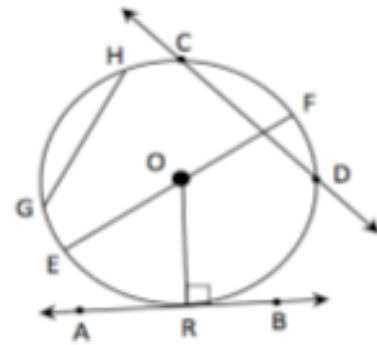


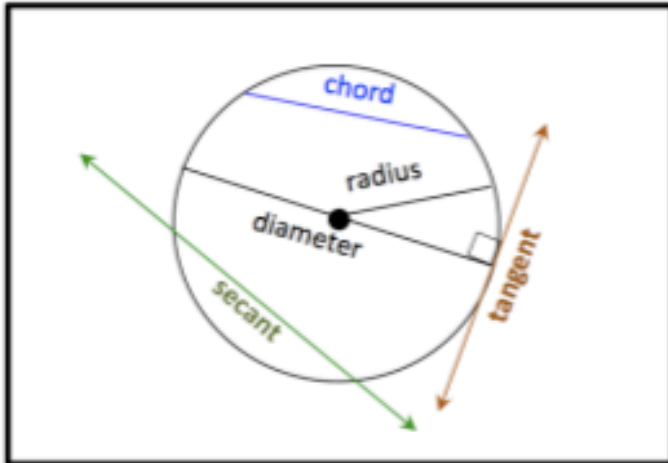
Circle Segments

USE THE DIAGRAM BELOW TO ANSWER:

In the table write the whether the indicated circle segment is a radius, diameter, chord, tangent or secant.



USE THIS DIAGRAM

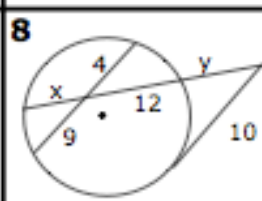
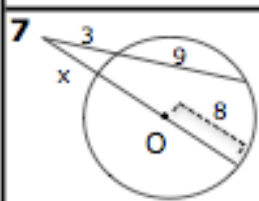
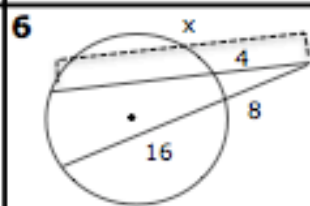
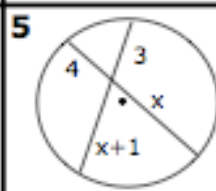
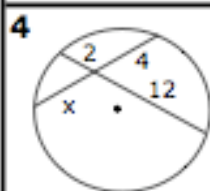
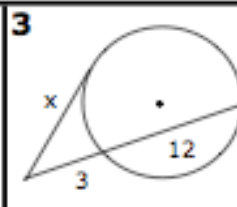
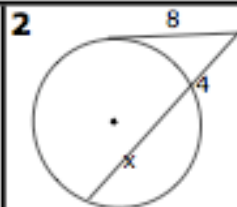
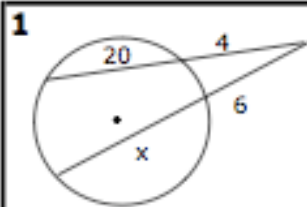


Segment	Segment Type
1) \overline{OR}	
2) \overline{AB}	
3) \overline{GH}	
4) \overline{CD}	
5) \overline{EF}	

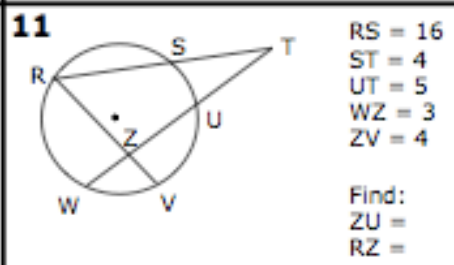
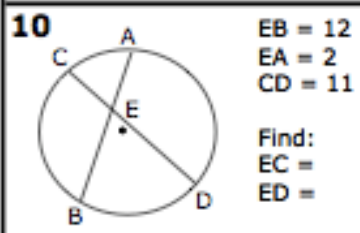
USE THIS CHART TO ANSWER QUESTIONS ON NEXT PAGE.

Situation	Formula & Solution
	<p>chord-chord</p> $(pt\ 1)(pt\ 2) = (pt\ 1)(pt\ 2)$ $(5)(8) = 10x$ $10x = 40$ $x = 4$
	<p>tan-tan</p> $tan = tan$ $3x - 10 = 2x$ $x = 10$ $tangent = 2x = 2(10) = 20$
	<p>sec-sec</p> $(sec)(outer\ part) = (sec)(outer\ part)$ $(x + 6)(6) = (12)(4)$ $6x + 36 = 48$ $6x = 12$ $x = 2$
	<p>tan-sec</p> $tan^2 = (sec)(outer\ part)$ $4^2 = (9)(x)$ $16 = 9x$ $x = \frac{16}{9}$

Find x or y as indicated using tangents, secants and chords as shown.



9 In a circle, diameter \overline{AB} is extended through B to external point P. Tangent \overline{PC} is drawn to point C on the circle. If the radius of the circle is 15, and $BP = 2$, find PC.



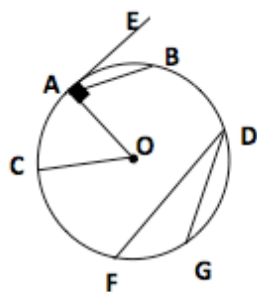
Circles: Angles and Arcs

	<p>$\angle O$ is a central angle.</p> <p>$\angle O$ intercepts \widehat{AB} ("arc AB")</p> <p>A central angle is formed by two radii.</p>		<p>$\angle E$ is an inscribed angle.</p> <p>$\angle E$ intercepts \widehat{DF} ("arc DF")</p> <p>An inscribed angle is formed by two chords meeting at common point on the circle.</p>
	<p>$\angle HKI$ & $\angle JKG$ are chord-chord angles.</p> <p>$\angle HKI$ intercepts \widehat{HI}</p> <p>$\angle JKG$ intercepts \widehat{JG}</p>		<p>$\angle U$ is a tan-chord angle.</p> <p>$\angle U$ intercepts \widehat{UW}</p>
	<p>$\angle Q$ is a tan-secant angle.</p> <p>$\angle Q$ intercepts \widehat{HS} and \widehat{PH}</p>		<p>$\angle P$ is a tan-tan angle.</p> <p>$\angle P$ intercepts major \widehat{RC}</p> <p>$\angle P$ intercepts minor \widehat{RC}</p>
		<p>$\angle Z$ is a secant-secant angle.</p> <p>$\angle Z$ intercepts \widehat{NO} and \widehat{ML}</p>	

Write whether the angle is central, inscribed, chord-chord, secant-secant, tan-tan, tan-chord or tan-secant.

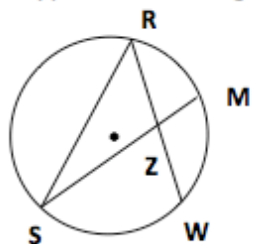
<p>$\angle P$ <input type="text"/></p> <p>$\angle D$ <input type="text"/></p> <p>$\angle PBC$ <input type="text"/></p> <p>$\angle BCD$ <input type="text"/></p> <p>$\angle CBD$ <input type="text"/></p>		<p>6. $\angle O$ <input type="text"/></p> <p>7. $\angle K$ <input type="text"/></p> <p>8. $\angle W$ <input type="text"/></p> <p>9. $\angle RVM$ <input type="text"/></p> <p>10. $\angle ZVM$ <input type="text"/></p>	
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A Write the type of circle angle each angle represents. Also, determine the intercepted arc.



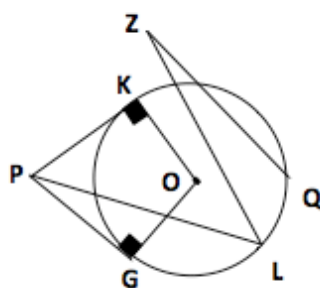
Angle	Circle Angle Type	Intercepted Arc
1) $\angle AOC$	<input type="text"/>	<input type="text"/>
2) $\angle D$	<input type="text"/>	<input type="text"/>
3) $\angle EAB$	<input type="text"/>	<input type="text"/>

B Write the type of circle angle each represents. Also, determine the intercepted arc.



Angle	Circle Angle Type	Intercepted Arc
1) $\angle MZW$	<input type="text"/>	<input type="text"/>
2) $\angle R$	<input type="text"/>	<input type="text"/>
3) $\angle RSM$	<input type="text"/>	<input type="text"/>

C Write the type of circle angle each represents. Also, determine the intercepted arc or arcs.



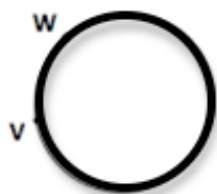
Angle	Circle Angle Type	Intercepted Arcs
1) $\angle GPK$	<input type="text"/>	<input type="text"/> & <input type="text"/>
2) $\angle GPL$	<input type="text"/>	<input type="text"/> & <input type="text"/>
3) $\angle Z$	<input type="text"/>	<input type="text"/> & <input type="text"/>
4) $\angle LO$	<input type="text"/>	<input type="text"/>

D Sketch the:

1) central angle intercepting \widehat{EF}



2) inscribed angle intercepting \widehat{VW}



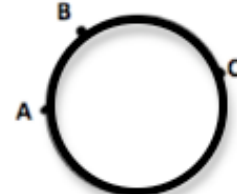
3) chord-chord angle intercepting \widehat{QR} & \widehat{ST}



4) tan-chord angle intercepting \widehat{NM}



5) tan-secant angle intercepting \widehat{AB} & \widehat{AC}



E Sketch a:

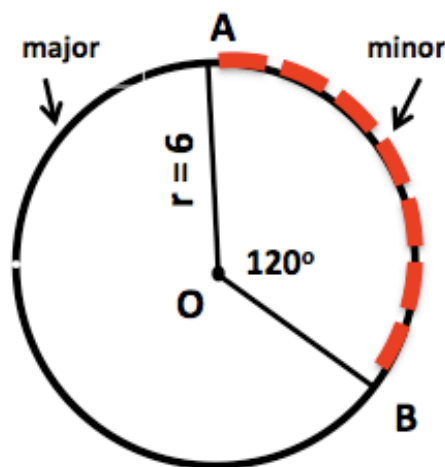
1) a circle with a central angle and an inscribed angle both intercepting the same arc.

2) a circle with an inscribed angle and a tan-chord angle intercepting the same arc.

Circles: Arc Measurement & Arc Length

Arcs can be measured in two ways: **degree measure** and **length**.

EXAMPLE: Find the degree measure & length of minor arc AB.



degree measure = ?

length = ?

SOLUTION:

a) The measure ($^\circ$) of an arc equals the measure of its central angle.

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

b) To find the length of an arc, find the circumference of the circle and multiply it by the quotient of the arc measure and 360° .

$$\text{Circumference} = 2\pi(6) = 12\pi$$

$$\text{Length arc } AB = 12\pi \left(\frac{120}{360}\right) = \frac{1}{3}(12\pi) = 4\pi$$

$$\text{Length } \widehat{AB} = 4\pi$$

Answers

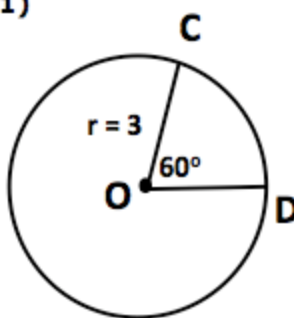
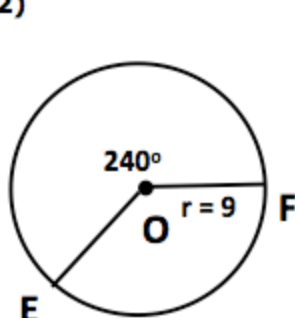
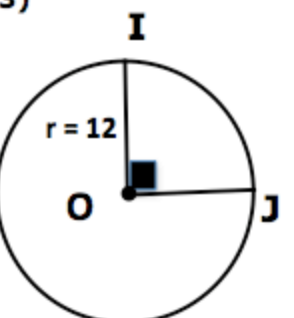
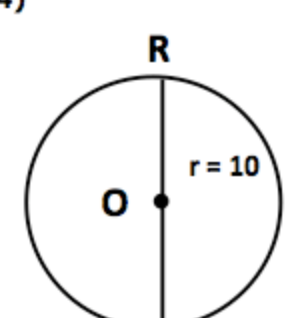
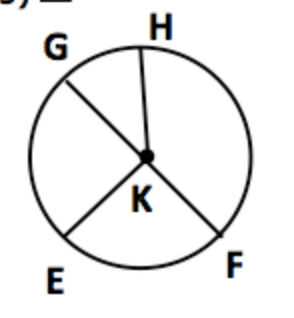
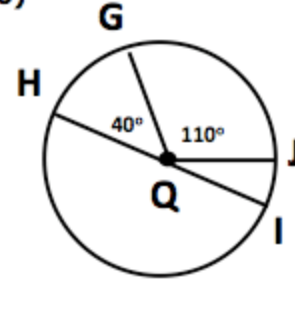
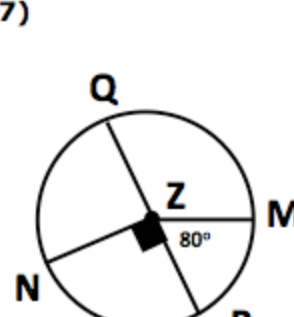
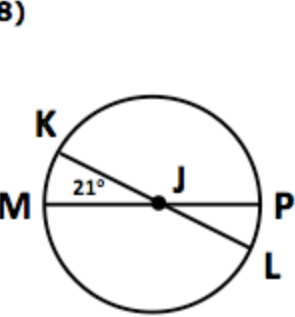
arc
measure

$$120^\circ$$

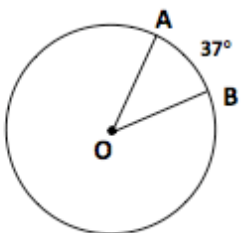
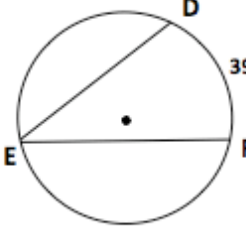
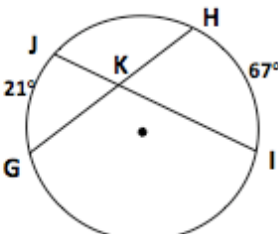
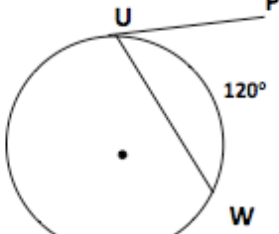
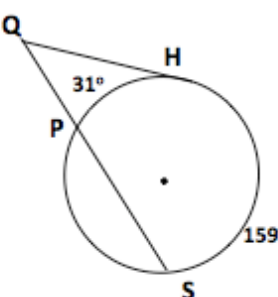
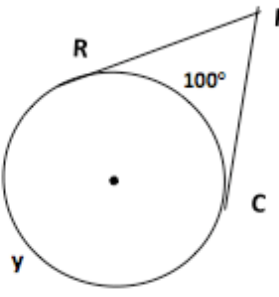
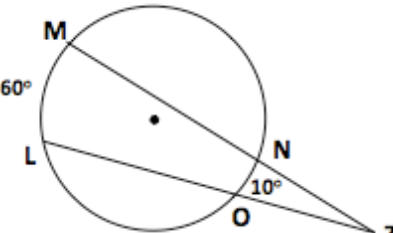
arc
length

$$4\pi$$

EXERCISES

<p>1)</p>  <p>a. What is the measure of minor arc CD? $m\widehat{CD} =$</p> <p>b. Find the length of minor arc CD.</p>	<p>2)</p>  <p>a. What is the measure of major arc EF? $m\widehat{EF} =$</p> <p>b. Find the length of major arc EF.</p>
<p>3)</p>  <p>a. What is the measure of minor arc IJ?</p> <p>b. Length minor arc IJ =</p>	<p>4)</p>  <p>a. What is the measure of arc RS?</p> <p>b. Length arc RS =</p> <p>c. Is arc RC minor, major or semi-circle?</p>
<p>5) <input checked="" type="checkbox"/></p>  <p>⊙K shown. Write whether arc listed is minor, major or semi-circle.</p> <p>a. \widehat{EF} _____</p> <p>b. \widehat{GH} _____</p> <p>c. \widehat{HFE} _____</p> <p>d. \widehat{FEG} _____</p> <p>e. \widehat{GHF} _____</p>	<p>6)</p>  <p>⊙Q Shown. Find the measure of each arc.</p> <p>a. \widehat{HG} _____</p> <p>b. \widehat{GJ} _____</p> <p>c. \widehat{JI} _____</p> <p>d. \widehat{HGI} _____</p> <p>e. \widehat{HI} _____</p>
<p>7)</p>  <p>⊙Z shown. Find the measure of each arc.</p> <p>a. \widehat{MP} _____</p> <p>b. \widehat{NP} _____</p> <p>c. \widehat{NQ} _____</p> <p>d. \widehat{PNQ} _____</p> <p>e. \widehat{MQ} _____</p> <p>f. \widehat{MPN} _____</p>	<p>8)</p>  <p>⊙J shown. Find the measure of each arc.</p> <p>a. \widehat{MK} _____</p> <p>b. \widehat{PL} _____</p> <p>c. \widehat{KP} _____</p> <p>d. \widehat{ML} _____</p> <p>e. \widehat{MLP} _____</p> <p>f. \widehat{MKL} _____</p>

Circle Angle Measurement Formulas

	<p>The measure of a central angle equals the measure of its intercepted arc.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $m\angle O = 37^\circ$ </div>		<p>An inscribed angle measures 1/2 of its intercepted arc.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $m\angle E = 19.5^\circ$ </div> $\frac{1}{2}(39) = 19.5$
	<p>A chord-chord angle measures 1/2 the SUM of the two intercepted arcs.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $m\angle HKI = 44^\circ$ </div> $\frac{1}{2}(67 + 21) = \frac{1}{2}(88) = 44$		<p>A tan-chord angle measures 1/2 of its intercepted arc.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $m\angle U = 60^\circ$ </div> $\frac{1}{2}(120) = 60$
	<p>A tan-secant angle measures 1/2 of the DIFFERENCE between its intercepted arcs.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $m\angle Q = 64^\circ$ </div> $\frac{1}{2}(159 - 31) = \frac{1}{2}(128) = 64$		<p>A tan-tan angle measures 1/2 the DIFFERENCE between its intercepted arcs.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $m\angle P = 80^\circ$ </div> $m\angle P = \frac{1}{2}(260 - 100) = \frac{1}{2}(160) = 80^\circ$ $y = \frac{1}{2}(360 - 100) = 260$
	<p>A secant-secant angle measures 1/2 the DIFFERENCE between its two intercepted arcs.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $m\angle Z = 25^\circ$ </div> $\frac{1}{2}(60 - 10) = \frac{1}{2}(50) = 25$		

Exercises;

1. Find the measure of a central angle intercepting an arc of 28° .
2. Find the measure of an inscribed angle intercepting an arc of 15° .
3. Find the measure of a tan-chord angle intercepting an arc of 100° .
4. Find the measure of a chord-chord angle intercepting arcs of 120° and 30° .
5. Find the measure of a tan-secant angle intercepting arcs of 88° and 16° .
6. Find the measure of a secant-secant angle intercepting arcs of 25° and 20° .
7. Find the measure of a tan-tan angle intercepting a minor arc of 72° .
(Hint: Find the measure of the major arc first.)
8. Find the measure of a tan-tan angle intercepting a major arc of 300° .
9. Find the measure of an arc intercepted by a central angle of 132.954° .
10. Find the measure of an arc intercepted by an inscribed angle of 77° .
11. Find the measure of an arc intercepted by a central angle of x° .
12. Find the measure of an arc intercepted by an inscribed angle of y° .