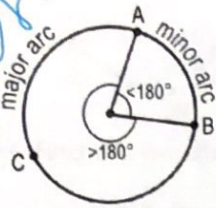


# 6.3 Inscribed Angles

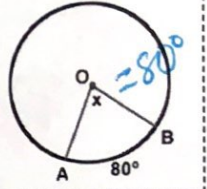
SWBAT apply the rules and theorems of inscribed angles to solve for unknowns.

*Central Angles*



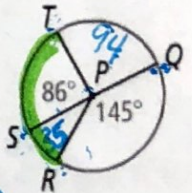
Major Arc: <i>3 letters</i>	Minor Arc: <i>2 letters</i>	Semicircle:
An arc of a circle measuring more than or equal to $180^\circ$ <i>&gt;180</i>	An arc of a circle measuring less than $180^\circ$ <i>&lt;180</i>	An arc of a circle measuring $180^\circ$ <i>=180</i>

<b>Central Angle:</b>	A central angle is an angle formed by two intersecting radii such that its vertex is at the center of the circle.
<b>Central Angle Theorem:</b>	In a circle, or congruent circles, congruent central angles have congruent arcs.



**Example 1:** Identify the following in  $\odot P$  at the right. For parts d-f, find the measure of each arc in  $\odot P$ .

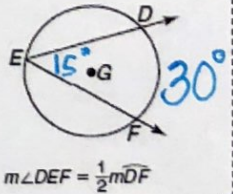
- a) A semicircle *STQ, SRQ*
- b) A minor arc *ST, SR, TA, RQ*
- c) A major arc *QRT, RTQ* *>180°*
- d)  $\widehat{ST}$  *80°*
- e)  $\widehat{STQ}$  *180°*
- f)  $\widehat{RT}$  *121° (86+35)*



<b>Inscribed Angle:</b>	An inscribed angle is an angle with its vertex "on" the circle, formed by two intersecting chords.
<b>Inscribed Angle Theorem:</b>	The measure of an inscribed angle is half the measure of its intercepted arc.

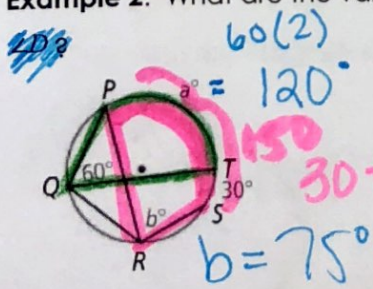
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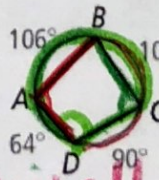


**Example 2:** What are the values of a and b?

**You Try!** What are the  $m\angle A$ ,  $m\angle B$ ,  $m\angle C$ , and  $m\angle D$ ?



*60(2)*  
 $a^\circ = 120^\circ$   
 $30 + 120 = 150$   
 $\frac{150}{2} = 75^\circ$   
 $b = 75^\circ$   
**Shortcuts!!**



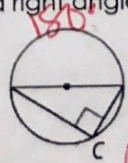
$m\angle A = \frac{1}{2}(100+90) = 95$   
 $m\angle B = 77^\circ$   
 $m\angle C = 85^\circ$   
 $m\angle D = 103^\circ$

<b>Corollary 1:</b>	Two inscribed angles that intercept the same arc are congruent.
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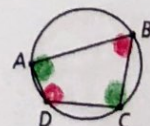
$m\angle A \cong m\angle B$

<b>Corollary 2:</b>	An angle inscribed in a semicircle is a right angle.
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*\* inscribed angle has a length of the diameter.*

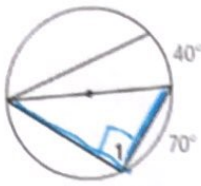
<b>Corollary 3:</b>	The opposite angles of a quadrilateral inscribed in a circle are supplementary. $= 180^\circ$
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$m\angle A + m\angle C = 180^\circ$   
 $m\angle B + m\angle D = 180^\circ$

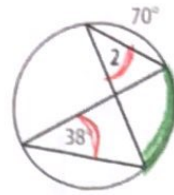
**Example 3:** What is the measure of each numbered angle?

a)



$m\angle 1 = 90^\circ$   
connects to the diameter!

b)



Have the same arc. ( $\frac{m}{2}$ )  
 $m\angle 2 = 38^\circ$

**You Try!** Find the measure of each numbered angle in the diagram to the right.

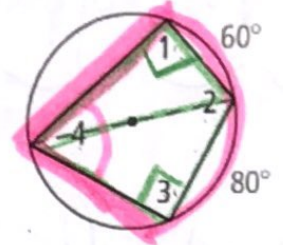
a)  $m\angle 1 = 90^\circ$  (touches diameter)

$180 - 70 = 110^\circ$

b)  $m\angle 2 =$

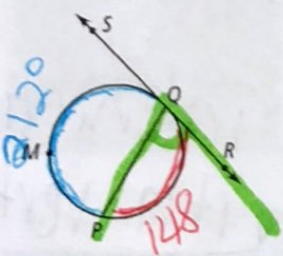
c)  $m\angle 3 = 90^\circ$

d)  $m\angle 4 = \frac{1}{2}(80 + 60) = 70^\circ$



<p><b>Tangent Chord Angle:</b></p>	<p>An angle formed by an intersecting tangent and chord has its vertex "on" the circle.</p>	
<p><b>Tangent Chord Angle Theorem:</b></p>	<p>The tangent chord angle is half the measure of the intercepted arc. <b>Tangent Chord Angle = <math>\frac{1}{2}</math> (Intercepted Arc)</b></p>	<p><math>m\angle C = \frac{1}{2} m\widehat{BDC}</math></p>

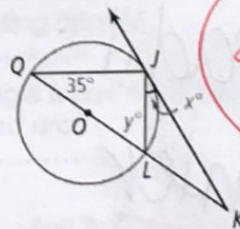
**Example 4:** In the diagram,  $SR$  is tangent to the circle at  $Q$ . If  $m\widehat{PMQ} = 212$ , what is the  $m\angle PQR$ ?



$360 - 212 = 148$

$\frac{148}{2} = 74^\circ$

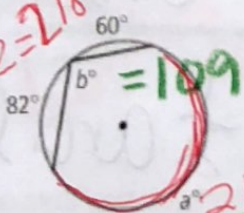
**You Try!** In the diagram,  $KJ$  is tangent to  $\odot O$ . What are the values of  $x$  and  $y$ ?



SKIP

**Practice:** Find the value of each variable. For each circle, the dot represents the center.

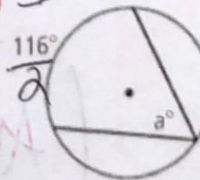
1.



$360 - 60 - 82 = 218$

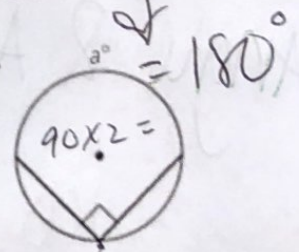
$\frac{218}{2} = 109$

2.



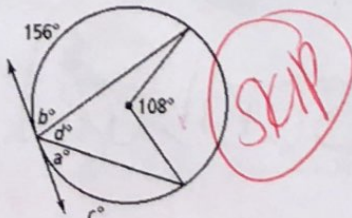
$a = 58$

3.



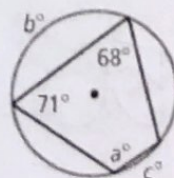
$90 \times 2 = 180$

4.



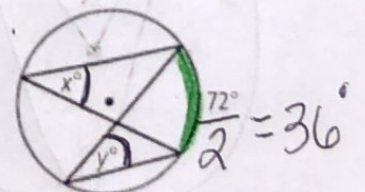
SKIP

5.



SKIP

6.



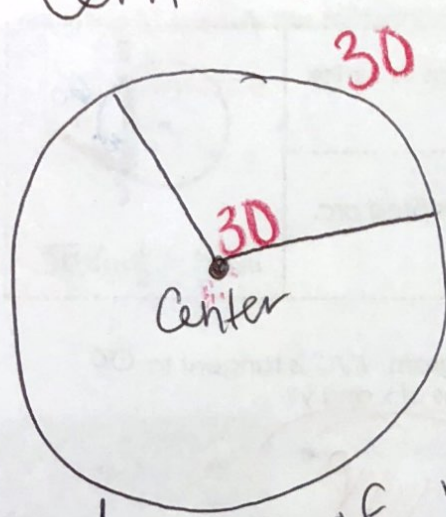
$x \& y = 36$

$\frac{72}{2} = 36$

Take Aways:

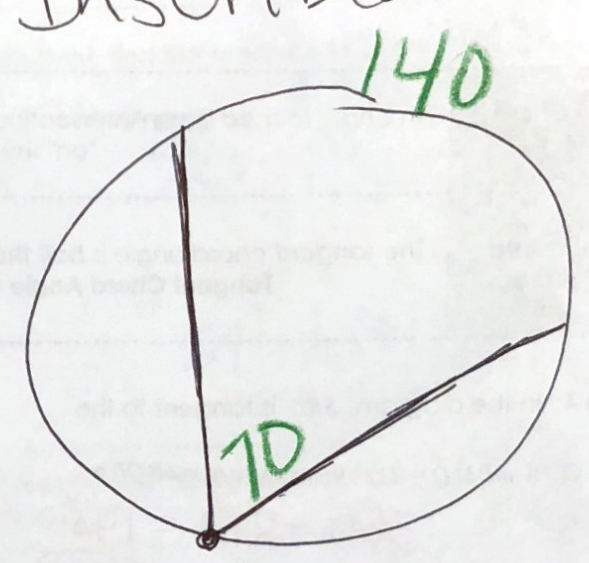
Two types of angles!

Central



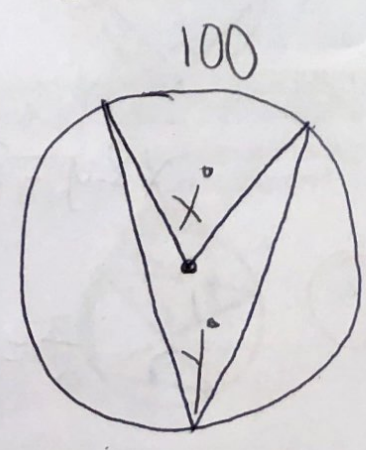
Made up of radii from the center  
(Angle & Arc  $\cong$ )

Inscribed



Made of intersecting chords, with vertex on the circle

(Angle is  $\frac{1}{2}$  arc length)



$x^\circ = 100$  (central)  
 $y^\circ = 50$  (inscribed)