Math 101. *Topics in Algebra.*

Homework 3. Due on Friday, 10/17/2008.

1. Let G be a group, and H a normal subgroup. Show that G is solvable if and only if H and G/H are solvable.

2. Show that the following three statements are equivalent. The second is the Feit-Thompson theorem.

   (a) Every finite non-abelian simple group has even order.

   (b) Every simple group of odd order is isomorphic to $\mathbb{Z}/p\mathbb{Z}$ where p is a prime.

   (c) Every group of odd order is solvable.

3. Let G be a finite group and H a normal subgroup. Show that G has a composition series one of whose terms is H.

4. [Dummit and Foote, Section 3.4, Problem 9]

5. [Dummit and Foote, Section 3.4, Problem 10]