History of Math Chapter 2 Exercise Sheet

Name: _____

1. Study the proof of "Proposition 1.1" provided in Euclid's "Elements" and the subsequent modern criticisms of this proof.
2. Understand how to prove SAS, ASA, and SSS.
3. Use superpositions to show that a triangle with two congruent angles is isosceles.
4. In a given triangle, an altitude is a bisector. Prove that the triangle is isosceles.
5. Study the proof of Proposition 1.16, the "Exterior Angle Theorem".
6. Use the "Exterior Angle Theorem" to prove that two perpendiculars to the same line cannot intersect no matter how far they are extended.
7. Use the "Exterior Angle Theorem" to prove that when two lines are intersected by a third line and
   (a) some corresponding angles are equal, or
   (b) some alternate angles are congruent

   then these two lines are parallel.
8. Prove that triangles with congruent bases and congruent altitudes are equivalent.
9. Study Euclid's proof of the Pythagorean Theorem. You may have to stare at the picture for some time before you get it.
10. (Construction) From a given point C on the line AB erect a perpendicular to AB.
11. (Construction) From a given point A, drop a perpendicular to a given line BC.
12. Prove that if the bisector of one of the exterior angles of a triangle is parallel to the opposite side, then the triangle is isosceles.