MATH 304 **Homework** **Due February 12, 2008**

Problem 1. Show that the set of rational numbers p/q, where p and q are integers, is countable.

Problem 2. Suppose that if $f : [0,1] \to [0,1]$ is a continuous function such that $f(0) = 0$, and $f(1) = 1$, then there is an $x \in [0,1]$ such that both x and $f(x)$ are irrational.

Problem 3. Do the exercise in Section 23 in Halmos's book. CORRECTION: Only do the first part that says that the finite subsets of a countable set is countable.

Problem 4. Do the exercise at the end of Section 24 in Halmos's book. DO NOT DO THIS PROBLEM.

Problem 5. Do the exercise at the top of page 101 in Halmos's book. DO NOT DO THIS PROBLEM NOW. WE WILL SEE THIS LATER.