Geometry Unit 9

9-6: Other Angles of Circles

Other Angles of Circles

- **Content Objective**: Students will be able to identify interior and exterior angles created by chords, secant, and tangent lines in circles.

- **Language Objective**: Students will be able to write equations and solve for the measures of interior and exterior angles in circles.

Interior Angles

- **Theorem 9-9**:The measure of an angle formed by two chords that intersect inside a circle is equal to half the sum of the measures of the intercepted arcs.
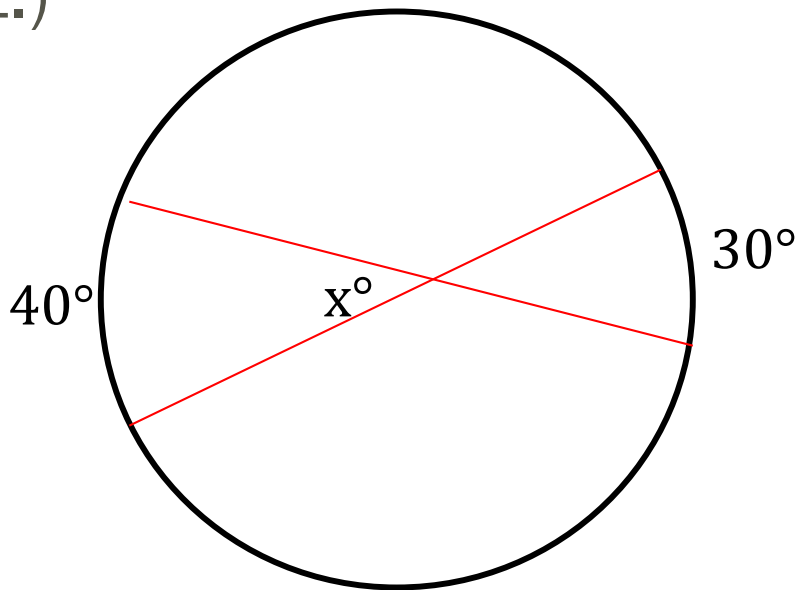
Equation:

$$m < 1 = \frac{1}{2}(m \, \widehat{AC} + m \, \widehat{BD})$$
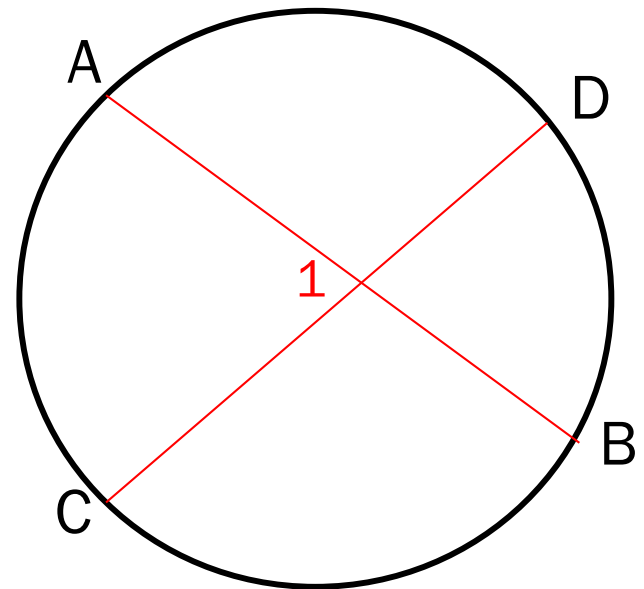
Interior Angles Practice

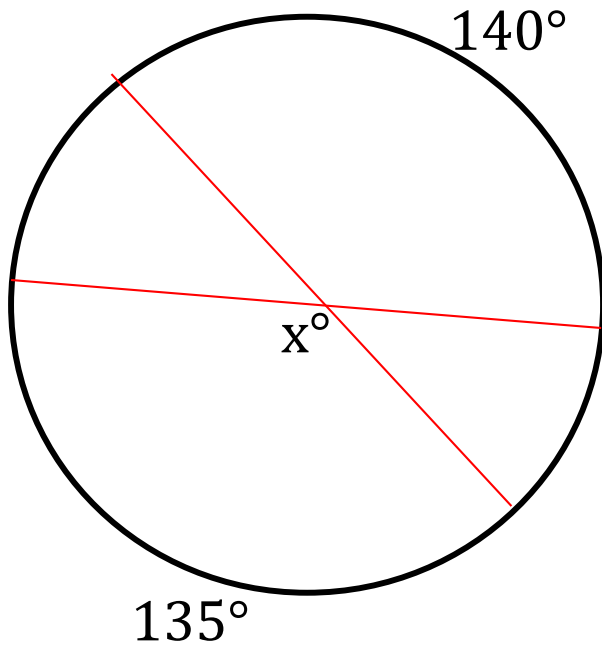 Find the measure of x.

 1.)

$$x = \frac{1}{2}(40 + 30)$$

$$x = \frac{1}{2} \times 70$$

$$x = 35$$

Interior Angles Practice

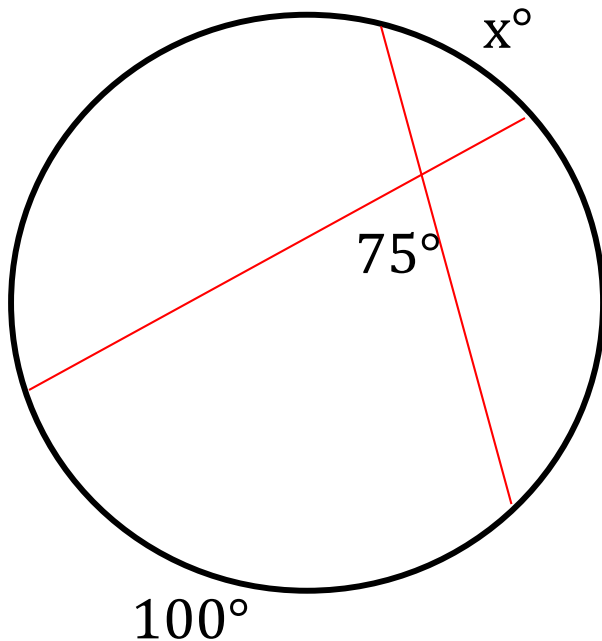❧ Find the measure of x.

❧ 2.)

$$x = \frac{1}{2}(140 + 135)$$

$$x = \frac{1}{2} \times 275$$

$$x = \mathbf{137.5}$$

Find the measure of x.

3.)

$$75 = \frac{1}{2}(x + 100)$$

$$150 = x + 100$$

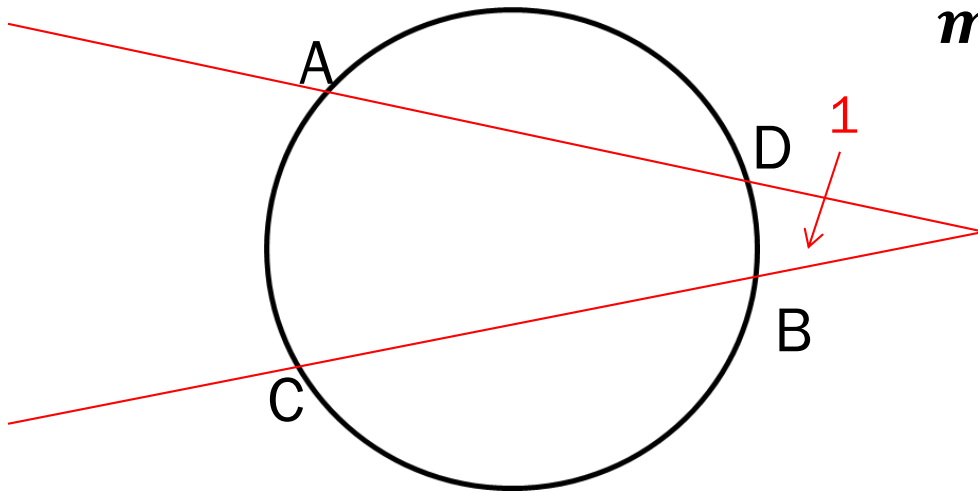$$x = 50$$

Exterior Angles

    Theorem 9-10: The measure of an angle formed by two secants, two tangents, or a secant and a tangent drawn from a point outside the circle is equal to
half the difference of the measures of the intercepted arcs.

Exterior Angles

 Theorem 9-10: Case 1: Two Secants
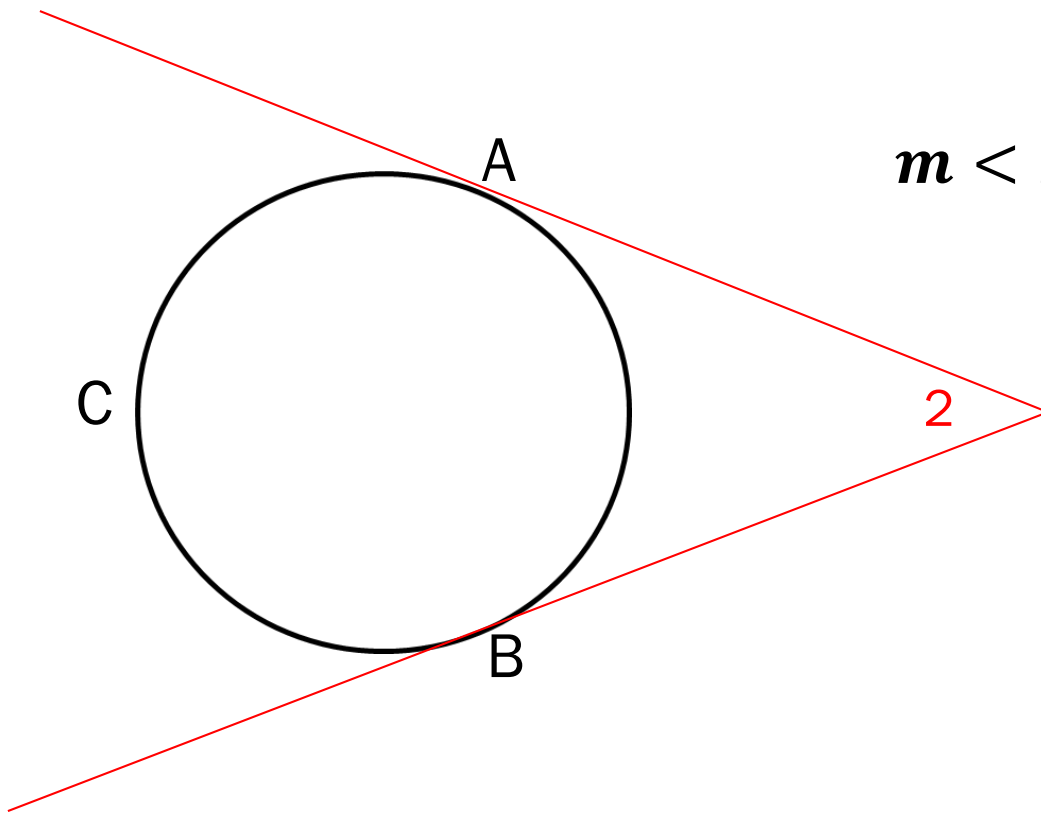

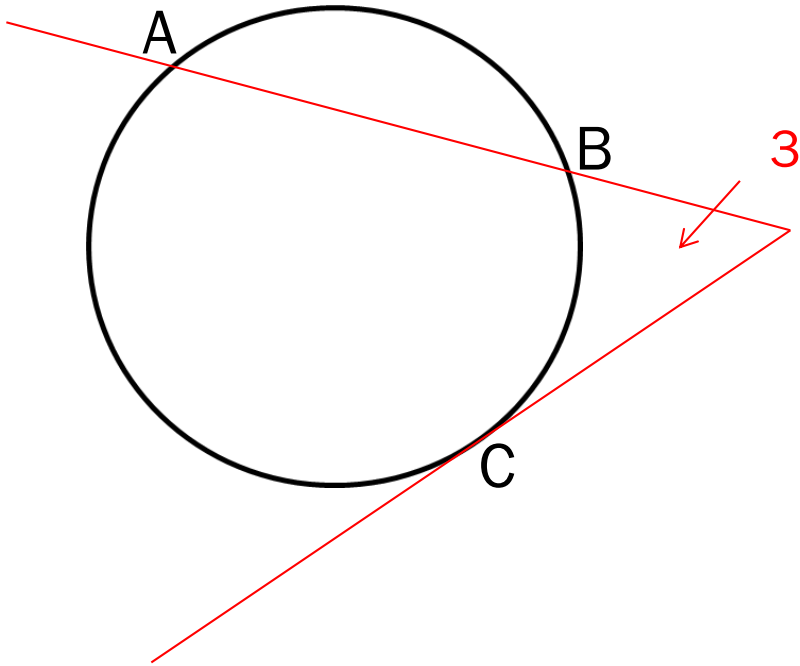$$m < 1 = \frac{1}{2}(m\,\widehat{AC} - m\,\widehat{BD})$$

Exterior Angles

Theorem 9-10: Case 2: Two Tangents

$$m \angle 2 = \frac{1}{2} \left(m \, \widehat{ACB} - m \, \widehat{AB} \right)$$

Exterior Angles
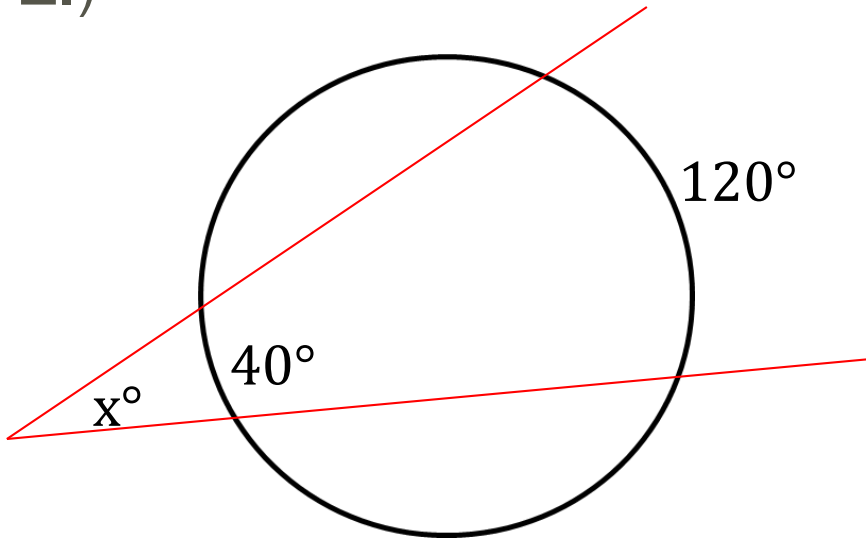
Theorem 9-10: Case 3: A secant and a Tangent

$$m < 3 = \frac{1}{2}(m\,\widehat{AC} - m\,\widehat{BC})$$

Exterior Angles Practice

ಬಾ Find the measure of x.

ಬಾ 1.)

$$x = \frac{1}{2}(120 - 40)$$

120°

40°

x°
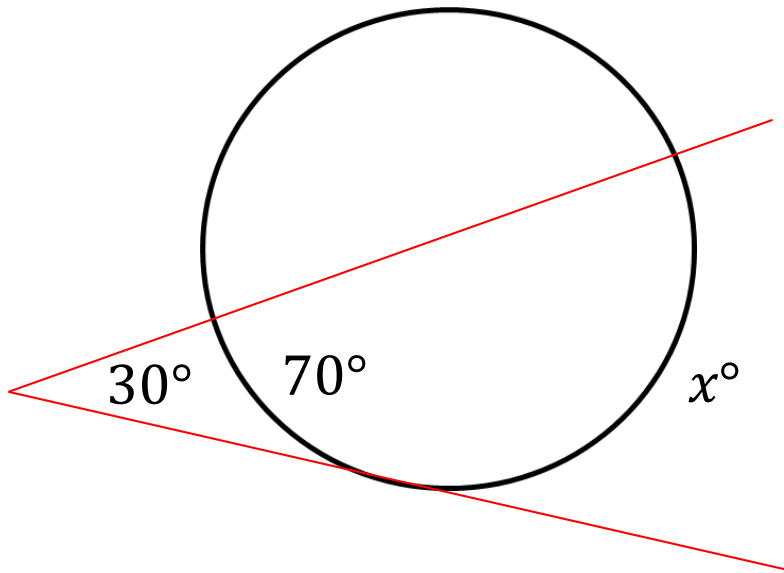
$$x = \frac{1}{2} \times 80$$

$$x = 40$$

Exterior Angles Practice

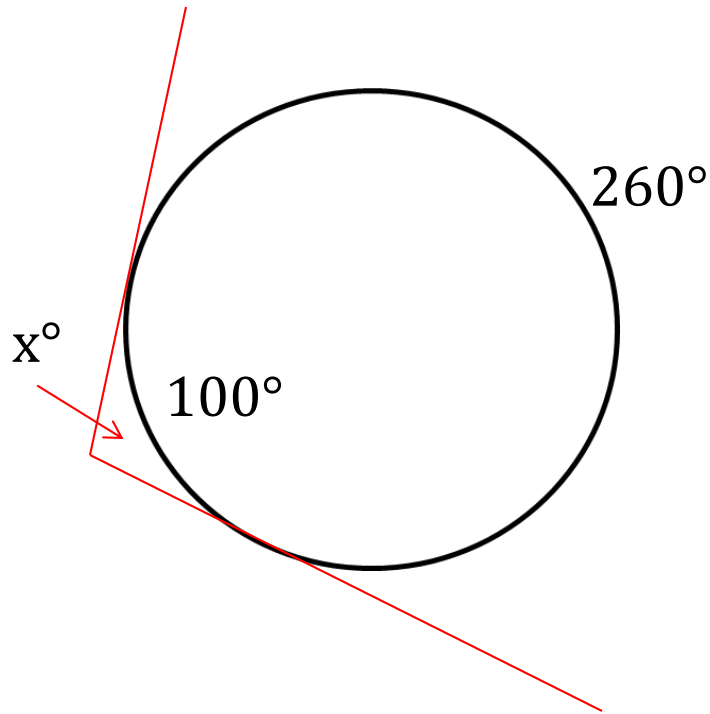- Find the measure of x.

- 3.)

$$30 = \frac{1}{2}(x - 70)$$

$$60 = x - 70$$

$$x = \mathbf{130}$$

Exterior Angles Practice

❧ Find the measure of x.
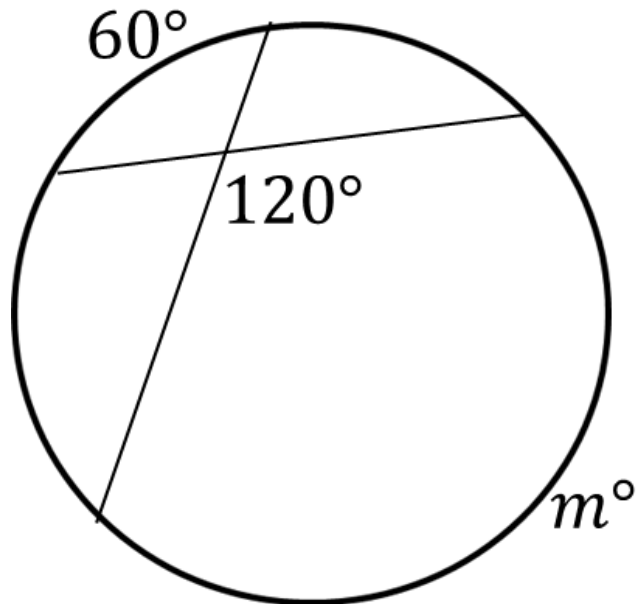
❧ 2.)

260°

x°

100°

$$x = \frac{1}{2}(260 - 100)$$

$$x = \frac{1}{2} \times 160$$

$$x = \mathbf{80}$$

Mixed Practice

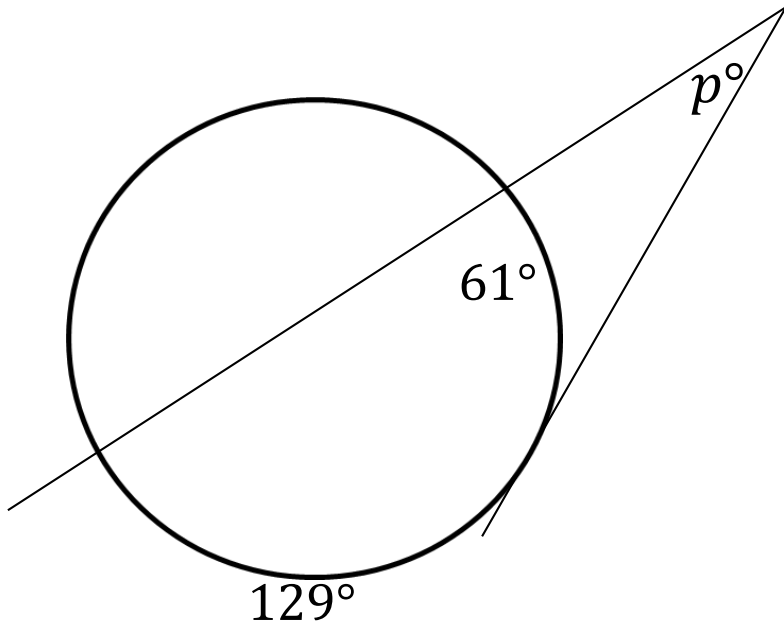 Solve for the missing value(s).

$$120 = \frac{1}{2}(60 + m)$$

$$240 = 60 + m$$

$$\boldsymbol{m = 180}$$

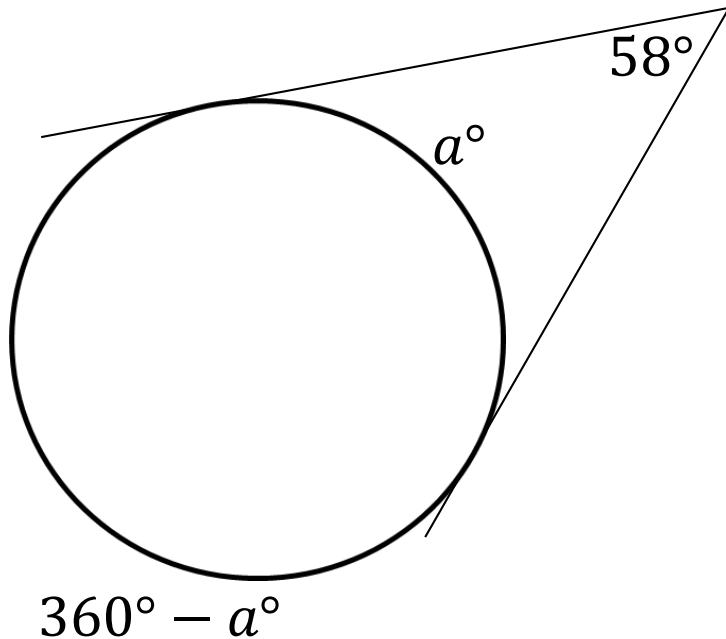# Mixed Practice

Solve for the missing value(s).

$$p = \frac{1}{2}(129 - 63)$$

$$p = \frac{1}{2}(66)$$

$$\boldsymbol{p = 33}$$

Mixed Practice

Solve for the missing value(s).

$$58 = \frac{1}{2}(360 - a - a)$$
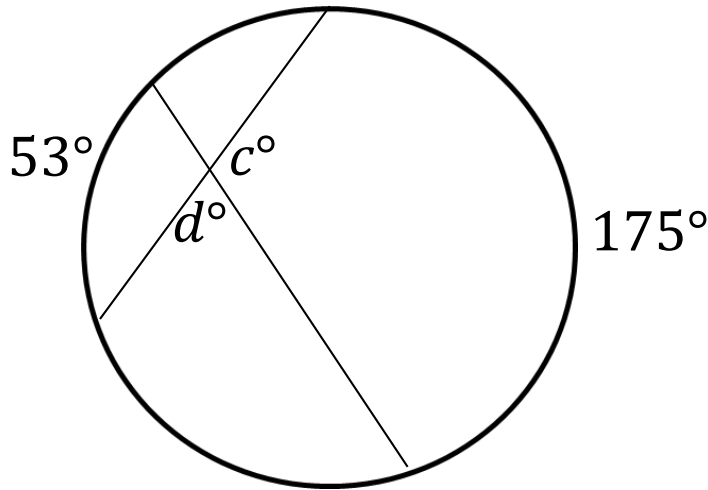
$$58 = \frac{1}{2}(360 - 2a)$$

$$58 = 180 - a$$

$$a = 180 - 58$$

$$\boldsymbol{a = 122}$$

Mixed Practice

 Solve for the missing value(s).

For c:

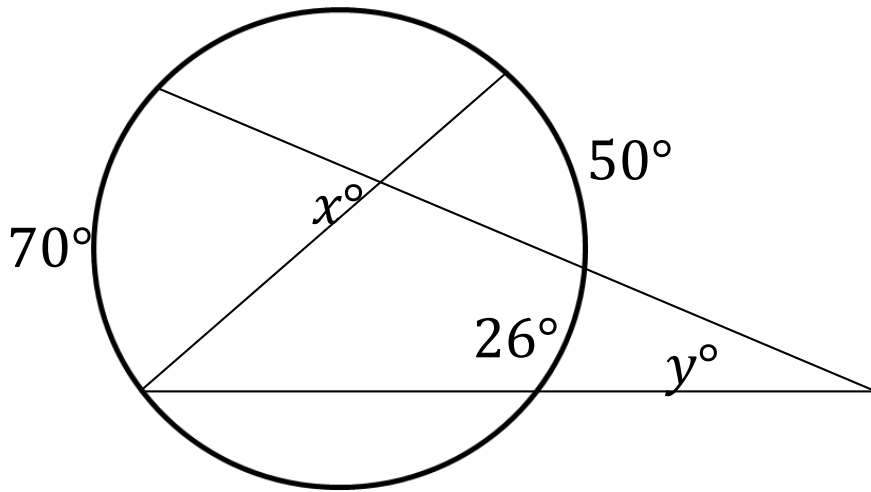$$c = \frac{1}{2}(175 + 53)$$

$$c = \frac{1}{2}(228)$$

$$\boldsymbol{c = 114}$$

For d:

$$d = 180 - 114$$

$$\boldsymbol{d = 66}$$

 Solve for the missing value(s).

For x:

$$x = \frac{1}{2}(70 + 50)$$
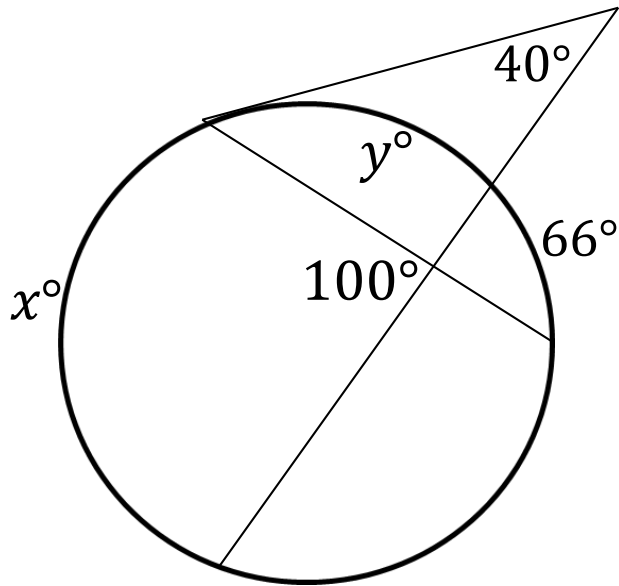
$$x = \frac{1}{2}(120)$$

$$x = 60$$

For y:

$$y = \frac{1}{2}(70 - 26)$$

$$y = \frac{1}{2} \times 44$$

$$y = 22$$

Mixed Practice

Solve for the missing value(s).

For x:

$$100 = \frac{1}{2}(x + 66)$$

$$200 = x + 66$$

$$x = \mathbf{134}$$

For y:

$$40 = \frac{1}{2}(134 - y)$$

$$80 = 134 - y$$

$$y = 134 - 80$$

$$y = \mathbf{54}$$

$40°$

$y°$

$66°$

$100°$

$x°$