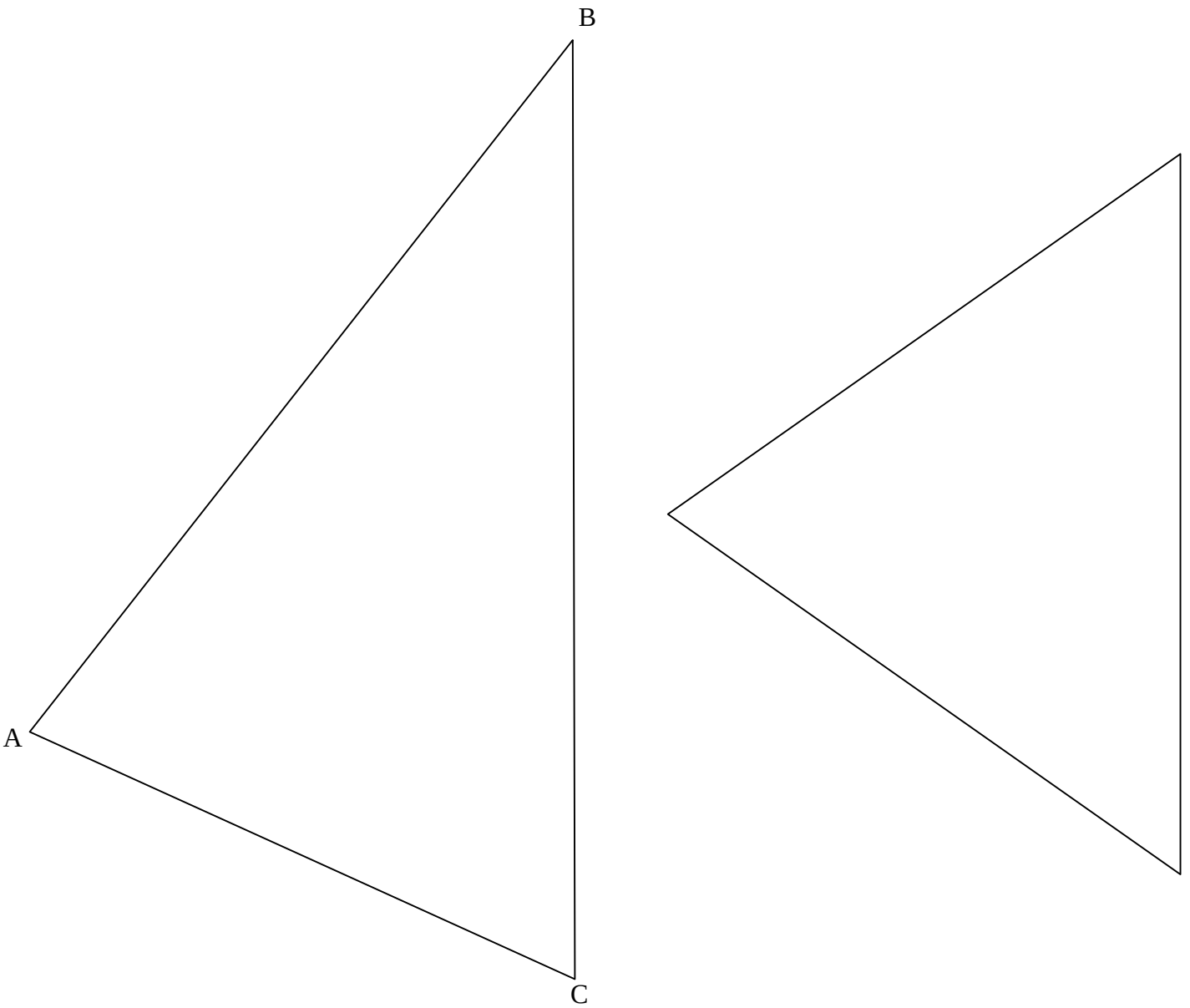
Name: _____ Date: _____ Period: _____

Focus on Geometry Discovery Activity on Medians of a triangle

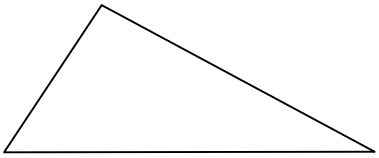
1) Using a compass, bisect every side of the triangles below. Recall that in order to bisect a segment you have to:
   a) place the center of the compass on one of the endpoints of the segment
   b) open the compass anywhere that is more than half of the measure of the segment
   c) draw an arc at the top and bottom of the segment
   d) repeat on the other endpoint of the segment
   e) connect the points of intersection of both sets of arcs
2) After you have bisected every side of the triangles, connect the midpoint of every side to the vertex of the angle across from each side. The three segments that you drew in each triangle connecting the midpoint to the vertex should meet at one point. If they do not, try to find where there is a mistake in your process, and fix it.
3) Cut up the original triangles.
4) Using a pen or pencil, try to balance the triangles that you cut out.

Where in the triangles are you able to balance the triangles (the triangles stay up and do not fall)? _____
_____
Now, measure each of the segments that you drew in the original triangle. What is the ratio between the side of the segment that is close to the vertex of the angle and the side of the segment that is closer to the side? _____
How would you represent that ratio in terms of a fraction? _____



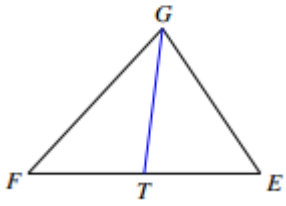
Objective: To find the medians of a triangle, and the relationship between the lengths of the segments on each side of the centroid.

A _____ is a segment whose endpoints are a vertex of a triangle and the midpoint of the side opposite of the vertex.

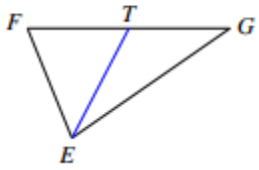


Example 1: Each figure shows a triangle with one or more of its medians. Find the measure of the indicated segments.

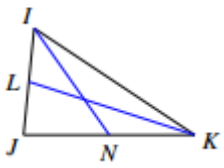
A) Find FE if $TE = 8$



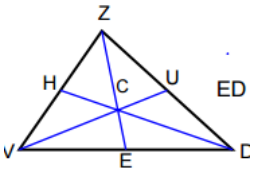
B) Find GF if $TF = 6.3$



C) Find LJ if $IJ = 6$

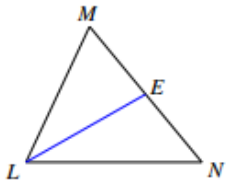


D) Find ED if VD = 12.

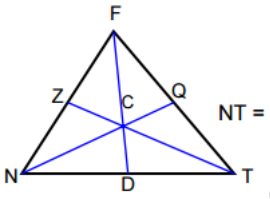


Practice 1: Each figure shows a triangle with one or more of its medians. Find the measure of the indicated segments.

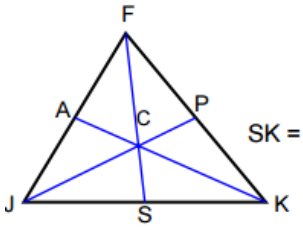
A) Find NM if $EM = 10$



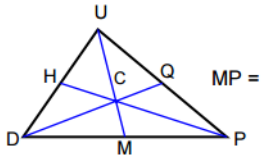
B) Find NT if DT = 17.



C) Find SK if JK = 16.

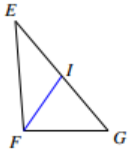


D) Find MP if DP = 14.

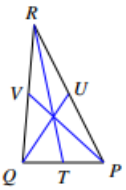


Example 2: Each figure shows a triangle with one or more of its medians. Find the values of the variable or measure of the indicated segments.

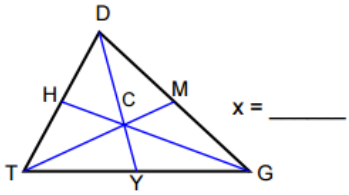
A) Find x if $GE = 3x + 5$ and $IE = x + 6$



B) Find x if $TP = 2x + 1$ and $TQ = 3x - 5$

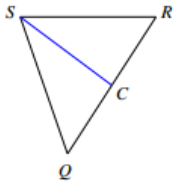


C) Find x if YG = 2x + 11 and TG = 7x + 5

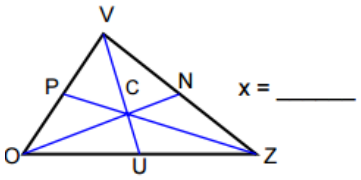


Practice 2: Each figure shows a triangle with one or more of its medians. Find the values of the variable or measure of the indicated segments.

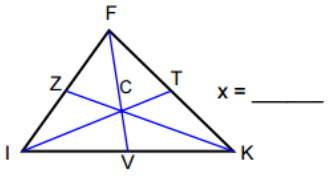
A) Find CQ if $CR = x$ and $CQ = 2x - 6$



B) Find x if UZ = 2x + 10 and OZ = 6x + 4

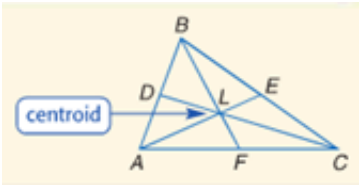


C) Find x if VK = 2x + 7 and IK = 7x + 5



Points of concurrency

- When three or more lines intersect at a common point, the lines are called _____, and their point of intersection is called the _____.
- The point of concurrency of the three medians in a triangle is called the _____. The centroid is the point of balance for any triangle.

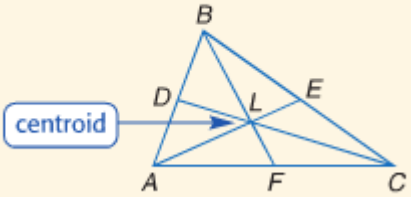


THEOREM 5.7 — *Centroid Theorem*

The centroid of a triangle is located two thirds of the distance from a vertex to the midpoint of the side opposite the vertex on a median.

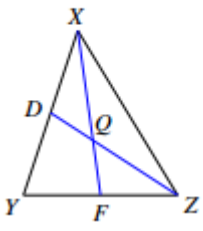
Example: If L is the centroid of $\triangle ABC$,

$AL = \frac{2}{3}AE$, $BL = \frac{2}{3}BF$, and $CL = \frac{2}{3}CD$.

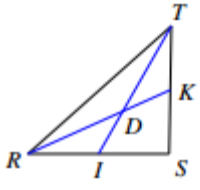


Example 3: Each figure shows a triangle with one or more of its medians. Find the measure of the indicated segments.

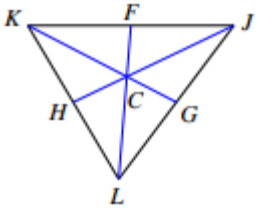
A) Find ZQ if $ZD = 6$



B) Find RK if $DK = 3.4$

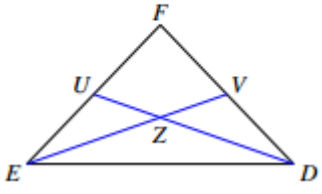


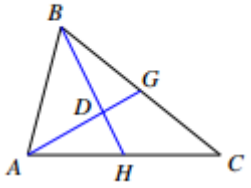
C) Find CG if $KG = 41.4$

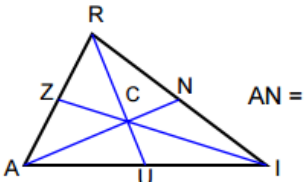


Practice 3: Each figure shows a triangle with one or more of its medians. Find the measure of the indicated segments.

Find EZ if $ZV = 12$ | Find DH if $BH = 4.5$ | CN = 11. Find AN.

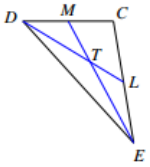
A) 

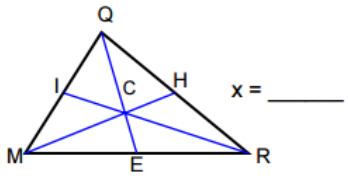
B) 

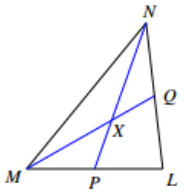
C) 

Example 4: Each figure shows a triangle with one or more of its medians. Find the values of the variable or measure of the indicated segments.

Find x if $ET = 3x + 2$ and $EM = 5x$ | Find x if CH = 2x + 12 and MH = 8x + 4 | Find XQ if $MQ = 3x - 3$ and $XQ = 2x - 6$

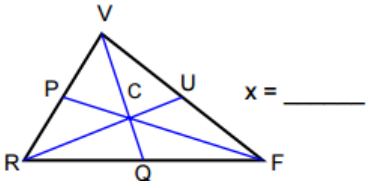
A) 

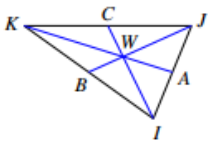
B) 

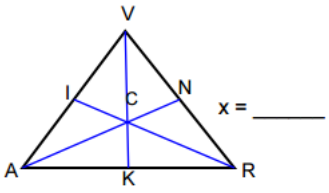
C) 

Practice 4: Each figure shows a triangle with one or more of its medians. Find the values of the variable or measure of the indicated segments.

Find x if CU = 2x + 14 and RU = 8x + 2 | Find JW if $JW = 6x + 2$ and $JB = 10$. | Find x if CA = 2x + 8 and AN = 4x + 4

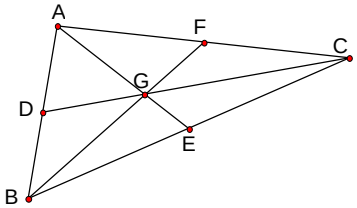
A) 

B) 

C) 

Example and practice 5: Find the information requested.

3. G is the centroid of ΔABC.



a. If AC = 32, then AF = _____
b. If AE = 18, then AG = _____ and GE = _____
c. If DG = 4, then GC = _____ and DC = _____

4B. D is the centroid of ΔABC. Solve for x, y, and z.