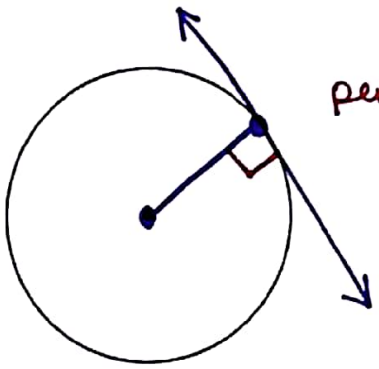
November 8

GUIDED NOTES: Lengths With Circles

Lengths Formed By Radius and Tangent



perpendicular

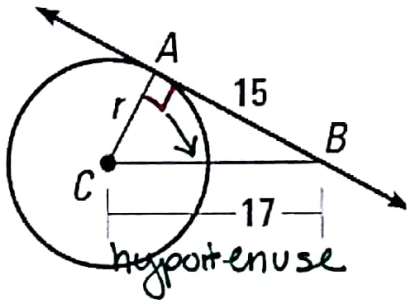
FORMULA:

Pythagorean Theorem

$a^2 + b^2 = c^2$

↑ legs ↑ ↑ hypotenuse

EX1



$r^2 + 15^2 = 17^2$

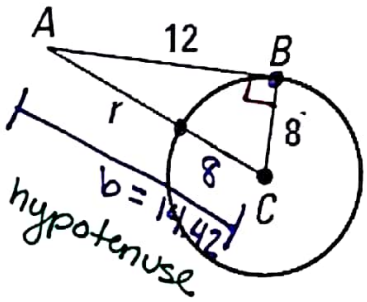
$r^2 + 225 = 289$

$-225 \quad -225$

$\sqrt{r^2} = \sqrt{64}$

$\boxed{r = 8}$

EX2



$12^2 + 8^2 = b^2$

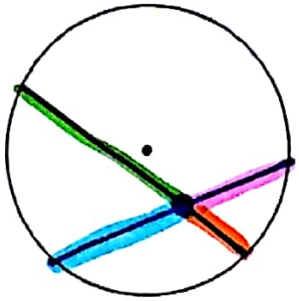
$144 + 64 = b^2$

$\sqrt{208} = \sqrt{b^2}$

$14.42 = b$

$14.42 - 8 = \boxed{6.42 = r}$

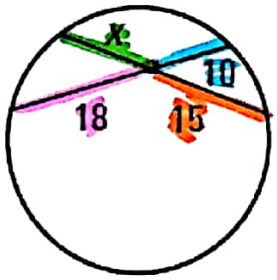
Lengths Formed By Chords



FORMULA:

$$\underline{\text{one piece}} \cdot \underline{\text{other piece}} = \underline{\text{one piece}} \cdot \underline{\text{other piece}}$$

EX3

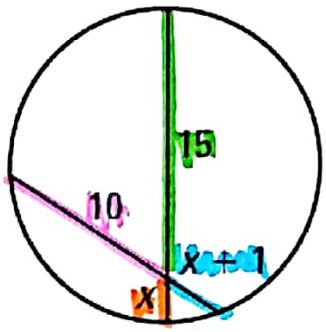


$$X \cdot 15 = 18 \cdot 10$$

$$\frac{15X}{15} = \frac{180}{15}$$

$$\boxed{X = 12}$$

EX4



$$15 \cdot X = 10(X+1)$$

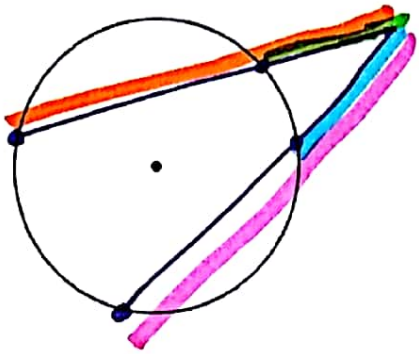
$$15X = 10X + 10$$

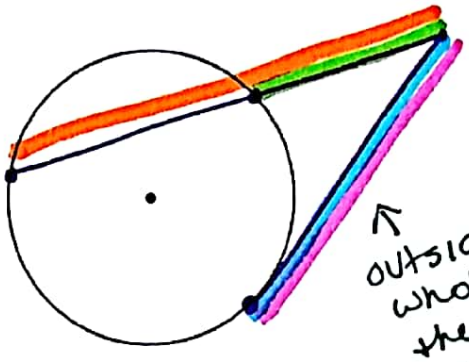
$$-10X \quad -10X$$

$$\frac{5X}{5} = \frac{10}{5}$$

$$\boxed{X = 2}$$

Lengths Formed By Secants and Tangents



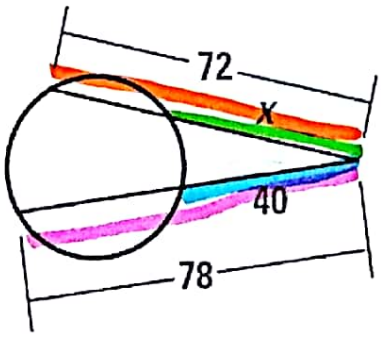


↑ outside piece + whole length are the same in a tangent

FORMULA:

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

EX5

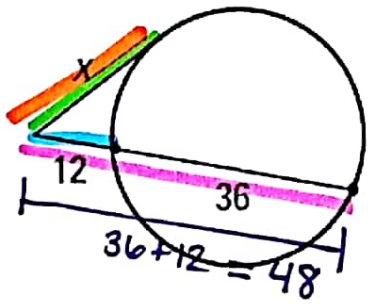


$x \cdot 72 = 40 \cdot 78$

$\frac{72x}{72} = \frac{3120}{72}$

$x = 43.33$

EX6

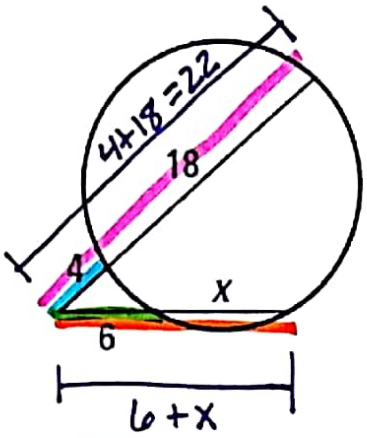


$x \cdot x = 12 \cdot 48$

$\sqrt{x^2} = \sqrt{576}$

$x = 24$

EX7



$6 \cdot (6+x) = 4 \cdot 22$

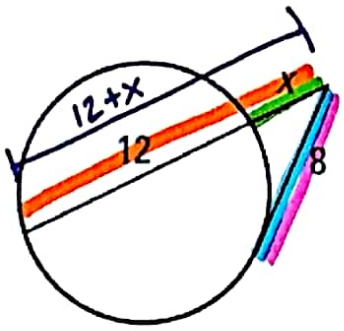
$36 + 6x = 88$

$-36 \quad -36$

$\frac{6x}{6} = \frac{52}{6}$

$\boxed{x = 8.67}$

EX8



$x \cdot (12+x) = 8 \cdot 8$

$12x + x^2 = 64$

$-64 \quad -64$

$12x + x^2 - 64 = 0$

$x^2 + 12x - 64 = 0$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$a: 1 \quad b: 12 \quad c: -64$

$x = \frac{-(12) \pm \sqrt{(12)^2 - 4(1)(-64)}}{2(1)}$

$x = \frac{-12 \pm \sqrt{400}}{2}$

$x = \frac{-12 \pm 20}{2}$

$x = 4, -16$ ← can't have negative length

$\boxed{x = 4}$