

Name: \_\_\_\_\_

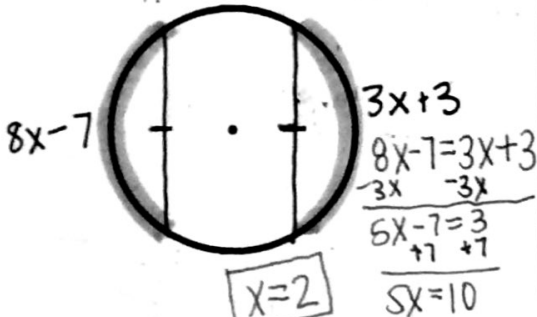
Date: \_\_\_\_\_



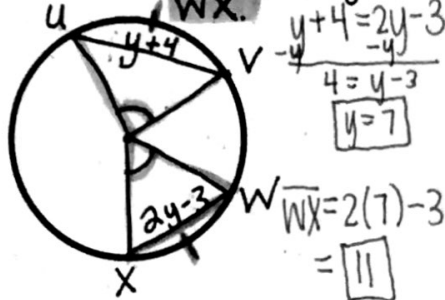
### Segments

If two chords are **congruent**, then their **corresponding arcs** are **congruent**.

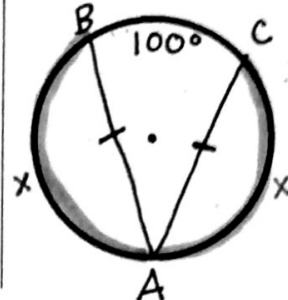
1. Solve for x.



2. Find the length of  $\overline{WX}$ .



3. Find  $m\widehat{AB}$

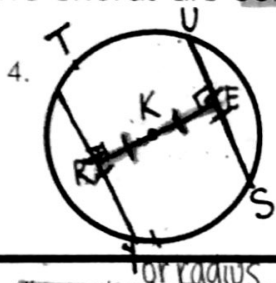


$$2x + 100 = 360$$

$$2x = 260$$

$$x = 130^\circ$$

If two chords are **congruent**, then they are **equidistant** from the **center**.



K is the midpoint of  $\overline{RE}$

$$\overline{Ty} = -3x + 56$$

$$\overline{US} = 4x$$

Find the length of  $\overline{TY}$

$$-3x + 56 = 4x$$

$$7x = 56$$

$$x = 8$$

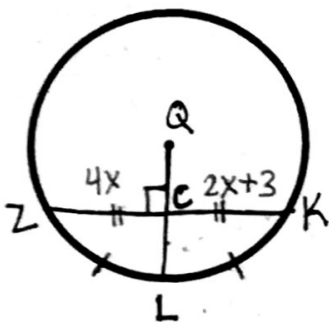
$$\overline{Ty} = -3(8) + 56$$

$$= 32$$

$$\overline{US} = 4(8) = 32$$

If a **diameter** is **perpendicular** to a **chord**, then it also **bisects** the **chord**. This results in **congruent arcs** too. Sometimes, this creates a **right triangle** & you'll use **Pythagorean Theorem**.

5.



$$\widehat{KL} \cong \widehat{LZ}$$

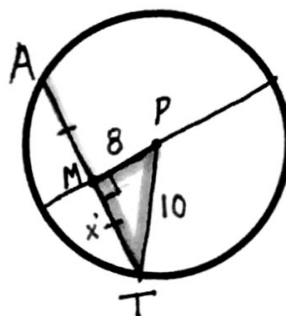
$$\overline{CK} = 2x + 3 \text{ find } x$$

$$\overline{CZ} = 4x$$

$$2x + 3 = 4x$$

$$\frac{3}{2} = \frac{2x}{2} \quad x = 1.5$$

6.



$$\overline{PM} \perp \overline{AT}$$

$$\overline{PT} = 10 \text{ Find } \overline{AT}$$

$$\overline{Pm} = 8$$

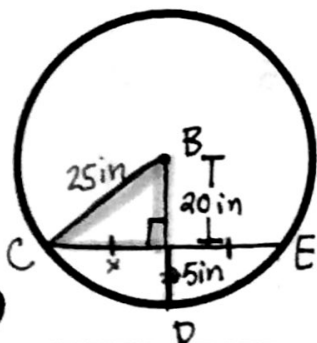
$$8^2 + x^2 = 10^2$$

$$64 + x^2 = 100$$

$$x^2 = 36$$

$$x = 6 \times 2 = \overline{AT} = 12$$

7.



Find  $\overline{CE}$ .

$$\overline{BD} \text{ is a radius. } = 25 \text{ in}$$

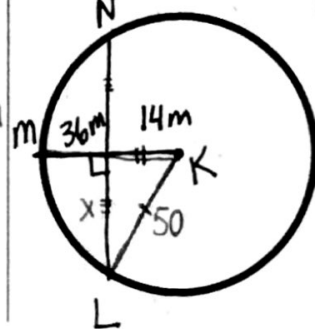
$$\overline{BC} \text{ is ALSO a radius } = 25 \text{ in}$$

$$x^2 + 20^2 = 25^2$$

$$x = 15$$

$$\overline{CE} = 30$$

8.



Find  $\overline{LN}$

$$x^2 + 14^2 = 50^2$$

$$x = 48$$

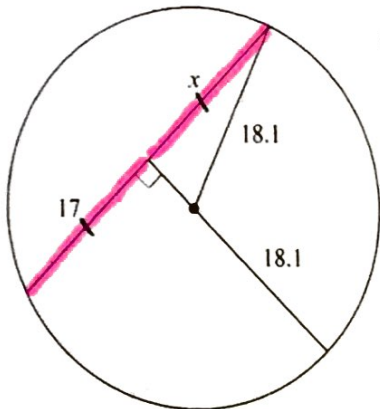
$$\overline{LN} = 96$$

\* Don't forget, a **radius** is the same length no matter where it's drawn. Sometimes **you** may need to draw it (Pythagorean Thm)

5.1 - Practice

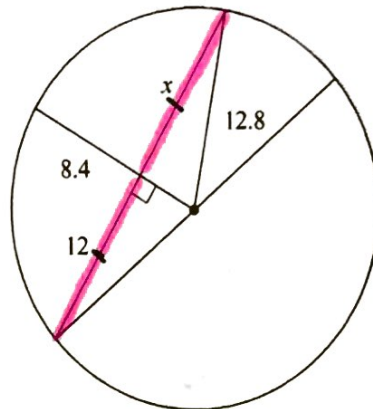
Find the length of the segment indicated. Round your answer to the nearest tenth if necessary.

1)



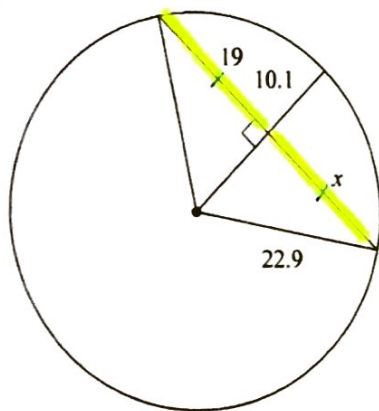
$x = 17$

2)



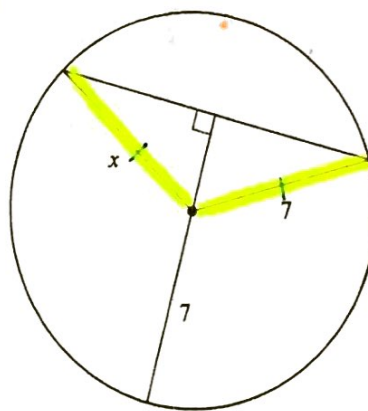
$x = 12$

3)



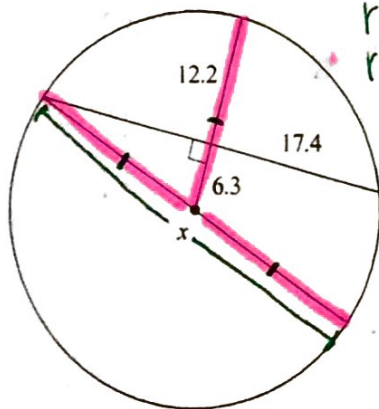
$x = 19$

4)



$x = 7$

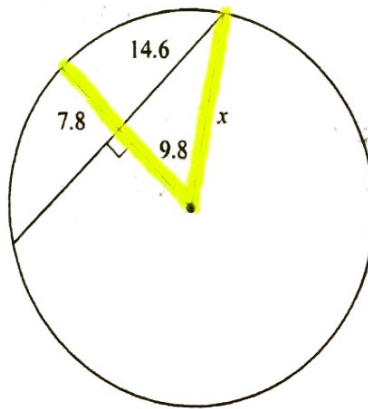
5)



$r = 12.2 + 6.3$   
 $r = 18.5$

$x = 37$

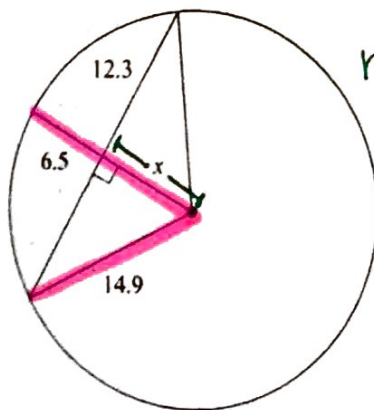
6)



$r = 7.8 + 9.8 = 17.6$

$x = 17.6$

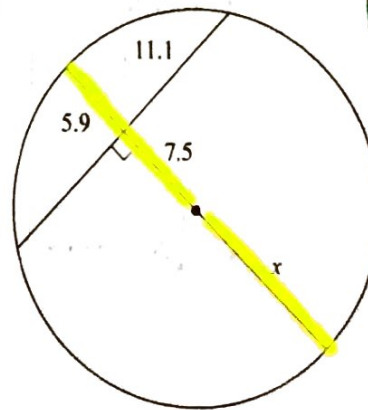
7)



$r = 14.9$   
 $x = 14.9 - 6.5$

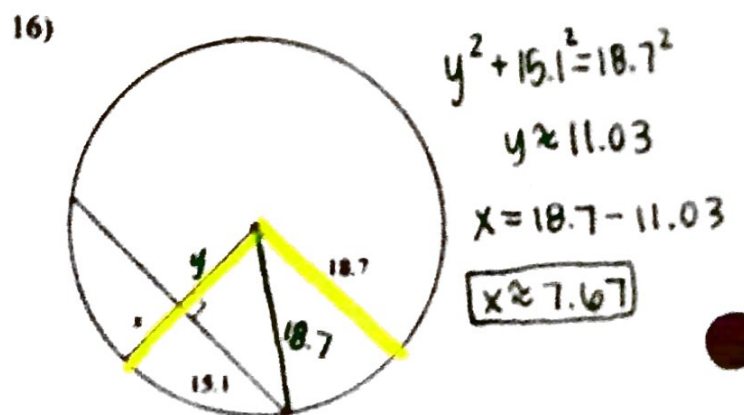
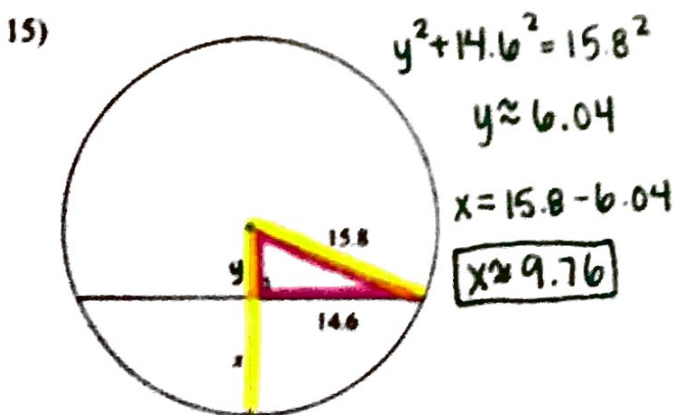
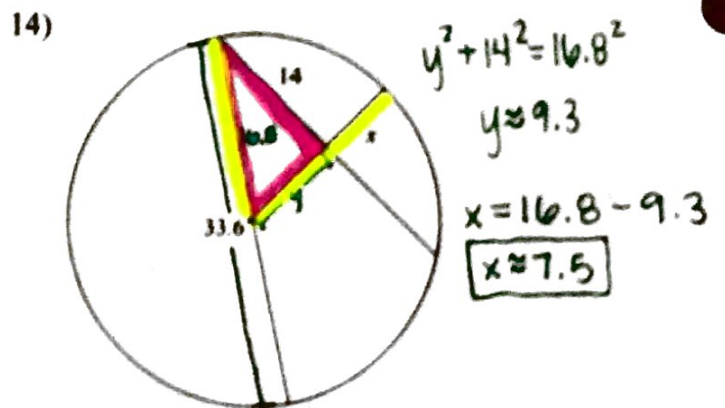
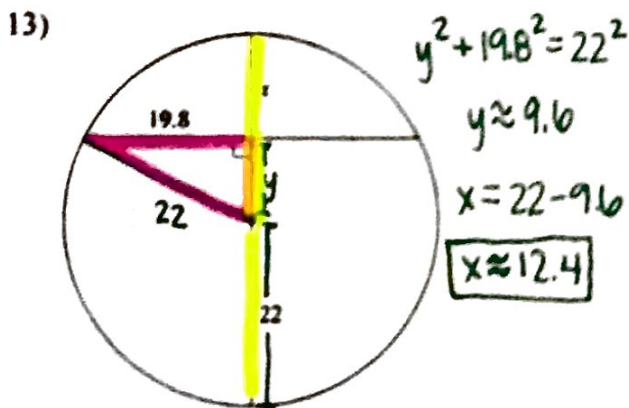
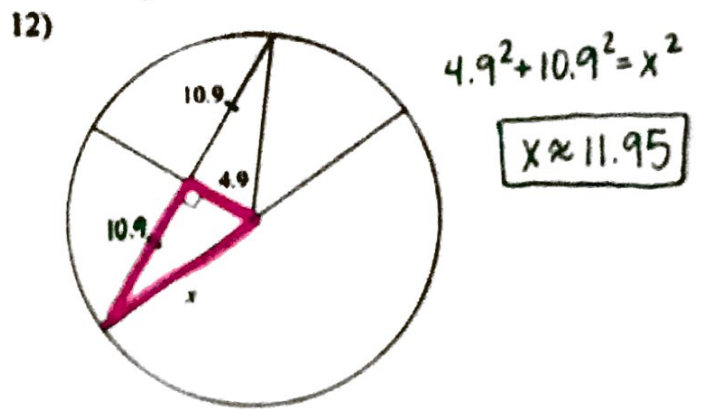
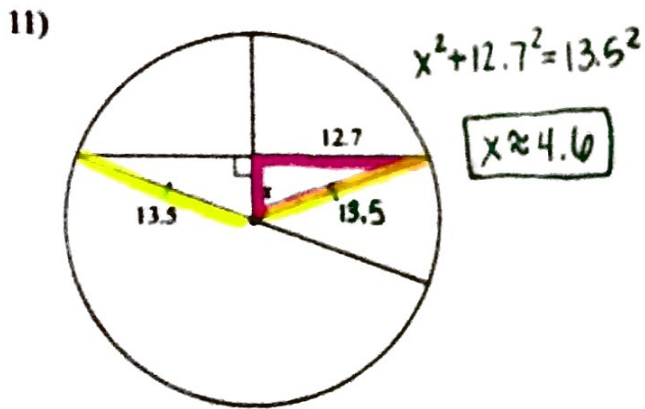
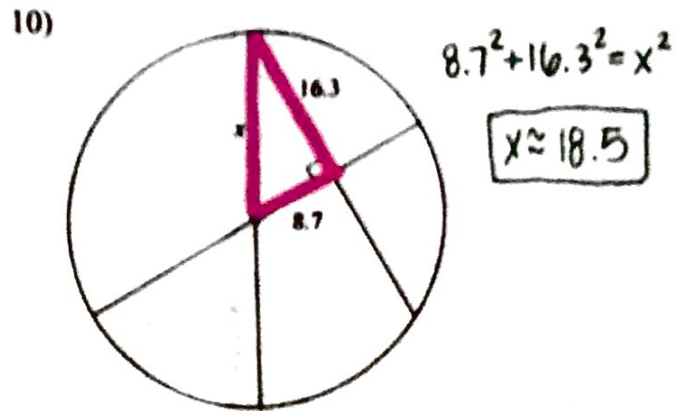
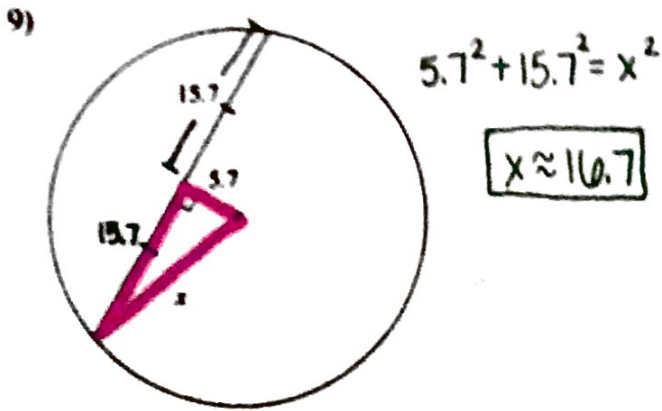
$x = 8.4$


8)



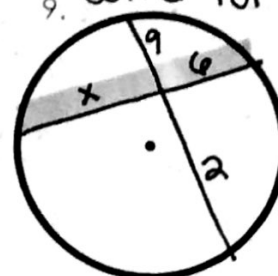
$r = 7.5 + 5.9$   
 $r = 13.4$

$x = 13.4$



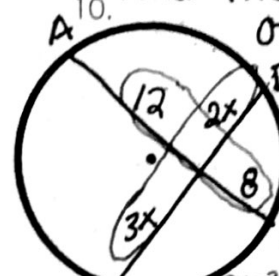
<p>two chords intersect INSIDE the circle</p>	<p>part · part = part · part</p>	
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9. Solve for x.



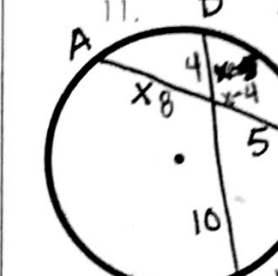
$6x = 9 \cdot 2$   
 $6x = 18$   
 $\frac{6x}{6} = \frac{18}{6}$   
 $x = 3$

10. Find the length of DB.

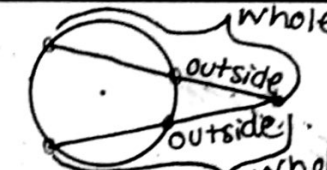


$3x \cdot 2x = 12 \cdot 8$   
 $6x^2 = 96$   
 $\frac{6x^2}{6} = \frac{96}{6}$   
 $x^2 = 16$   
 $x = 4$   
 $DB = 2x + 3x = 5x = 5(4) = 20$

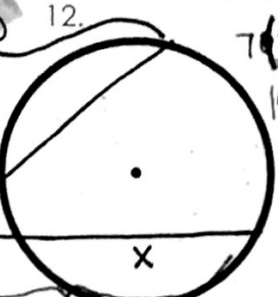
11. Find both chord lengths.



$5x = 10(x-4)$   
 $5x = 10x - 40$   
 $-5x = -40$   
 $x = 8$   
 $AC = 13$   
 $PB = 14$

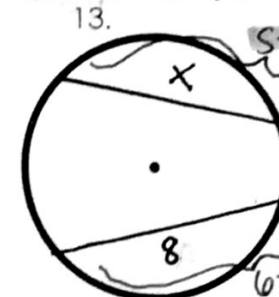
<p>two secants intersect OUTSIDE the circle</p>	<p>outside(whole) = outside(whole) *sometimes you have to add to get the whole</p>	
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12. Solve for x.



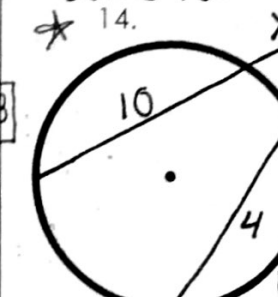
$7(20) = 4(4+x)$   
 $140 = 16 + 4x$   
 $124 = 4x$   
 $x = 31$

13. Solve for x.

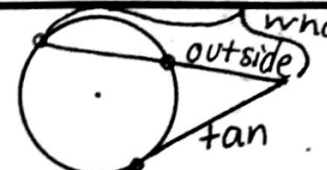


$5(x+5) = 6(14)$   
 $5x+25 = 84$   
 $5x = 59$   
 $x = 11.8$   
 $6+8 = 14$

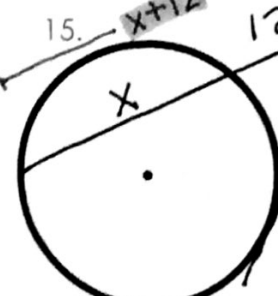
14. Solve for x.



$x(x+10) = 8(12)$   
 $x^2 + 10x = 96$   
 $x^2 + 10x - 96 = 0$   
 $(x-6)(x+16) = 0$   
 $x = 6$  (Note:  $x = -16$  is crossed out)

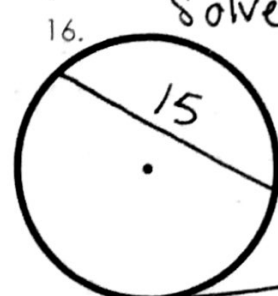
<p>one secant &amp; one tangent intersect OUTSIDE the circle</p>	<p>outside(whole) = tan<sup>2</sup></p>	
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15. Solve for x.



$12(x+12) = 24^2$   
 $12x + 144 = 576$   
 $\frac{12x}{12} = \frac{432}{12}$   
 $x = 36$

16. Solve for x.

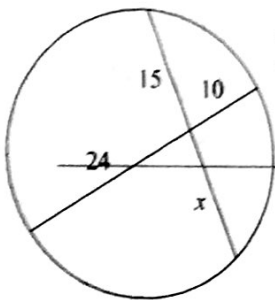


$5(20) = x^2$   
 $100 = x^2$   
 $x = 10$

Chord Segment Lengths

Solve for  $x$ . Assume that lines which appear tangent are tangent.

1)

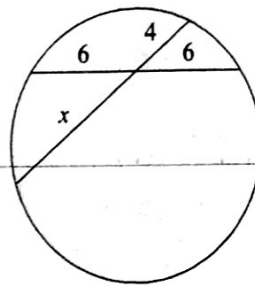


$$24 \cdot 10 = 15 \cdot x$$

$$240 = 15x$$

$$x = 16$$

2)

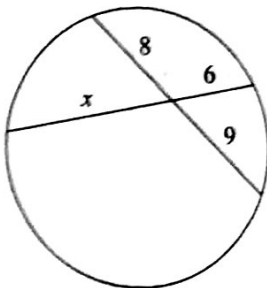


$$6 \cdot 6 = 4 \cdot x$$

$$36 = 4x$$

$$x = 9$$

3)

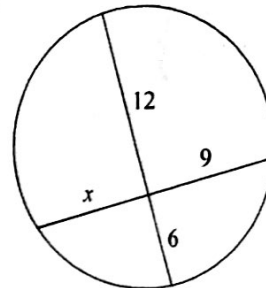


$$8 \cdot 9 = 6x$$

$$72 = 6x$$

$$x = 12$$

4)

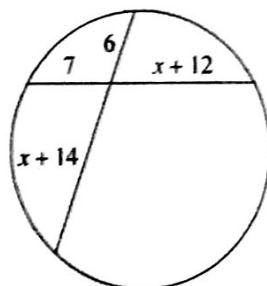


$$12 \cdot 6 = 9 \cdot x$$

$$72 = 9x$$

$$x = 8$$

5)

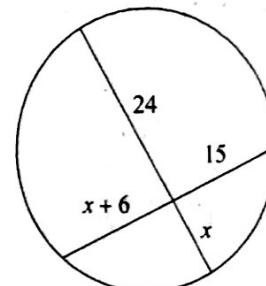


$$7(x+12) = 6(x+14)$$

$$7x+84 = 6x+84$$

$$x = 0$$

6)



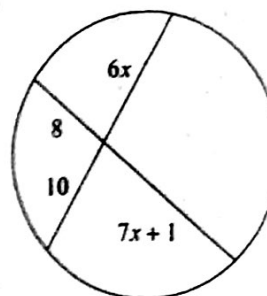
$$15(x+6) = 24x$$

$$15x+90 = 24x$$

$$90 = 9x$$

$$x = 10$$

7)



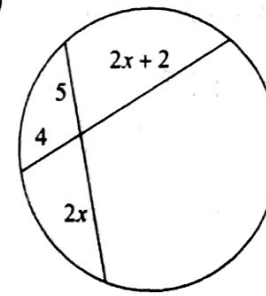
$$6x \cdot 10 = 8(7x+1)$$

$$60x = 56x+8$$

$$4x = 8$$

$$x = 2$$

8)



$$4(2x+2) = 5 \cdot 2x$$

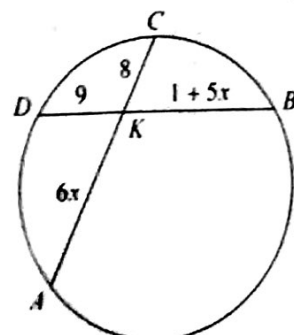
$$8x+8 = 10x$$

$$8 = 2x$$

$$x = 4$$

Find  $x$  and the measure of the line segment indicated.

9) Find  $KA$



$$9(1+5x) = 8 \cdot 6x$$

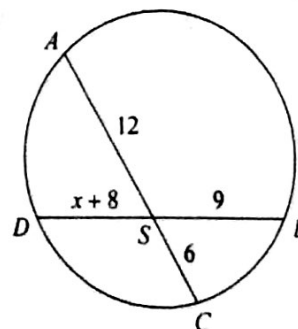
$$9+45x = 48x$$

$$9 = 3x$$

$$x = 3$$

$$KA = 6(3) = 18$$

10) Find  $SD$



$$12 \cdot 6 = 9(x+8)$$

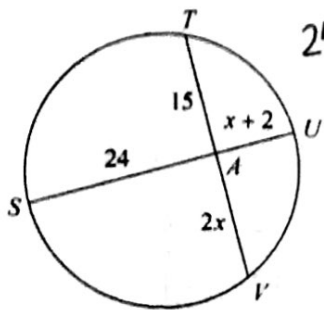
$$72 = 9x+72$$

$$9x = 0$$

$$x = 0$$

$$SD = 0+8 = 8$$

11) Find TV



$$24(x+2) = 2x \cdot 15$$

$$24x + 48 = 30x$$

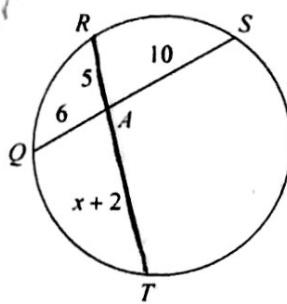
$$48 = 6x$$

$$x = 8$$

$$TV = 2x + 15$$

$$= 2(8) + 15 = 31$$

12) Find RT



$$5(x+2) = 6 \cdot 10$$

$$5x + 10 = 60$$

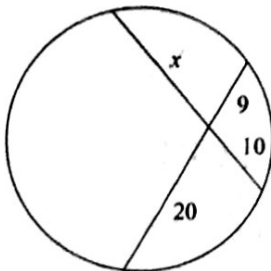
$$5x = 50$$

$$x = 10$$

$$RT = x + 7 = 10 + 7 = 17$$

Solve for x. Assume that lines which appear tangent are tangent.

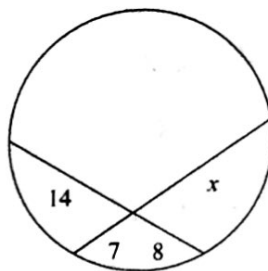
13)



$$10x = 180$$

$$x = 18$$

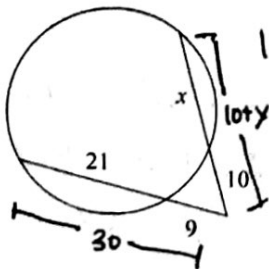
14)



$$7x = 112$$

$$x = 16$$

15)



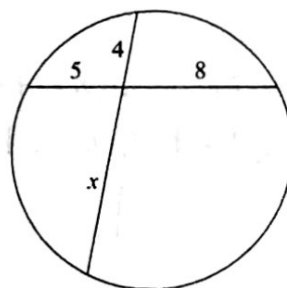
$$10(10+x) = 9(30)$$

$$100 + 10x = 270$$

$$10x = 170$$

$$x = 17$$

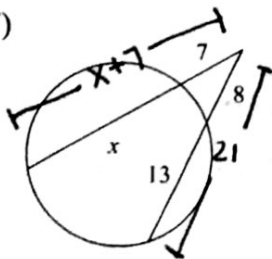
16)



$$4x = 40$$

$$x = 10$$

17)



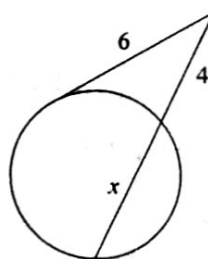
$$7(x+7) = 8(21)$$

$$7x + 49 = 168$$

$$7x = 119$$

$$x = 17$$

18)



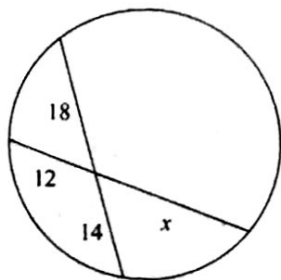
$$4(4+x) = 6^2$$

$$16 + 4x = 36$$

$$4x = 20$$

$$x = 5$$

19)

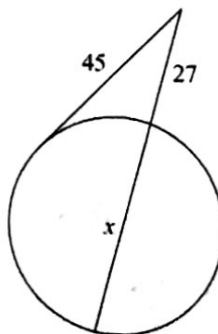


$$18 \cdot 14 = 12x$$

$$252 = 12x$$

$$x = 21$$

20)



$$27(27+x) = 45^2$$

$$729 + 27x = 2025$$

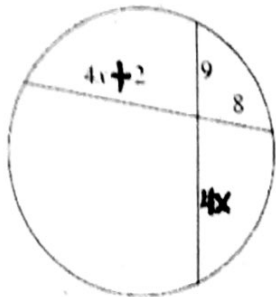
$$27x = 1296$$

$$x = 48$$

Name: \_\_\_\_\_ Date: \_\_\_\_\_

### Segment Lengths with Circles Homework

1.  $x =$  \_\_\_\_\_



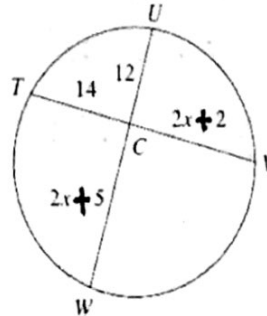
$$8(4x+2) = 9(4x)$$

$$32x + 16 = 36x$$

$$16 = 4x$$

$$\boxed{x=4}$$

2.  $x =$  \_\_\_\_\_



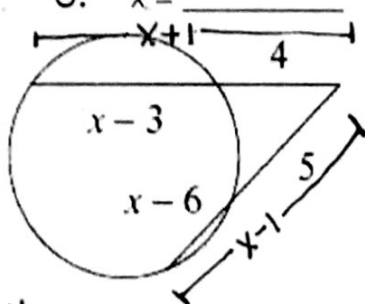
$$14(2x+2) = 12(2x+5)$$

$$28x + 28 = 24x + 60$$

$$4x = 32$$

$$\boxed{x=8}$$

3.  $x =$  \_\_\_\_\_

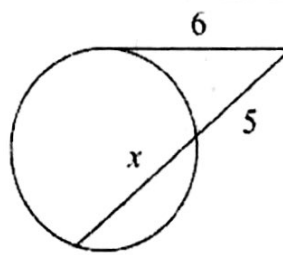


$$4(x+1) = 5(x-1)$$

$$4x + 4 = 5x - 5$$

$$\boxed{9=x}$$

4.  $x =$  \_\_\_\_\_



$$6^2 = 5(x+5)$$

$$36 = 5x + 25$$

$$11 = 5x$$

$$\boxed{x=2.2}$$

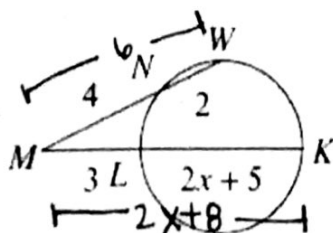
$$x-3+4$$

$$\boxed{x+1}$$

$$x-6+5$$

$$\boxed{x-1}$$

5.  $x =$  \_\_\_\_\_



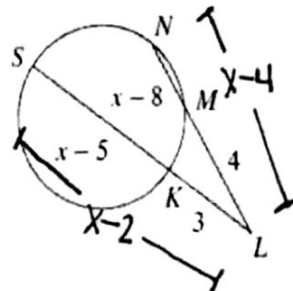
$$4(6) = 3(2x+8)$$

$$24 = 6x + 24$$

$$6x = 0$$

$$\boxed{x=0}$$

6.  $x =$  \_\_\_\_\_

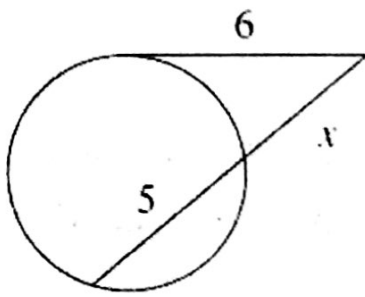


$$3(x-2) = 4(x-4)$$

$$3x - 6 = 4x - 16$$

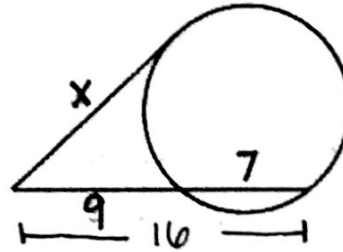
$$\boxed{x=10}$$

7.  $x =$  \_\_\_\_\_



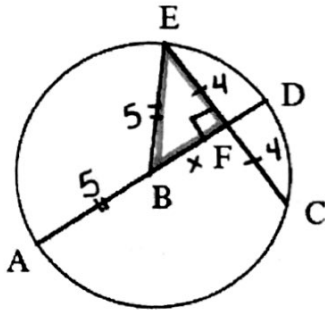
$$\begin{aligned}
 6^2 &= x(x+5) \\
 36 &= x^2 + 5x \\
 x^2 + 5x - 36 &= 0 \\
 (x+9)(x-4) &= 0 \\
 x &= -9 \quad \boxed{x=4}
 \end{aligned}$$

8.  $x =$  \_\_\_\_\_



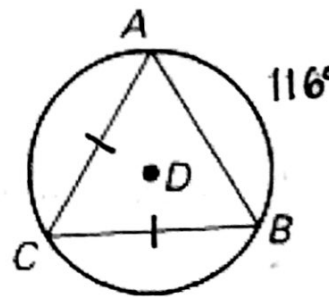
$$\begin{aligned}
 x^2 &= 9(16) \\
 x^2 &= 144 \\
 \boxed{x=12}
 \end{aligned}$$

9.  $EC = 8, AB = 5, BF =$  \_\_\_\_\_



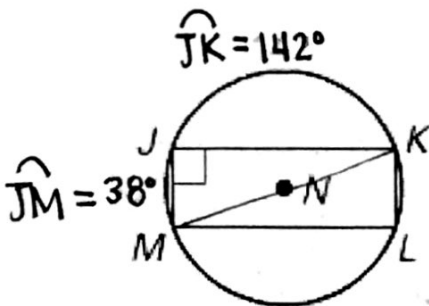
$$\begin{aligned}
 x^2 + 4^2 &= 5^2 \\
 x^2 + 16 &= 25 \\
 x^2 &= 9 \\
 \boxed{x=3}
 \end{aligned}$$

10.  $m\widehat{BC} =$  \_\_\_\_\_

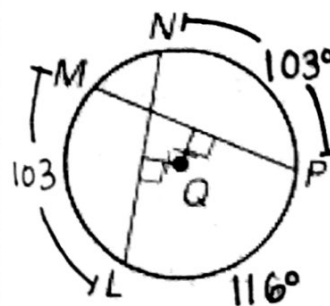


$$\begin{aligned}
 360 - 116 \\
 \frac{244}{2} &= \boxed{122^\circ}
 \end{aligned}$$

11.  $m\widehat{KLM} = 180^\circ$



12.  $m\widehat{MN} = 38^\circ$



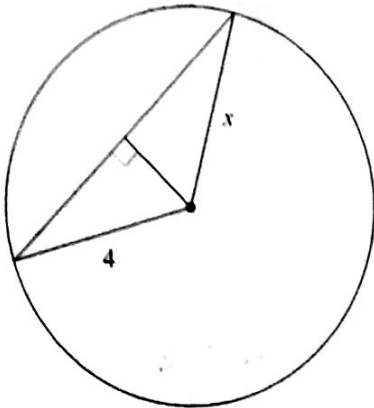
$$\begin{aligned}
 360 - 116 &= 244 \\
 -206 \\
 \hline
 38
 \end{aligned}$$



5.1 - Practice

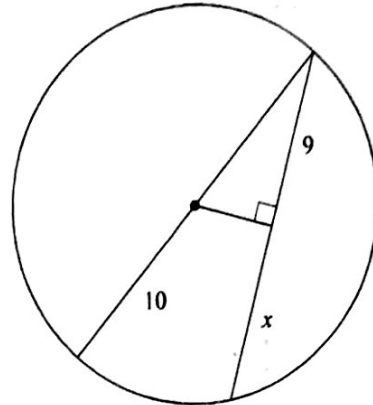
Find the length of the segment indicated. Round your answer to the nearest tenth if necessary.

1)



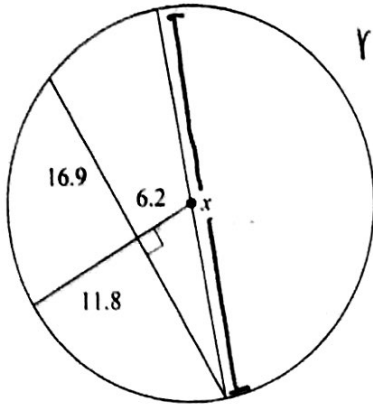
$x = 4$

2)



$x = 9$

3)

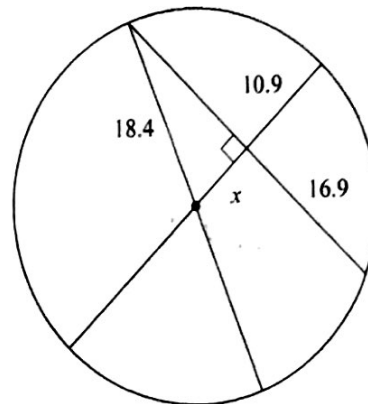


$r = 11.8 + 6.2$

$r = 18$

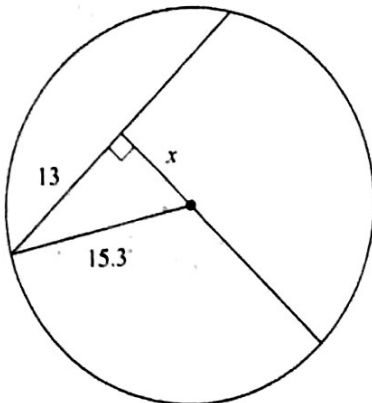
$x = 36$

4)



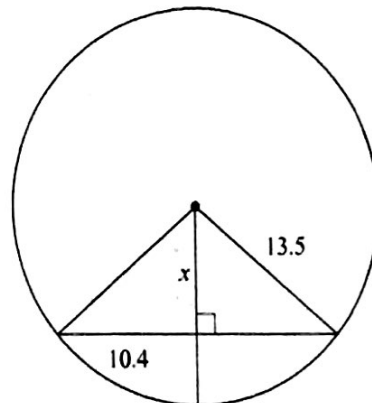
$x = 7.5$

5)



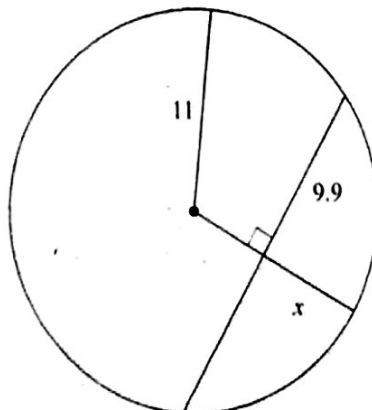
$x = 8.1$

6)



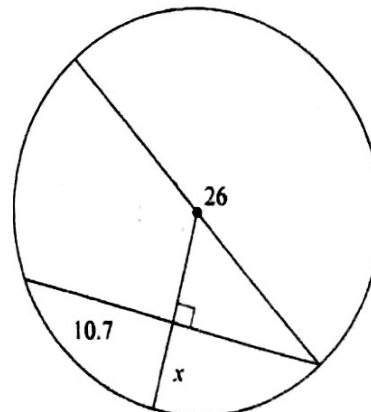
$x = 8.6$

7)



$x = 6.2$

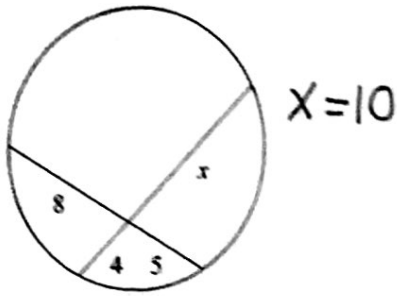
8)



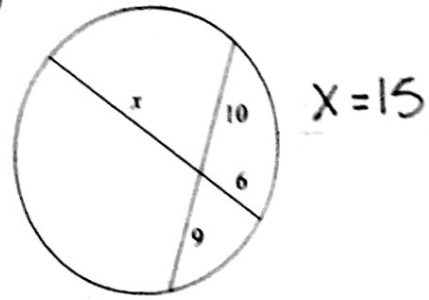
$x = 5.6$

Solve for  $x$ . Assume that lines which appear tangent are tangent.

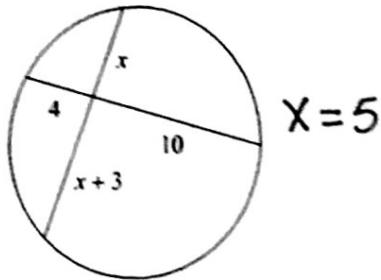
9)



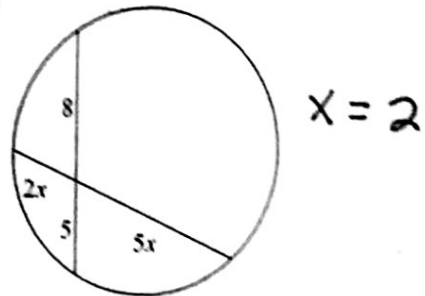
10)



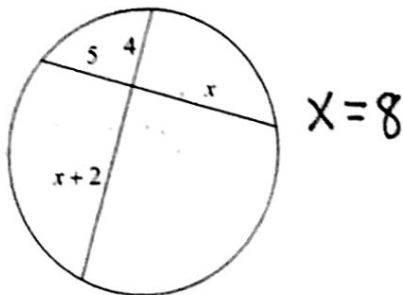
11)



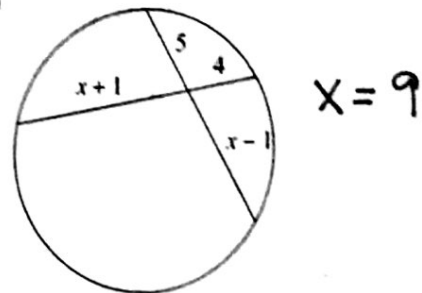
12)



13)

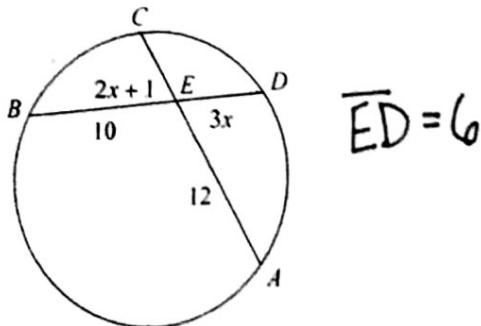


14)

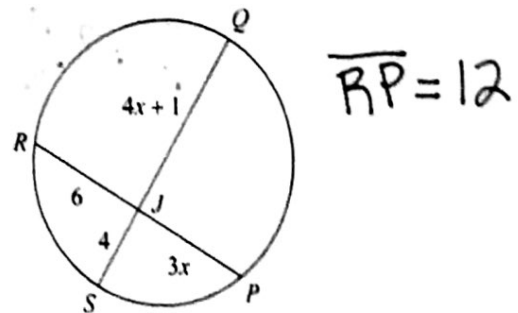


Find the measure of the line segment indicated. Assume that lines which appear tangent are tangent.

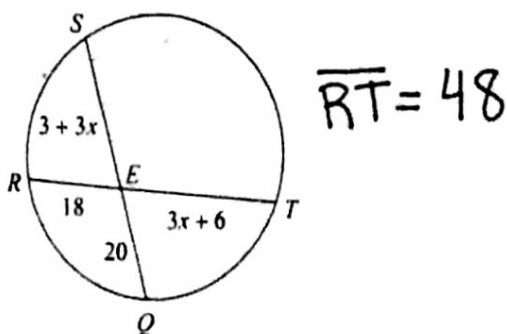
15) Find  $ED$



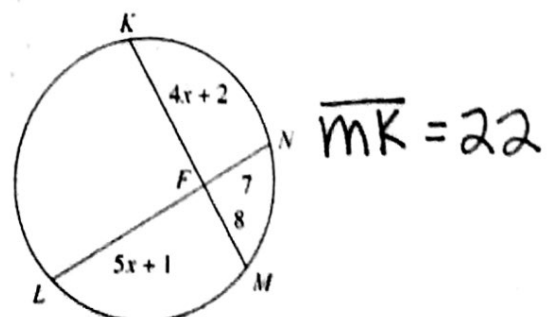
16) Find  $RP$



17) Find  $RT$



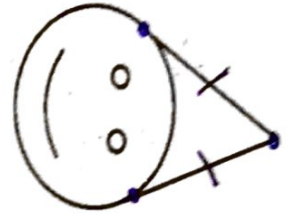
18) Find  $MK$



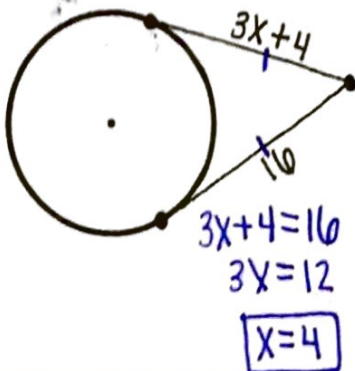
Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Segment Lengths - Tangents**

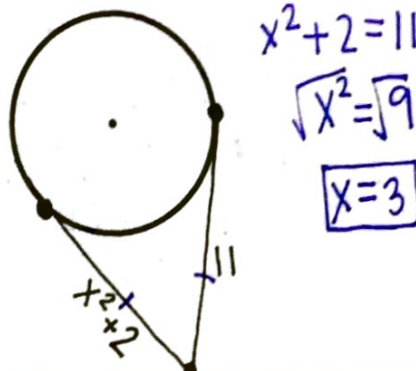
☆ If two segments from the same exterior point are tangent to a circle, then they are congruent.



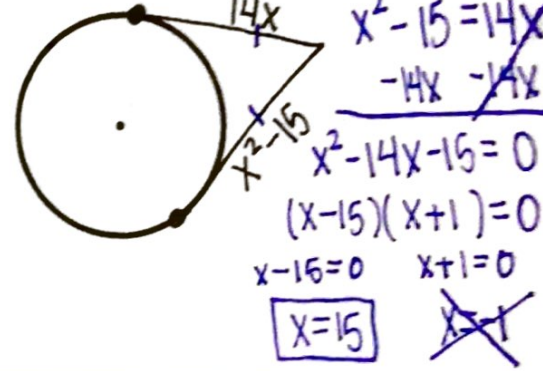
1.  $x =$  \_\_\_\_\_



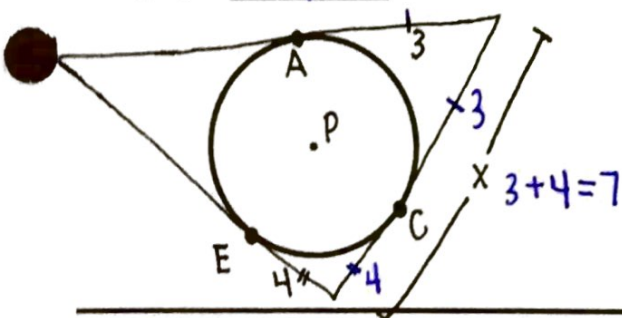
2.  $x =$  \_\_\_\_\_



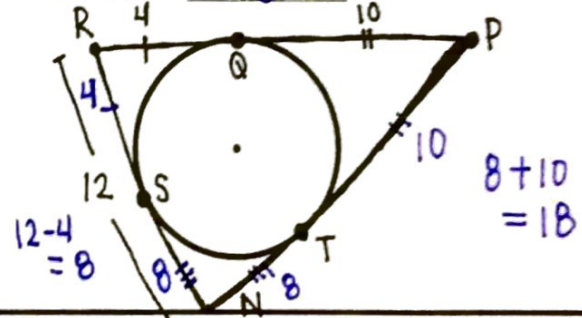
3.  $x =$  \_\_\_\_\_



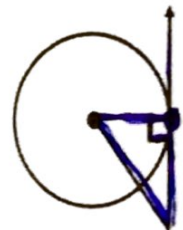
4.  $x =$  7



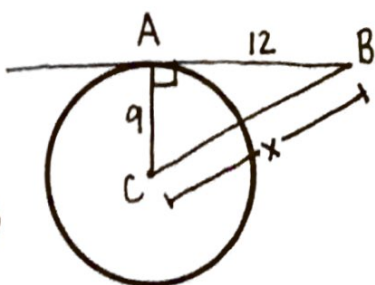
5.  $NP =$  18



☆ If a line (segment or ray) is tangent to a circle, then it is perpendicular to the radius drawn to the point of tangency.

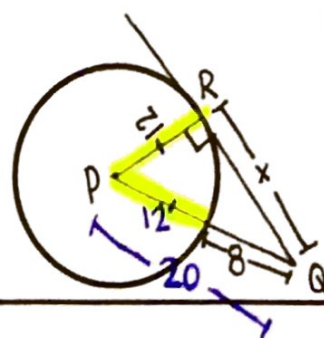


6.  $x =$  \_\_\_\_\_



$q^2 + 12^2 = x^2$   
 $81 + 144 = x^2$   
 $x=15$

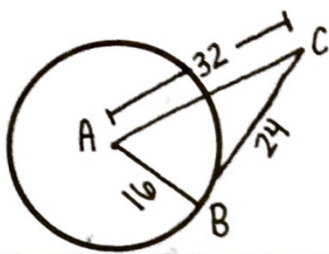
7.  $RQ =$  16



$x^2 + 12^2 = 20^2$   
 $x^2 + 144 = 400$   
 $x^2 = 256$   
 $x=16$

# Test Pythagorean Thm!

8. Is CB tangent to the circle?



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

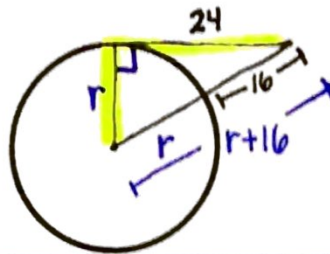
$$16^2 + 24^2 = 32^2$$

$$256 + 576 = 1024$$

$$832 \neq 1024$$

**NO!**

9.  $r =$  \_\_\_\_\_



$$24^2 + r^2 = (r+16)^2$$

$$= (r+16)(r+16)$$

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

$$576 + r^2 = r^2 + 32r + 256$$

$$576 = 32r + 256$$

$$320 = 32r$$

**X=10**

10. A green on a golf course is in the shape of a circle. Your golf ball is 8 feet from the edge of the green and 32 feet from a point of tangency on the green.

a.  $r =$  60

$$32^2 + r^2 = (r+8)^2$$

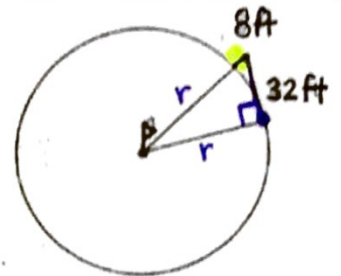
$$= (r+8)(r+8)$$

$$1024 + r^2 = r^2 + 16r + 64$$

$$1024 = 16r + 64$$

$$960 = 16r$$

$r = 60$



b. How far is your ball from the cup at the center?  $60 + 8 = 68$

Two circles that intersect:

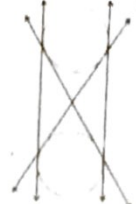
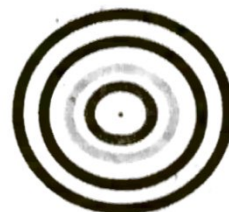
at two points



at one point



at no points

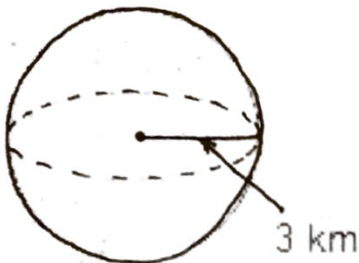


## 5.4 - Surface Area & Volume of a Sphere

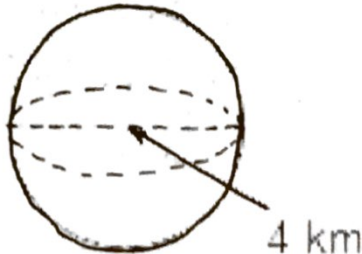
$$SA = 4\pi r^2$$

$$V = \frac{4}{3}\pi r^3$$

11. SA = \_\_\_\_\_ & V = \_\_\_\_\_



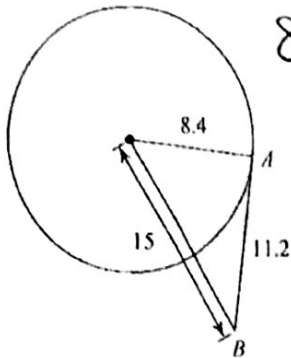
12. SA = \_\_\_\_\_ & V = \_\_\_\_\_



Tangents & Party Hats

Determine if line AB is tangent to the circle.  $a^2 + b^2 = c^2$

1)

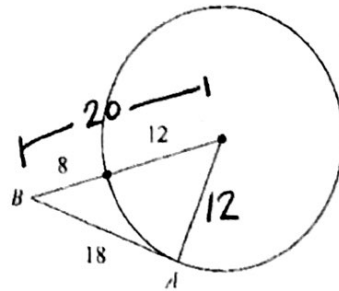


$$8.4^2 + 11.2^2 = 15^2$$

$$196 \neq 225$$

**No!**

2)

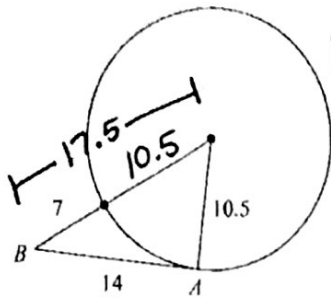


$$12^2 + 18^2 = 20^2$$

$$468 \neq 400$$

**No!**

3)

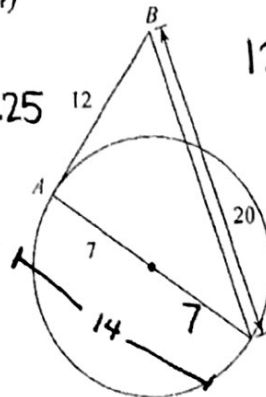


$$10.5^2 + 14^2 = 17.5^2$$

$$306.25 = 306.25$$

**Yes!**

4)



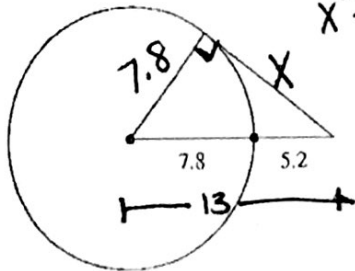
$$12^2 + 14^2 = 20^2$$

$$340 \neq 400$$

**No!**

Find the segment length indicated. Assume that lines which appear to be tangent are tangent.

5)

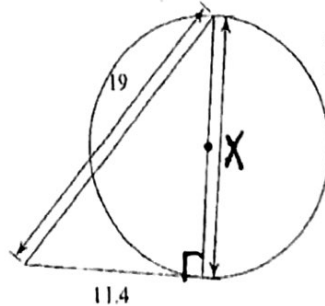


$$X^2 + 7.8^2 = 13^2$$

$$X^2 = 108.16$$

**X = 10.4**

6)

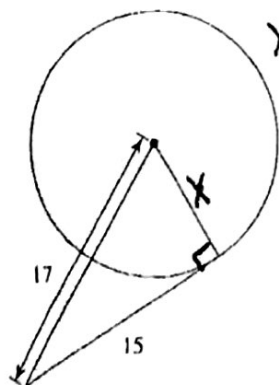


$$X^2 + 11.4^2 = 19^2$$

$$X^2 = 231.04$$

**X = 15.2**

7)

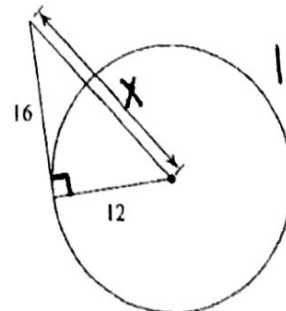


$$X^2 + 15^2 = 17^2$$

$$X^2 = 64$$

**X = 8**

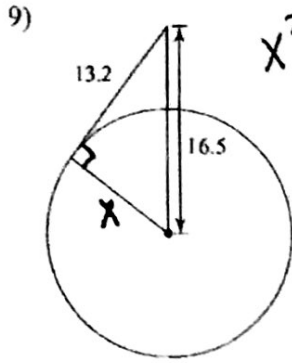
8)



$$12^2 + 16^2 = X^2$$

$$400 = X^2$$

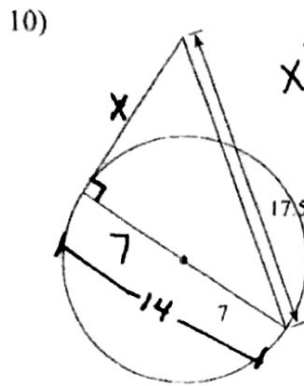
**X = 20**



$$x^2 + 13.2^2 = 16.5^2$$

$$x^2 = 98.01$$

$$x = 9.9$$

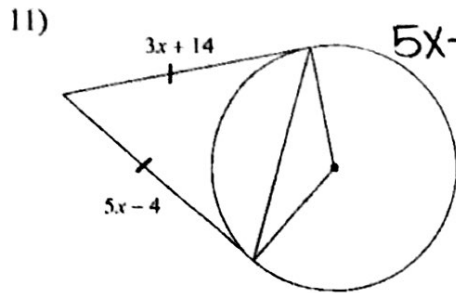


$$x^2 + 14^2 = 17.5^2$$

$$x^2 = 110.25$$

$$x = 10.5$$

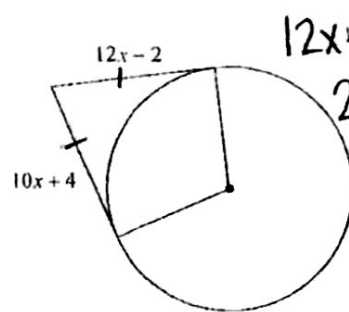
Solve for  $x$ . Assume that lines which appear to be tangent are tangent.



$$5x - 4 = 3x + 14$$

$$2x = 18$$

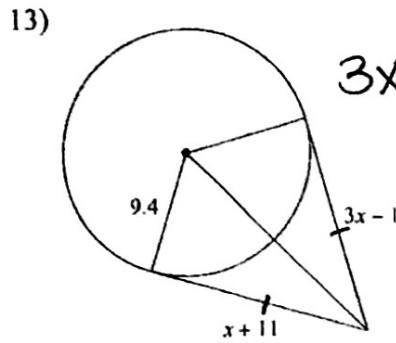
$$x = 9$$



$$12x - 2 = 10x + 4$$

$$2x = 6$$

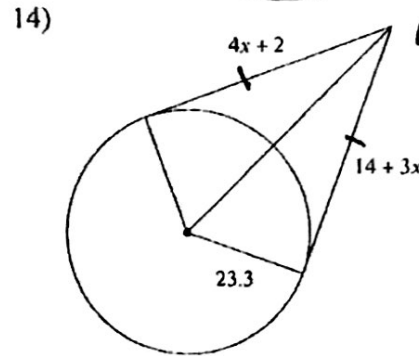
$$x = 3$$



$$3x - 1 = x + 11$$

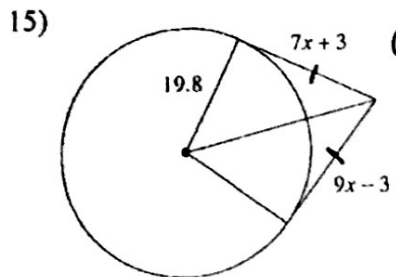
$$2x = 12$$

$$x = 6$$



$$4x + 2 = 14 + 3x$$

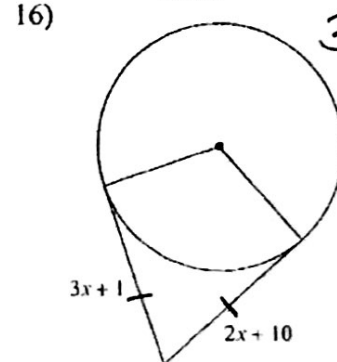
$$x = 12$$



$$9x - 3 = 7x + 3$$

$$2x = 6$$

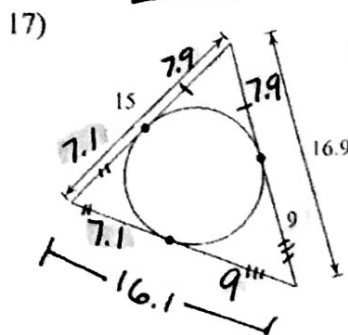
$$x = 3$$



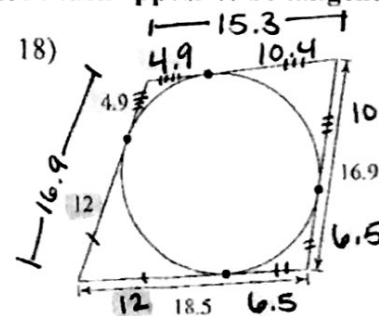
$$3x + 1 = 2x + 10$$

$$x = 9$$

Find the perimeter of each polygon. Assume that lines which appear to be tangent are tangent.



$$P = 48$$

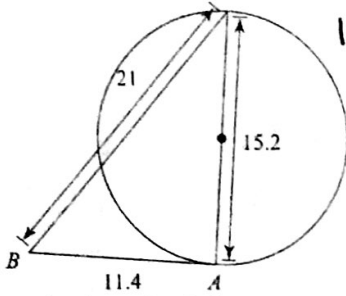


$$P = 67.6$$

Unit 5 Quiz Review

Determine if line AB is tangent to the circle.

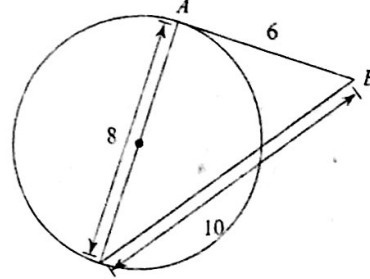
1)



$$11.4^2 + 15.2^2 \neq 21^2?$$

**NO!**

2)

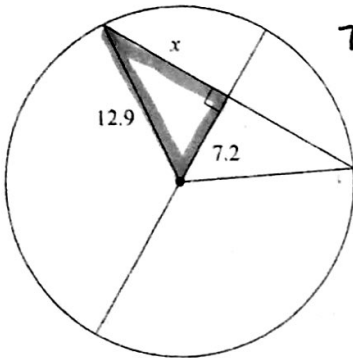


$$6^2 + 8^2 = 10^2?$$

**Yes!**

Find the length of the segment indicated. Round your answer to the nearest tenth if necessary.

3)

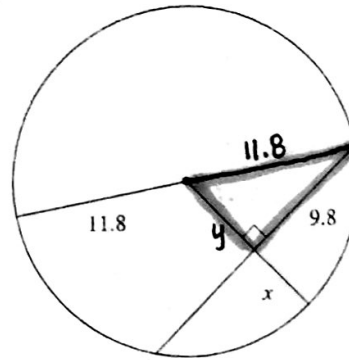


$$7.2^2 + x^2 = 12.9^2$$

$$x^2 = 114.57$$

$$x = 10.7$$

4)



$$y^2 + 9.8^2 = 11.8^2$$

$$y^2 = 43.2$$

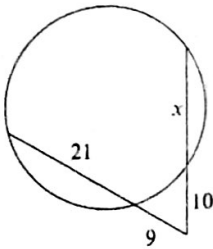
$$y \approx 6.6$$

$$x = 11.8 - 6.6$$

$$x = 5.2$$

Solve for x. Assume that lines which appear tangent are tangent.

5)



$$10(10+x) = 9(21+9)$$

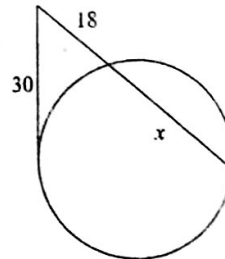
$$100 + 10x = 9(30)$$

$$100 + 10x = 270$$

$$10x = 170$$

$$x = 17$$

6)



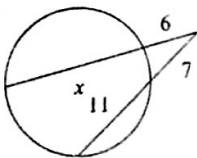
$$18(18+x) = 30^2$$

$$324 + 18x = 900$$

$$18x = 576$$

$$x = 32$$

7)



$$6(6+x) = 7(11+7)$$

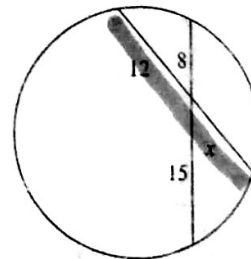
$$36 + 6x = 7(18)$$

$$36 + 6x = 126$$

$$6x = 90$$

$$x = 15$$

8)



$$8(15) = 12x$$

$$120 = 12x$$

$$x = 10$$

9)  $8(8+x) = 12^2$   
 $64 + 8x = 144$   
 $8x = 80$   
 $x = 10$

10)  $20(9) = 10x$   
 $180 = 10x$   
 $x = 18$

11)  $7(4x+8) = 8(3x+8)$   
 $28x + 56 = 24x + 64$   
 $4x = 8$   
 $x = 2$

12)  $9(x+18) = 10(x+15)$   
 $9x + 162 = 10x + 150$   
 $x = 12$

Find the measure of the line segment indicated. Assume that lines which appear tangent are tangent.

13) Find  $TS$   
 $12(x+15) = 18^2$   
 $12x + 180 = 324$   
 $12x = 144$   
 $x = 12$   
 $TS = 12 + 3 = 15$

14) Find  $CE$   
 $3(2x-10) = 4(6)$   
 $6x - 30 = 24$   
 $6x = 54$   
 $x = 9$   
 $CE = 2(9) - 10 = 8$

Solve for  $x$ . Assume that lines which appear to be tangent are tangent.

15)  $5x+4 = 4x+9$   
 $x = 5$

16)  $7x+4 = 8x$   
 $x = 4$

Find the perimeter of each polygon. Assume that lines which appear to be tangent are tangent.

17)  $P = 50.8$

18)  $P = 75$