STCH 250 – Fall 03 Name:

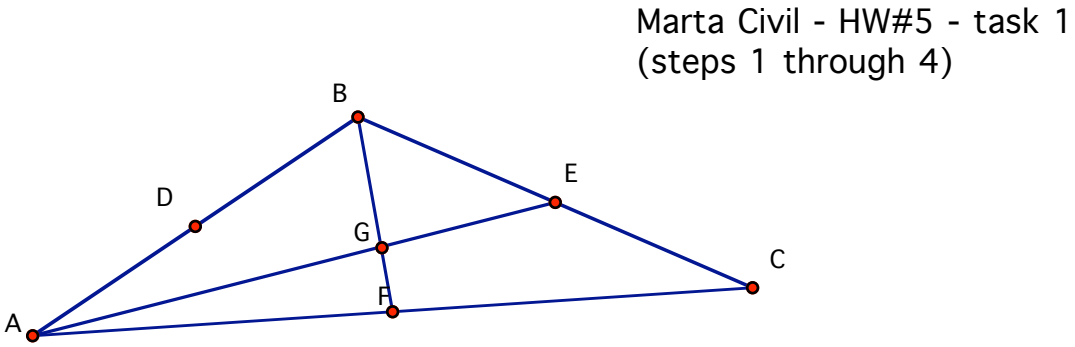
HW# 5: Geometer's Sketchpad

**Due Tuesday October 7**

You will need to use the PCs in the ILC Commons Room as those have Geometer's Sketchpad. You **need to include a printout of your work** (points will be deducted if printout is missing) and attach it to this homework. Make sure that you PRINT your name as part of the print-out (and not hand-written) (see example below). Read the Task carefully and fill out the necessary information, whether it is recording a measurement or answering a question.

Task 1: Centroid of a triangle

Step 1: Construct triangle ABC
Step 2: Construct the midpoints on each side. Label them as D for midpoint of AB, E for midpoint of BC, and F for midpoint of AC
Step 3: Construct two segments, AE, BF (these segments are called medians)
Step 4: Construct the point of intersection of these medians, G.
Step 5: Construct the third median, CD.




Investigate: Drag any of the vertices of triangle ABC (or on any of the midpoints). What can you say about the three medians and point G?

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Step 6: Measure the distance from B to G and the distance from G to F (you can choose any other vertex and its corresponding Median point (that is, AG and GE, or CG and GD) Record here:

Distance BG = Distance GF =

Drag any of the vertices or midpoints and see how the distances change. Look for a relationship between distance BG and distance GF. Describe:

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Let's continue exploring the relationship between those two distances:

Complete the table below with your own values for distances BG and GF

| | Value 1 | Value 2 | Value 3 | Value 4 |
|---|---|---|---|---|
| BG | | | | |
| GF | | | | |
| BG/GF | | | | |

Write a conjecture about the relationship between the distance from the Centroid (point G) to a vertex and the distance from the Centroid to a midpoint:

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Here is how to use Geometer's Sketchpad to do some of the work for you:

On your sketch, select the measures of the distances from B to G and from G to F (you should have those measures there since you needed them for step 6 and for the table you just did). Under the **Graph** menu, choose **tabulate**. This should create a table that looks like this:

| BG | GF |
|---|---|
| 3.72 cm | 1.86 cm |

You can use this Tabulate function to generate a table of values. All you have to do is double click on the table (on your sketch) and that generates another entry. Drag any vertex or midpoint and you get another set of values. Repeat this till you have a table with at least 6 entries. Here is an example with three entries:

| BG | GF |
|---|---|
| 3.72 cm | 1.86 cm |
| 4.49 cm | 2.24 cm |
| 5.73 cm | 2.87 cm |

Optional challenge: You can use the Tabulate feature to make a table that will show not only BG and GF but also the ratio of BG/GF. How? (Hint…. Just select the measures of BG, GF, and the ratio BG/GF that you will first need to generate by using the **Calculate** feature in the **Measure** menu)

**CONTINUE READING. NEXT IS NOT OPTIONAL**

Anyway, let's continue with our table with at least 6 values for BG and GF.
Select the table and go to the **Graph** menu, choose **Plot Table Data**. You get a dialog box, just click plot. You then get a plot of your six (maybe more if you had more data points) points.

Note: if you want the plot in a different sketch, select and copy the table. Then open a new sketch and paste the table. You will also get the Centroid attached to the table. You can hide it. (Or you can choose to hide everything on your original sketch, except the graph.) (Remember the hide option is in the display menu.)

What is the shape of the graph you get?

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What is the slope and how does it relate to this whole investigation?

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Task 2: Write a complete procedure, step by step on how to CONSTRUCT a square in Geometer's Sketchpad. Make sure you try it! I may try yours and I will follow the steps as you have them written down. It has to be a "real" square, not something that on the screen looks like one.