Math 310 Homework 1, Due Sept. 10, 2008

Consult Class Notes 1 and 2 to solve the following problems.

(1) Prove in details that the empty set has no elements. (10 points)

(2) Prove in details that the empty set is contained in any set. (5 points)

(3) Prove in details that if $A \subseteq A \cap B$, then $A \subseteq B$. (5 points)

(4) Prove, in details, Theorem 4 in Class Notes 2 (the set-theoretic version of Peano’s Axioms). (15 points, 3 points for each part)

(5) Prove in details that $A \notin A$ for any set $A$ by the Axiom of Regularity. (10 points)
   (Hint: If $A \in A$, then $A \in A \cap \{A\}$. Apply the Axiom of Regularity to the set $\{A\}$ to get a contradiction.)