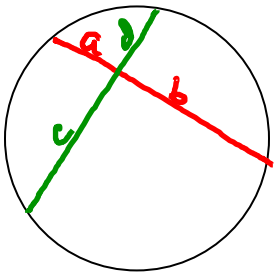
Notes for Lesson 9-7: Circles and Lengths of Segments

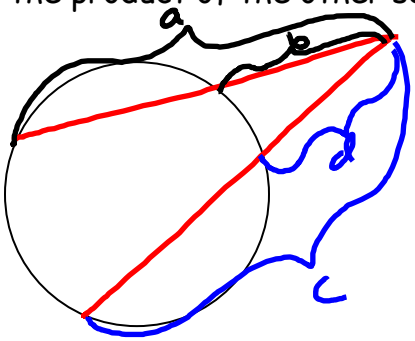
Draw a diagram as an example to the following theorems.

Theorem 9-11: When two chords intersect inside a circle, the product of the segments of one chord equals the product of the segments of the other chord.



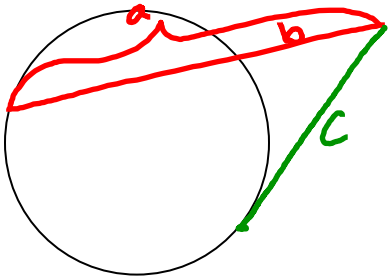
$$a \cdot b = c \cdot d$$

Theorem 9-12: When two secant segments are drawn to a circle from an external point, the product of one secant segment and its external segment equals the product of the other secant and its external segment.



$$a \cdot b = c \cdot d$$

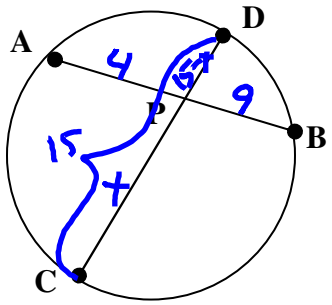
Theorem 9-13: When a secant segment and a tangent segment are drawn to a circle from an external point, the product of the secant segment and its external segment is equal to the square of the tangent segment.



$$a \cdot b = c^2$$

Use the three theorems to solve the following example problems.

Ex 1:



Ex 1:

A) If AP = 4, PB = 6, and CP = 8, find PD

$8 \cdot x = 4 \cdot 6$

$x = 3$

B) If AP = 4, PB = 9, and CD = 15, find CP

$x(15-x) = 4 \cdot 9$

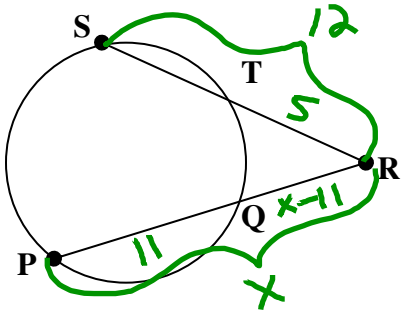
$15x - x^2 = 36$

$0 = x^2 - 15x + 36$

$0 = (x-12)(x-3)$

$x = 12, 3$

Ex 2:



Ex 2:

A) If PQ = 9, QR = 3, and TR = 4, find SR

$x \cdot 4 = 12 \cdot 3$

$x = 9$

B) If PQ = 11, SR = 12, and TR = 5, find PR

$x(x-11) = 12 \cdot 5$

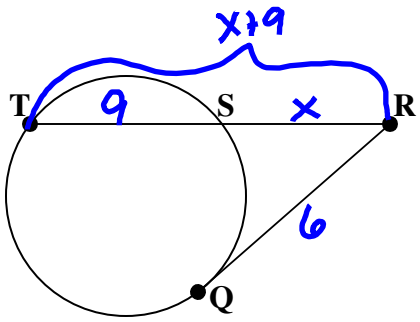
$x^2 - 11x = 60$

$x^2 - 11x - 60 = 0$

$(x-15)(x+4) = 0$

$x = 15$

Ex 3:



Ex 3:

A) If RT = 25 and RS = 5, find QR

$25 \cdot 5 = x^2$

$\sqrt{125} = \sqrt{x^2}$

$x = 5\sqrt{5}$

B) If QR = 6 and ST = 9, find RS

$x(x+9) = 6^2$

$x^2 + 9x = 36$

$x^2 + 9x - 36 = 0$

$(x+12)(x-3) = 0$

$x = 3$