Math 4060 (Cherry) Test #1 Review

Test Date: Monday, March 6

You will have some choice of problems on the test. You will be asked to write solutions to three. The test will have three sections:

Section I. You will choose one of two "proof" problems similar in spirit to the homework problems we had in sections 1 and 3 of Hartshorne.

Section II. You will choose one of two "construction" problems similar in spirit to the homework problems we had in sections 2 and 3 of Hartshorne.

Section III. You will be asked to give the poof of one of the following three Euclid propositions: I.43, III.20, or III.32.

Although you will have a choice of problems within the first two sections, you must do problems from all three sections.

Do not feel obligated to memorize Euclid propositions by number. You may refer to them by names or reasonable abbreviations, for example: SAS, vertical angles, chord-tangent, central angle is double circumference angle, *etc.* Of course, if you do know Euclid's propositions by number, you are welcome to refer to them that way as well, *e.g.,* I.15, I.32, and so forth.

For **Section I** of the test, be prepared to be able to give a **proof in the style of Euclid** of a problem of comparable difficulty to Hartshorne exercises 1.4–1.13 or Hartshorne exercises 3.8–3.11.

For **Section II** of the test, know how to do "standard" **ruler and compass constructions,** and unlike the homework, **know how to prove the constructions work.** Standard ruler and compass constructions include: constructing an equilateral triangle; bisecting a segment; bisecting an angle; given a segment and a point on the segment, construct the line through the point perpendicular to the segment; given a segment and a point off the segment, construct the line through the point and perpendicular to the segment; finding the center of a circle; constructing a line through a point parallel to a given line; given a circle and a point outside the circle, constructing a tangent to the circle through the given point, inscribing a square in a circle, inscribing a hexagon in a circle, inscribing a circle in a triangle (Hartshorne Exercise 2.9, also Euclid Book IV), circumscribing a circle about a triangle (Hartshorne exercise 2.10, also Euclid Book IV), *etc.* Constructions at the level of Hartshorne exercises 3.3–3.5 are also possibilities. You will not have to know the regular pentagon constructions for the test.

For **Section III** of the test, be prepared to give the proof of the following **Euclid propositions:** I.43, III.20, and III.32. The test will only ask for one of these three, but you will not know which one until you see the test. As with your class presentations, you should be able to correctly state any propositions the proof depends on, but you need not prove those other propositions used in the proof.

Additional Information

- During the test itself in class, you will not be allowed to talk with your classmates. You are allowed to study together before the test.
- Ruler and compass constructions can be drawn free hand during the test, but you may want to bring a ruler and compass with you to help you think.
- In addition to ruler and compass, bring something to write with. You will be provided with paper to write on. You **Do NOT** need to bring your books, notes, or your own scratch paper.

Extra Office Hours: Sunday, March 5: 2–5 p.m.