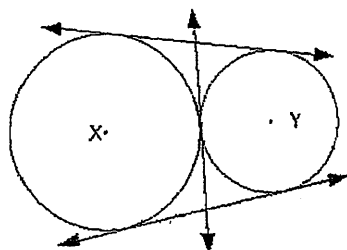
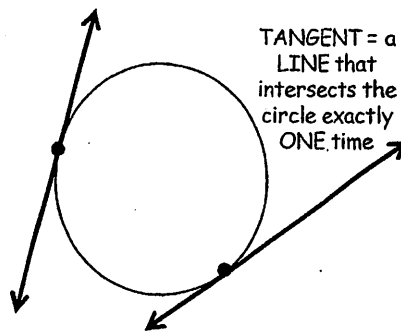


PROPERTIES OF TANGENTS

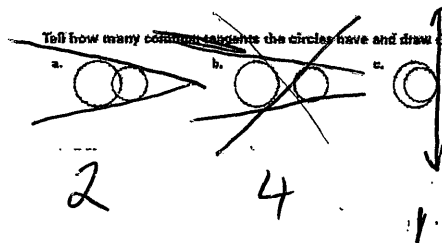


TANGENT = a
LINE that
intersects the
circle exactly
ONE time



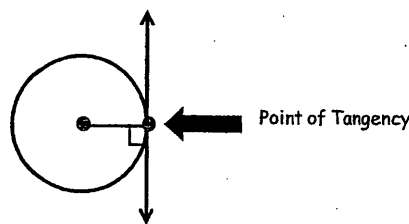
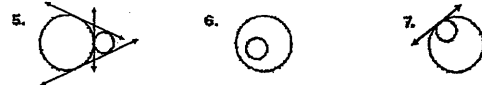
Common Tangents

Tell how many common tangents the circles have and draw them.



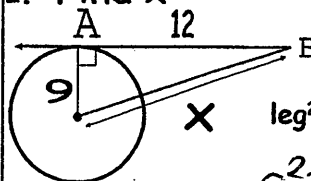
YOUR TURN

Tell how many common tangents the circles have and draw them.



If a line is tangent to a circle, then it is perpendicular to the radius drawn to the point of tangency

1. Find x



$$\text{leg}^2 + \text{leg}^2 = \text{hyp}^2$$

$$9^2 + 12^2 = x^2$$

$$225 = x^2$$

$$x = 15$$

2. Find RQ

$X^2 + 12^2 = 20^2$

$X^2 = 256$

$X = 16$

YOUR TURN!!!

Find PT

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

$48^2 + r^2 = (36 + r)^2$

$48^2 + r^2 = 1296 + 36r + 36r + r^2$

$48^2 = 1296 + 72r$

$1008 = 72r$

$14 = r$

$RS \cong TS$

If two segments from the same exterior point are tangent to a circle, then they are congruent.

Party hat problems!

3. Find x

$x^2 + 2 = 11$

$x^2 = 9$

$x = 3$

$x =$

4. Find x

$2x - 13 = 47$

$x =$

YOUR TURN

Find x

$x =$

$2x = 60$

$x = 30$

$\frac{1}{2}x - 5 = 9$

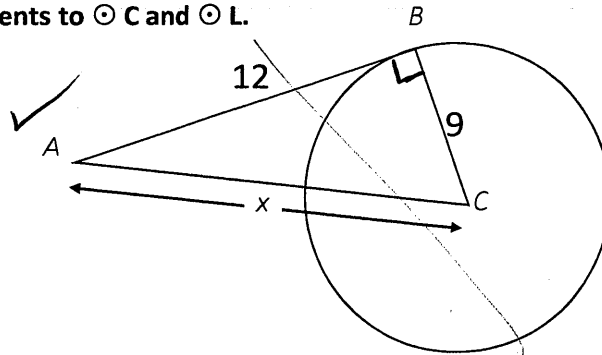
~~$2x = 14$~~

~~$\frac{1}{2}x = 14 - 2$~~

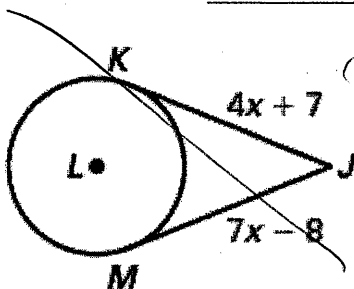
$x = 28$

Examples: Segments AB, JK, and JM are tangents to $\odot C$ and $\odot L$.

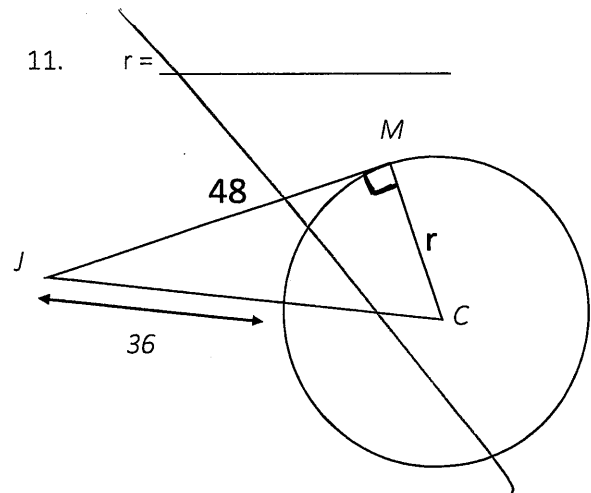
9. $x =$ _____



10. $x =$ _____

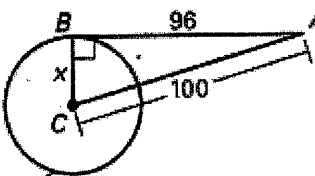


11. $r =$ _____

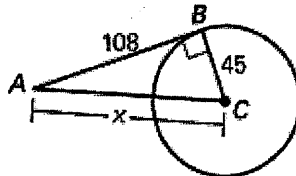


In Exercises 12-17, \overline{BC} is a radius of $\odot C$ and \overline{AB} is tangent to $\odot C$. Find the value of x .

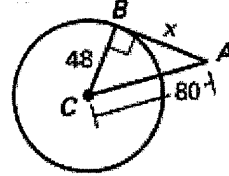
12. _____



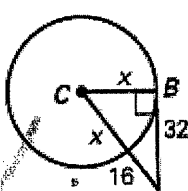
13. _____



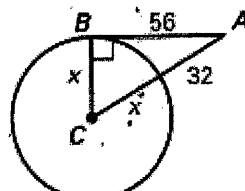
14. _____



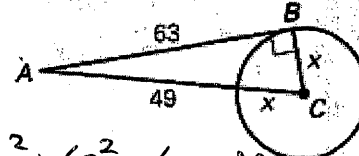
15. _____



16. _____



17. _____



$$\begin{aligned} x^2 + 32^2 &= (x+16)^2 \\ x^2 + 32^2 &= (x+16)(x+16) \\ x^2 + 32^2 &= x^2 + 16x + 16x + 16^2 \\ 32^2 &= 32x + 16^2 \\ -16^2 & \quad -16^2 \\ \hline 24 &= x \end{aligned}$$

$$\begin{aligned} 56^2 + x^2 &= (x+32)^2 \\ 56^2 + x^2 &= (x+32)(x+32) \\ 56^2 + x^2 &= x^2 + 32x + 32x + 32^2 \\ 56^2 &= 64x + 32^2 \\ 56^2 - 32^2 &= 64x \\ 2112 &= 64x \\ \hline x &= 33 \end{aligned}$$

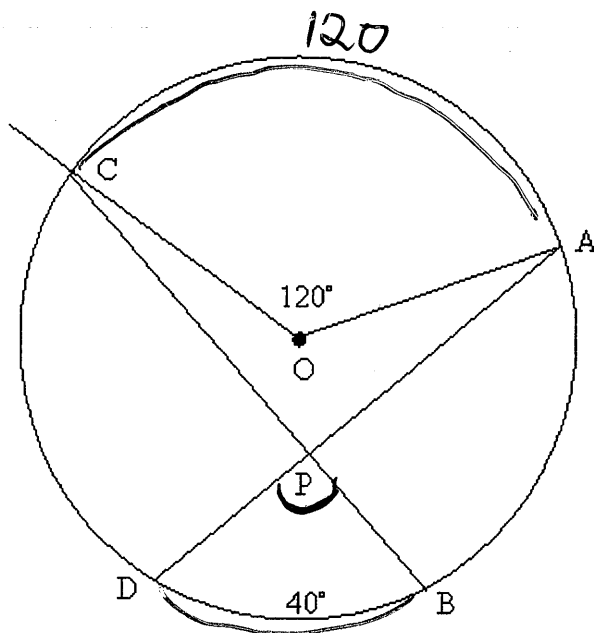
$$\begin{aligned} x^2 + 63^2 &= (x+49)^2 \\ x^2 + 63^2 &= (x+49)(x+49) \\ x^2 + 63^2 &= x^2 + 49x + 49x + 49^2 \\ 63^2 &= 98x + 49^2 \\ 1568 &= 98x \\ \hline 16 &= x \end{aligned}$$

Review Problems for Angles and Circles: Central, Inscribed, Tangent, Secant

18. Find the following:

a) $m\widehat{AC} = 120^\circ$

b) $m\angle BPD = \frac{1}{2}(40 + 120)$
 80°

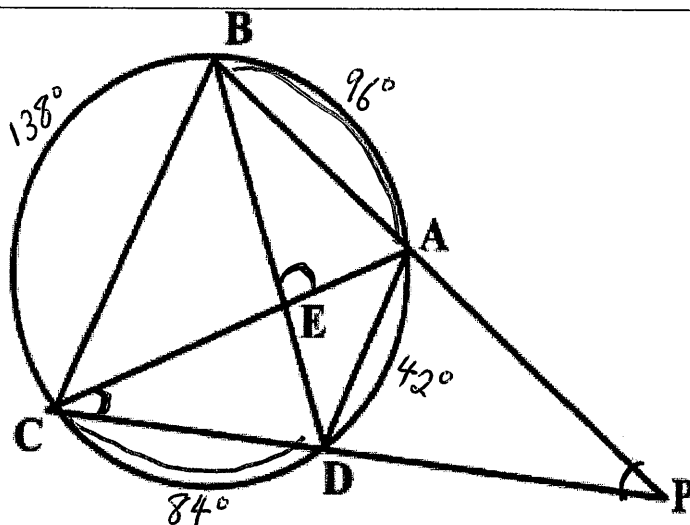


19. Find the following:

a) $m\angle BPC = \frac{1}{2}(138 - 42) = \frac{1}{2}(96)$
 48°

b) $m\angle BEA = \frac{1}{2}(96 + 84)$
 90°

c) $m\angle ACD = \frac{1}{2}(42) = 21^\circ$



20. Find the following:

a) $X = 80^\circ$

b) $Y = 40^\circ$

c) $W =$

$$2 \cdot 70 = \frac{1}{2}(W + 120) \cdot 2$$

$$140 = W + 120$$

$$\begin{array}{r} 140 \\ -120 \\ \hline 20 \end{array} = \begin{array}{r} W \\ -120 \\ \hline \end{array}$$

$$20^\circ = W$$

