Math 300   Spring 2005   Homework 07

Due March 30

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Name

For this homework set you are allowed to work with other members of either of the geometry classes. However, must cite everyone with whom you have discussed your problem.

In addition, you may **NOT** consult with anyone (except me) when you write your paper explaining your problem(s).

"Civilization advances by extending the number of important operations which we can perform without thinking of them." (Alfred North Whitehead)

"We used to think that if we knew one, we knew two, because one and one are two. We are finding that we must learn a great deal more about 'and.'" (Sir Arthur Eddington)

Problems

Remember that you may use any previous problem as part of the justification for your problem(s).

1. (**Lindsey**) Prove Proposition 4.7 which states _Hilbert's Parallel Postulate_ $\Longleftrightarrow$ _Statement S.7_.

   Here statement S.7 is: If a line intersects one of two parallel lines, then it also intersects the other.

2. (**Luke**) Prove Proposition 4.8 which states _Hilbert's Parallel Postulate_ $\Longleftrightarrow$ _Statement S.8_.

   Here statement S.8 is: The converse to Theorem 4.1.

3. (**Noa**) Prove Proposition 4.9 which states _Hilbert's Parallel Postulate_ $\Longleftrightarrow$ _Statement S.9_.

   Here statement S.9 is: If t is a transveral to l, $l \parallel m$, and $t \perp l$, then $t \perp m$.

4. (**Amy**) Prove Proposition 4.10 which states _Hilbert's Parallel Postulate_ $\Longleftrightarrow$ _Statement S.10_.

   Here statement S.10 is: If $k \parallel m$, $m \perp k$, and $n \perp l$, then either $m = n$ or $m \parallel n$.

5. (**Letani**) Prove Proposition 4.11 which states _Hilbert's Parallel Postulate_ $\Longrightarrow$ _Statement S.11_.

   Here statement S.11 is: The angle sum of every triangle is $180°$.

6. (**Everyone**) Prove proposition 4.3: Every segment has a unique midpoint.

   (Note this requires you prove two things: that there is a midpoint and that there are not two.)