1. (30 pts) State whether each of the following axiom systems is consistent and also whether it is complete. If it is consistent and complete specify a model, if it is consistent but not complete specify two non-isomorphic models.

   a) Hilbert axiom groups I-III (Incidence, Betweenness & Congruence).
   b) Hilbert axiom groups I-IV (Incidence, Betweenness, Congruence & Parallel)
   c) 7-point projective plane

2. (30 pts) Using Hilbert’s Axioms prove that any line segment AB (where A and B are distinct) contains an infinite number of points.

3. (40 pts) Given a circle and using only the Euclidean tools (compass and straightedge) which of the following regular polygons can be constructed? For those that can be constructed, describe the steps in the construction.

   a) A regular heptagon (7-sided polygon) inscribed in the circle.
   b) An 11-sided regular polygon circumscribed about the circle.
   c) A regular dodecagon (12-sided polygon) inscribed in the circle.