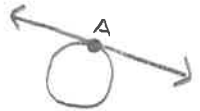


Recall the definition of **Tangent**:

a line that intersects a circle at exactly one point that point is called the point of tangency

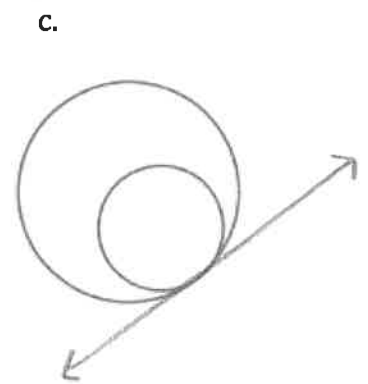
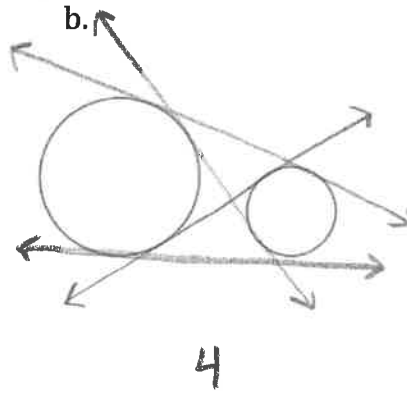
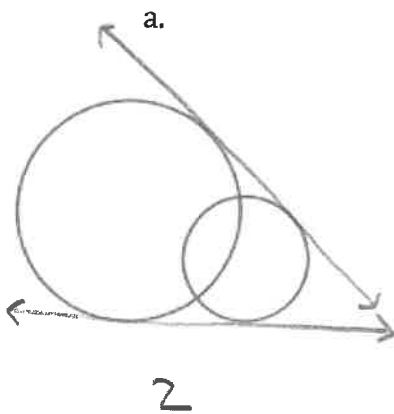


**Common Tangent:**

a line, ray, or segment that is tangent to two circles in the same plane



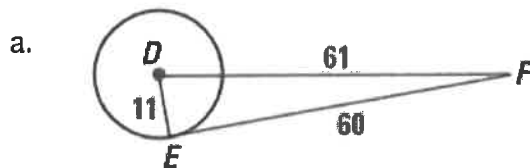
1. Determine how many common tangents the circles below could contain:



<p>Theorem 10.10</p>	<p>In a plane, a line is tangent to a circle and only if it is perpendicular to a radius drawn to the point of tangency.</p>	
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2. Verify if the segment is tangent to the circle.

★ check pythagorean Thm

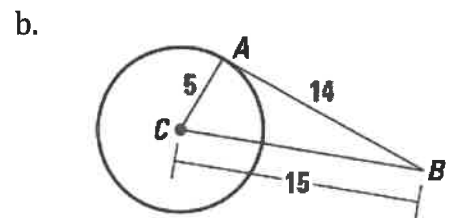


$$11^2 + 60^2 \stackrel{?}{=} 61^2$$

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

$$3721 = 3721$$

Right  $\Delta$   
 $\overline{EF}$  is tangent to  $\odot D$



$$5^2 + 14^2 \stackrel{?}{=} 15^2$$

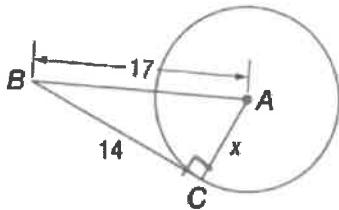
$$25 + 196 \stackrel{?}{=} 225$$

$$221 \neq 225$$

$\overline{AB}$  is not tangent to  $\odot C$

3. Find the value of  $x$ . Assume the segments that appear to be tangent are tangent.

a.



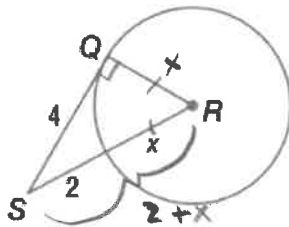
$$x^2 + 14^2 = 17^2$$

$$x^2 + 196 = 289$$

$$x^2 = 93$$

$$x = \sqrt{93}$$

b.



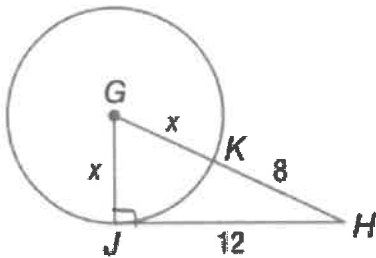
$$4^2 + x^2 = (2+x)^2$$

$$16 + x^2 = 4 + 2x + x^2$$

$$12 = 2x$$

$$6 = x$$

4.  $\overline{JH}$  is a tangent to  $\odot G$  at  $J$ . Find the value of  $x$ .



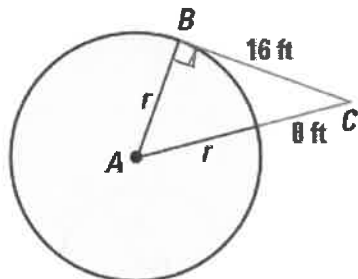
$$x^2 + 12^2 = (x+8)^2$$

$$x^2 + 144 = x^2 + 16x + 64$$

$$80 = 16x$$

$$5 = x$$

5. You are standing at  $C$ , 8 feet from a grain silo. The distance from you to a point of tangency on the tank is 16 feet. What is the radius of the silo?

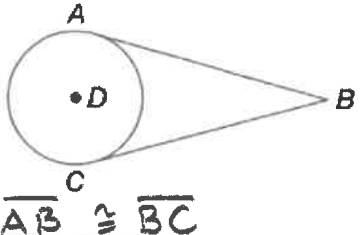


$$16^2 + r^2 = (r+8)^2$$

$$256 + r^2 = r^2 + 16r + 64$$

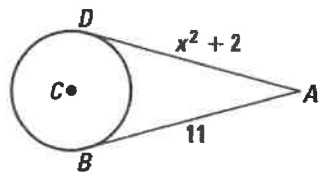
$$192 = 16r$$

$$12 = r$$

<p>Theorem 10.11</p>	<p>If two segments from the same exterior point are tangent to a circle, then they are congruent.</p>	
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6. Find the value of  $x$  below applying Theorem 10.3:

a.

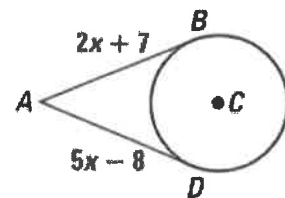


$$x^2 + 2 = 11$$

$$x^2 = 9$$

$$x = \pm 3$$

b.

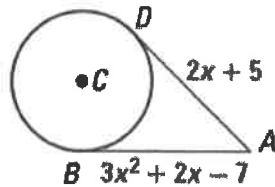


$$2x + 7 = 5x - 8$$

$$15 = 3x$$

$$5 = x$$

c.



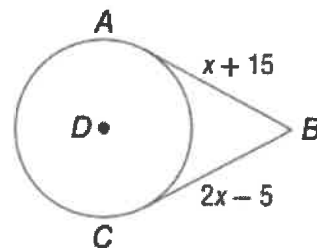
$$2x + 5 = 3x^2 + 2x - 7$$

$$12 = 3x^2$$

$$4 = x^2$$

$$\pm 2 = x$$

d.



$$x + 15 = 2x - 5$$

$$20 = x$$

