Math 4513

Assignment 2

7. Suppose you are given three points which lie on a circle (but you are not given the center of the circle). Describe a construction for finding the center of the circle.

8. Suppose ΔABC is an arbitrary triangle. Let l_1 be the perpendicular bisector of side AB, l_2 be the perpendicular bisector of side BC, and l_3 be the perpendicular bisector of side CA. Prove that these three lines must all intersect in one point.

9. Given the vertices of a triangle, describe a construction for finding a circle which passes through all three vertices. (Hint: use problem 8.)

10. Given a line segment AB, describe a construction of a regular hexagon with AB as one side.

11. Suppose $ABCDE$ is a regular pentagon with side AB of length 1.

    a. Prove that the length of the diagonal AC is $\dfrac{1+\sqrt{5}}{2}$. (Hint: draw all the diagonals in the pentagon and try to find similar triangles in your diagram.)

    b. Deduce from part *a* that given a line segment AB it is possible to construct a regular pentagon with side AB. (You do not have to describe the construction.)