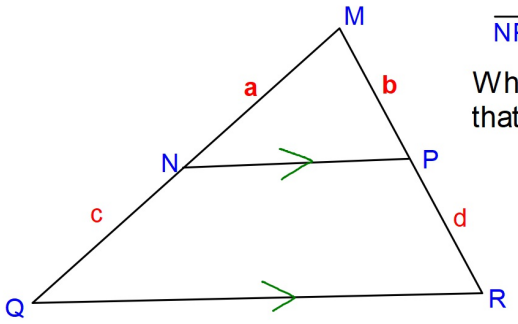
Section 7-5: Proportions in Triangles.

Theorem 7-4 **Side-Splitter Theorem**

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



$\overline{NP} \parallel \overline{QR}$

What are some proportions that can be used in this figure?

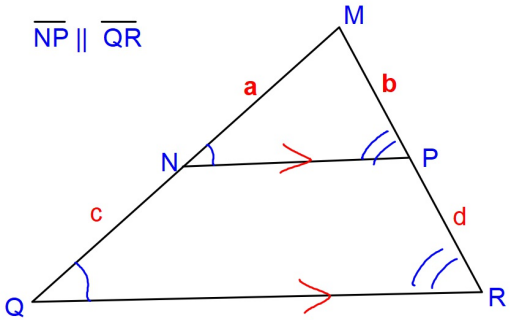
$\frac{a}{c} = \frac{b}{d}$

$\frac{a}{b} = \frac{c}{d}$

$\frac{b}{a} = \frac{d}{c}$

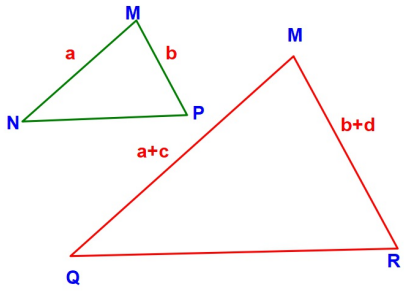
$\frac{c}{a} = \frac{d}{b}$

$\overline{NP} \parallel \overline{QR}$



Are these triangles similar?

Yes, by AA-Sim Post

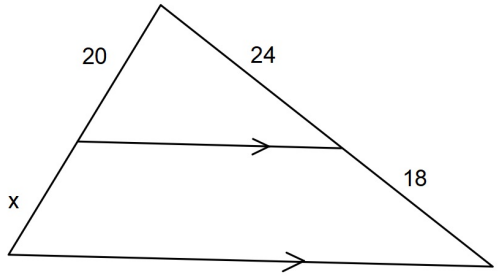


What other proportions can be used in this figure because of the similar triangles?

$\frac{a}{b} = \frac{a+c}{b+d}$

or $\frac{a}{a+c} = \frac{b}{b+d}$

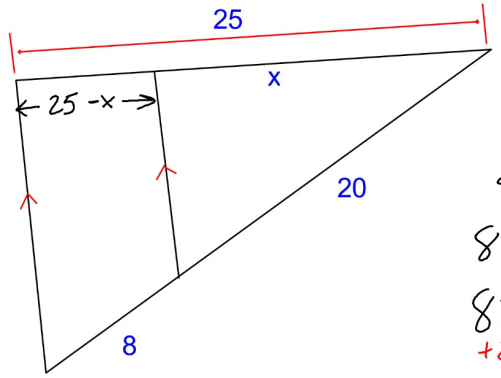
Find the value of x.



$\frac{20}{x} = \frac{24}{18}$

$x = 15$

Find the value of x.



$$\frac{x}{25-x} = \frac{20}{8}$$

$$8x = 20(25-x)$$

$$8x = 500 - 20x$$

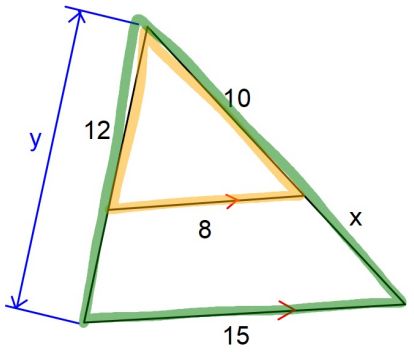
$+20x \quad +20x$

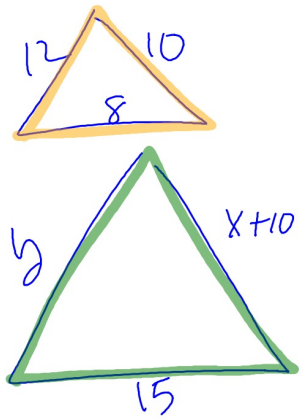
$$28x = 500$$

$28 \quad 28$

$$x = 17.86$$

Find the values of the variables.





FOR y

$$\frac{12}{y} = \frac{8}{15}$$

$y = 22.5$

FOR x

$$\frac{8}{15} = \frac{10}{x+10} \rightarrow 150 = 8(x+10)$$

$$150 = 8x + 80$$

$-80 \quad -80$

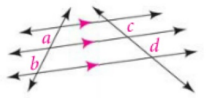
$$70 = 8x$$

$8 \quad 8$

$$x = 8.75$$

Corollary — **Corollary to Theorem 7-4**

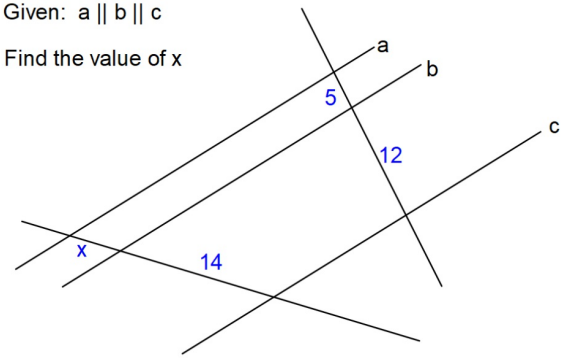
If three parallel lines intersect two transversals, then the segments intercepted on the transversals are proportional.



$$\frac{a}{b} = \frac{c}{d}$$

Given: a || b || c

Find the value of x



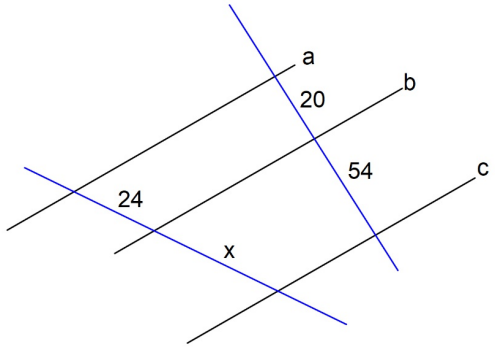
$$\frac{x}{5} = \frac{14}{12}$$

or

$$\frac{x}{14} = \frac{5}{12}$$

$$x = 5.83$$

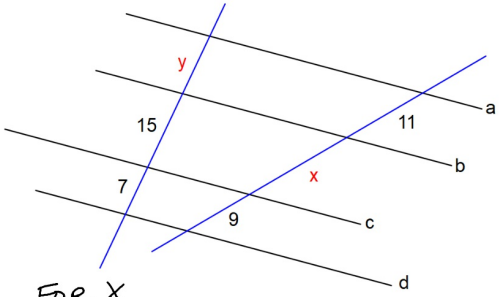
Given: a || b || c Find the value of x



$\frac{20}{54} = \frac{24}{x}$

$x = 64.8$

Given: a || b || c || d Find the value of x and y



FOR x

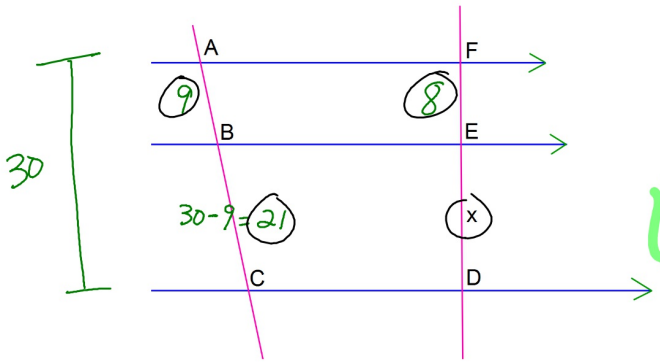
$\frac{15}{7} = \frac{x}{9}$ $x = 19.29$

FOR y

$\frac{y}{7} = \frac{11}{9}$

$y = 8.56$

Find the value of x. AB = 9 EF = 8 AC = 30



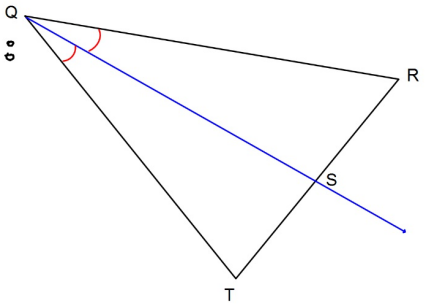
$\frac{9}{21} = \frac{8}{x}$

$x = 18.67$

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

here are 2 possible proportions:

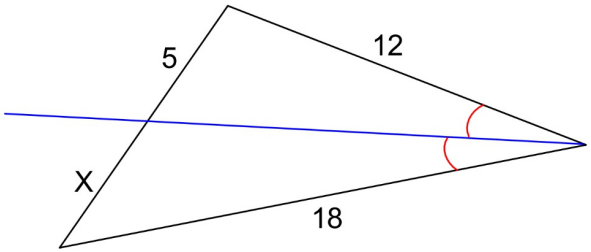


① $\frac{ST}{SR} = \frac{QT}{QR}$

or

② $\frac{ST}{QT} = \frac{SR}{QR}$

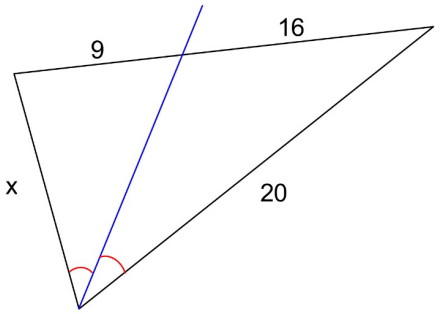
Find the value of x.



$\frac{5}{12} = \frac{x}{18}$

$X = 7.5$

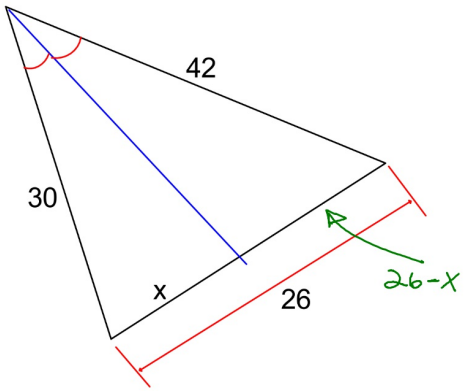
Find the value of x.



$\frac{9}{x} = \frac{16}{20}$

$X = 11.25$

Find the value of x.



$\frac{x}{30} = \frac{26-x}{42}$

$42x = 30(26-x)$

$42x = 780 - 30x$

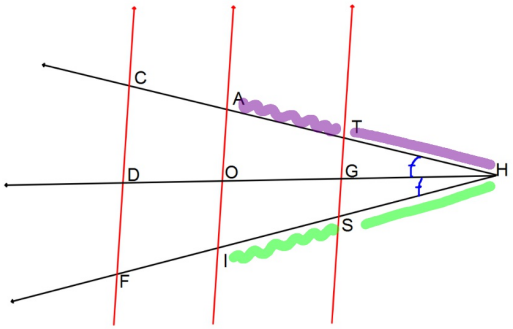
$+30x \quad +30x$

$\frac{72x}{72} = \frac{780}{72}$

$X = 10.83$

Complete each proportion.

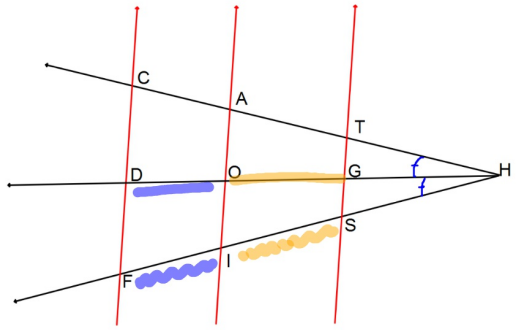
1. $\frac{HT}{TA} = \frac{\quad}{SI}$



1. $\frac{HT}{TA} = \frac{HS}{SI}$

Complete each proportion.

2. $\frac{\overline{FI}}{FI} = \frac{GO}{SI}$



$\downarrow$

2. $\frac{\overline{DO}}{\overline{FI}} = \frac{GO}{SI}$

Hwk #13

Sec 7-5

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Problems 1, 2, 4-8, 10, 12-14

That's it. Done with Chapter 7.