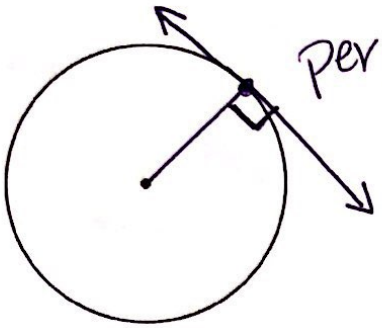
GUIDED NOTES: Lengths With Circles

Lengths Formed By Radius and Tangent



Perpendicular (90°)

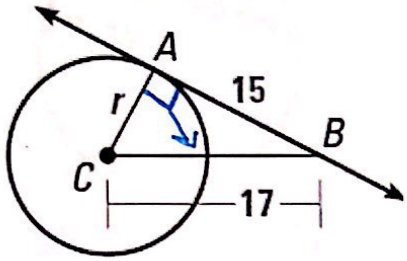
FORMULA:

Pythagorean Theorem

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

legs, hypotenuse

EX1



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

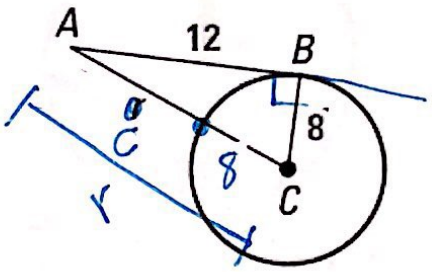
$225 + r^2 = 289$

$-225 \quad -225$

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

$r = 8$

EX2



$8^2 + 12^2 = r^2$

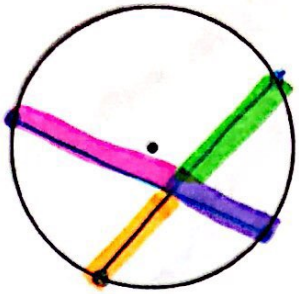
$64 + 144 = r^2$

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

$r = 14.42$

$14.42 - 8 = 6.42 = C$

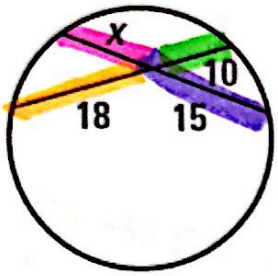
Lengths Formed By Chords



FORMULA:

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

EX3

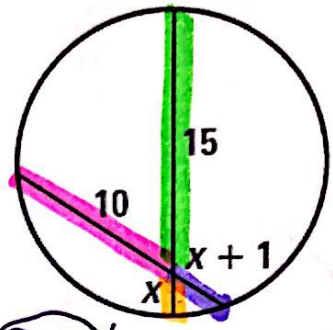


$$x \cdot 15 = 18 \cdot 10$$

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

$$\boxed{x = 12}$$

EX4



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

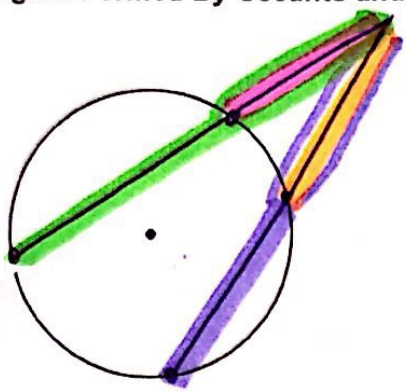
$$10x + 10 = 15x$$

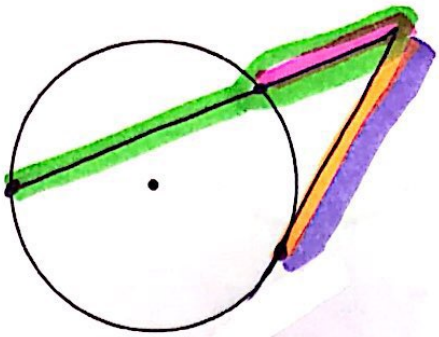
$$-10x \qquad -10x$$

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

$$\boxed{x = 2}$$

Lengths Formed By Secants and Tangents

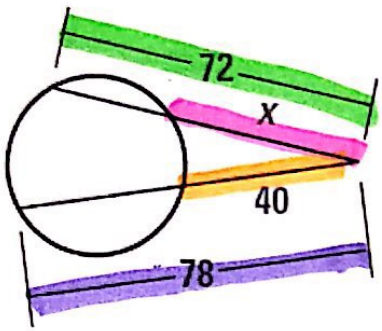




FORMULA:

outside piece · whole length = outside piece · whole length

EX5

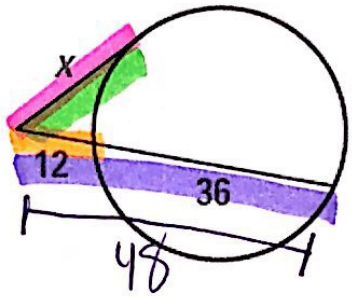


$x \cdot 72 = 40 \cdot 78$

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

$x = 43.33$

EX6

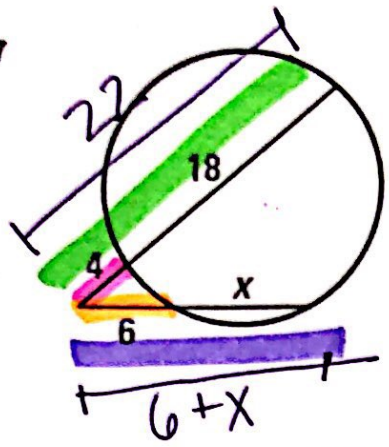


$x \cdot x = 12 \cdot 48$

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

$x = 24$

EX7



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

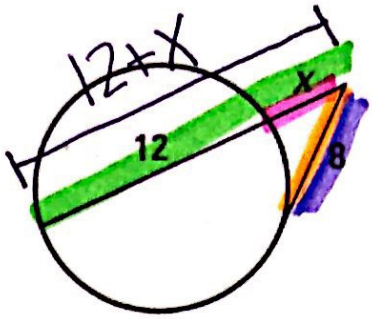
$88 = 36 + 6x$

$-36 \quad -36$

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

$\boxed{x = 8.67}$

EX8



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

$12x + x^2 = 64$

$-64 \quad -64$

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

$-64x^2$

$-4x \quad 16x$

$\frac{x^2}{x} - \frac{4x}{x} \;\Big|\; + \frac{16x}{16} - \frac{64}{16} = 0$

$x(x-4) \;\Big|\; +16(x-4) = 0$

$(x+16)(x-4) = 0$

$x+16=0 \qquad x-4=0$

$-16 \quad -16 \qquad +4 \quad +4$

$\boxed{x = 4}$

~~$x = -16$~~

cannot have - length!