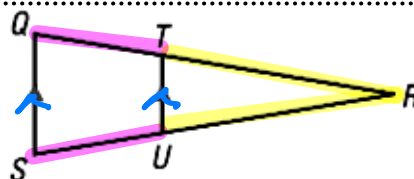


# Proportions in Similar Triangles

## Triangle Proportionality Theorem

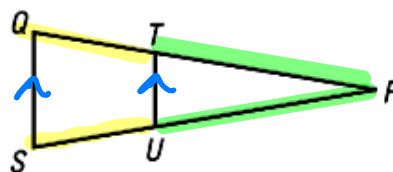
If a line parallel to one side of a triangle intersects the other two sides, then it divides the two sides proportionally.



If  $\overline{TU} \parallel \overline{QS}$ , then  $\frac{RT}{TQ} = \frac{RU}{US}$  or  $\frac{QT}{SU} = \frac{TR}{UR}$

## Converse of the Triangle Proportionality Theorem

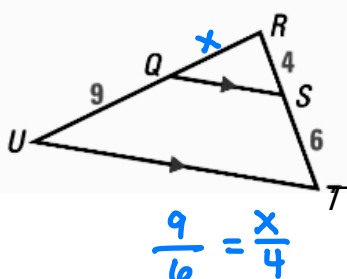
If a line divides two sides of a triangle proportionally, then it is parallel to the third side.



If  $\frac{RT}{TQ} = \frac{RU}{US}$ , then  $\overline{TU} \parallel \overline{QS}$ .

## Practice Theorems 6.4-6.5:

1.) In the diagram,  $\overline{QS} \parallel \overline{UT}$ ,  $RS = 4$ ,  $ST = 6$ , and  $QU = 9$ . What is the length of  $\overline{RQ}$ ?



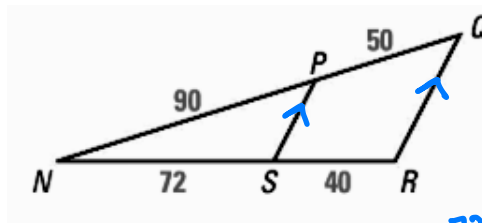
$$\frac{x}{9} = \frac{4}{6}$$

$$6x = 36$$

$$\boxed{x = 6}$$

$$\frac{9}{6} = \frac{x}{4}$$

2.) Determine whether  $\overline{PS} \parallel \overline{QR}$

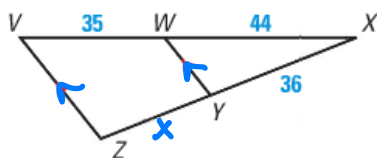


yes !!

$$\frac{72}{40} = \frac{90}{50} \text{ or } \frac{72}{90} = \frac{40}{50}$$

## On your Own:

a. Find the length of  $\overline{YZ}$ .



$$\frac{44}{35} = \frac{36}{x}$$

$$x = \frac{315}{11}$$

$$\approx 28.64$$

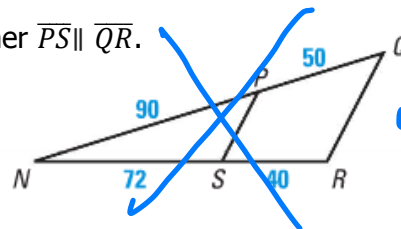
$$\frac{44}{36} = \frac{35}{x}$$

$$\frac{11}{9} = \frac{35}{x}$$

$$315 = 11x$$

$$\frac{315}{11} = x$$

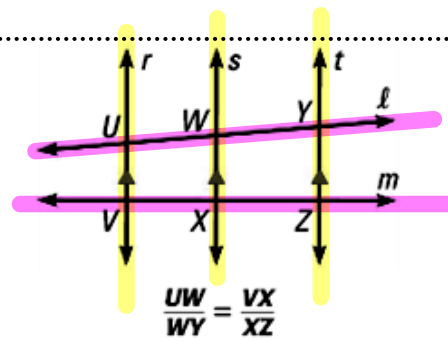
b. Determine whether  $\overline{PS} \parallel \overline{QR}$ .



oops!

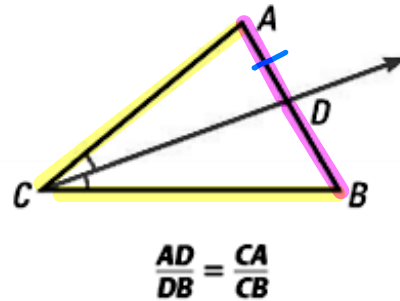
### Side Splitter Proportionality

If three parallel lines intersect two transversals, then they divide the transversals proportionally.



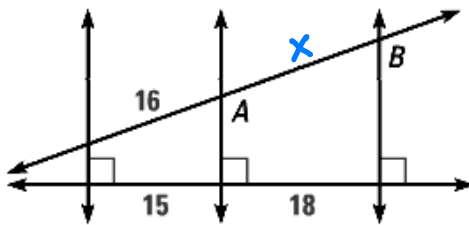
### Angle Bisector Proportionality

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



### Practice with Proportionality:

3.) Find the length of  $\overline{AB}$ .



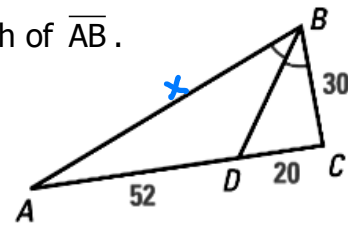
$$\frac{15}{18} = \frac{16}{x}$$

$$\frac{5}{6} = \frac{16}{x}$$

$$5x = 96$$

$$x = 19.2$$

4.) Find the length of  $\overline{AB}$ .

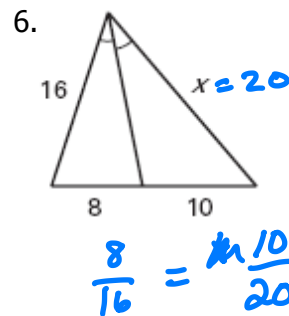
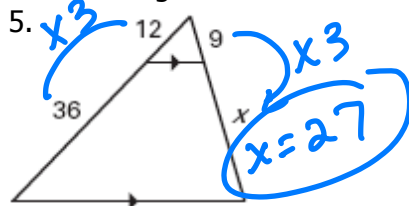


$$\frac{x}{52} = \frac{30}{20}$$

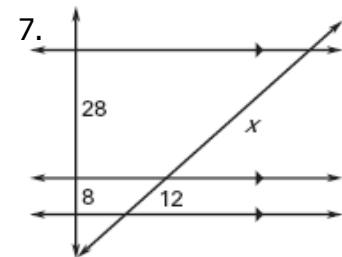
$$\frac{x}{52} = \frac{3}{2}$$

$$x = 78$$

Use the diagrams to find the value of each variable.



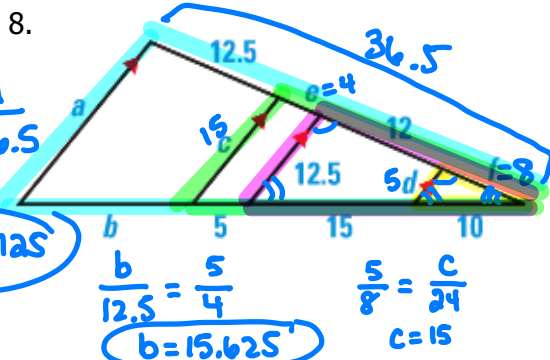
$$\frac{8}{16} = \frac{10}{20}$$



$$\frac{8}{28} = \frac{12}{x}$$

$$\frac{2}{7} = \frac{12}{x}$$

$$x = 42$$



$$\frac{5}{15} = \frac{e}{12} \quad e = 4$$

$$\frac{10}{15} = \frac{f}{12}$$

$$\frac{d}{8} = \frac{12.5}{20}$$

$$d = 5$$

**Mixed Practice**

#9-13: Use the diagram to find the value of each variable.

9.) 
$$\frac{9}{10} = \frac{x}{18}$$

$$x = 16.2$$

10.) 
$$\frac{21}{35} = \frac{x}{40}$$

$$x = 24$$

11.) 
$$\frac{x}{5} = \frac{24}{6}$$

$$\frac{x}{5} = \frac{4}{1}$$

$$x = 20$$

12.) 
$$\frac{a}{17} = \frac{21}{34}$$

$$a = 10.5$$

13.) 
$$\frac{2}{5} = \frac{x}{7.5}$$

$$x = 3$$

$$\frac{6}{5} = \frac{y}{7}$$

$$y = 8.4$$

#14-17: Determine the length of each segment.

14.)  $\overline{AG} = 2\frac{2}{3}$

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

16.)  $\overline{ED} = 11.25$

$$\frac{n}{15} = \frac{3}{4}$$

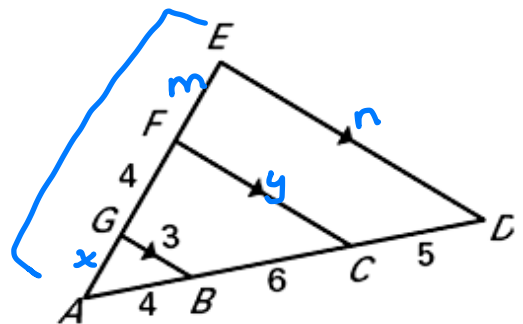
15.)  $\overline{FC} = 7.5$

$$\frac{y}{10} = \frac{3}{4}$$

17.)  $\overline{AE} = 10$

$$x + 4 + m$$

$$2\frac{2}{3} + 4 + 3\frac{1}{3}$$



$$\frac{4}{m} = \frac{6}{5}$$

$$m = 3\frac{1}{3}$$