

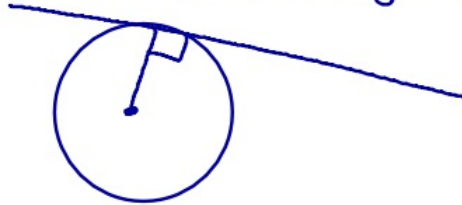
Day 4: Tangents, Secants, Circumscribed Angles

Date _____

TANGENT LINES

1) A tangent line is a line that intersects a circle at a right angle

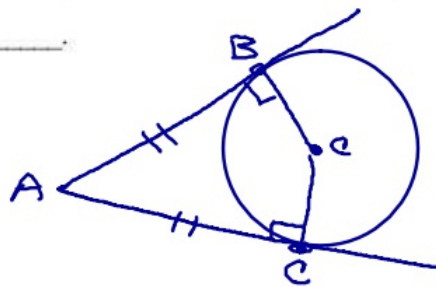
Example:



2) If two lines are tangent to the same circle, and originate from the same exterior point, then the segments are congruent.

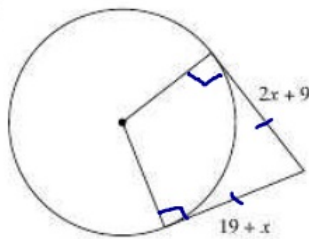
Example:

$$\overline{AB} \cong \overline{AC}$$



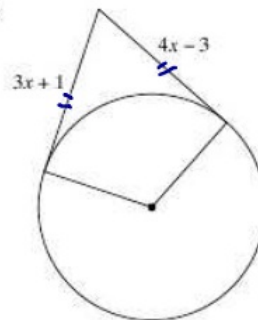
Solve for x . Assume that lines which appear to be tangent are tangent.

3)



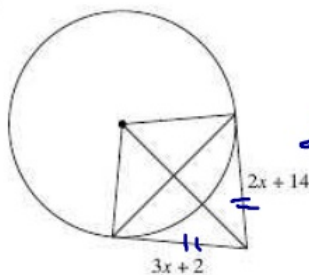
$$\begin{aligned} 2x+9 &= 19+x \\ -x & \quad -x \\ \hline x+9 &= 19 \\ -9 & \quad -9 \\ \hline x &= 10 \end{aligned}$$

4)



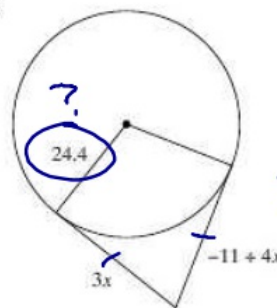
$$\begin{aligned} 3x+1 &= 4x-3 \\ 1 &= x-3 \\ 4 &= x \end{aligned}$$

5)



$$\begin{aligned} 2x+14 &= 3x+2 \\ 14 &= x+2 \\ 12 &= x \end{aligned}$$

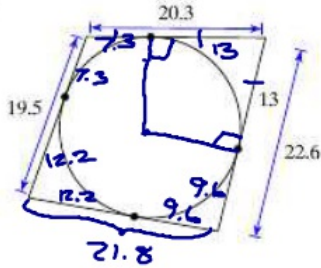
6)



$$\begin{aligned} 3x &= -11+4x \\ -3x & \quad -3x \\ \hline 0 &= -11+x \\ +11 & \quad +11 \\ \hline 11 &= x \end{aligned}$$

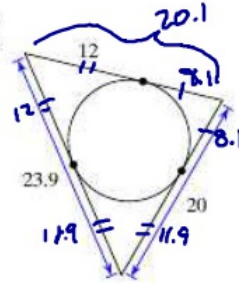
Find the perimeter of each polygon. Assume that lines which appear to be tangent are tangent.

7)



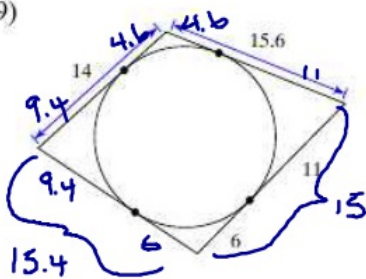
$P = 84.2$

8)



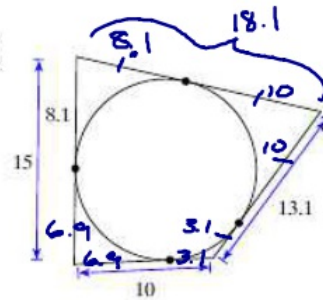
$P = 64.0$

9)



$P = 60.0$

10)



$$\begin{array}{r} 15.0 \\ 18.1 \\ 13.1 \\ \hline 10.0 \\ \hline 56.2 \end{array}$$

$P = 56.2$

CIRCUMSCRIBED ANGLES

11) A circumscribed angle is formed by two Segments lines whose vertex is outside of the circle.

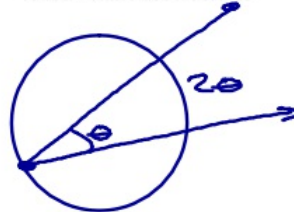
**The measure of a circumscribed angle is equal to $\frac{(\text{Big} - \text{Little})}{2} = \theta$ | $\text{Big} - \text{Little} = 2\theta$

Draw an example of the listed angle type. Below each picture, write out the formula for finding the measure of the angle.

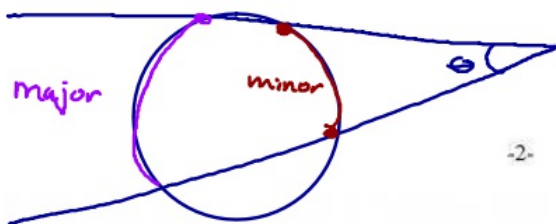
12) Central Angle



13) Inscribed Angle



14) Circumscribed Angle



$\theta = \frac{\text{Major} - \text{minor}}{2} = \frac{\text{Big} - \text{Little}}{2}$

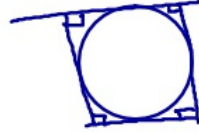
or $\rightarrow 2\theta = \text{Big} - \text{Little}$

Use what you know about the definitions of circumscribed and inscribed to answer the following questions.

15) Draw a triangle inscribed in a circle.



16) Draw a square circumscribed about a circle.



17) Draw a triangle circumscribed about a square.



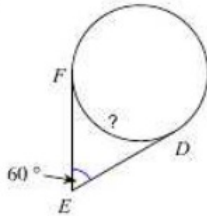
18) Draw a 5-point star inscribed in a circle.



19) Describe the difference between a circle circumscribed about a triangle, and a triangle inscribed in a circle. Use pictures to back up your logic.

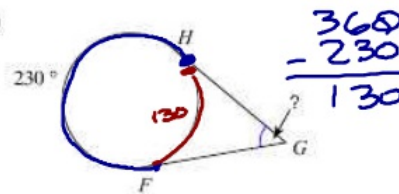
Find the measure of the arc or angle indicated. Assume that lines which appear tangent are tangent.

20)



$$m\widehat{FD} = 120^\circ$$

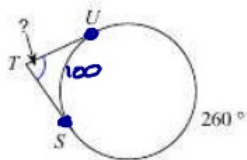
21)



$$\frac{230 - 130}{2} = \frac{100}{2} = 50^\circ$$

$$m\angle FGH = 50^\circ$$

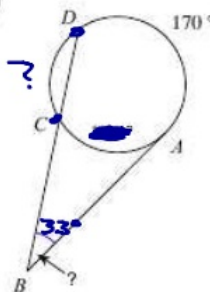
22)



$$\frac{260 - 100}{2} = \frac{160}{2} = 80^\circ$$

$$m\angle UTS = 80^\circ$$

23)

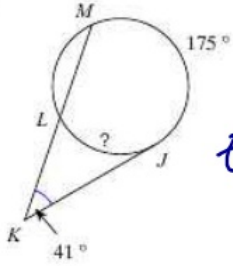


$$\frac{\text{major} - \text{minor}}{2}$$

$$\frac{170 - 104}{2} = \frac{66}{2} = 33^\circ$$

$$m\angle CBA = 33^\circ$$

24)



$$\theta = \frac{1}{2}(175 - 25)$$

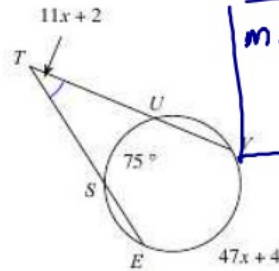
$$\frac{\text{major} - \text{minor}}{2} = \theta$$

$$2 \cdot \left(\frac{175 - ?}{2} \right) = 41 \cdot 2$$

$$\begin{aligned} 175 - ? &= 82 \\ -175 &= -175 \\ -? &= -93 \\ ? &= 93 \end{aligned}$$

$$m\widehat{LJ} = 93^\circ$$

25) Find $m\angle VTE$



$$\begin{aligned} m\angle VTE &= 11(3) + 2 \\ &= 33 + 2 \\ &= 35^\circ \end{aligned}$$

$$\frac{(47x+4) - (75)}{2} = 11x+2$$

$$47x+4-75 = 2(11x+2)$$

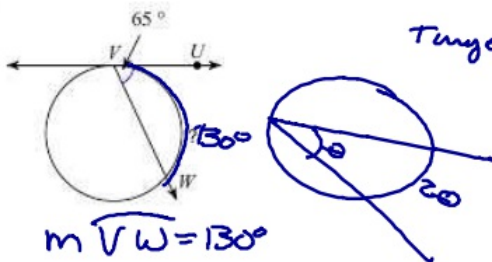
$$\begin{aligned} 47x-71 &= 22x+4 \\ -22x & \quad -22x \\ \hline 25x-71 &= 4 \\ 25x &= 75 \\ x &= 3 \end{aligned}$$

26) A Secant line is a line that intersects the circle _____.

The measure of an angle formed by a Secant and a tangent is equal to double the angle.

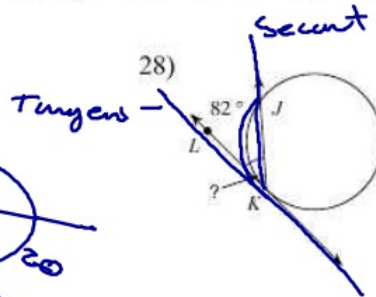
Find the measure of the arc or angle indicated. Assume that lines which appear tangent are tangent.

27)



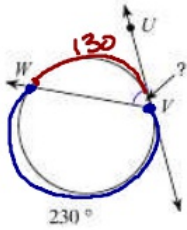
$$m\widehat{VW} = 130^\circ$$

28)



$$m\angle LKJ = 41^\circ$$

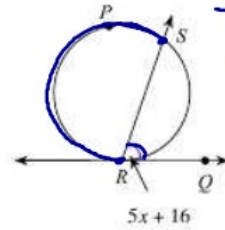
29)



$$m \widehat{WV} = 130^\circ$$

$$m \angle WCV = 65^\circ$$

30) $m\widehat{SPR} = 18x + 20$
Find $m\widehat{SPR}$



$$m \widehat{SR} = 2(5x + 16)$$

$$m\widehat{SPR} = 18(11) + 20$$

$$= 198 + 20$$

$$= 218^\circ$$

$$18x + 20 + 2(5x + 16) = 360^\circ$$

$$18x + 20 + 10x + 32 = 360$$

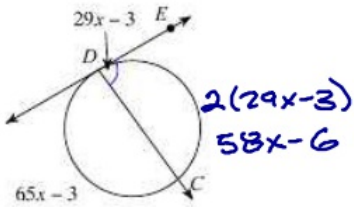
$$28x + 52 = 360$$

$$28x = 308$$

$$x = 11$$

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

31)



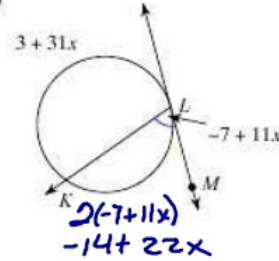
$$65x - 3 + 58x - 6 = 360$$

$$123x - 9 = 360$$

$$123x = 369$$

$$x = 3$$

32)



$$3 + 31x - 14 + 22x = 360$$

$$53x - 11 = 360$$

$$53x = 371$$

$$x = 7$$