Math 113 homework due 1/11

Mathematics ... is really one of the languages of the imagination, along with literature and music

– Northrop Frye

(1) Read and review section 10.2 in the book

(2) Prove that the inscribed triangle that we drew in class (there is a picture on page 243 of your book) is an equilateral triangle.

(3) Explain, step by step, how to construct a regular octagon using compass and straightedge. If you don't have a compass, that's fine, you can illustrate your explanation with sketches or make your own compass by taping two pencils together.
Hint: start with the construction of a square inside a circle.

(4) a) Suppose that in question 3 you started with a triangle inscribed in a circle instead of a square. What polygon would you create in the end?
b) So far we know how to get a square, equilateral triangle, hexagon and octagon, and how to bisect edges. By starting with a polygon that we know how to construct and repeatedly bisecting edges, what regular polygons can you make? Write a complete list.

(5) 10.9 on page 250 of the course notes. (This problem would be a good one to discuss in tutorial)

(6) Compare our definition of polygon from class (something like "a closed curve consisting of straight line segment edges that meet at vertices") with the definition in the book on page 233, and the definitions in Exercise 10.16 (page 251-252). Which ones allow which of the figures on page 252 to be polygons? Are any of the definitions equivalent to each other?