

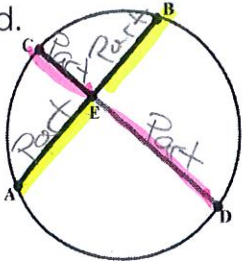
Geometry
Special Segment Lengths in a Circle

Name: _____

Date: _____

Two Chords Intersecting

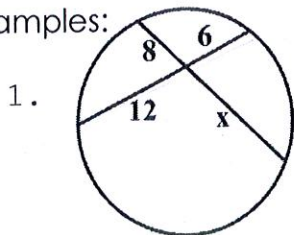
If two chords intersect in the interior of a circle, then the product of the lengths of the segments of one chord is equal to the product of the lengths of the segments of the other chord.



$$\underline{AE} \cdot \underline{EB} = \underline{EC} \cdot \underline{ED}$$

$$\underline{\text{Part}} \cdot \underline{\text{Part}} = \underline{\text{Part}} \cdot \underline{\text{Part}}$$

Examples:

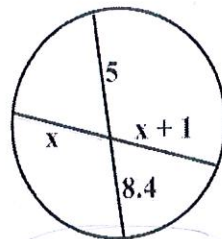


$$12 \cdot 6 = 8 \cdot x$$

$$72 = 8x$$

$$\boxed{x = 9}$$

2.



$$x(x+1) = 5(8.4)$$

$$x^2 + x = 42$$

$$x^2 + x - 42 = 0$$

$$(x+7)(x-6) = 0$$

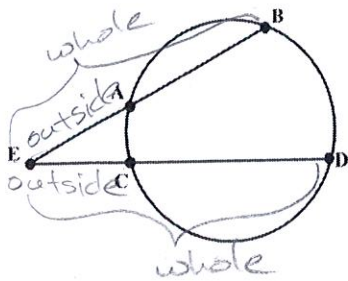
$$x+7=0 \quad x-6=0$$

$$x = -7, 6$$

$$\boxed{x = 6}$$

Two Secant Segments Intersecting Outside a Circle

The product of the length of one external secant segment and its ^{outside}entire segment equals the product of the length of the other external secant segment and its ^{whole}entire segment.

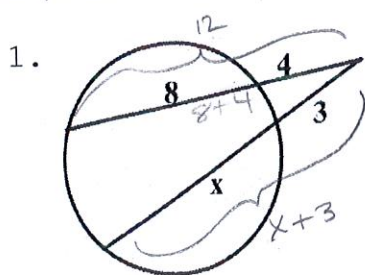


$$\underline{EA} \cdot \underline{EB} = \underline{EC} \cdot \underline{ED}$$

$$\text{outside} \cdot \text{whole} = \text{outside} \cdot \text{whole}$$

$$ow = ow$$

Examples:



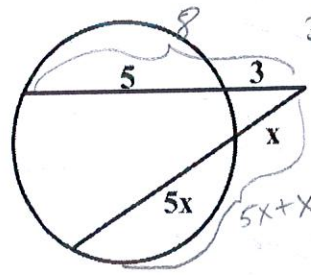
$$4(12) = 3(x+3)$$

$$48 = 3x + 9$$

$$39 = 3x$$

$$\boxed{x = 13}$$

2.



$$3(8) = x(6x)$$

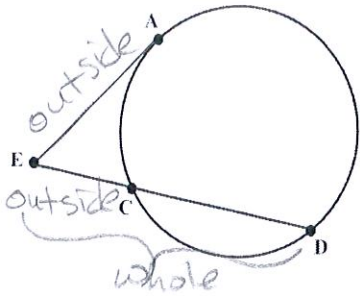
$$\frac{24}{6} = \frac{6x^2}{6}$$

$$\sqrt{4} = \sqrt{x^2}$$

$$\boxed{x = 2}$$

A Secant Segment and a Tangent Segment Intersecting Outside a Circle

The square of the length of the tangent segment equals the product of the length of the external secant segment and the entire secant segment.



$$(EA)^2 = EC \cdot ED$$

$$(\text{outside})^2 = \text{outside} \cdot \text{whole}$$

Examples:

1. $8^2 = x(x+12)$
 $64 = x^2 + 12x$
 $0 = x^2 + 12x - 64$
 $0 = (x+16)(x-4)$
 $x = -16, 4$ $x = 4$

2. $8^2 = 3(x)$
 $64 = 3x$
 $x = \frac{64}{3}$
 $x = 21\frac{2}{3}$

Let's Practice! Use the pictures below to fill in the given parts.

1. $AQ = 10, QB = 6, QD = 15$. Find CQ .
2. $CD = 8, CQ = 10, AQ = 24$. Find BQ .
3. $AB = 7, BQ = 9, DQ = 18$. Find CD .
4. $FQ = 8, CQ = 4$. Find CD .
5. $BD = 9, BE = 3, CE = 2$. Find AE .
6. $AE = 8, BD = 16, BE = 4$. Find AC .

1. $x(15) = 6(10)$
 $15x = 60$
 $x = 4$

2. $10(18) = x(24)$
 $180 = 24x$
 $x = 7.5$

3. $9(16) = x(18)$
 $144 = 18x$
 $x = 8$
 $x = 10$

4. $8^2 = 4(4+x)$
 $64 = 16 + 4x$
 $48 = 4x$
 $x = 12$

5. $2(x) = 3(6)$
 $2x = 18$
 $x = 9$

6. $4(12) = 8y$
 $48 = 8y$
 $y = 6$
 $x = 8 + 6$
 $x = 14$