

**MATH 109 WINTER 2007 HOMEWORK 2, DUE  
1/19/07 IN CLASS**

(All exercise and page numbers refer to Eccles.)

1. READING AND PRACTICE

Read Chapters 4-5 of Eccles. Do as many of the end of chapter exercises as you can, but do not hand them in. Check your work against the answers in the back. (Note that we will not finish covering all of Chapter 5 until Friday 1/19, so some of the practice problems from chapter 5 might not be doable yet.)

2. EXERCISES TO SUBMIT ON FRIDAY 1/19

1. Recall that a positive integer  $p$  is called *prime* if  $p \neq 1$  and if the only positive integers which divide  $p$  are 1 and  $p$  itself. Prove that for all positive integers  $n$ , if  $n^3 + 1$  is a prime number, then  $n = 1$ .
2. Let  $n$  be a positive integer with  $n > 1$ . Prove that there is some prime number  $p$  such that  $p|n$ . (Hint: consider the smallest integer not equal to 1 which divides  $n$ . You can take as obvious that given a finite collection of integers, one of them is smallest.)
3. In the Problems I which begin on page 53, do #8, 9, 11, 12, 13, 16.