Spring 2010 **Exam 2** **Math** 300

March 11

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Name

Directions: Only write on one side of each page.

Do any (5) of the following

1. (20 points) Give **complete** justifications for each step of the following proof of Proposition 3.17 (ASA).

   Proof: Given $\triangle ABC$ and $\triangle DEF$ with $\measuredangle A \cong \measuredangle D$, $\measuredangle C \cong \measuredangle F$ and $AC \cong DF$.

   To prove: $\triangle ABC \cong \triangle DEF$:

   (a) There is a unique point B' on ray $\overrightarrow{DE}$ such that $DB' \cong AB$.

   (b) $\triangle ABC \cong \triangle DB'F$.

   (c) Hence, $\measuredangle DFB' \cong \measuredangle C$.

   (d) This implies $\overrightarrow{FE} = \overrightarrow{FB'}$.

   (e) In that case, $B' = E$.

   (f) Hence, $\triangle ABC \cong \triangle DEF$.

2. (20 points) Using any results through Chapter 3, prove if $AB < CD$ then $2 \cdot AB < 2 \cdot CD$.

3. (20 points) A set of points is called **convex** if whenever two points A and B are in S, then the entire segment AB is contained in S. Using any results through Chapter 3, prove that the interior of any angle is a convex set .

4. (20 points) Using any previous results, prove the last claim in Proposition 3.13:

   If $AB < CD$ and $CD < EF$, then $AB < EF$.

5. (20 points) Using any results through Chapter 3, prove the following.

   Given a circle γ with center O and a line l that is not incident with O but that meets γ at two distinct points P and Q. Prove that the perpenicular bisector of segment PQ passes through the point O.

6. (20 points) Using any previous results, prove Proposition 3.23: All right angles are congruent to each other.