NAME _____ DATE _____

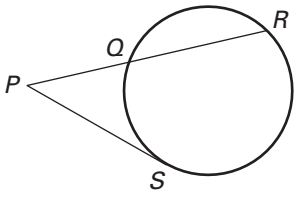
Reteaching with Practice

For use with pages 629–635

GOAL **Find the lengths of segments of chords, tangents, and secants**

VOCABULARY

In the figure shown, $\overline{PS}$ is a **tangent segment** because it is tangent to the circle at an endpoint. $\overline{PR}$ is a **secant segment** because one of the two intersection points with the circle is an endpoint. $\overline{PQ}$ is the **external segment** of $\overline{PR}$.



Theorem 10.16

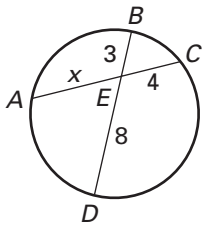
If two secant segments share the same endpoint outside a circle, then the product of the length of one secant segment and the length of its external segment equals the product of the length of the other secant segment and the length of its external segment.

Theorem 10.17

If a secant segment and a tangent segment share an endpoint outside a circle, then the product of the length of the secant segment and the length of its external segment equals the square of the length of the tangent segment.

EXAMPLE 1 ***Finding Segment Lengths Using Theorem 10.15***

Find the value of x.



SOLUTION

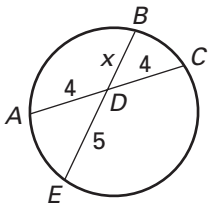
Because $\overline{AC}$ and $\overline{BD}$ are chords which intersect in the interior of the circle, Theorem 10.15 applies.

$EC \cdot EA = EB \cdot ED$	Use Theorem 10.15.
$4 \cdot x = 3 \cdot 8$	Substitute.
$4x = 24$	Simplify.
$x = 6$	Divide each side by 4.

Exercises for Example 1

Find the value of *x*.

1.



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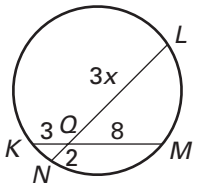

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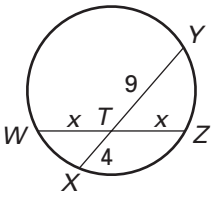

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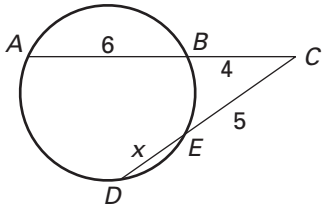
EXAMPLE 2 Finding Segment Lengths Using Theorem 10.16

Find the value of x.



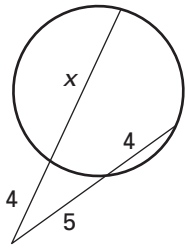
SOLUTION

$CB \cdot CA = CE \cdot CD$	Use Theorem 10.16.
$4 \cdot (6 + 4) = 5 \cdot (x + 5)$	Substitute.
$40 = 5x + 25$	Simplify.
$15 = 5x$	Subtract 25 from each side.
$x = 3$	Divide each side by 5.

Exercises for Example 2

Find the value of *x*.

4.



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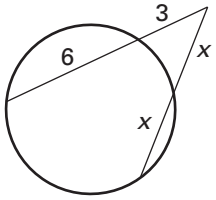

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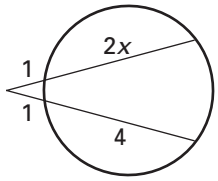
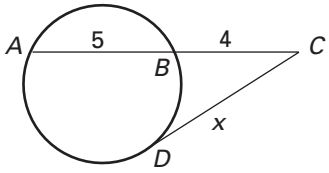


EXAMPLE 3 Finding Segment Lengths Using Theorem 10.17

Find the value of x.



SOLUTION

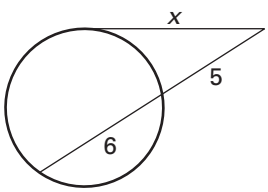
$CB \cdot CA = (CD)^2$	Use Theorem 10.17.
$4 \cdot (5 + 4) = x^2$	Substitute.
$36 = x^2$	Simplify.
$\pm 6 = x$	Take the square root of each side.

Use the positive solution, because lengths cannot be negative. So, $x = 6$.

Exercises for Example 3

Find the value of *x*.

7.



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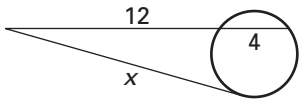

9.