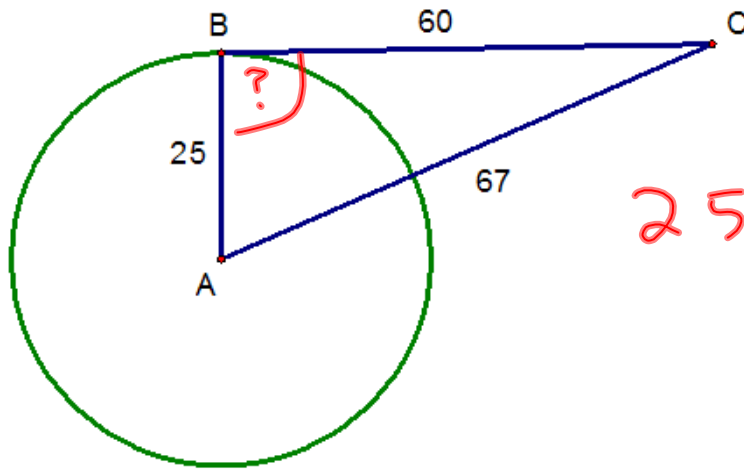
Example 2: How many common tangents do the circles have?



Theorem 10.1



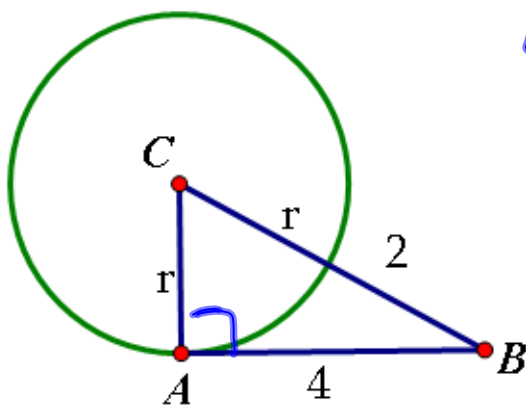
Example 3: In the diagram  $\overline{AB}$  is a radius of  $\odot A$ . Is  $\overline{BC}$  tangent to  $\odot A$ ?



$$25^2 + 60^2 \stackrel{?}{\neq} 67^2$$

NO

Example 4: Segment AB is tangent to the circle. Find the value of  $r$ .



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

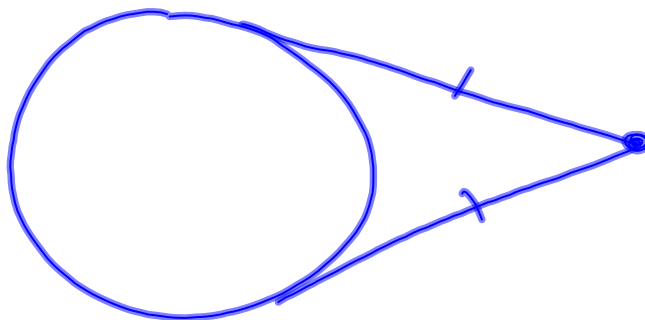
$$16 + \cancel{r^2} = \cancel{r^2} + 4r + 4$$

$$16 = 4r + 4$$

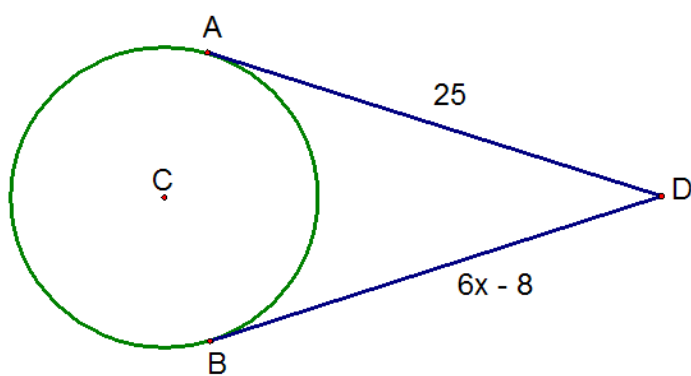
$$12 = 4r$$

$$3 = r$$

## Theorem 10.2

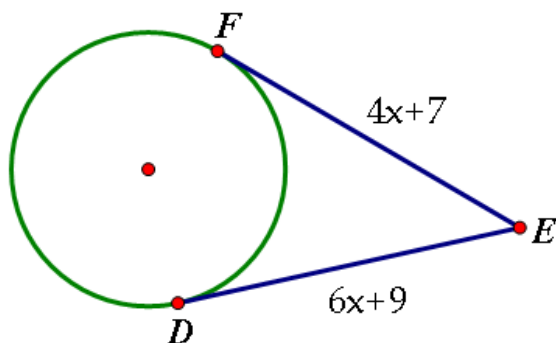


Example 5: In  $\odot C$ ,  $\overline{DA}$  is tangent at A and  $\overline{DB}$  is tangent to  $\odot C$  at B. Find x.



$$\begin{aligned} 6x - 8 &= 25 \\ 6x &= 33 \\ x &= 5.5 \end{aligned}$$

Example 6: Find the value of the variable if both F and D are tangent to the circle.



$$\begin{aligned}4x+7 &= 6x+9 \\4x &= 6x+2 \\-2x &= 2 \\x &= -1\end{aligned}$$