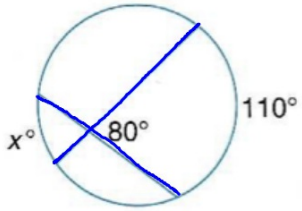
For each figure, write an equation in terms of x and the given measures. Then solve for x. Assume lines that appear to be tangent are tangent.

10.



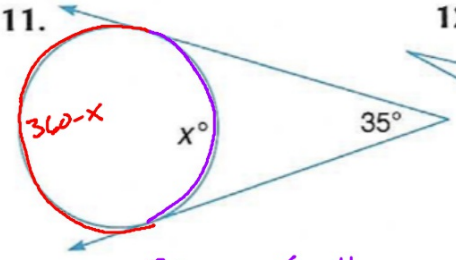
$\angle = \frac{x^\circ + y^\circ}{2}$

$2(80^\circ) = \left(\frac{x^\circ + 110^\circ}{2}\right)2$

$160 = x + 110$

$x = 50^\circ$

11.



$m\angle = \frac{\text{Big arc} - \text{Small arc}}{2}$

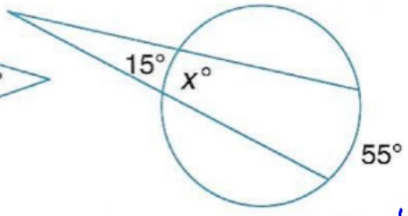
$35 = \frac{360 - x - x}{2}$

$70 = 360 - 2x$

$-290 = -2x$

$x = 145$

12.



$m\angle = \frac{\text{Big} - \text{Small}}{2}$

$15 = \frac{55 - x}{2}$

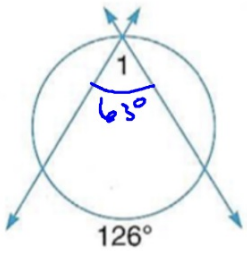
$30 = 55 - x$

$-25 = -x$

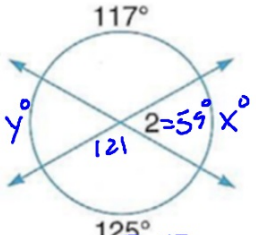
$x = 25$

For each circle, measurements of certain arcs are given. Find the measure of each numbered angle. Assume lines that appear to be tangent are tangent.

4.

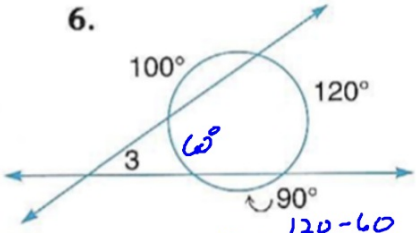


5.



$\theta = \frac{125+117}{2}$

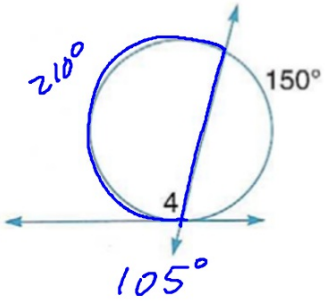
6.



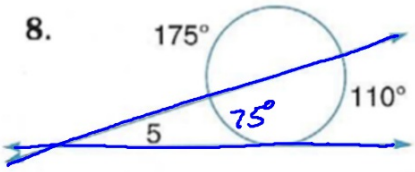
$m\angle 3 = \frac{120-60}{2}$

$= 30$

7.



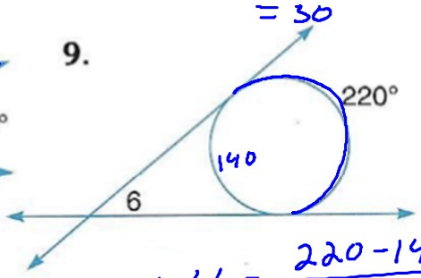
8.



$m\angle 5 = \frac{110-75}{2}$

$= 17.5°$

9.

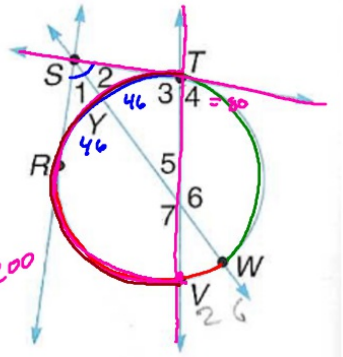


$m\angle 6 = \frac{220-140}{2}$

$= 40°$

In the figure, $m\angle 1 = 2x$, $m\angle 1 = m\angle 2$, $m\overset{\frown}{RYT} = 4x + 4$, $m\overset{\frown}{YT} = 3x - 20$, $m\angle 4 = 3x + 14$, and $\overleftrightarrow{ST}$ and $\overleftrightarrow{SR}$ are tangents. Find each value or measure.

28. $x = 22$
29. $m\angle 1 = 44$
30. $m\overset{\frown}{RV} = 108$
31. $m\angle 2 = 44$
32. $m\overset{\frown}{RYT} = 92$
33. $m\overset{\frown}{TRV} = 200$
34. $m\overset{\frown}{YT} = 46$
35. $m\overset{\frown}{YR} = 46$
36. $m\angle 5 = 36$
37. $m\overset{\frown}{TW} = 134$
38. $m\overset{\frown}{RW} = 134$
39. $m\angle 6 = 144$
40. $m\angle 4 = 80$
41. $m\overset{\frown}{TWV} = 160°$
42. $m\overset{\frown}{YV} = 154$
43. $m\overset{\frown}{VW} = 26°$
44. $m\angle 3 = 100$
45. $m\angle 7 = 144$



$44 = \frac{x - 46}{2}$

$88 = x - 46$

46

134

$44 = \frac{\overset{\frown}{TW} - 46}{2}$

$36 = \frac{46 + \overset{\frown}{VW}}{2}$

$72 = 46 + \overset{\frown}{VW}$

72

-46

26

$360 - (4x + 4)$

$4x = \frac{360 - (4x+4) - (4x+4)}{2}$

$8x = 360 - 4x - 4 - 4x - 4$

$360 - 8x - 8$

$8x = -8x + 352$

$16x = 352$

$x = 22$