

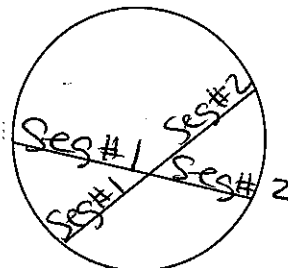
Geometry Notes

Name

Key

10.6 Find Segment Lengths in Circles

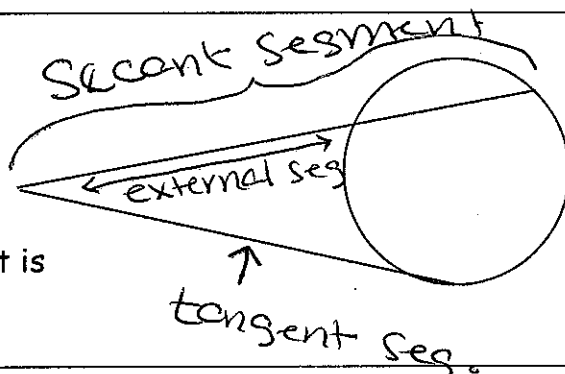
Segments of the Chord: when two chords intersect in the interior of a circle, each chord is divided into two segments called segments of the chord.



Secant Segment: a secant segment is a segment that contains a chord of a circle, and has exactly one endpoint outside the circle.

External Segment

An external segment is the part of a secant segment that is outside the circle.



Theorems

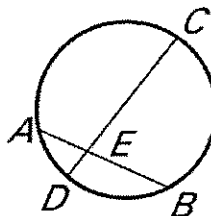
Picture/ Description

SEGMENTS OF CHORDS THEOREM

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.

What are the segments of chord DC? $DE + EC$

What are the segments of chord AB? $AE + EB$



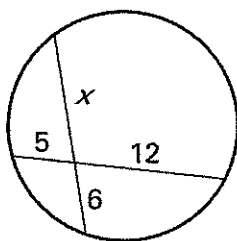
$$DE \cdot EC = AE \cdot EB$$

1. Find x.

$$6x = 5(12)$$

$$6x = 60$$

$$x = 10$$



Are the chords equal in length?

No
 $16 \neq 17$

2. Find x.

$$3x(x+1) = 4x(x)$$

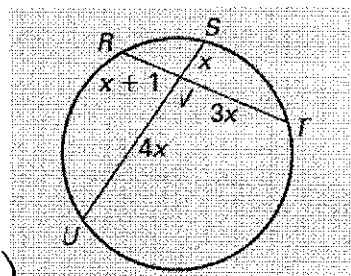
$$3x^2 + 3x = 4x^2$$

$$3x = x^2$$

$$0 = x^2 - 3x$$

$$0 = x(x-3)$$

extraneous value $x=0$ $x-3=0$
 $x=3$



Are the chords equal in length? No $15 \neq 13$

3. If the chords were equal in problem #2. What could you conclude about arc US?

$$\widehat{US} \cong \widehat{RT}$$

SEGMENTS OF SECANTS THEOREM

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

Name two secant segments

EB and DE

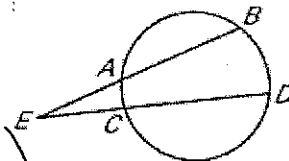
What is the external segment of EB ?

EA

What is the external segment of DE ?

EC

$$EB \cdot EA = DE \cdot EC$$



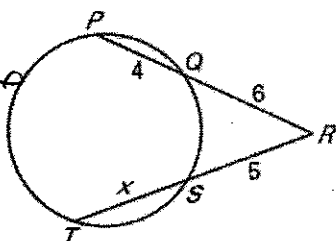
4. Find x .

$$(x+5)5 = 10 \cdot 6$$

$$5x + 25 = 60$$

$$5x = 35$$

$$x = 7$$



5. Find x .

$$(x+5)3 = (2x)(x+1)$$

$$3x + 15 = 2x^2 + 2x$$

$$0 = 2x^2 - x - 15$$

$$0 = (2x+5)(x-3)$$

$$2x+5=0$$

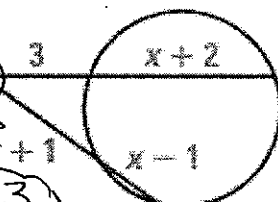
$$2x=-5$$

$$x = -5/2$$

extraneous

$$x-3=0$$

$$x=3$$



Are the secant segments equal in length? No $12 \neq 10$

SEGMENTS OF SECANTS AND TANGENTS THEOREM

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

What is the tangent segment?

AE

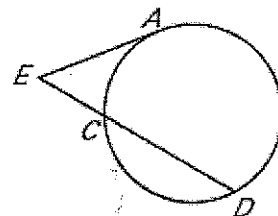
What is the secant segment?

DE

What is the external segment of the secant segment?

EC

$$AE^2 = DE \cdot EC$$



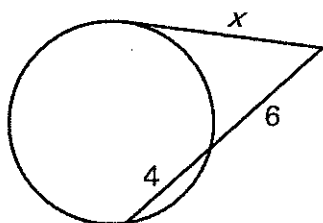
6. Find x .

$$x^2 = 10 \cdot 6$$

$$x^2 = 60$$

$$x = \pm \sqrt{60}$$

$$x = \pm 2\sqrt{15}$$



$$x = 2\sqrt{15}$$

7. a) Find the length of the secant segment.

18

b) Find the length of the tangent segment.

12

$$(3x)^2 = (2x+10)2x$$

$$9x^2 = 4x^2 + 20x$$

$$5x^2 - 20x = 0$$

$$5x(x-4) = 0$$

$$5x = 0$$

$$x = 0$$

extraneous value

$$x-4=0$$

$$x=4$$

