

Homework #4: Orthocenter and Centroid**College Geometry**

In this activity you will carry out some basic constructions using GeoGebra. If you have never used GeoGebra before, don't worry; for what we need it to do, it is fairly straightforward. If you get stuck, ask for help!

Each of the following problems should be constructed on a separate file, and these files should be given descriptive titles **including your name and the activity number**. When you are finished, email the files to me. So I should get four files from you, with names like "Nathan Bloomfield - A1 - construct equilateral triangle.ggb".

Finally, **your constructions must be robust**. Every geometric construction starts with one or more *free elements*; these are points and lines given in the hypotheses of the construction proof. You should be able to **move the free elements around** without destroying your construction.

1. **Construct the orthocenter of a triangle.** Start by placing three free points a , b , and c , and draw the segments \overline{ab} , \overline{bc} , and \overline{ca} . Following the proof we gave in class, construct the orthocenter of $\triangle abc$.

Make your construction into a GeoGebra tool.

2. **Construct the centroid of a triangle.** Start by placing three free points a , b , and c , and draw the segments \overline{ab} , \overline{bc} , and \overline{ca} . Following the proof we gave in class, construct the centroid of $\triangle abc$.

Make your construction into a GeoGebra tool.

3. Place three free points a , b , and c , and draw the triangle $\triangle abc$. Now construct the orthocenter, the circumcenter, and the centroid of this triangle. Do you notice anything interesting about these points?