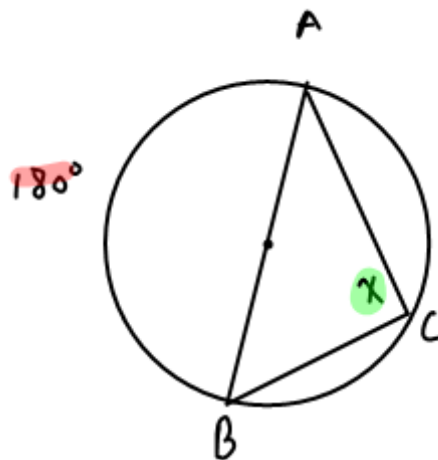


Warm up: Find the value of  $x$ .

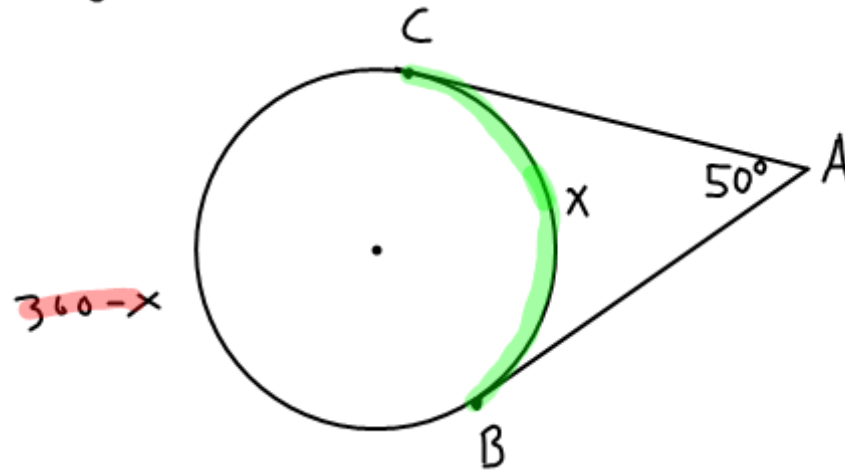
①  $\overline{AB}$  diameter.



Work:

$$\frac{1}{2} (180) = 90^\circ$$

②  $\overline{AB}, \overline{AC}$  tangent



Also, what is the value of

$$x + 50 = ? \rightarrow 180 \checkmark$$

work:



$$50 = \frac{1}{2} (360 - x - x)$$

$$100 = 360 - 2x$$

$$-260 = -2x$$

$$130 = x$$

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### Circle Puzzles

1) Given:  $\odot O, \widehat{DC} \cong \widehat{AE}, \widehat{DE} = 40^\circ, m\angle BAC = 30^\circ$

Find:

$30 = \frac{1}{2} \widehat{BC}$   
 $\downarrow$   
 $2(30) = 60$   


---

 $m\widehat{BC}$   $120^\circ$   


---

 $m\widehat{BA}$   $180 - 40 = 140$   


---

 $m\widehat{CD}$   $140 / 2 = 70$   


---

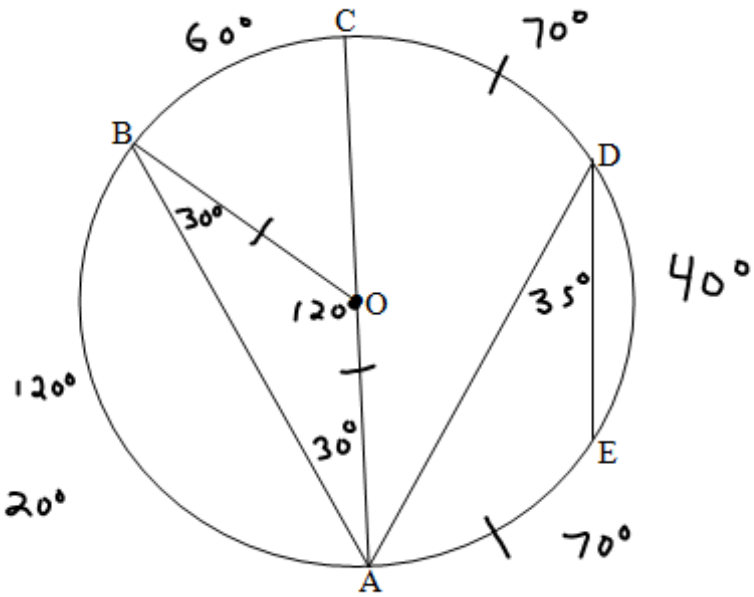
 $m\angle ADE$   $\frac{1}{2}(70) = 35^\circ$   


---

 $m\angle OBA$   $\triangle \rightarrow \triangle 30^\circ$   


---

 $m\angle BOA$   $180 - 30 - 30 = 120^\circ$



2) Given: circle O, diameter  
 Tangents FB and FC  
 Secants PE, PD, and PC  
 $m\angle DOC = 68^\circ$   
 $m\angle DRE = 80^\circ$   
 $m\widehat{BC} = 90^\circ$

Find:

$m\angle BFC$  \_\_\_\_\_

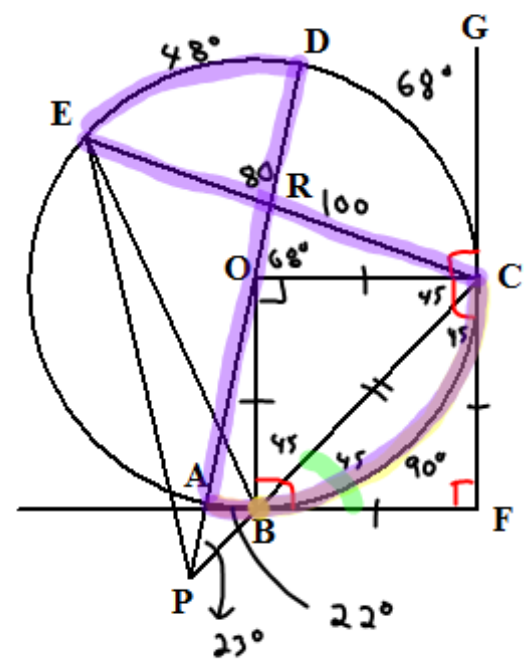
$m\angle CBF$  \_\_\_\_\_

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2) Given: circle O, diameter  
 Tangents FB and FC  
 Secants PE, PD, and PC  
 $m\angle DOC = 68^\circ$   
 $m\angle DRE = 80^\circ$   
 $m\widehat{BC} = 90^\circ$



Find:

$m\angle BFC$	$\widehat{BC} + \angle OFC = 180$ $90 + \angle BCF = 180$ $-90 \quad -90$ $\therefore \angle BCF = 90^\circ$
$m\angle CBF$	$45^\circ$
$m\widehat{DC}$	$68$
$m\widehat{AB}$	$180 - 68 - 90 = 22$
$m\angle DPC$	$\frac{1}{2}(68 - 22) = \frac{1}{2}(46) = 23$
$m\angle BEC$	$\frac{1}{2}(90) = 45$
$m\angle DRC$	$100$
$m\widehat{DE}$	$80 = \frac{1}{2}(112 + DE) \Rightarrow 160 = 112 + DE$ $-112 \quad -112$ $48^\circ = DE$
$m\angle OCB$	$45^\circ$
$m\angle OCG$	$90^\circ$



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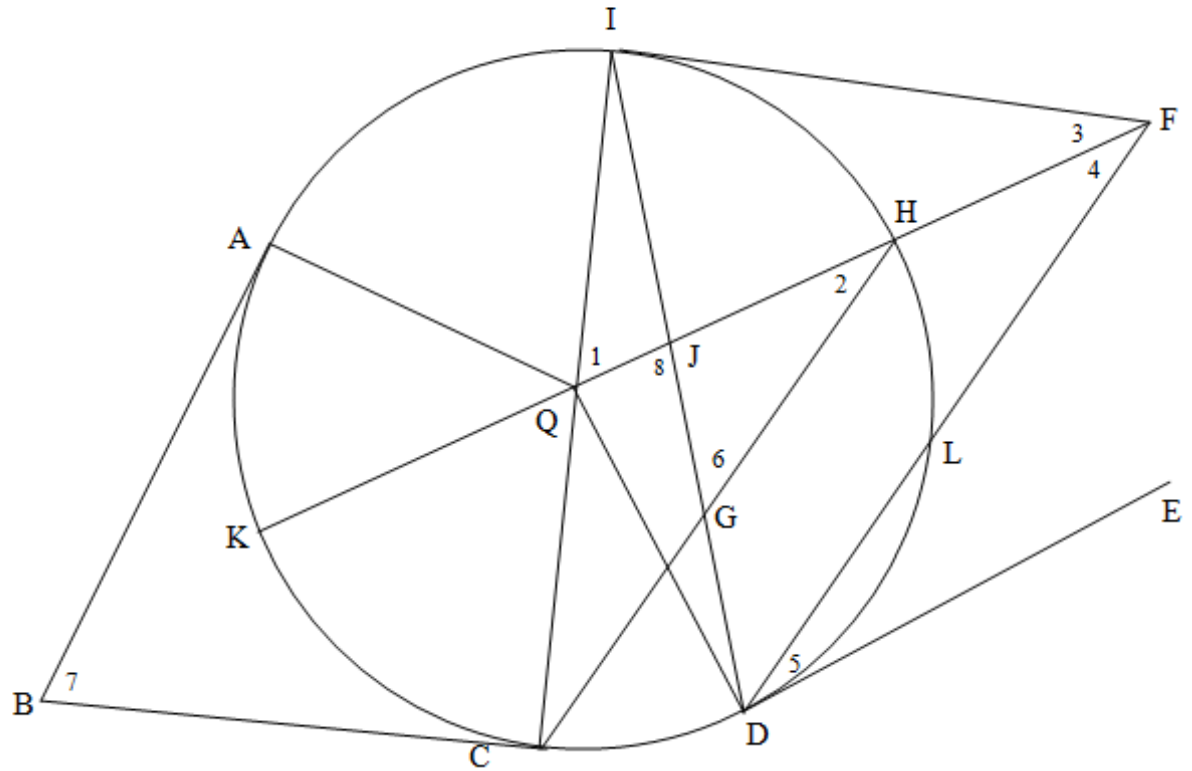
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3) Given:  $\odot Q$ ,  $\overline{CI}$  and  $\overline{KH}$  are diameters,  $\overline{BA}$  is tangent at  $A$ ,  $\overline{BC}$  is tangent at  $C$   
 $\overline{DE}$  is tangent at  $D$ ,  $\overline{FI}$  is tangent at  $I$ ,  $m\widehat{CD} = 46^\circ$ ,  $m\widehat{HI} = 32^\circ$   
 $m\widehat{KC} = 32^\circ$ ,  $m\widehat{HL} = 24^\circ$ ,  $m\angle A Q K = 50^\circ$

1 stamp  
E.L.



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Find:

$m\widehat{AI}$  \_\_\_\_\_  $m\widehat{AK}$  \_\_\_\_\_

$m\angle 1$  \_\_\_\_\_  $m\angle 2$  \_\_\_\_\_

$m\angle 3$  \_\_\_\_\_  $m\angle 4$  \_\_\_\_\_

$m\angle 5$  \_\_\_\_\_  $m\angle 6$  \_\_\_\_\_

$m\angle 7$  \_\_\_\_\_  $m\angle 8$  \_\_\_\_\_