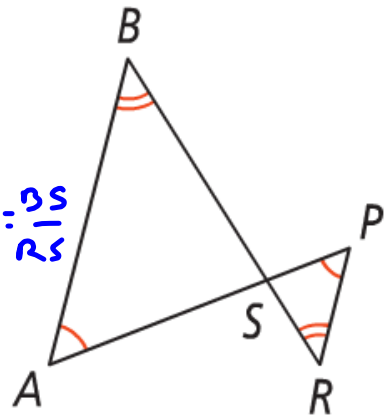
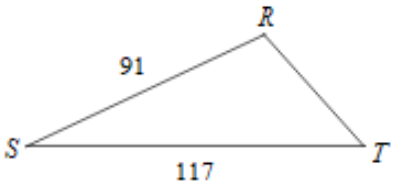
Warm Up:

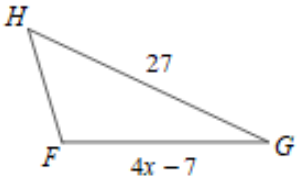
1. The triangles at right are similar. Write a similarity statement. $\triangle ABS \sim \triangle PRS$
Write out the extended proportion for the ratios of the corresponding sides.



$\frac{AS}{PS} = \frac{BA}{RP} = \frac{BS}{RS}$

2. $\triangle TSR \sim \triangle HGF$





$\frac{91}{4x-7} = \frac{117}{27}$

$2457 = 117(4x-7)$

$2457 = 468x - 819$

$+819 \quad +819$

$\frac{3276}{468} = \frac{468x}{468}$ $x = 7$

7

Learning Goal: Today I will learn about proportions in triangles.

Success Criteria: I am able to apply the side splitter and triangle angle bisector theorems to create proportions and solve.

7.5 Proportions in Triangles

*Theorem 7-4 Side-Splitter Theorem

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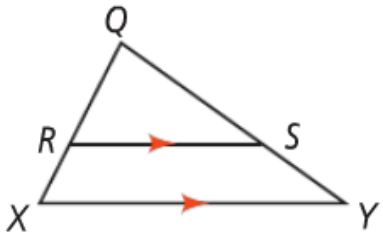
Theorem

If a line is parallel to one side of a triangle and intersects the other two sides, then it divides those sides proportionally.

If . . .

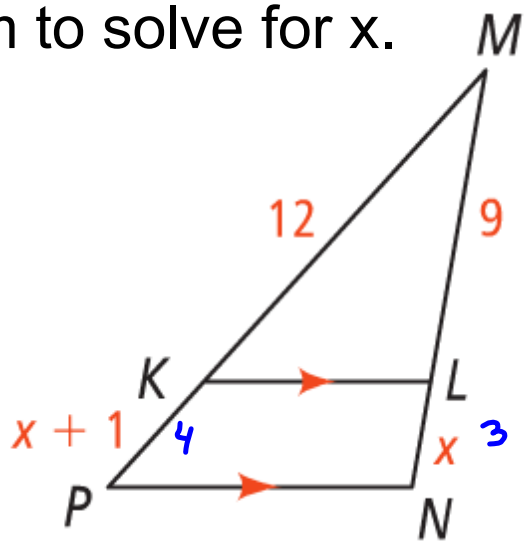
$\overleftrightarrow{RS} \parallel \overleftrightarrow{XY}$



Then . . .

$\frac{XR}{RQ} = \frac{YS}{SQ}$

Use the side splitter theorem to solve for x.



$$\frac{12}{x+1} = \frac{9}{x}$$

$$12x = 9(x+1)$$

$$12x = 9x + 9$$

$$-9x \quad -9x$$

$$\frac{3x}{3} = \frac{9}{3}$$

$$x = 3$$

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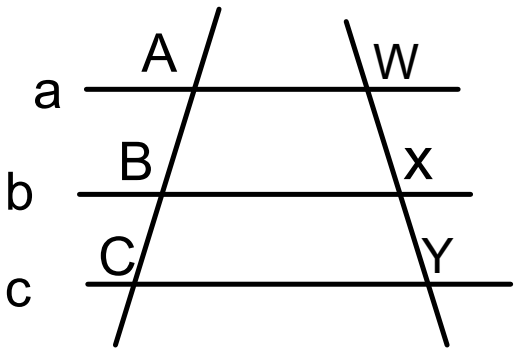
Corollary to the Side Splitter

If three parallel lines intersect two transversals, then the segments intercepted on the transversals are proportional.

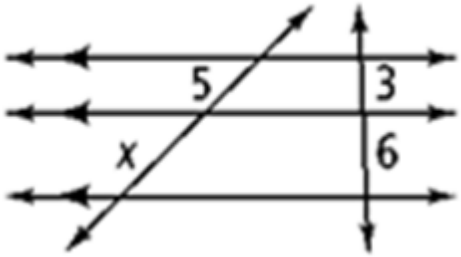
If a ll b ll c



Then

$$\frac{AB}{BC} = \frac{WX}{XY}$$

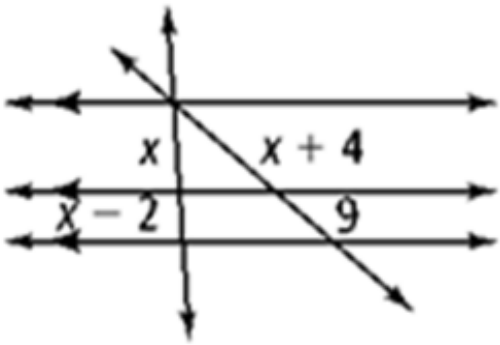
1.



$\frac{5}{x} = \frac{3}{6}$

$\frac{3x}{3} = \frac{30}{3}$ $x = 10$

2.



$\frac{x}{x-2} = \frac{x+4}{9}$

$9x = (x-2)(x+4)$

$9x = x^2 + 4x - 2x - 8$

$9x = x^2 + 2x - 8$

$-9x$

$0 = x^2 - 7x - 8$

$(x - 8)(x + 1)$

$x = 8$ $x = -1$

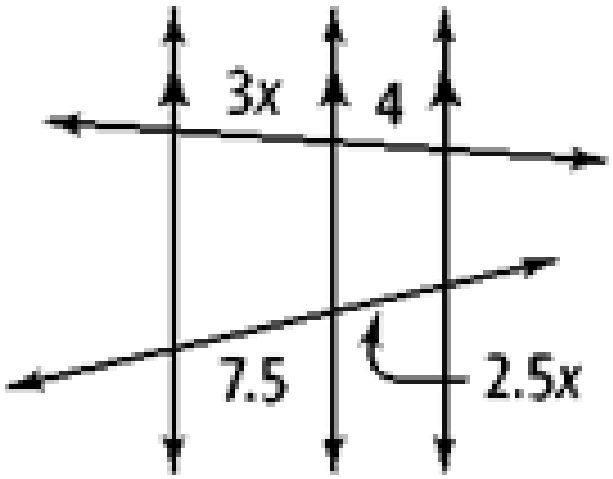
Use the side splitter theorem to solve for x.

$\frac{3x}{4} = \frac{7.5}{2.5x}$

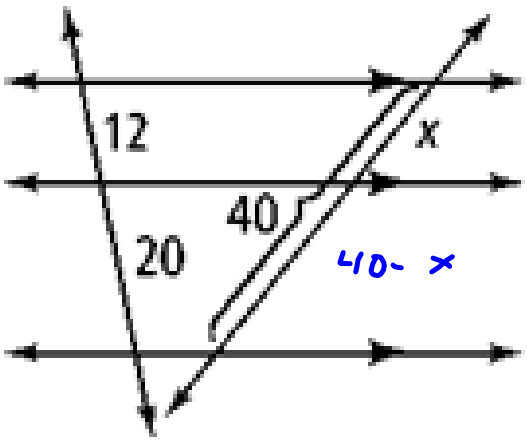
$\frac{30}{7.5} = \frac{7.5x^2}{7.5}$

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

$x = 2$



Use the side splitter theorem to solve for x.



$\frac{12}{20} = \frac{x}{40-x}$

$12(40-x) = 20x$

$480 - 12x = 20x$

$+12x \quad +12x$

$\frac{480}{32} = \frac{32x}{32}$

$480/32 =$

$x = 15$

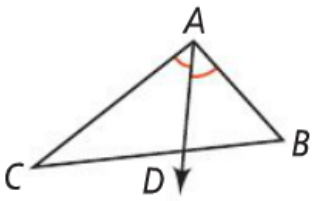
*Theorem 7-5 Triangle-Angle-Bisector Theorem gs

Theorem

If a ray bisects an angle of a triangle, then it divides the opposite side into two segments that are proportional to the other two sides of the triangle.

If . . .

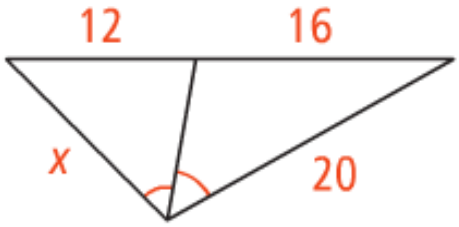
$\overrightarrow{AD}$ bisects $\angle CAB$



Then . . .

$\frac{CD}{DB} = \frac{CA}{BA}$

Solve for x.



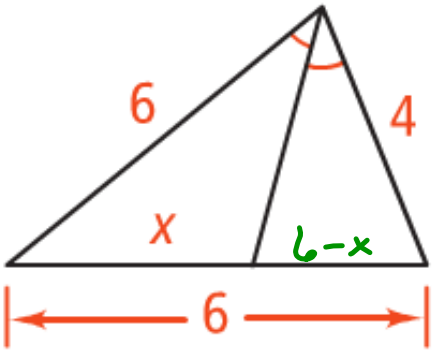
$$\frac{12}{16} = \frac{x}{20}$$

$$16x = 12(20)$$

$$\frac{16x}{16} = \frac{240}{16}$$

$$x = 15$$

Solve for x.



$$\frac{6}{4} = \frac{x}{6-x}$$

$$4x = 6(6-x)$$

$$4x = 36 - 6x$$

$$+6x \qquad +6x$$

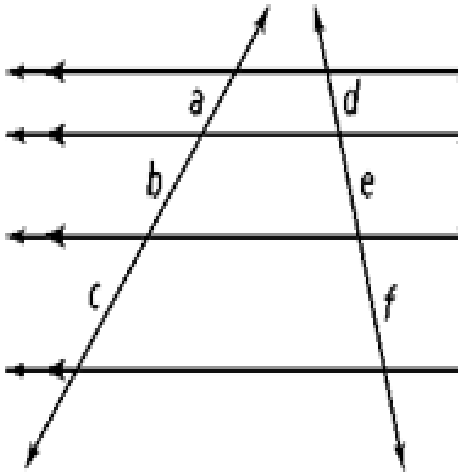
$$\frac{10x}{10} = \frac{36}{10}$$

$$x = 3.6$$

Closure: Today I learned about the proportions that exist in triangles.

I can set up proportions using the side splitter and triangle angle bisector theorems.

Use the figure at the right to complete each proportion.



1. $\frac{a}{c} = \frac{\square}{f}$ d

2. $\frac{f}{e} = \frac{c}{\square}$ b

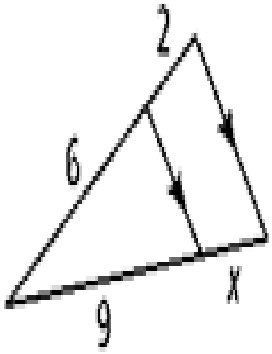
3. $\frac{\square}{c} = \frac{e}{f}$ b

4. $\frac{a}{\square} = \frac{b}{e}$ d

5. $\frac{a}{b} = \frac{\square}{e}$ d

6. $\frac{e}{\square} = \frac{f}{c}$ b

7.



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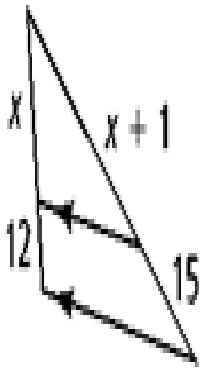

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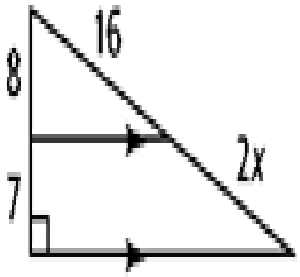

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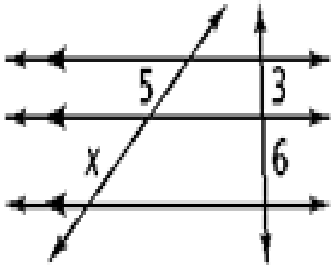

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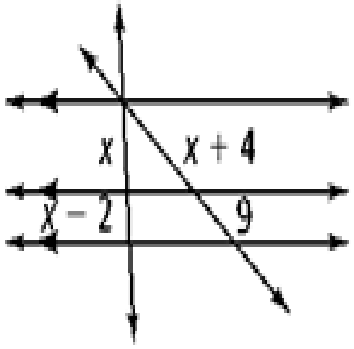

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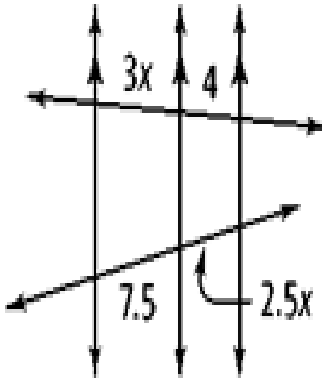

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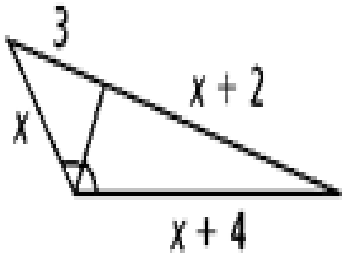

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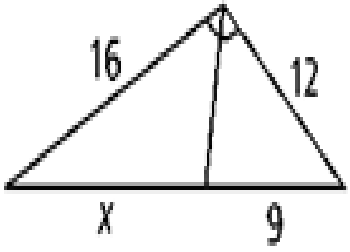

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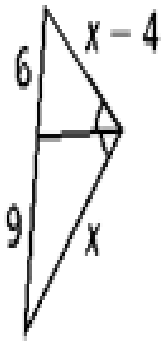

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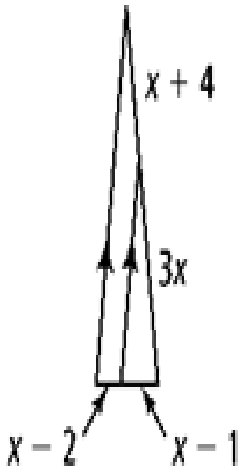

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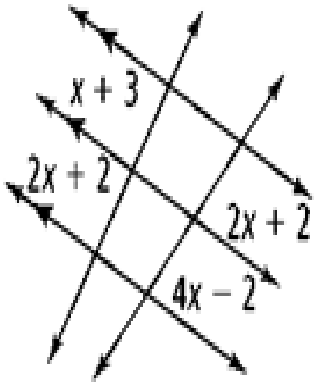

18.