Directions: Only write on one side of each page.

Do any (5) of the following

1. Using any previous results, prove Proposition 4.1 (SAA) in neutral geometry. Specifically, Given $AC \cong DF$, $\angle A \cong \angle D$, and $\angle B \cong \angle E$. Then $\triangle ABC \cong \triangle DEF$.

2. Using any previous results, prove the following half of Proposition 4.10.
   (If $k \parallel l$, $m \perp k$, and $n \perp l$, then either $m = n$ or $m \parallel n$.) implies Hilbert’s Euclidean parallel postulate.

3. Prove
   (a) Every acute angle has a complementary angle.
   (b) If the complements of two acute angles are congruent then the acute angles are congruent.

4. A scalene triangle is defined to be any triangle that is not isosceles. Using any results through the end of Chapter 4, prove that in any Hilbert plane there is a triangle that is scalene.

5. Here is a statement $S_p$: Given lines $l, m, n$. If $l \parallel m$ and $m \parallel n$, then $l \parallel n$.
   Using any results through Chapter 4, prove $S_p$ holds if and only if Hilbert’s Euclidean parallel postulate holds.

6. Using any result through the Chapter 4, prove the following.
   If $\square ABCD$ is a convex quadrilateral and $l$ is any line other than $\overrightarrow{AB}$ intersecting segment $AB$ in a point between $A$ and $B$, then $l$ also intersects at least one of $BC, CD, AD$. 