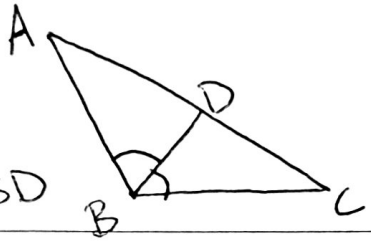
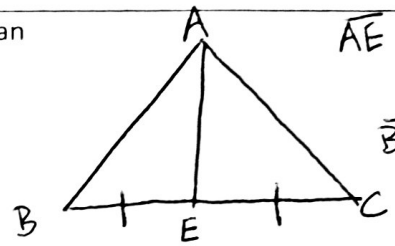
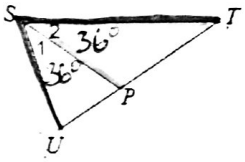
10.3 Other Similarities

Angle Bisector	Median
$\overline{BD}$ is an angle bisector $\angle ABD \cong \angle CBD$ 	 $\overline{AE}$ is a median $\overline{BE} \cong \overline{EC}$

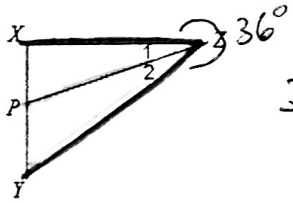
1) Find the indicated measurement given that the segment is an angle bisector. $m\angle 1 = m\angle 2$

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



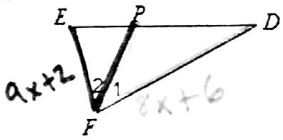
$36 + 36 = \boxed{72°}$

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



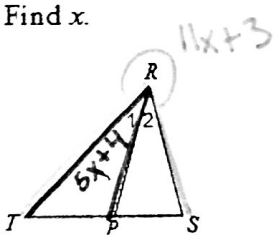
$\frac{36}{2} = \boxed{18°}$

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



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

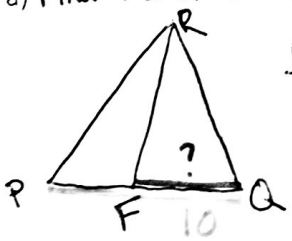
e)
$m\angle 1 = 5x + 4$ and $m\angle TRS = 11x + 3$.
Find x.



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

2) Find the indicated measurement given that the segment is a median. Splits side in half

a) Find FQ if PQ=10.

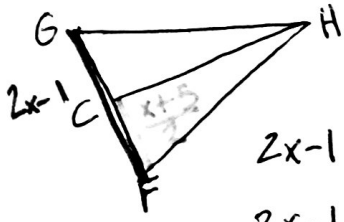


$\frac{10}{2} = \boxed{5}$

b) Find MG if EG=1.

$\boxed{\frac{1}{2}}$

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

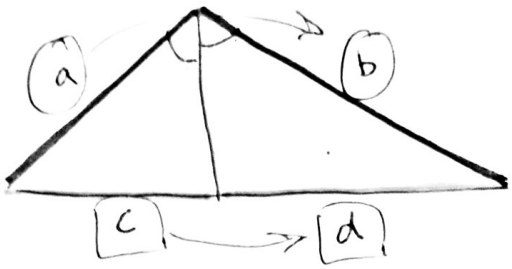


$2x - 1 = 2\left(\frac{x+5}{2}\right)$
$2x - 1 = x + 5$
$-x + 1 \quad -x + 1$
$\boxed{x = 6}$

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

$2x + 4 = 2x - 2$

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

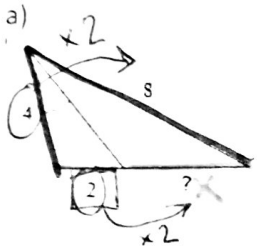


Fold in half to line up corresponding sides

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

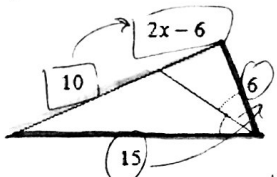
3) Find the indicated length.

a)



$\boxed{4}$

b)



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

$15(2x-6) = 60$

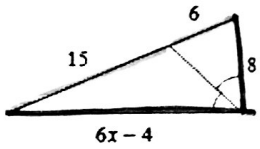
$30x - 90 = 60$

$+90 \quad +90$

$30x = 150$

$\boxed{x = 5}$

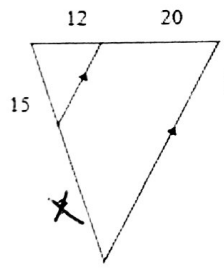
c)



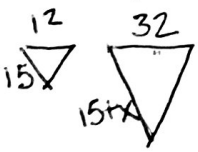
Parallel Line Similarity: A line parallel to one side of the triangle splits the triangle into two similar triangles.

3) Find the missing length indicated.

a)



*Big triangle: Add all pieces of the side together



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

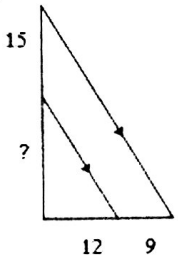
$12(15+x) = 480$

$180 + 12x = 480$

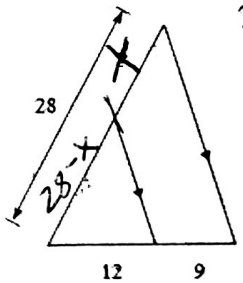
$12x = 300$

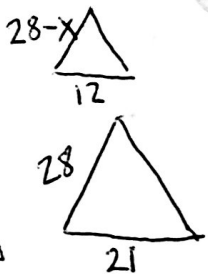
$\boxed{x = 25}$

b)



c)





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

$21(28-x) = 336$

$588 - 21x = 336$

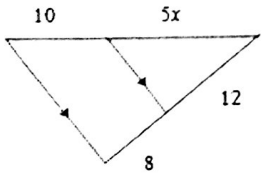
$-588 \quad -588$

$\frac{-21x}{-21} = \frac{-252}{-21}$

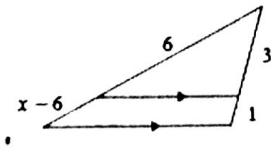
$\boxed{x = 12}$

4) Solve for x.

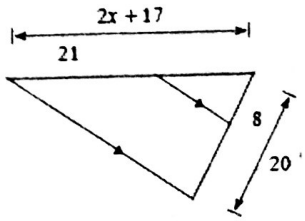
a)



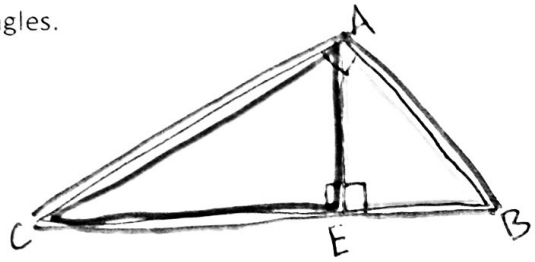
b)

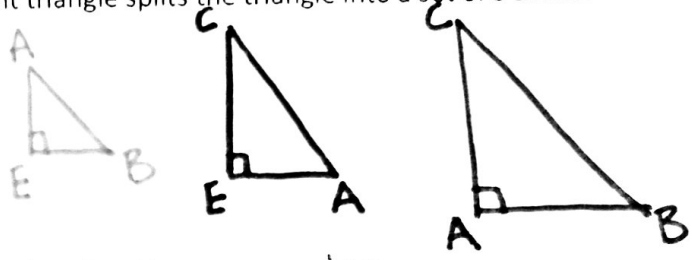


c)



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

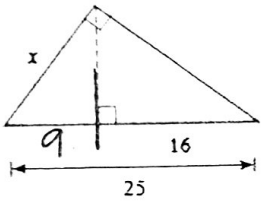


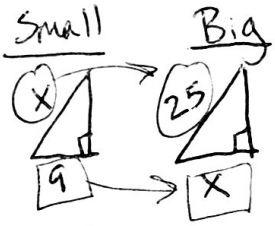


* Need two triangles with two sides labeled

4) Find the missing length indicated.

a)



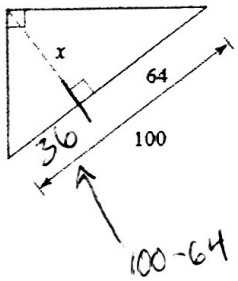


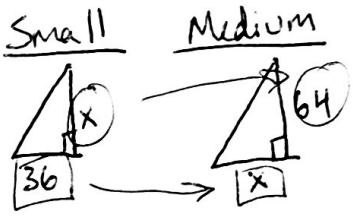
$\frac{x}{25} = \frac{9}{x}$

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

$\boxed{x = 15}$

b)



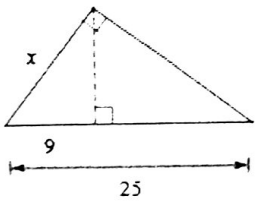


$\frac{x}{64} = \frac{36}{x}$

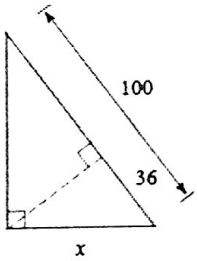
$\sqrt{x^2} = \sqrt{2304}$

$\boxed{x = 48}$

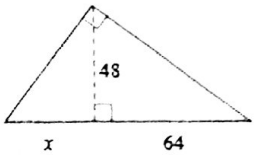
c)



d)



e)



f)