

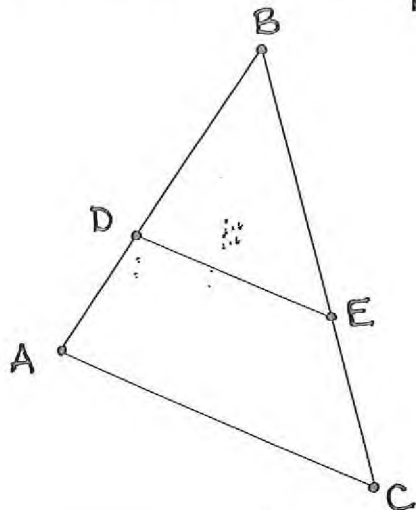
Triangle Proportionality Theorem

#30

Standard MCC9-12.G.SRT.4 Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally...

Triangle Proportionality Theorem

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



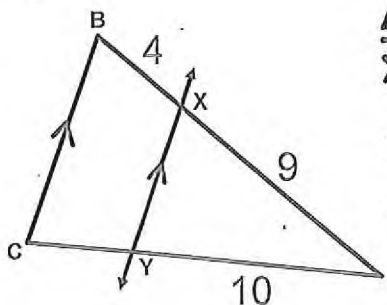
$$\overline{DE} \parallel \overline{AC}$$

SO ...

$$\frac{BD}{DA} = \frac{BE}{EC}$$

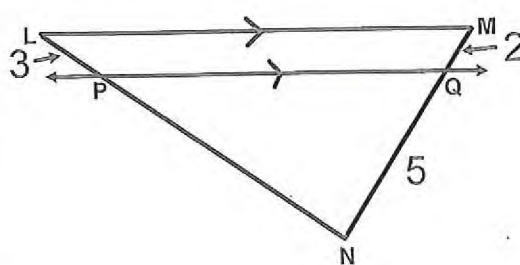
Examples:

1) Find CY.



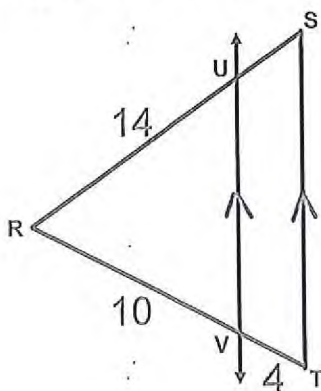
$$\begin{aligned} \frac{AX}{XB} &= \frac{AY}{YC} \\ \frac{9}{4} &= \frac{10}{YC} \\ 9 \cdot YC &= 10 \cdot 4 \\ 9 \cdot YC &= 40 \\ \frac{9 \cdot YC}{9} &= \frac{40}{9} \\ \boxed{YC} &= \boxed{4.\bar{4}} \end{aligned}$$

2) Find PN.



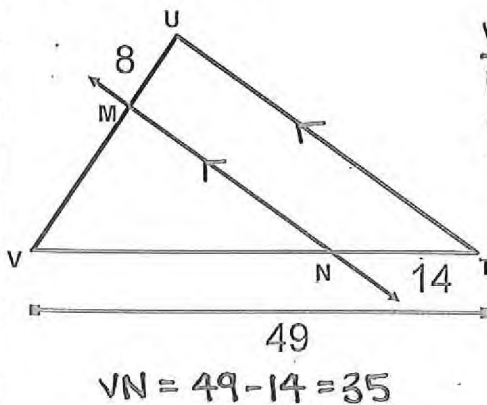
$$\begin{aligned} \frac{PN}{PL} &= \frac{NQ}{QM} \\ \frac{PN}{3} &= \frac{5}{2} \\ PN \cdot 2 &= 5 \cdot 3 \\ \frac{PN \cdot 2}{2} &= \frac{15}{2} \\ \boxed{PN} &= \boxed{7.5} \end{aligned}$$

3) Find US.



$$\begin{aligned} \frac{RU}{US} &= \frac{RV}{VT} \\ \frac{14}{US} &= \frac{10}{4} \\ 14 \cdot 4 &= 10 \cdot US \\ \frac{56}{10} &= \frac{10 \cdot US}{10} \\ \boxed{5.6} &= \boxed{US} \end{aligned}$$

4) Find MV.



$$\begin{aligned} \frac{VM}{MU} &= \frac{VN}{NT} \\ \frac{VM}{8} &= \frac{35}{14} \\ VM \cdot 14 &= 8 \cdot 35 \\ \frac{VM \cdot 14}{14} &= \frac{280}{14} \\ \boxed{VM} &= \boxed{20} \end{aligned}$$

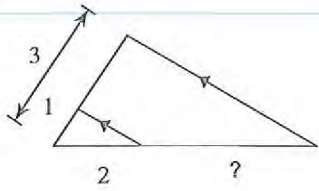
$VN = 49 - 14 = 35$

Triangle Proportionality Theorem

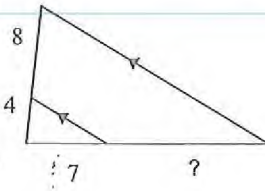
PRACTICE

Find the missing length indicated.

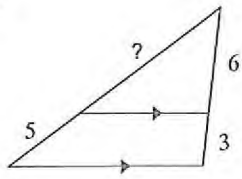
1)



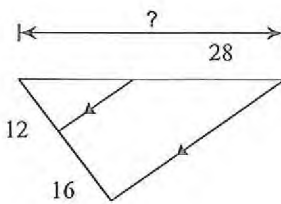
2)



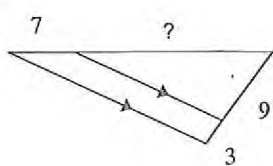
3)



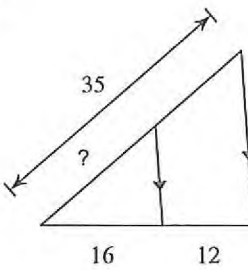
4)



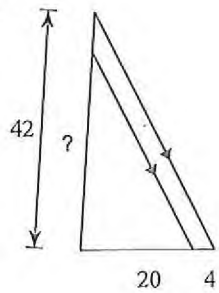
5)



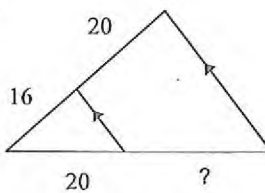
6)



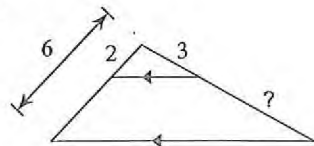
7)



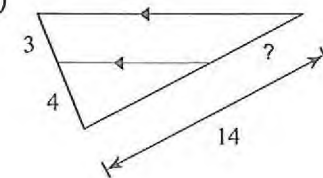
8)



9)



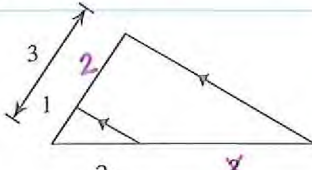
10)

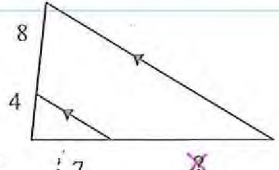


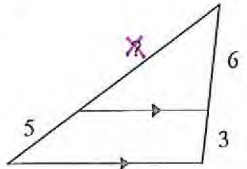
Triangle Proportionality Theorem

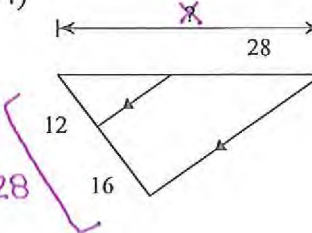
PRACTICE

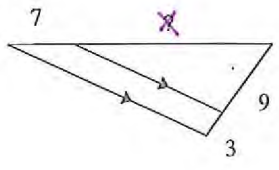
Find the missing length indicated.

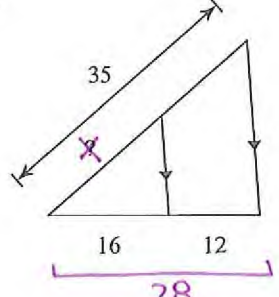
1)  $\frac{1}{2} = \frac{2}{X}$
 $1 \cdot X = 2 \cdot 2$
 $X = 4$

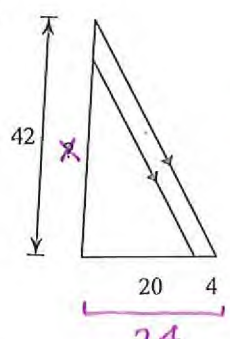
2)  $\frac{4}{8} = \frac{7}{X}$
 $4 \cdot X = 7 \cdot 8$
 $4X = 56$
 $X = 14$

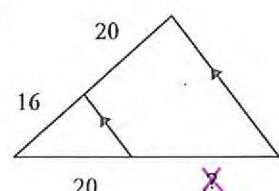
3)  $\frac{X}{5} = \frac{6}{3}$
 $3 \cdot X = 5 \cdot 6$
 $3X = 30$
 $X = 10$

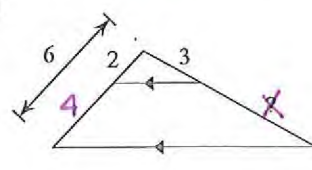
4)  $\frac{X}{28} = \frac{28}{16}$
 $16 \cdot X = 28 \cdot 28$
 $16X = 784$
 $X = 49$

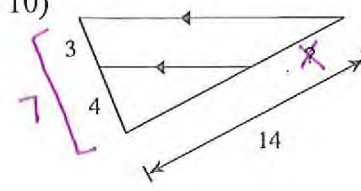
5)  $\frac{X}{7} = \frac{9}{3}$
 $3 \cdot X = 9 \cdot 7$
 $3X = 63$
 $X = 21$

6)  $\frac{X}{35} = \frac{16}{28}$
 $28 \cdot X = 16 \cdot 35$
 $28X = 560$
 $X = 20$

7)  $\frac{X}{42} = \frac{20}{24}$
 $24 \cdot X = 42 \cdot 20$
 $24X = 840$
 $X = 35$

8)  $\frac{16}{20} = \frac{20}{X}$
 $16 \cdot X = 20 \cdot 20$
 $16X = 400$
 $X = 25$

9)  $\frac{2}{4} = \frac{3}{X}$
 $2 \cdot X = 3 \cdot 4$
 $2X = 12$
 $X = 6$

10)  $\frac{3}{7} = \frac{X}{14}$
 $X \cdot 7 = 3 \cdot 14$
 $7X = 42$
 $X = 6$