Exam 1 covers the material from the first day of class through Tuesday, October 7th. (Note that we defined the incenter and circumcenter in Tuesday's class, although we worked with them more on Thursday.) The exam will begin at 1:25 and last for approximately 70-80 minutes, at which point we'll take a break and then wrap up a few things for the rest of the class period. The exam will have a mix of problems, some of which will be very similar (or even identical...) to homework problems. There will also be a problem or two which will check if you can take definitions and propositions/theorems which we have used repeatedly and prove some other fairly straightforward result.

Hence one of the best ways to study for the exam is to go back and review your homework and the solutions which are posted online. Also do other homework problems which were unassigned but similar to those that were. (I can suggest a few specific problems if you'd like.) Also scan through the text and review definitions and results, particularly those which we have used over and over. (See below.)

A few words of advice:

(1) Don't spend too much time reviewing linear algebra. You should definitely be conversant in vectors, scalar products, matrix multiplication, and so on, but my focus is on testing your *geometry* knowledge, not linear algebra. So if I were to give you a problem which required you to solve a system of equations to get the final answer, interpreting the geometry correctly to set up the correct systems would be worth most of the points. The actual solving of the system would be worth minimal credit.

(2) The exam will be closed book, closed notes, closed calculator, etc.

(3) Don't trivialize any problems on the exam. For example, if I ask you to prove that, given a line $l$ and a point $P$, you can find a unique line through $P$ which is parallel to $l$, you shouldn't simply cite Corollary 8 of Chapter 1, or write, "We proved this in class." I'm asking you to write a proof of this statement on your own.

(4) Along those lines, you shouldn't try to memorize every single definition and result in the text. However, you should know definitions and results which we have used repeatedly. For example: the parametric and normal form form of a line, the test using the normal form to see if two points $P$ and $Q$ are on the same side of a line, the "vector version" of the law of cosines, the fact that any vector can be written as a unique combination of two linearly independent vectors, and so on.

To give a concrete example, My goal is not to see if you can memorize the barycentric coordinates of the feet of a triangles altitudes, as in Proposition 4.5. However, I might ask you to define the orthocenter, or find the orthocenter of a specific triangle, or prove that the medians intersect at a point in the interior of the triangle.

(5) Watch out for things which are not specifically in our textbook, but which I deemed important enough to spend significant class time discussing. (Barycentric "quadrants" of the plane are the main thing which come to mind.)

(6) In terms of isometries, I intend to limit possible isometries on the exam to those whose orthogonal matrices $M$ represent rotation about the origin by an angle $\theta$, reflection across the $x$- or $y$-axes, reflection through the origin, or reflection across a diagonal:

$$M \in \left\{ \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}, \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}, \begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}, \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}, \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}, \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix} \right\}$$

In fact, on Tuesday in class I'll probably pare this list down to just one or two.

Please feel free to email me with questions. I'll discuss the text in class on Tuesday as well.