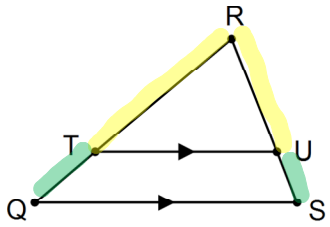
SM 2

Date: **Section:** 10.5

Objective: Use theorems about triangle proportionality and midsegments

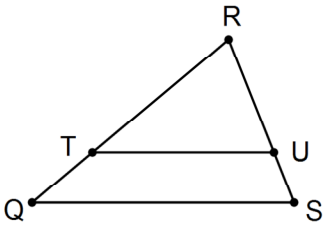
Triangle Proportionality Theorem: If a line parallel to one side of a triangle intersects the other two sides, then it divides the two sides proportionally.



Write if-then statement for the triangles.

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

Converse of the Triangle Proportionality Theorem: If a line divides two sides of a triangle proportionally, then it is parallel to the third side

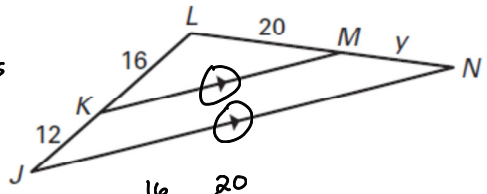


Write if-then statement for the triangles.

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

Examples: Find the value of the variable.

a)



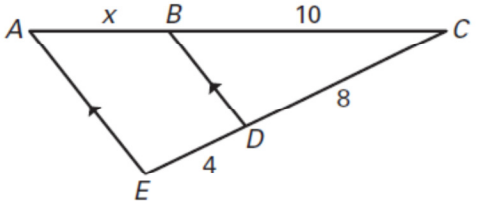
Make fractions out of the two pieces of each side.

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

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

$y = 15$

b)

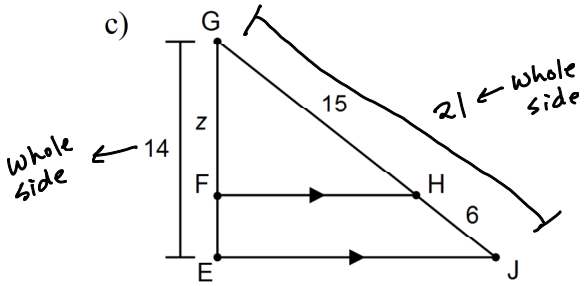


$\frac{10}{x} = \frac{8}{4}$

$\frac{8x}{8} = \frac{40}{8}$

$x = 5$

c)



big piece / big piece

$\frac{z}{14} = \frac{15}{21}$

whole side / whole side

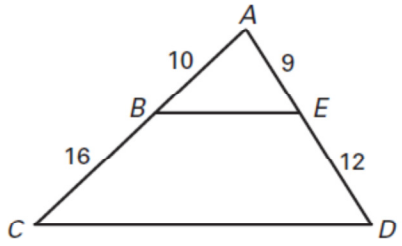
$\frac{21z}{21} = \frac{210}{21}$

$z = 10$

Do fractions of pieces of sides reduce to same thing?

Examples: Given the diagram, determine whether $\overline{BE} \parallel \overline{CD}$. Show work to support your answer.

a)

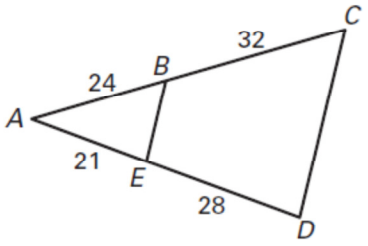


$\frac{10}{16} = \frac{5}{8}$

$\frac{9}{12} = \frac{3}{4}$

$\overline{BE}$ is not parallel to $\overline{CD}$

b)

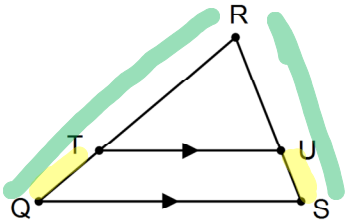


$\frac{24}{32} = \frac{3}{4}$

$\frac{21}{28} = \frac{3}{4}$

$\overline{BE} \parallel \overline{CD}$

Example: Complete the proportion using the figure.



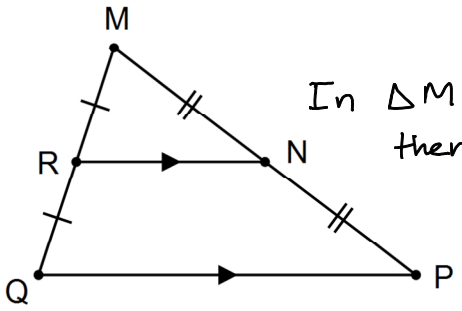
short piece / short piece

$\frac{QT}{QR} \cong \frac{SU}{?}$ SR

whole side / whole side

Midsegment of a Triangle: A segment that connects the midpoints of two sides of a triangle.

Midsegment Theorem: The segment connecting the midpoints of two sides of a triangle is parallel to the third side and is half as long as the third side

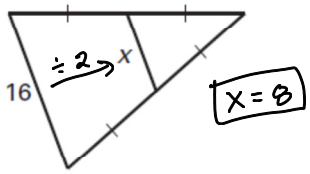


Write if-then statement for the triangles.

In $\triangle MPQ$, if $MR = RQ$ & $MN = NP$ ($\overline{RN}$ is a midsegment), then $\overline{RN} \parallel \overline{QP}$ and $RN = \frac{1}{2}QP$

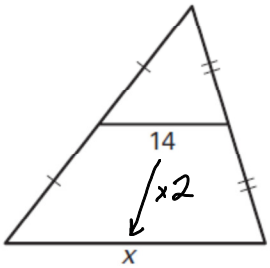
Examples: Find the value of the variable.

a)



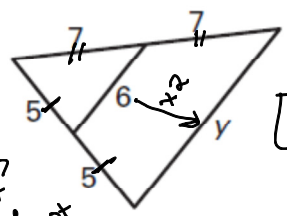
$x = 8$

b)



$x = 28$

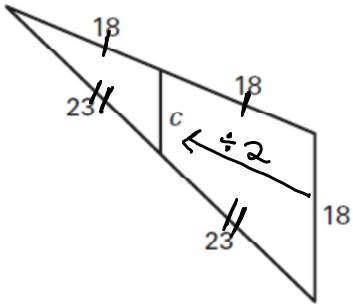
c)



$y = 12$

The 5s & 7's just show the sides got cut in half

d)



$c = 9$