

The background features a dark, textured surface with faint, light-colored chalkboard-style sketches. On the left side, there is a detailed drawing of a microscope. Above it, a globe of the Earth is visible. Below the microscope, there are sketches of books and other geometric shapes. The overall theme is educational and scientific.

Lesson 15.4

Module 15: Angles and Segments in Circles

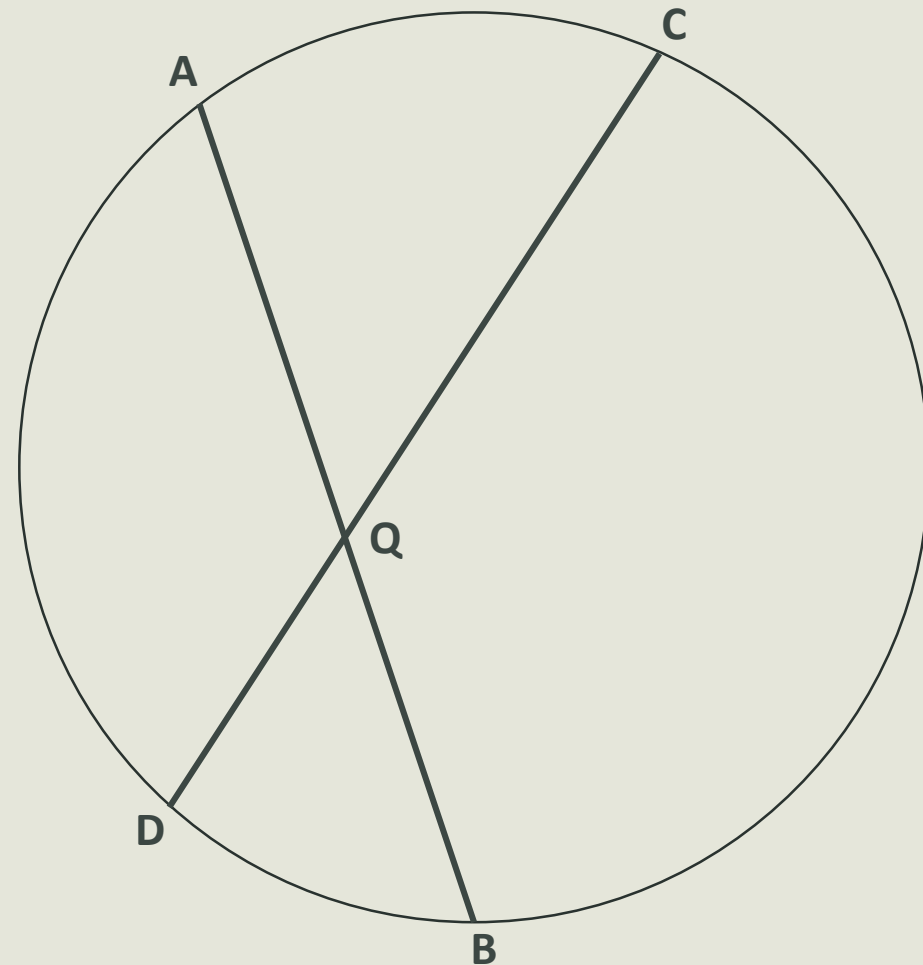
Intersecting Chords

Intersecting chords create four segments that have a proportional relationship. This relationship is called:

The Chord Chord Product Theorem:

If two chords intersect, the product of the created segments from each chord must be equal.

$$AQ \cdot QB = CQ \cdot QD$$



Module 15: Angles and Segments in Circles

Chord Chord Product Theorem Practice

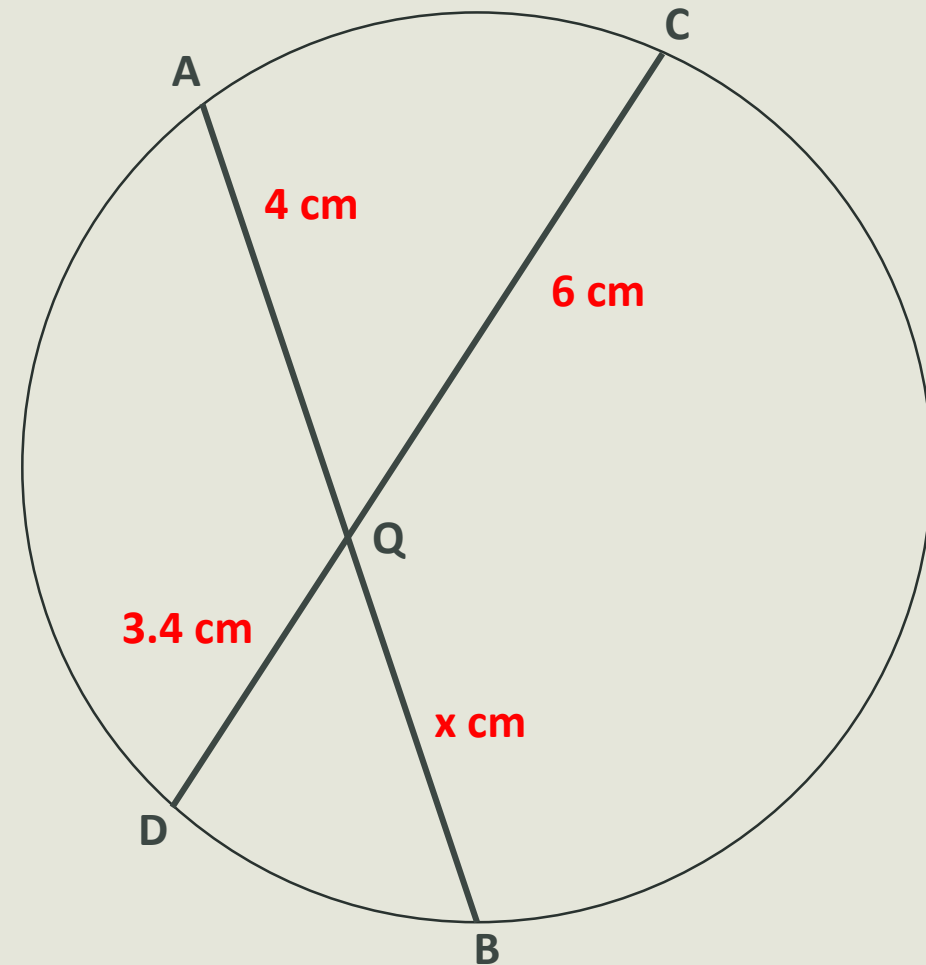
Find the measure of the missing segment (labeled with an 'x') given the measures of the other three segments.

$$6 \cdot 3.4 = 4 \cdot x$$

$$20.4 = 4x$$

Divide both sides by 4....

$$x = 5.1$$



Module 15: Angles and Segments in Circles

Chord Chord Product Theorem Practice

Find the measure of the missing segment QB by solving for 'x'.

$$4 \cdot 10 = 8 \cdot (x + 2)$$

$$40 = 8 \cdot (x + 2)$$

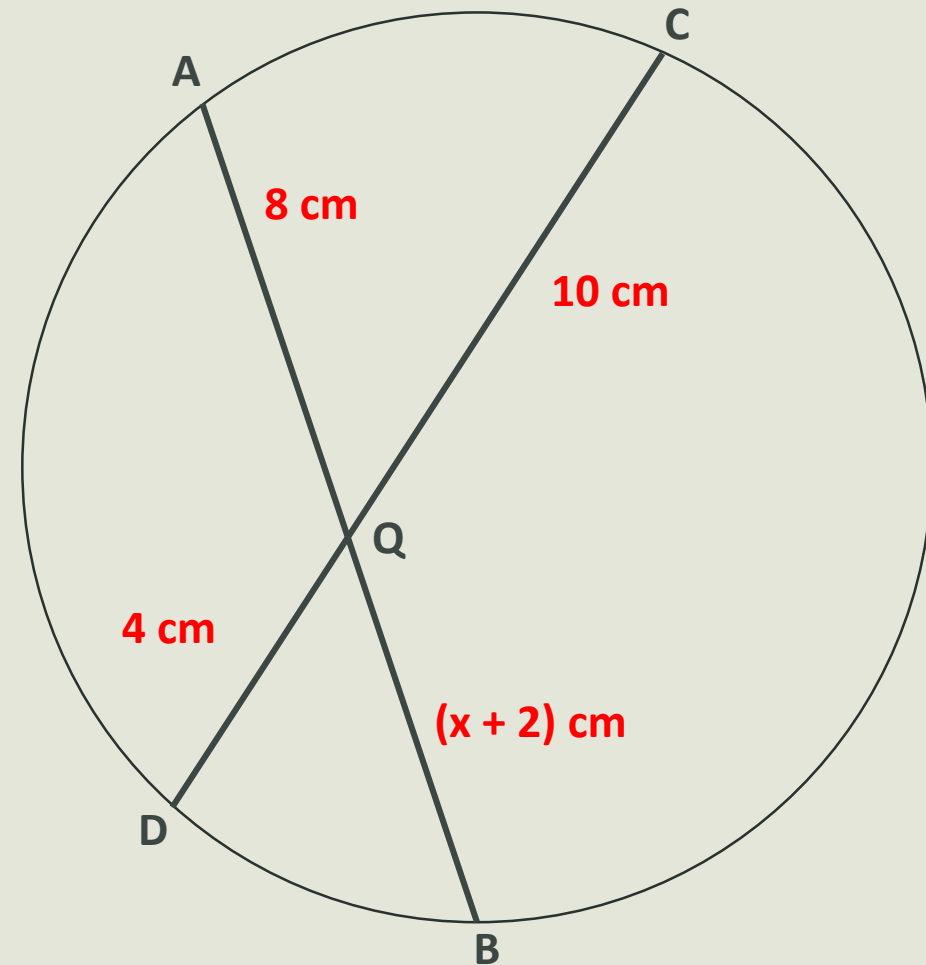
Divide both sides by 8....

$$5 = x + 2$$

Subtract 2 from both sides....

$$x = 3$$

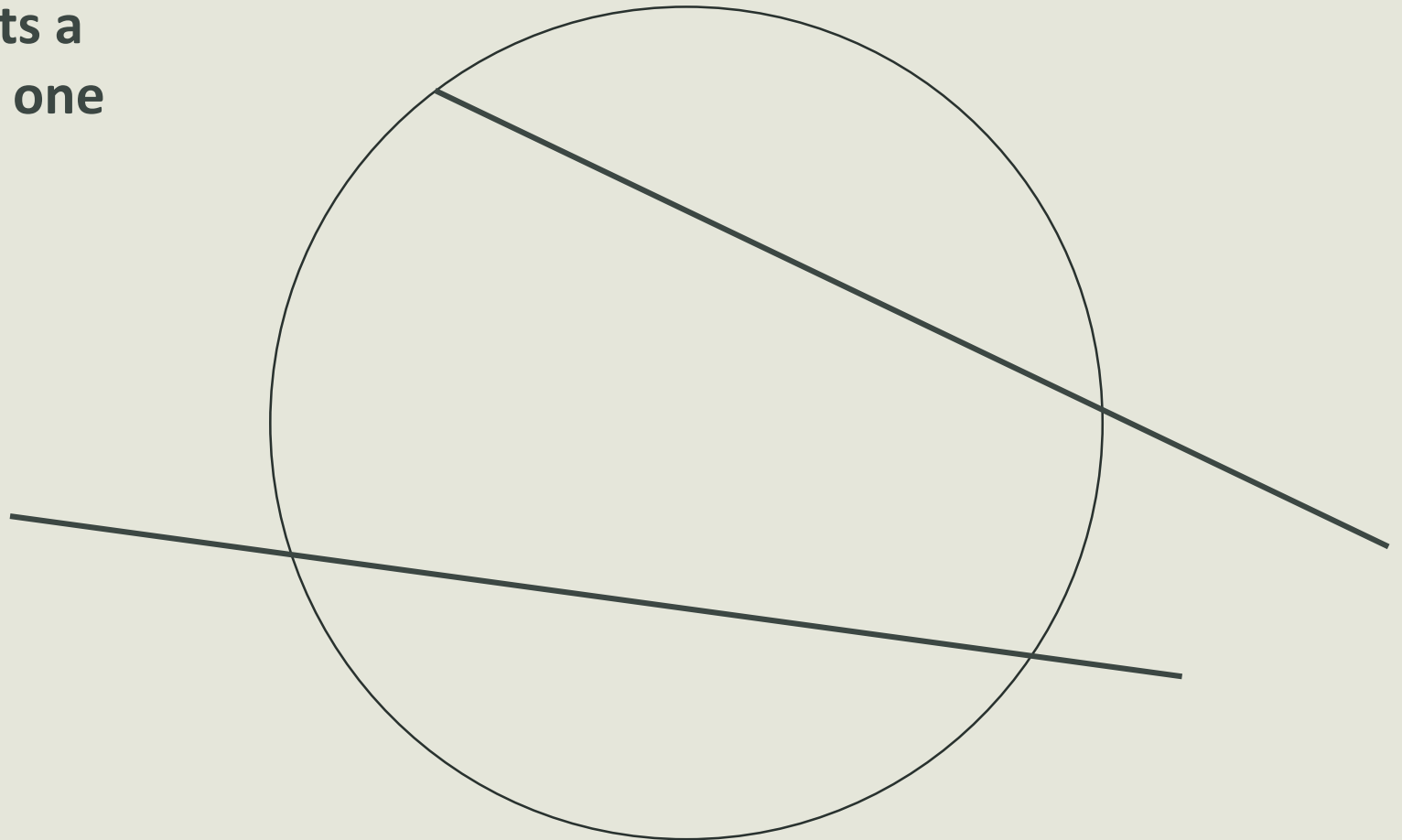
Plug in 3 for x, and QR = 5 cm



Module 15: Angles and Segments in Circles

Secants

A secant is a segment that intersects a circle at two points, where at most one endpoint is on the circle.



Module 15: Angles and Segments in Circles

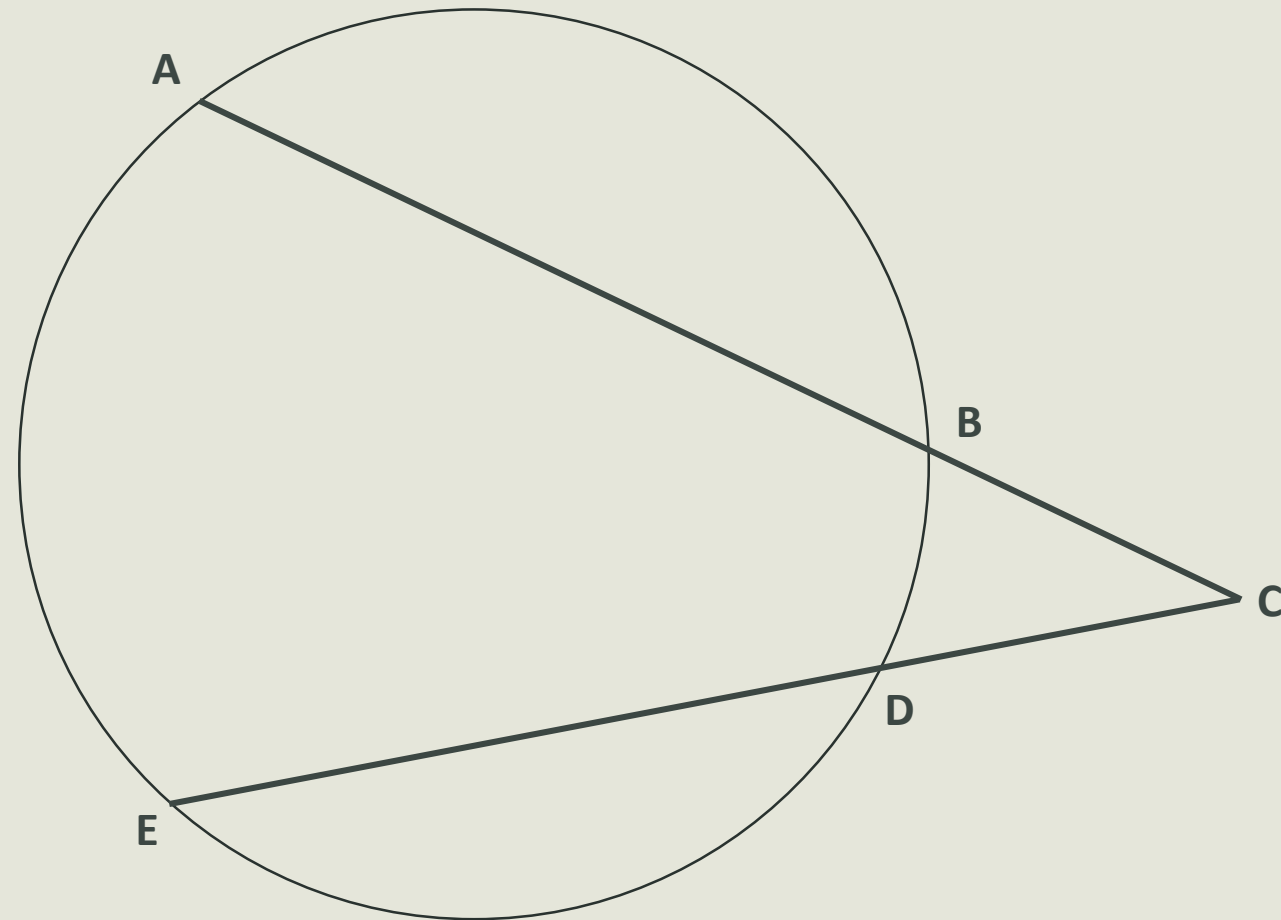
Secants

When two secants connect outside of a circle, four segments are created.

The Secant Secant Product Theorem:

If two secants intersect, the product of the exterior segments multiplied by the full segment lengths must be equal:

$$AC \cdot BC = EC \cdot DC$$



Module 15: Angles and Segments in Circles

Secants

Find the value of 'x' in the diagram.

$$AC \cdot BC = EC \cdot DC$$

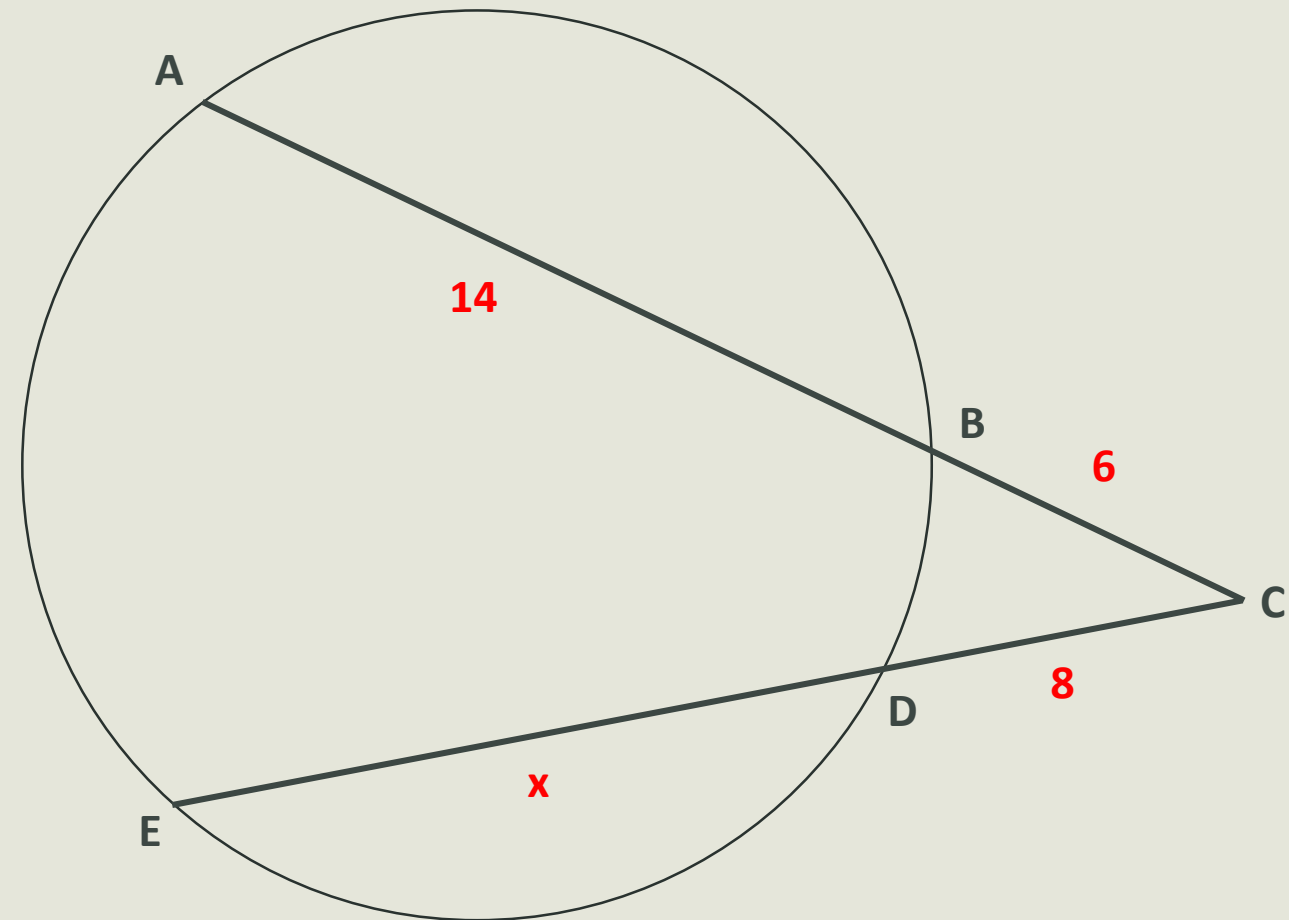
$$(6 + 14) \cdot (6) = (x + 8) \cdot (8)$$

$$20 \cdot 6 = 8x + 64$$

$$120 = 8x + 64$$

$$56 = 8x$$

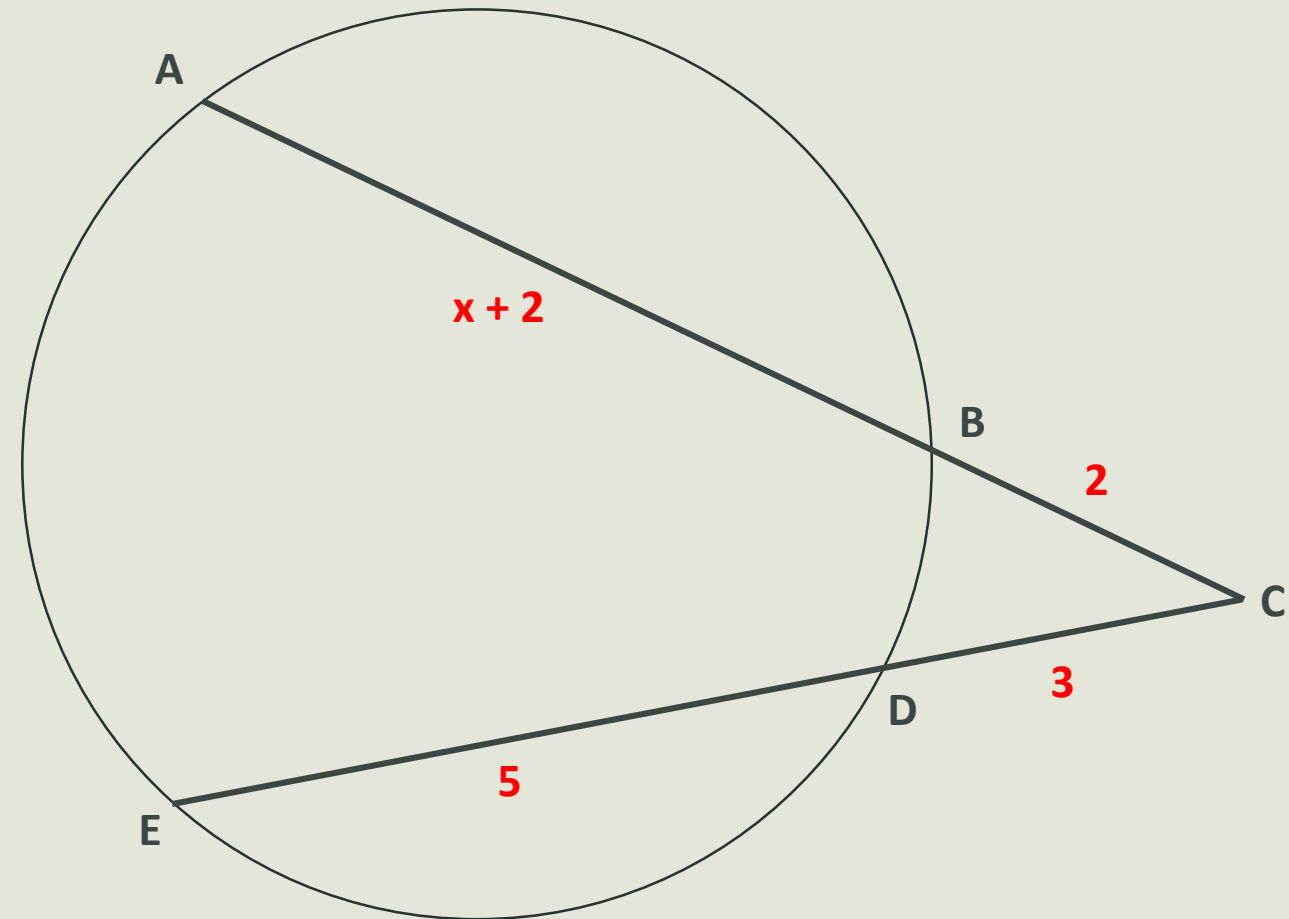
$$7 = x$$



Module 15: Angles and Segments in Circles

Secants

Find the value of 'x' in the diagram.



Module 15: Angles and Segments in Circles

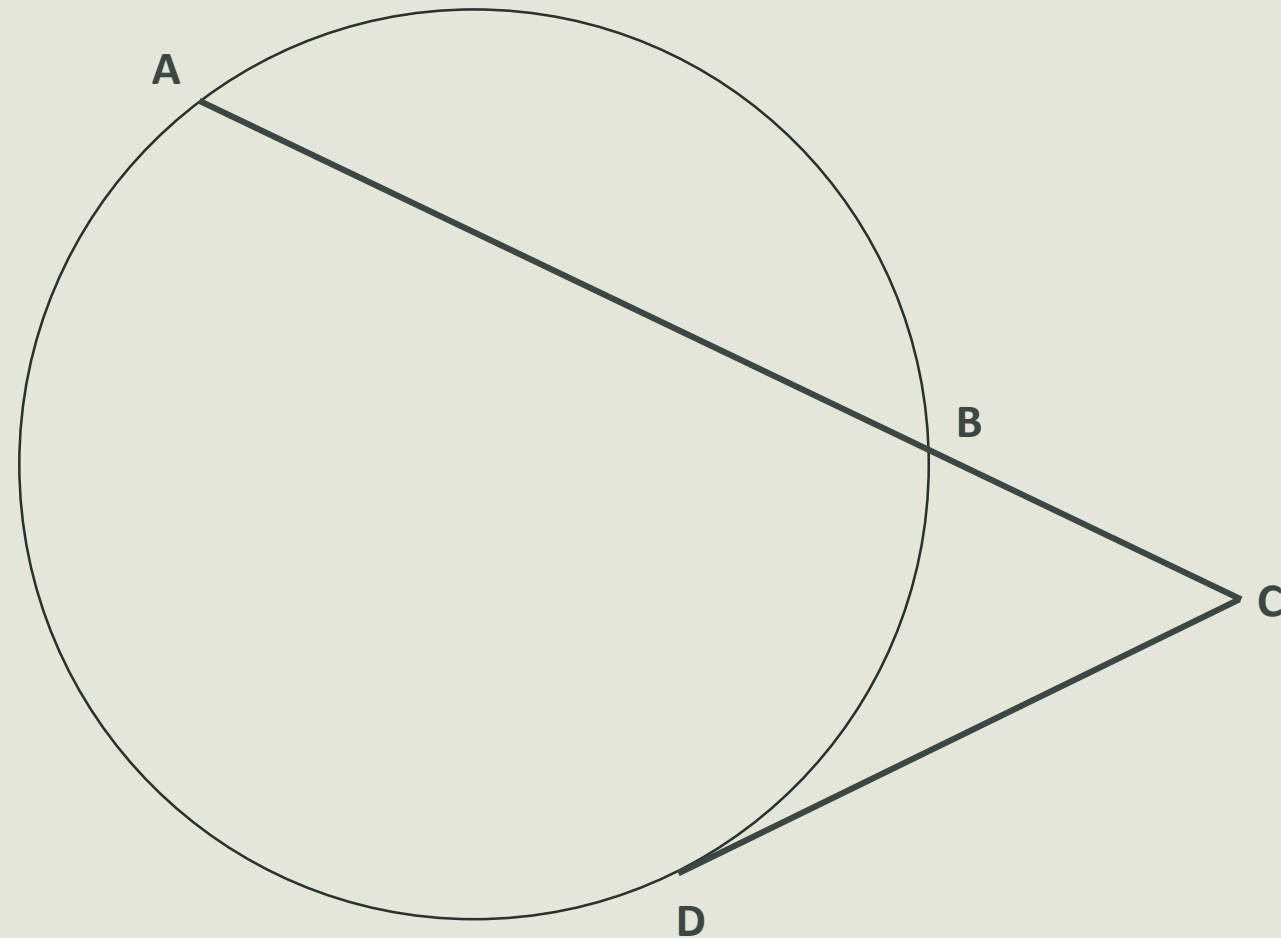
Secants and Tangents

When two secants connect outside of a circle, four segments are created.

The Secant Tangent Product Theorem:

If a secant and a tangent intersect, the product of the exterior segment and the entire segment of the secant will be equivalent to the square of the tangent.

$$AC \cdot BC = DC^2$$



Module 15: Angles and Segments in Circles

Secants and Tangents

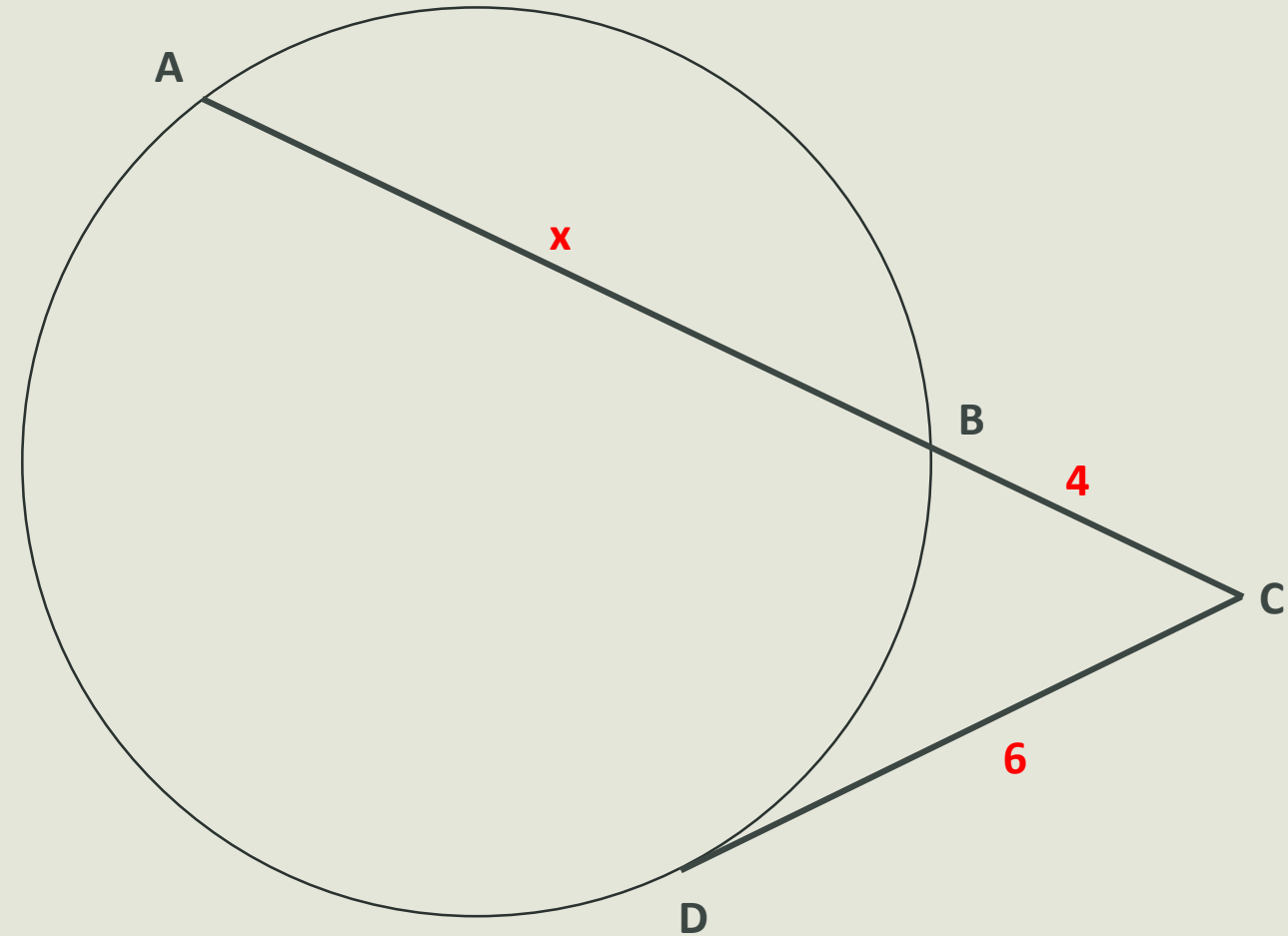
$$AC \cdot BC = DC^2$$

$$(x + 4) \cdot (4) = (6)^2$$

$$4x + 16 = 36$$

$$4x = 20$$

$$x = 5$$

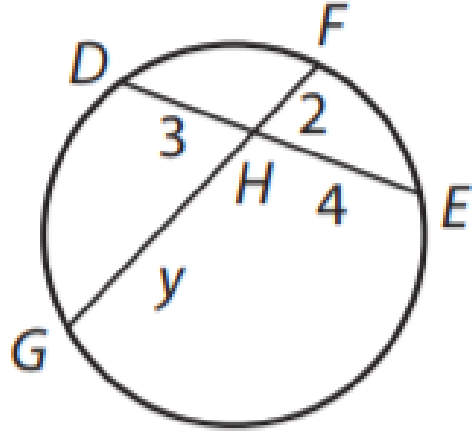


Module 15: Angles and Segments in Circles

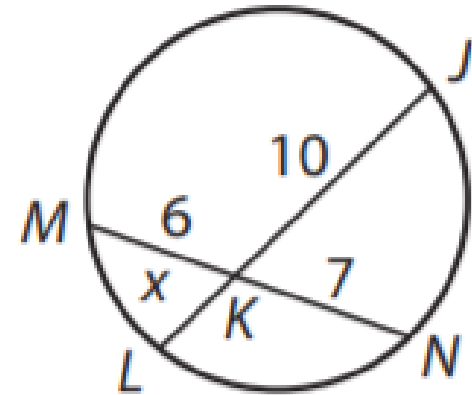
Try these problems on page 823

Find the value of the variable and the length of each chord.

5.



6.

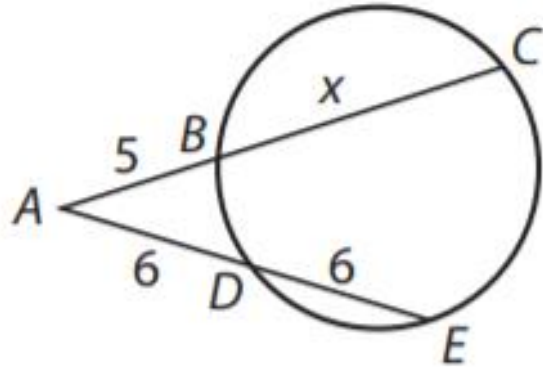


Module 15: Angles and Segments in Circles

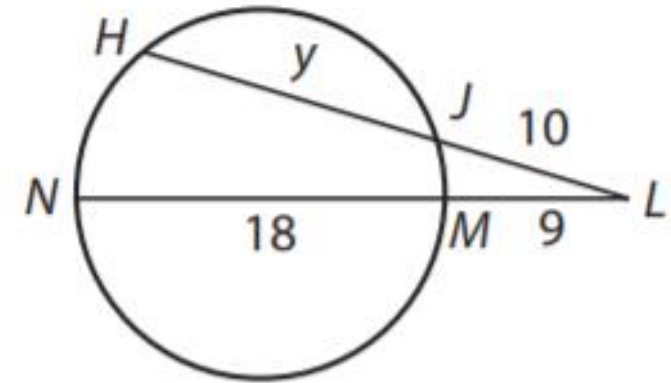
Try these problems on page 824

Find the value of the variable and the length of each secant segment.

10.



11.

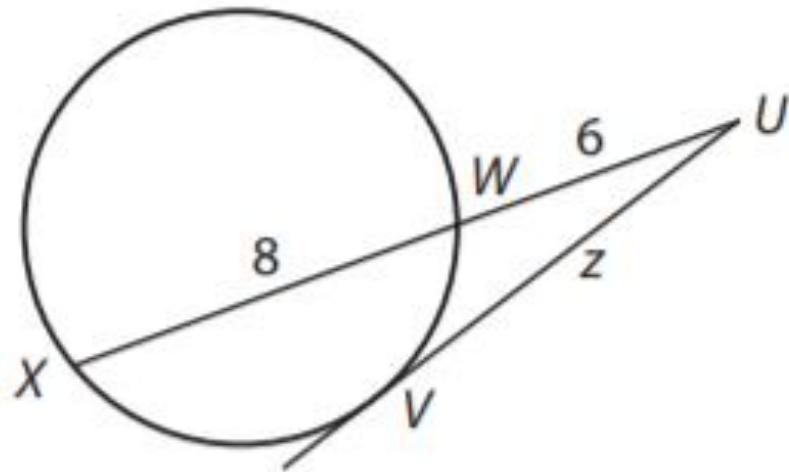


Module 15: Angles and Segments in Circles

Try these problems on page 824

Find the value of the variable.

13.



14.

