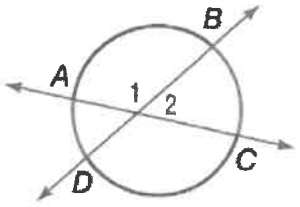
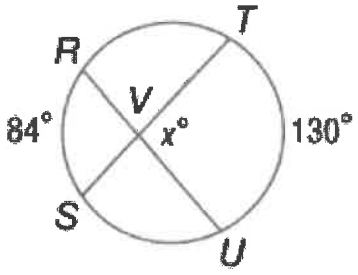
Secant: a line that intersects a circle in exactly 2 points

⇑ not central or inscribed angles

Theorem 10.12	If two secants of chords intersect in the interior of the circle, then the measure of an angle formed is one half of the sum of the measure of the arcs intercepted by the angle and its vertical angle.	 $m\angle 1 = \frac{1}{2}(m\overset{\frown}{AB} + m\overset{\frown}{DC})$

1. Find x in the following:

a.

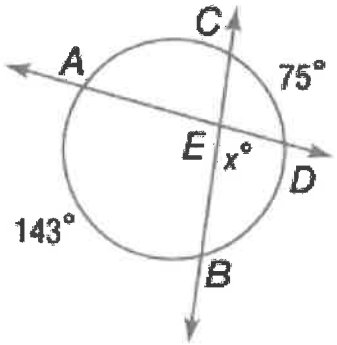


$x = \frac{1}{2}(130 + 84)$

$x = \frac{1}{2}(214)$

$\boxed{x = 107°}$

b.

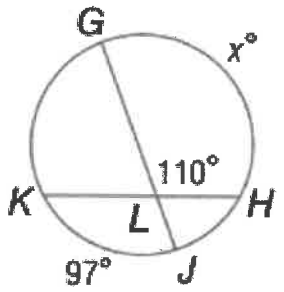


$180 - x = \frac{1}{2}(75 + 143)$

$180 - x = 109°$

$x = 71°$

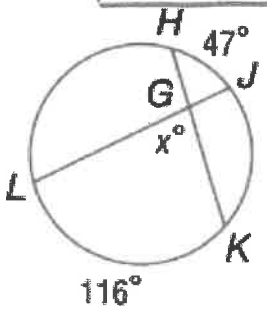
c.



$110 = \frac{1}{2}(x + 97)$

$220 = x + 97$

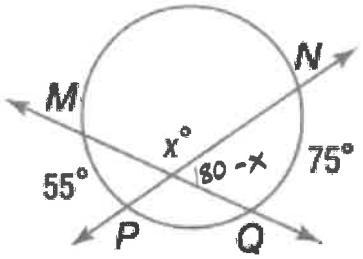
d. $\boxed{123° = x}$



$x = \frac{1}{2}(47 + 116)$

$\boxed{x = 81.5°}$

e.



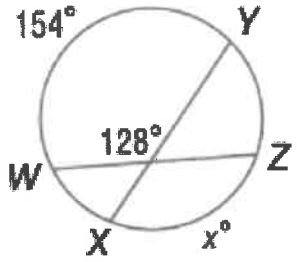
$180 - x = \frac{1}{2}(55 + 75)$

$180 - x = 65$

$-x = -115$

$x = 115°$

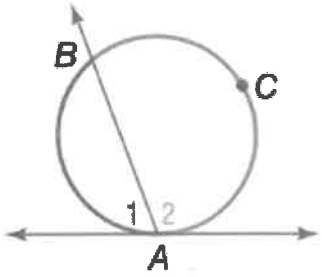
f.



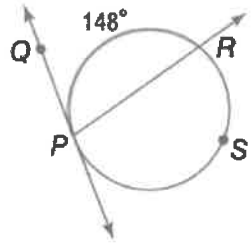
$128 = \frac{1}{2}(x + 154)$

$256 = x + 154$

$102° = x$

Theorem 10.13	If a secant and a tangent line intersect at the point of tangency, then the measure of each angle formed is ½ the measure of of its intercepted arc	 $m\angle 1 = \frac{1}{2}(m\overset{\frown}{AB})$

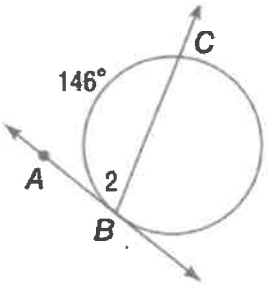
2. Find the $m\angle QPR$



$m\angle QPR = \frac{1}{2}(148)$

$= 74°$

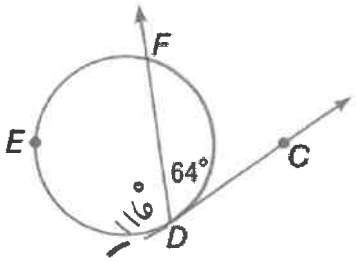
3. Find the $m\angle 2$



$m\angle 2 = \frac{1}{2}(146)$

$m\angle 2 = 73°$

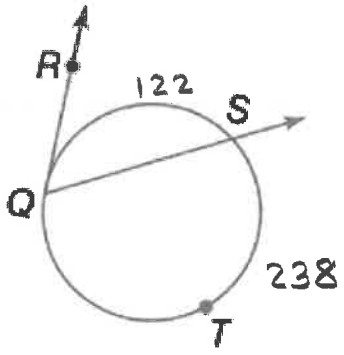
4. Find the $m\overset{\frown}{DEF}$



$\frac{1}{2}(m\overset{\frown}{DEF}) = 116°$

$m\overset{\frown}{DEF} = 232°$

6. Find the $m\angle QRS$, if $m\overset{\frown}{QTS} = 238$

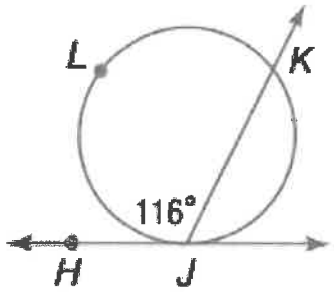


$360 - 238 = 122$

$m\angle QRS = \frac{1}{2}(122)$

$= 61°$

5. Find the $m\overset{\frown}{JLK}$

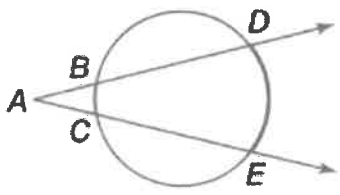


$116 = \frac{1}{2}(m\overset{\frown}{JLK})$

$232° = m\overset{\frown}{JLK}$

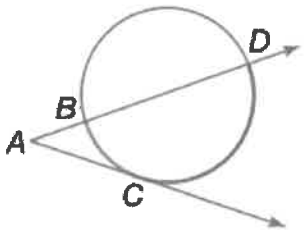
★ always outer intercepted arc − inner intercepted arc

Theorem 10.14	If two secants, a secant and a tangent, or two tangents intersect in the exterior of a circle, then the measure of the angle formed is one half of the difference of the measure of the intercepted arcs.



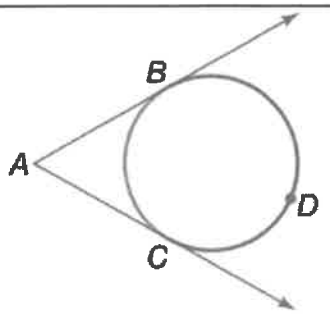
Two Secants

$m\angle A = \frac{1}{2}(m\overset{\frown}{DE} - m\overset{\frown}{BC})$



Secant-Tangent

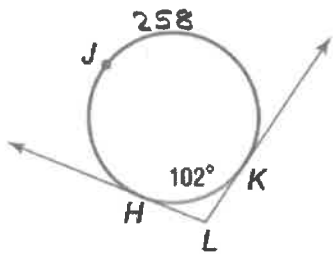
$m\angle A = \frac{1}{2}(m\overset{\frown}{DC} - m\overset{\frown}{BC})$



Two Tangents

$m\angle A = \frac{1}{2}(m\overset{\frown}{BDC} - m\overset{\frown}{BC})$

7. Find the $m\angle L$



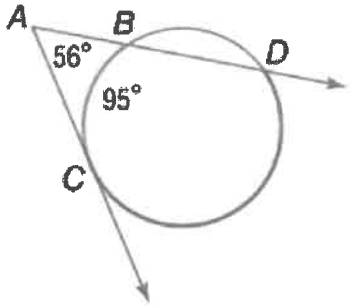
360 − 102 = 258

$m\angle L = \frac{1}{2}(258 - 102)$

$m\angle L = \frac{1}{2}(156)$

$m\angle L = 78^\circ$

8. Find the $m\overset{\frown}{CD}$

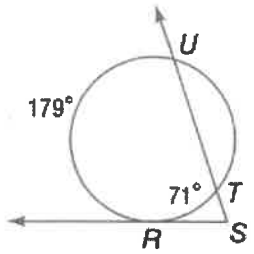


$56 = \frac{1}{2}(m\overset{\frown}{DC} - 95)$

$112 = m\overset{\frown}{DC} - 95$

$207^\circ = m\overset{\frown}{DC}$

9. Find the $m\angle S$

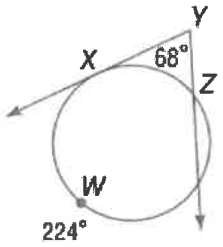


$m\angle S = \frac{1}{2}(179 - 71)$

$m\angle S = \frac{1}{2}(108)$

$m\angle S = 54°$

10. Find the $m\overset{\frown}{XZ}$

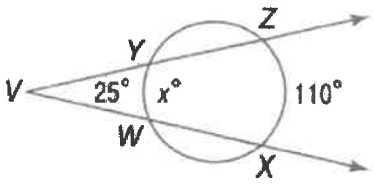


$68 = \frac{1}{2}(224 - m\overset{\frown}{XZ})$

$136 = 224 - m\overset{\frown}{XZ}$

$88 = m\overset{\frown}{XZ}$

11. Find the value of x



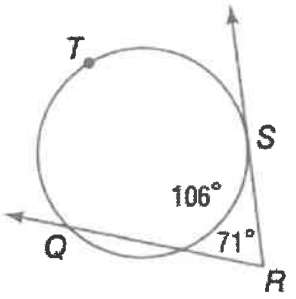
$25 = \frac{1}{2}(110 - x)$

$50 = 110 - x$

$-60 = -x$

$60° = x$

12. Find the $m\overset{\frown}{QTS}$



$71 = \frac{1}{2}(m\overset{\frown}{QTS} - 106)$

$142 = m\overset{\frown}{QTS} - 106$

$248 = m\overset{\frown}{QTS}$