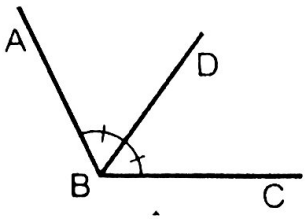
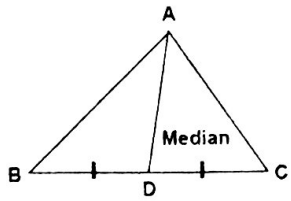
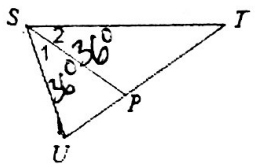
10.4 Other Similarities

Angle Bisector	Median
Segment that cuts an angle in half 	Segment that cuts a side in half 

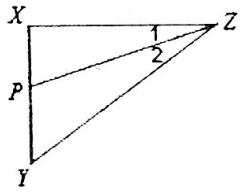
1) Find the indicated measurement given that the segment is an angle bisector.

a)
Find $m\angle UST$ if $m\angle 2 = 36°$.



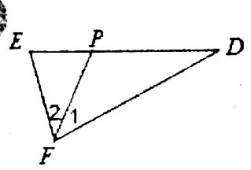
$36+36=\boxed{72°}$

b)
$m\angle XZY = 36°$. Find $m\angle 2$.



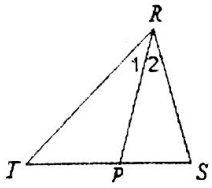
$\frac{36}{2} = \boxed{18°}$

d)
Find x if $m\angle 2 = 9x + 2$ and $m\angle 1 = 8x + 6$.



$9x+2 = 8x+6$
$-8x \quad -2 \quad -8x \quad -2$
$\boxed{x=4}$

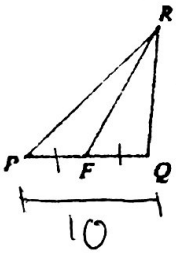
e)
$m\angle 1 = 5x + 4$ and $m\angle TRS = 11x + 3$.
Find x.



$2(5x+4) = 11x+3$
$10x + 8 = 11x + 3$
$-10x \quad -3 \quad -10x \quad -3$
$\boxed{5 = x}$

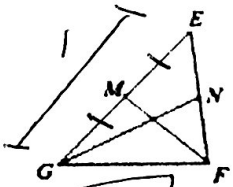
2) Find the indicated measurement given that the segment is a median.

a) Find FQ if $PQ = 10$



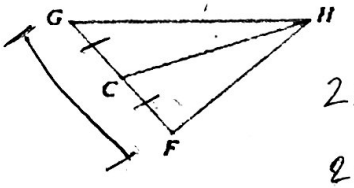
$\boxed{5}$

b) Find MG if $EG = 1$



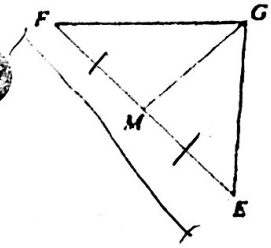
$\boxed{0.5}$

c) Find x if $GF = 2x - 1$ and $CF = \frac{x+5}{2}$



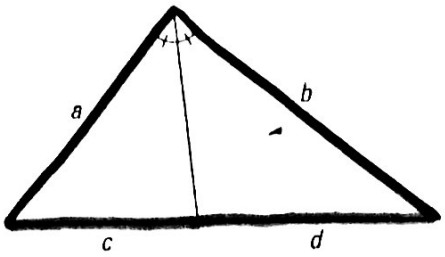
$2x-1 = \cancel{2}\left(\frac{x+5}{\cancel{2}}\right)$
$2x-1 = x+5$
$-x \quad +1 \quad -x \quad +1$
$\boxed{x=6}$

c) Find x if $FE = 2x + 4$ and $ME = 2x - 2$



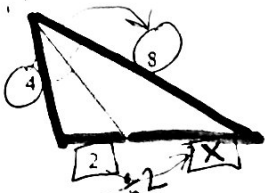
$2x+4 = 2(2x-2)$
$2x+4 = 4x-4$
$-2x \quad +4 \quad -2x \quad +4$
$\frac{8}{2} = \frac{2x}{2}$
$\boxed{4=x}$

Angle Bisector Similarity: An angle bisector in a triangle divides the triangle into two similar triangles.

If 

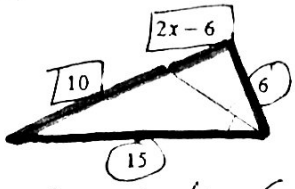
then $\frac{a}{b} = \frac{c}{d}$

3) Find the indicated length.

a) 

$\frac{4}{8} = \frac{2}{x}$ $\div 2$ $\div 2$

$\boxed{x=4}$

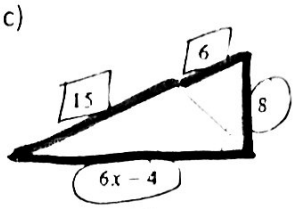
b) 

$10 \cdot \frac{6}{15} = \frac{2x-6}{10} \cdot 10$

$4 = 2x - 6$
$+6 \quad +6$

$\frac{2x}{2} = \frac{10}{2}$

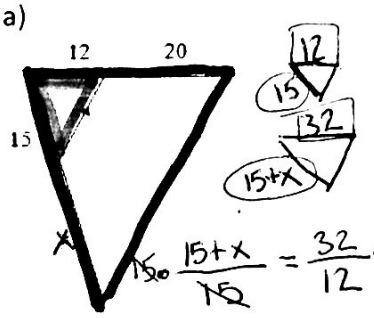
$\boxed{x=5}$

c) 

$\boxed{x=4}$

Parallel Line Similarity: A line parallel to one side of the triangle splits the triangle into two similar triangles.

3) Find the missing length indicated.

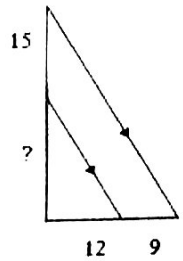
a) 

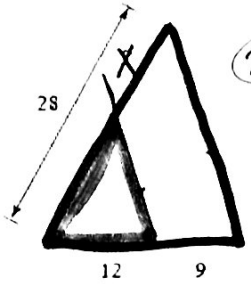
12
15
32
15+x

$15 \cdot \frac{15+x}{15} = \frac{32}{12} \cdot 15$

$15 + x = 40$
$-15 \quad -15$

$\boxed{x=25}$

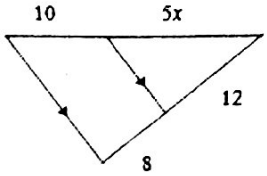
b) 

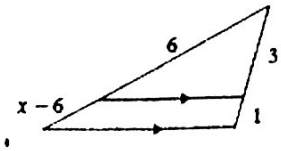
c) 

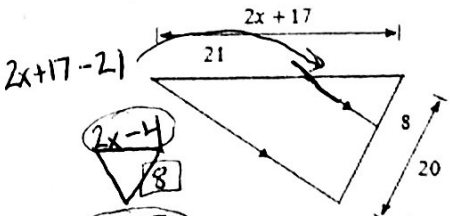
28 − x
12
28
21

$\frac{28-x}{28} = \frac{12}{21}$

4) Solve for x.

a) 

b) 

c) 

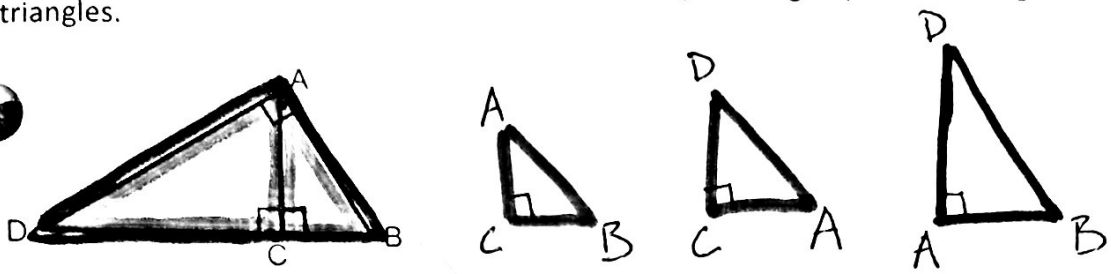
2x+17−21

2x−4
8
2x+17
20

$\frac{2x-4}{2x+17} = \frac{8}{20}$

$20(2x-4) = 8(2x+17)$

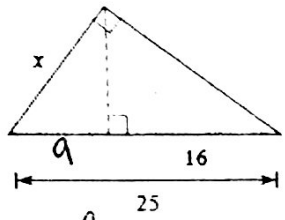
Right Triangle Similarity: The altitude (height) of a right triangle splits the triangle into a set of 3 similar triangles.



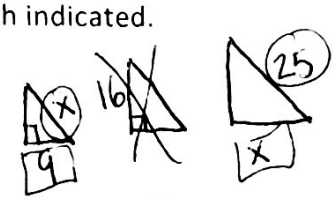
We will use the two triangles that give us two sets of corresponding sides

4) Find the missing length indicated.

a)



$25-16=9$

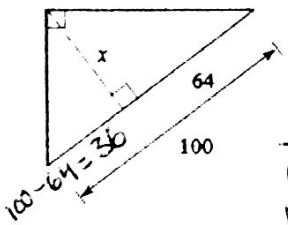


$\frac{x}{25} = \frac{9}{x}$

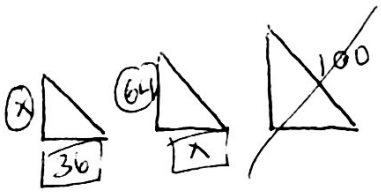
$\sqrt{x^2} = \sqrt{225}$

$\boxed{x = 15}$

b)



$100-64=36$

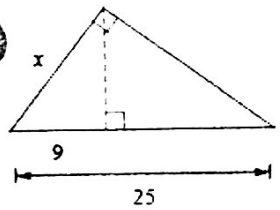


$\frac{x}{64} = \frac{36}{x}$

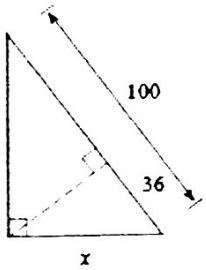
$\sqrt{x^2} = \sqrt{2304}$

$\boxed{x = 48}$

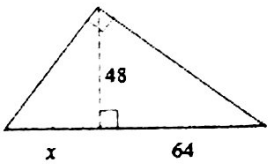
c)



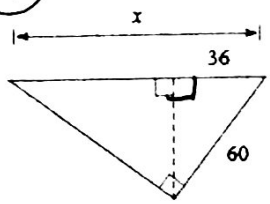
d)



e)



f)



$\frac{60}{x} = \frac{36}{60}$

$\frac{3600}{36} = \frac{36x}{36}$

$\boxed{100 = x}$