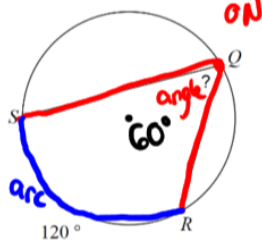
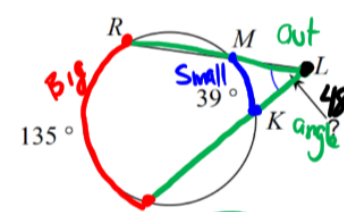

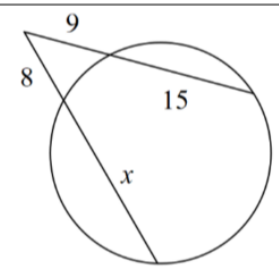
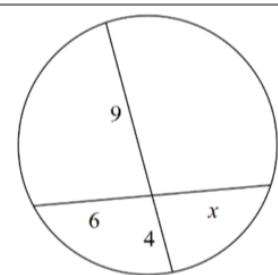


Angles and Arcs

Where is the Vertex?	ON	OUTSIDE	INSIDE
Equation	$2(\angle) = \text{arc}$	$2(\angle) = \widehat{\text{Big}} - \widehat{\text{Small}}$	$2(\angle) = \widehat{1} + \widehat{2}$
<p>Example</p> <p>Steps to follow:</p> <ol style="list-style-type: none"> <li>Determine the location of the angle. ON, IN, OUT, or CENTER</li> <li>Choose equation based off the location</li> <li>Identify parts needed for equation.</li> <li>Substitute and solve</li> </ol>	 <p><math>2(\angle) = \text{arc}</math></p> <p><math>2(?) = 120</math></p> <p><math>? = 60^\circ</math></p>	 <p><math>2(\angle) = \widehat{\text{Big}} - \widehat{\text{Small}}</math></p> <p><math>2(?) = 135 - 39</math></p> <p><math>\frac{2?}{2} = \frac{96}{2}</math></p> <p><math>? = 48^\circ</math></p>	 <p><math>2(\angle) = \widehat{1} + \widehat{2}</math></p> <p><math>2(?) = 70 + 64</math></p> <p><math>2? = 134</math></p> <p><math>? = 67^\circ</math></p>

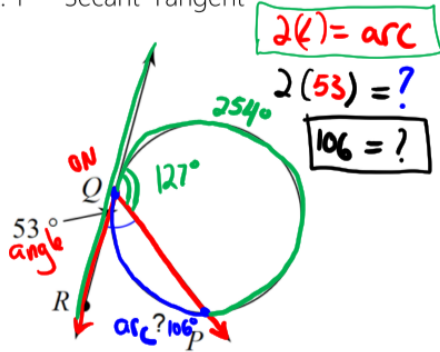
Segments

Where is the Vertex?	OUTSIDE	INSIDE
Equation		
Example		

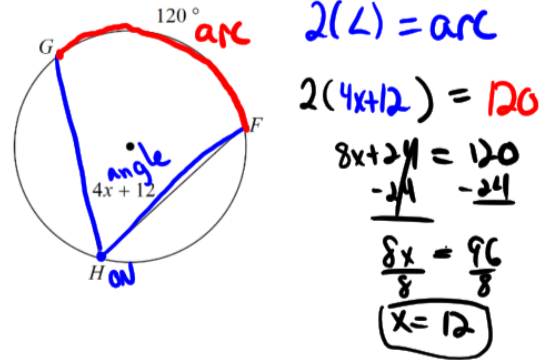
# Angles: Vertex ON the Circle

Video Link:

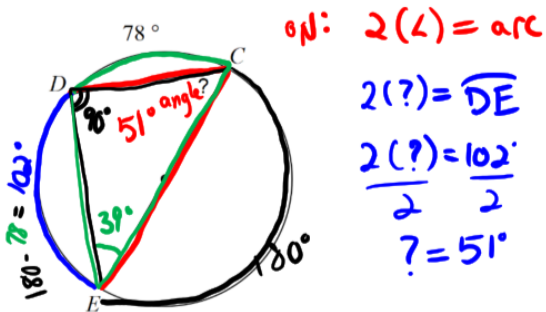
Ex. 1 Secant-Tangent



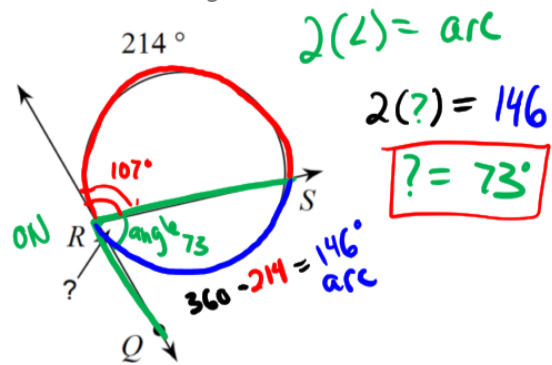
Ex. 2 Inscribed Angle (Secant-Secant)



Ex. 3 Inscribed Angle



Ex. 4 Secant Tangent



Angles: Vertex ON Circle

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

1)  $2(\angle) = \text{arc}$   
 $2(42) = \widehat{RS}$   
 $84 = \widehat{RS}$   
 $180 - 84 = 96$   
 $?\angle = 96^\circ$

2)  $110 + 102 = 212^\circ = \widehat{BAC}$   
 $2(\angle) = \text{arc}$   
 $2(?) = \frac{148}{2}$   
 $? = 74^\circ$

3)  $2(?) = 150$   
 $? = 75^\circ$

4)  $2(\angle) = \text{arc}$   
 $2(?) = \frac{100}{2}$   
 $? = 50$

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

5)  $2(\angle) = \text{arc}$   
 $2(60x) = 120$   
 $\frac{60x}{60} = \frac{60}{60}$   
 $x = 1$

6)  $2(\angle) = \text{arc}$   
 $2(30) = \widehat{mXY}$   
 $60 = \widehat{mXP}$   
 $23x + 5 + 60 = 180$   
 $23x + 65 = 180$   
 $23x = 115$   
 $x = 5$

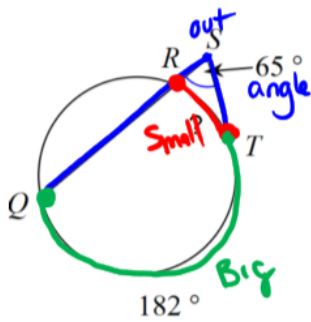
7)  $2(\angle) = \text{arc}$   
 $2(22x - 1) = \widehat{LM}$   
 $44x - 2 = \widehat{LM}$   
 $44x - 2 + 78x - 4 = 360$   
 $122x - 6 = 360$   
 $122x = 366$   
 $x = 3$

8)  $2(\angle) = \text{arc}$   
 $2(15x + 5) = \widehat{CD}$   
 $30x + 10 = \widehat{CD}$   
 $87x - 1 + 30x + 10 = 360$   
 $117x + 9 = 360$   
 $117x = 351$   
 $x = 3$

## Angles: Vertex OUTSIDE the Circle

Video Link:

Ex. 1 Secant Tangent



$$2(\angle) = \widehat{\text{Big}} - \widehat{\text{Small}}$$

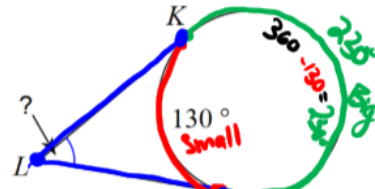
$$2(65) = 182 - ?$$

$$130 = 182 - ?$$

$$-52 = -?$$

$$52 = ?$$

Ex. 2 Tangent Tangent



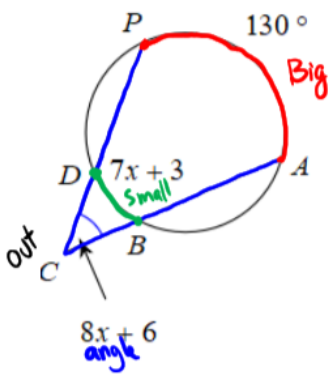
$$2(\angle) = \widehat{\text{Big}} - \widehat{\text{Small}}$$

$$2(?) = 230 - 130$$

$$? = 50^\circ$$

Tangent  
Tangent  
 $\angle = 180 - \widehat{\text{small}}$

Ex. 3 Secant Secant



$$2(\angle) = \widehat{\text{Big}} - \widehat{\text{Small}}$$

$$2(8x+6) = 130 - (7x+3)$$

$$16x+12 = 130 - 7x - 3$$

$$16x+12 = 127 - 7x$$

$$\begin{array}{r} 16x+12 \\ +7x \\ \hline 23x+12=127 \end{array}$$

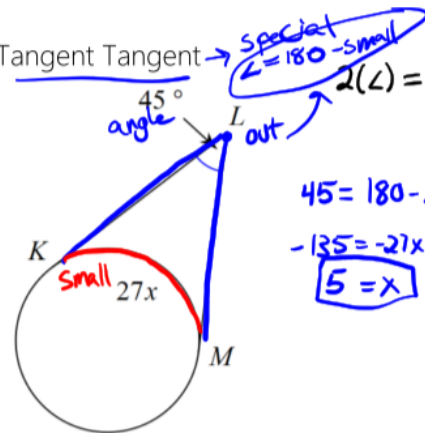
$$23x+12=127$$

$$23x=115$$

$$\boxed{x=5}$$

Ex. 4

Tangent Tangent



$$2(\angle) = \widehat{\text{Big}} - \widehat{\text{Small}}$$

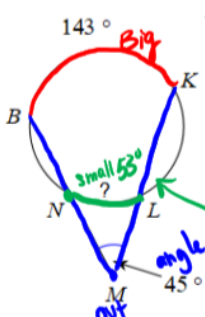
$$45 = 180 - 27x$$

$$-135 = -27x$$

$$\boxed{5=x}$$

### Angles: Vertex OUTSIDE Circle

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

1) 

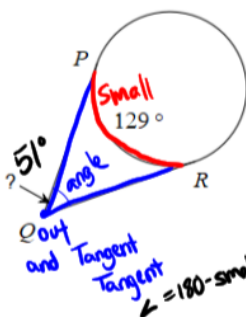
$$2(\angle) = \widehat{Big} - \widehat{Small}$$

$$2(45) = 143 - ?$$

$$90 = 143 - ?$$

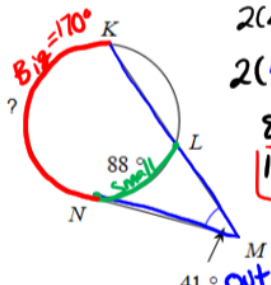
$$-53 = -?$$

$$\boxed{53^\circ = ?}$$

2) 

$$? = 180 - 129$$

$$\boxed{? = 51^\circ}$$

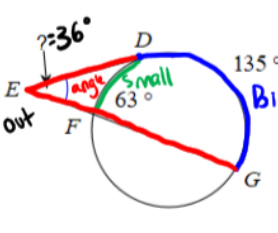
3) 

$$2(\angle) = \widehat{Big} - \widehat{Small}$$

$$2(41) = ? - 88$$

$$82 = ? - 88$$

$$\boxed{170 = ?}$$

4) 


$$2(\angle) = \widehat{Big} - \widehat{Small}$$

$$2(?) = 135 - 63$$

$$2? = 72$$

$$\boxed{? = 36^\circ}$$

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

5) 

Tangent Tangent

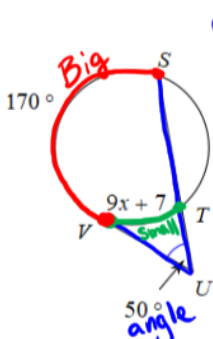
$$\angle = 180 - \widehat{Small}$$

$$6x + 4 = 180 - 11$$

$$6x + 4 = 70$$

$$6x = 66$$

$$\boxed{x = 11}$$

6) 

out:  $2(\angle) = \widehat{Big} - \widehat{Small}$

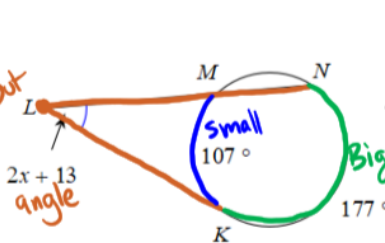
$$2(50) = 170 - (9x + 7)$$

$$100 = 170 - 9x - 7$$

$$100 = 163 - 9x$$

$$-63 = -9x$$

$$\boxed{7 = x}$$

7) 

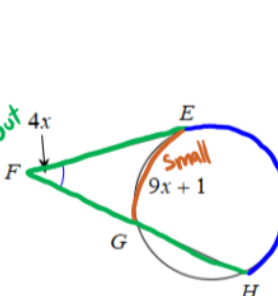
$$2(\angle) = \widehat{Big} - \widehat{Small}$$

$$2(2x + 13) = 177 - 107$$

$$4x + 26 = 70$$

$$4x = 44$$

$$\boxed{x = 11}$$

8) 

$$2(\angle) = \widehat{Big} - \widehat{Small}$$

$$2(4x) = 171 - (9x + 1)$$

$$8x = 171 - 9x - 1$$

$$8x = 170 - 9x$$

$$17x = 170$$

$$\boxed{x = 10}$$