

# Reteaching with Practice

For use with pages 621–627

**GOAL**

Use angles formed by tangents and chords to solve problems in geometry and use angles formed by lines that intersect a circle to solve problems

**VOCABULARY**

**Theorem 10.12**

If a tangent and a chord intersect at a point on a circle, then the measure of each angle formed is one half the measure of its intercepted arc.

**Theorem 10.13**

If two chords intersect in the *interior* of a circle, then the measure of each angle is one half the *sum* of the measures of the arcs intercepted by the angle and its vertical angle.

**Theorem 10.14**

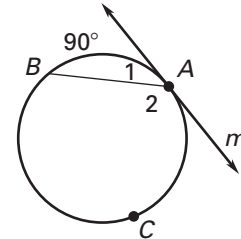
If a tangent and a secant, two tangents, or two secants intersect in the *exterior* of a circle, then the measure of the angle formed is one half the *difference* of the measures of the intercepted arcs.

**EXAMPLE 1**

**Finding Angle and Arc Measures**

Line  $m$  is tangent to the circle.

- a. Find  $m\angle 1$
- b.  $m\widehat{ACB}$

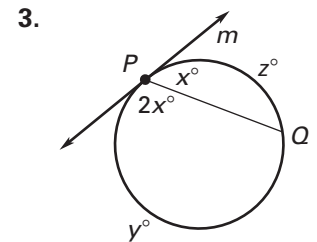
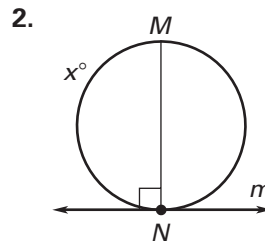
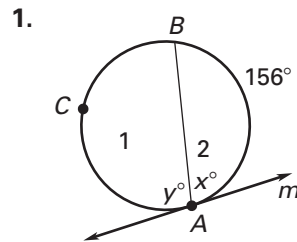


**SOLUTION**

- a.  $m\angle 1 = \frac{1}{2}(90^\circ) = 45^\circ$
- b. Because  $\angle 1$  and  $\angle 2$  are a linear pair,  
 $m\angle 2 = 180^\circ - m\angle 1 = 180^\circ - 45^\circ = 135^\circ$ . So,  
 $m\widehat{ACB} = 2(135^\circ) = 270^\circ$ .

**Exercises for Example 1**

Find the value of each variable.



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### EXAMPLE 2 Using Theorem 10.13

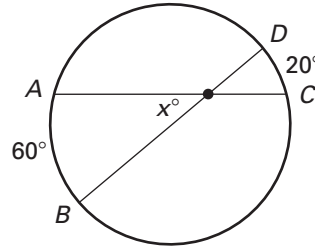
Find the value of  $x$ .

#### SOLUTION

$$x^\circ = \frac{1}{2}(m\widehat{AB} + m\widehat{CD}) \quad \text{Apply Theorem 10.13.}$$

$$x^\circ = \frac{1}{2}(60^\circ + 20^\circ) \quad \text{Substitute.}$$

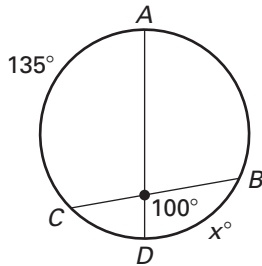
$$x = 40 \quad \text{Simplify.}$$



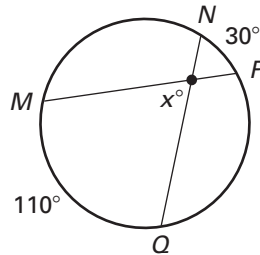
#### Exercises for Example 2

Find the value of  $x$ .

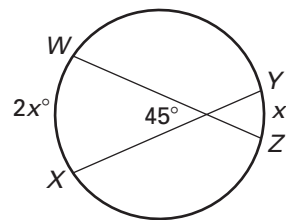
4.



5.



6.



### EXAMPLE 3 Using Theorem 10.14

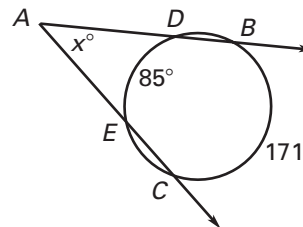
Find the value of  $x$ .

#### SOLUTION

$$x^\circ = \frac{1}{2}(m\widehat{BC} - m\widehat{DE}) \quad \text{Apply Theorem 10.14.}$$

$$x^\circ = \frac{1}{2}(171^\circ - 85^\circ) \quad \text{Substitute.}$$

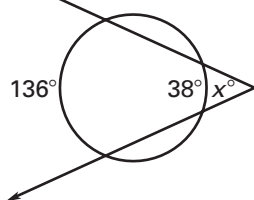
$$x = 43 \quad \text{Simplify.}$$



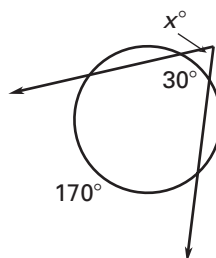
#### Exercises for Example 3

Find the value of  $x$ .

7.



8.



9.

