

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 $A \subset A \cap B$, then $A \subset B$. (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.)