Math 109 Winter 2010 Homework 2

Due 1/15/10 in class

Reading

All references will be to the Eccles book. Read Chapters 4-6 (and any earlier chapters you didn't read yet) and do the end of the chapter exercises (do not write up) as you read along. Note that the answers to these are in the back of the book.

Assigned problems from the text (write up and hand in.)

Problems I p. 53: #11, 12, 13, 14, 16.

Additional problems (write up and hand in.)

1. Recall that an integer $p > 1$ is *prime* if 1 and p are the only positive integers which divide p. Prove by contradiction that there does not exist an integer $n > 1$ such that $n^3 + 1$ is prime.

2. Prove that there do not exist integers a and b such that $a^2 - b^2 = 98$. (Hint: one way to do this is to consider cases depending on whether a and b are even or odd. You can use that an integer is odd if and only if it is equal to $2k + 1$ for some integer k; we will prove this during week 2.)

3. Prove that there exist integers m, n, and s which satisfy the equation $10m + 35n = s$ if and only if 5 divides s.