

Consider the triangles shown. Which can be used to prove the triangles are congruent?

A. SSS  
 B. ASA  
 C. SAS  
 D. AAS

1

Angles and Arcs of Circles

Interior Angles *secant* Exterior Angles *tangent*

*Chord*  
*Secant-tangent*

2

Vertex is in the circle

$$\angle 1 = \frac{\text{arc} + \text{arc}}{2}$$

OR

$$2(\angle 1) = \text{arc} + \text{arc}$$

Looks like a PLUS sign!

3

Ex. 1 Find  $m\angle 1$ .

$$m\angle 1 = \frac{97 + 81}{2}$$

$$m\angle 1 = \frac{178}{2}$$

$$m\angle 1 = 89^\circ$$

4

Ex. 2 Find  $m\widehat{NT}$ .

$$\angle 1 = \frac{\text{arc} + \text{arc}}{2}$$

$$101 = \frac{46 + x}{2}$$

$$202 = 46 + x$$

$$x = 156^\circ$$

5

Ex. 3 Find measure of  $x$ .

$$\angle 1 = \frac{\text{arc} + \text{arc}}{2}$$

$$172 = \frac{168 + x}{2}$$

$$344 = 168 + x$$

$$x = 176^\circ$$

*180 - 58 = 122*

6

Vertex is outside the circle

The vertex is out so you must Subtract

$$\angle_{out} = \frac{Big - small}{2}$$

OR

$$2(\angle_{out}) = Big - small$$

7

Ex. 4 Find  $m\angle 1$ .

$$\angle_{out} = \frac{Big - small}{2}$$

$$\angle_{out} = \frac{73 - 24}{2}$$

$$= \frac{49}{2}$$

$$m\angle 1 = 24.5^\circ$$

8

Ex. 5 Find  $m\widehat{AB}$ .

$$\angle_{out} = \frac{Big - small}{2}$$

$$57 = \frac{182 - x}{2}$$

$$114 = 182 - x$$

$$-182 \quad -182$$

$$-68 = -x$$

$$x = 68^\circ$$

9

Ex. 6 Find  $m\angle 1$ .

$$\angle_{out} = \frac{Big - small}{2}$$

$$m\angle 1 = \frac{216 - 144}{2}$$

$$m\angle 1 = \frac{72}{2}$$

$$m\angle 1 = 36^\circ$$

$$\begin{array}{r} 360 \\ -216 \\ \hline 144 \end{array}$$

10

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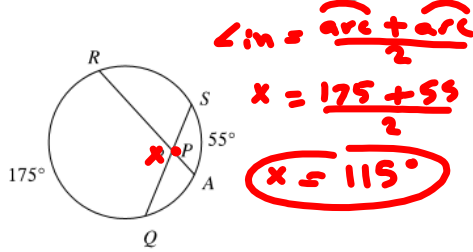
Name \_\_\_\_\_

Secant Angles

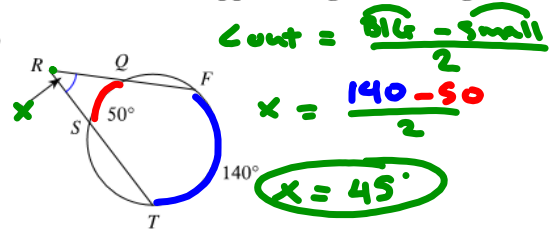
Date \_\_\_\_\_ Period \_\_\_\_\_

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

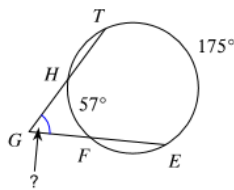
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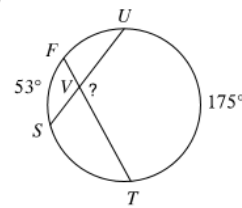
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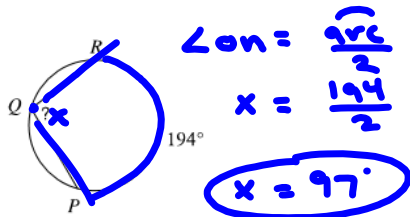
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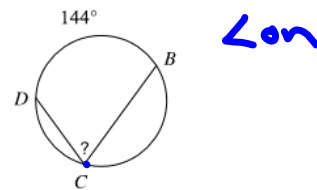
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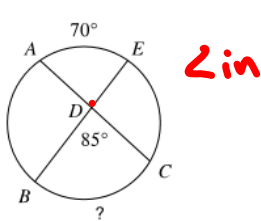
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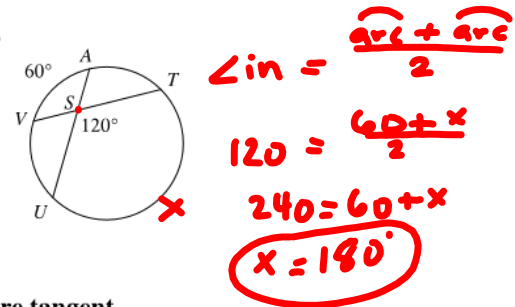
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7)

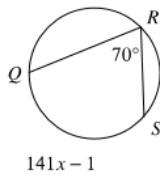


8)

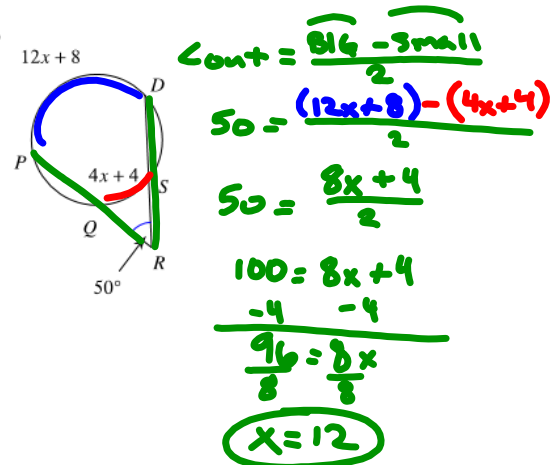


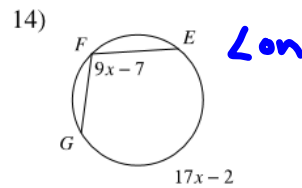
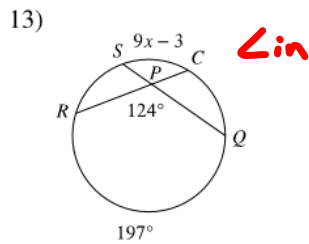
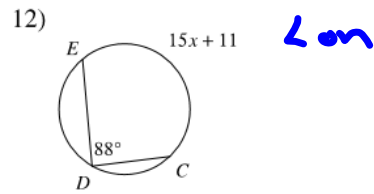
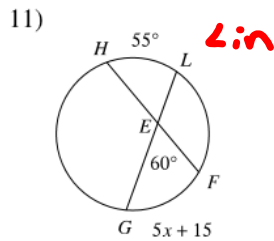
Solve for x. Assume that lines which appear tangent are tangent.

9)

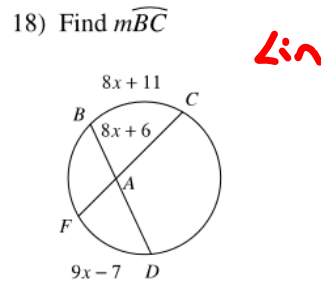
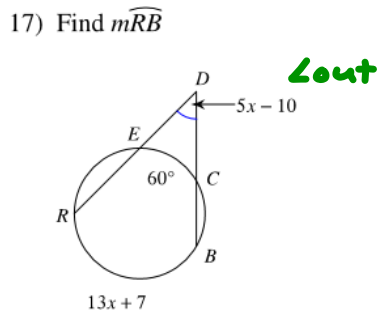
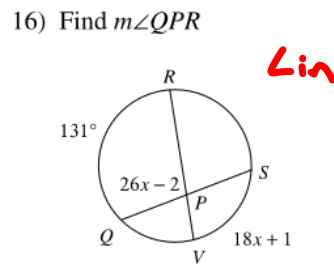
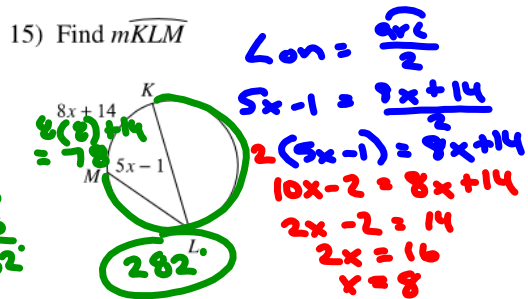


10)





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



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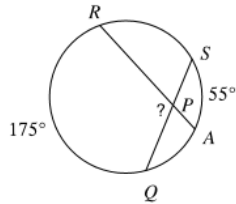
Name \_\_\_\_\_

Secant Angles

Date \_\_\_\_\_ Period \_\_\_\_\_

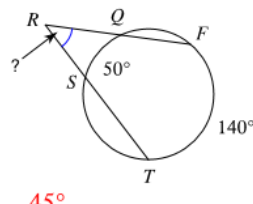
Find the measure of the arc or angle indicated. Assume that lines which appear tangent are tangent.

1)



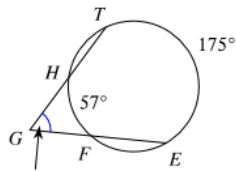
115°

2)



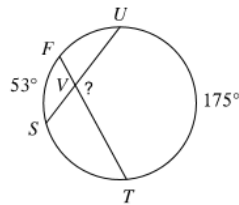
45°

3)



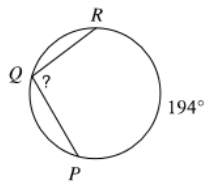
59°

4)



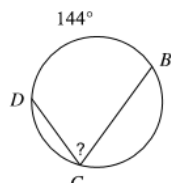
114°

5)



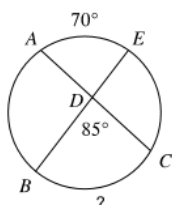
97°

6)



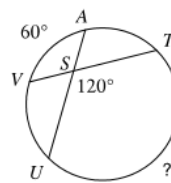
72°

7)



100°

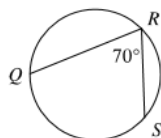
8)



180°

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

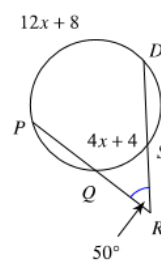
9)



141x - 1

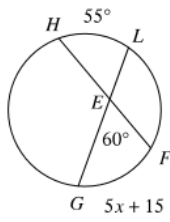
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10)



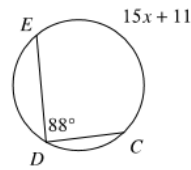
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11)



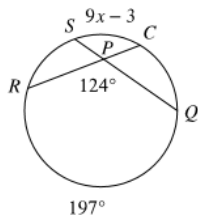
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12)



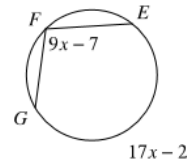
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13)



6

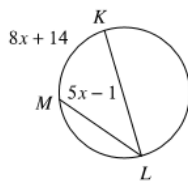
14)



12

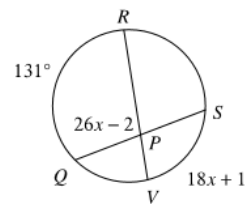
Find the measure of the arc or angle indicated. Assume that lines which appear tangent are tangent.

15) Find  $m\widehat{KLM}$



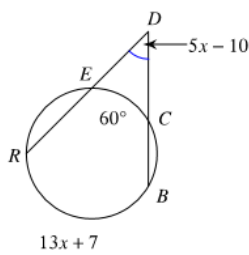
282°

16) Find  $m\angle QPR$



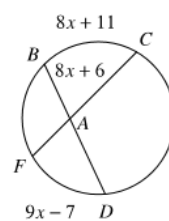
102°

17) Find  $m\widehat{RB}$



150°

18) Find  $m\widehat{BC}$



75°

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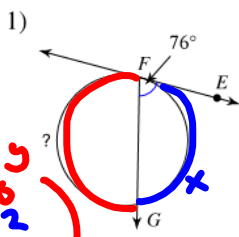
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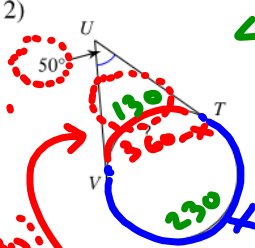
Secant-Tangent and Tangent-Tangent Angles

Date \_\_\_\_\_ Period \_\_\_\_\_

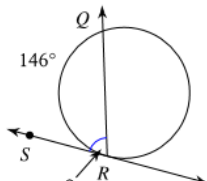
Find the measure of the arc or angle indicated. Assume that lines which appear tangent are tangent.

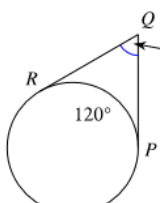
1)   $\angle out = \frac{arc}{2}$   
 $76 = \frac{x}{2}$   
 $x = 152$

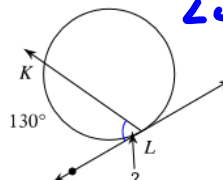
*Handwritten notes:*  $360 - 152 = 208$  (circled in red),  $\angle out = \frac{arc}{2}$ ,  $76 = \frac{x}{2}$ ,  $x = 152$ .

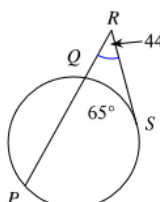
2)   $\angle out = \frac{arc - small}{2}$   
 $50 = \frac{x - (360 - x)}{2}$   
 $50 = \frac{2x - 360}{2}$   
 $100 = 2x - 360$   
 $460 = 2x$   
 $x = 230$   
 $? = 130$

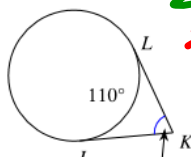
*Handwritten notes:*  $\angle out = \frac{arc - small}{2}$ ,  $50 = \frac{x - (360 - x)}{2}$ ,  $50 = \frac{2x - 360}{2}$ ,  $100 = 2x - 360$ ,  $460 = 2x$ ,  $x = 230$ ,  $? = 130$ . A red slash is drawn over the diagram. A red dashed box around the 130 degree angle is labeled "Small" and "180 - 50 = 130".

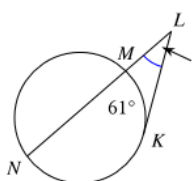
3)   $\angle out$

4)   $\angle out$   
 tangent!  
 small = 180 -  $\angle out$   
 $x = 180 - 120$   
 $x = 60$

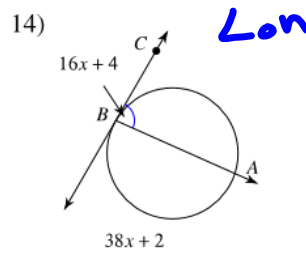
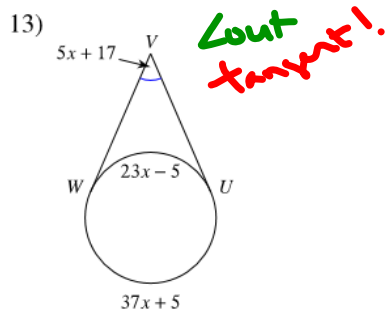
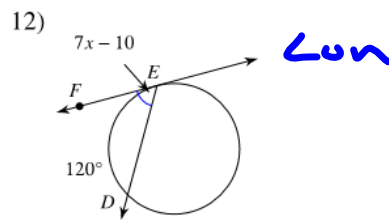
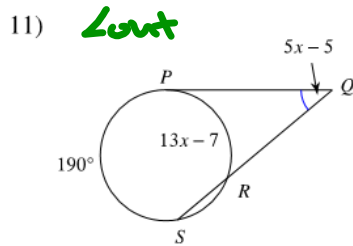
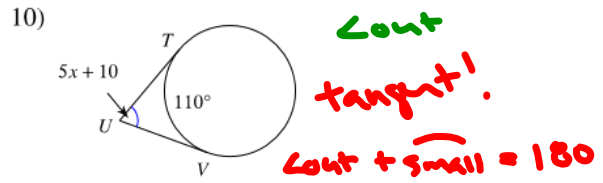
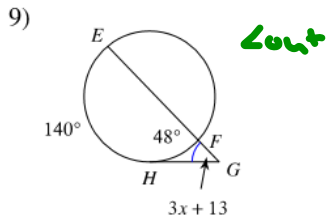
5)   $\angle out$

6)   $\angle out = \frac{arc - small}{2}$

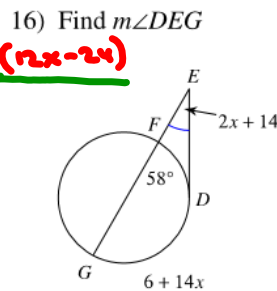
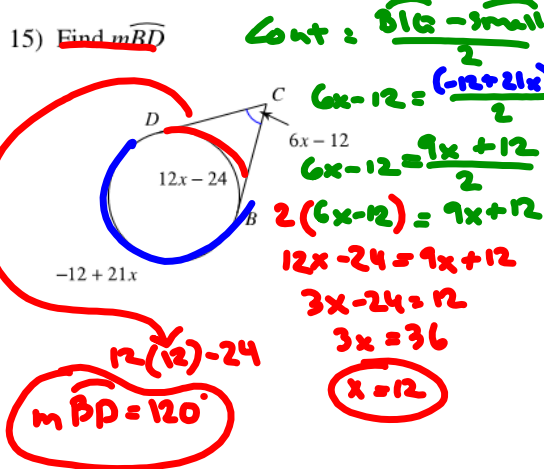
7)   $\angle out$   
 tangent!

8)   $\angle out = \frac{arc - small}{2}$

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



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





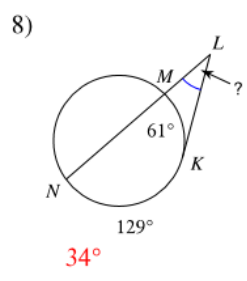
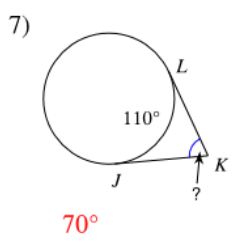
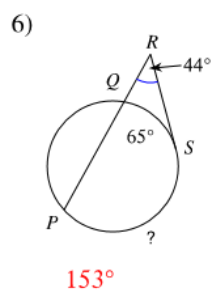
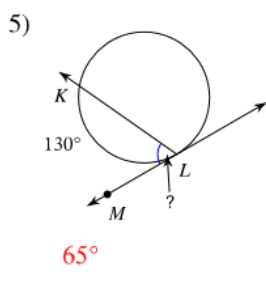
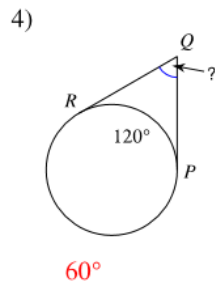
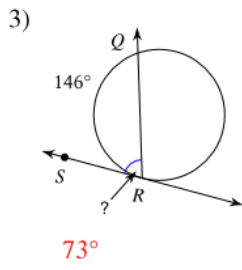
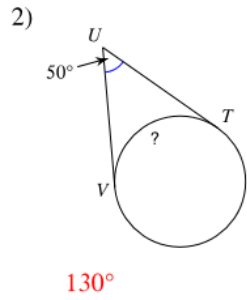
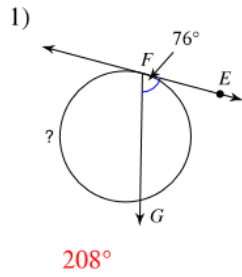
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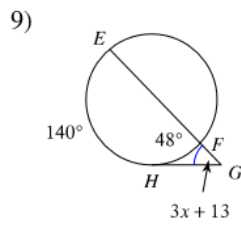
Secant-Tangent and Tangent-Tangent Angles

Date \_\_\_\_\_ Period \_\_\_\_\_

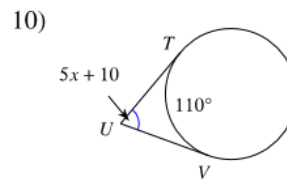
Find the measure of the arc or angle indicated. Assume that lines which appear tangent are tangent.



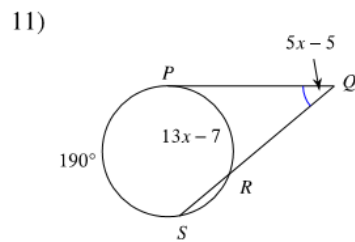
Solve for  $x$ . Assume that lines which appear tangent are tangent.



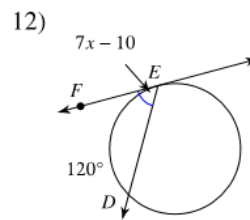
11



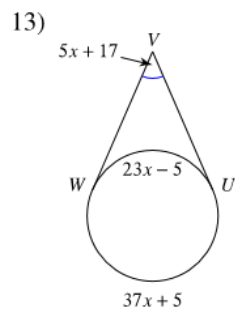
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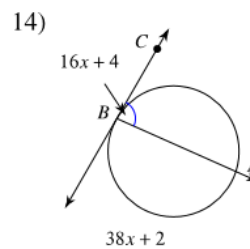
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10

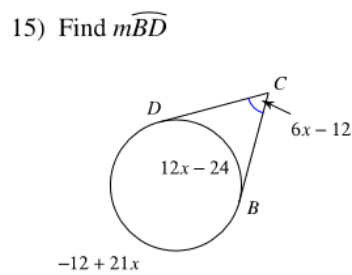


6

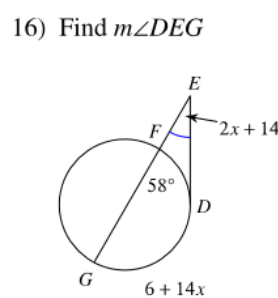


5

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



120°



30°

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Name \_\_\_\_\_

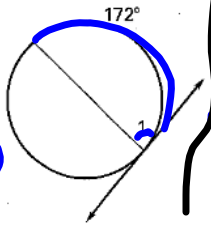
Date \_\_\_\_\_

**LESSON 6.5 Practice**

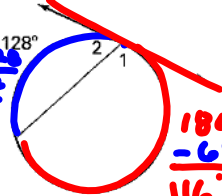
Vertex on, inside, + outside the circle.

Find the measure of each numbered angle or arc.

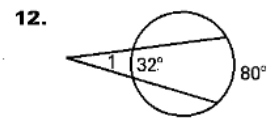
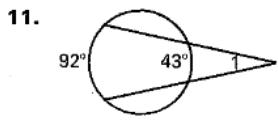
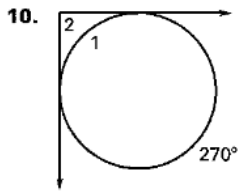
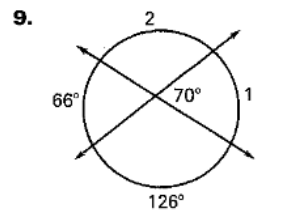
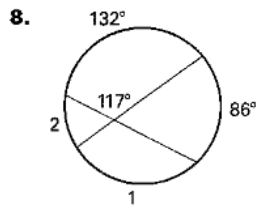
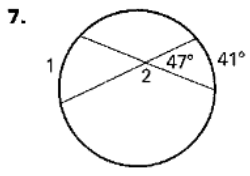
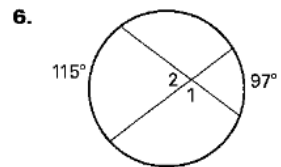
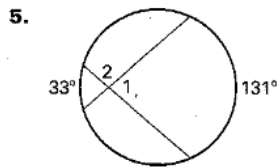
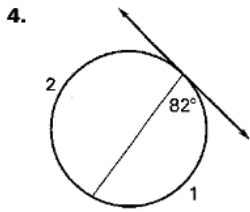
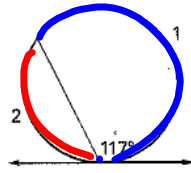
1.  $\angle on = \frac{arc}{2}$   
 $m\angle 1 = \frac{172}{2}$   
 $m\angle 1 = 86^\circ$



2.  $\angle on = \frac{arc}{2}$   
 $m\angle 2 = 64^\circ$   
 $180 - 64 = 116$   
 $m\angle 1 = 116^\circ$



3.  $\angle on = \frac{arc}{2}$   
 $117 = \frac{arc}{2}$   
 $m\widehat{1} = 2(117)$   
 $m\widehat{1} = 234^\circ$   
 $360 - 234 = 126$   
 $m\widehat{2} = 126$

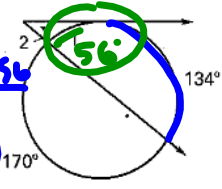


Name \_\_\_\_\_

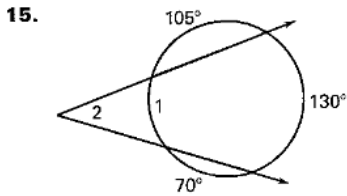
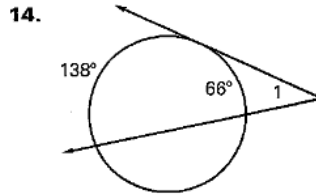
Date \_\_\_\_\_

**LESSON 6.5 Practice** *continued*

Find the measure of each numbered angle or arc.

13.   $m\angle 2 = \frac{170 - 56}{2}$   
 $m\angle 2 = 37$

$$\begin{array}{r} 360 \\ - 134 \\ \hline 226 \\ - 170 \\ \hline 56 \end{array}$$



Find the value of  $x$ .

