

**Math 4281**

**Homework 3**

**Date due: Wednesday, February 9, 2011**

The problem set is due at the beginning of the class on Wednesday.

**Section 1.8:** Exercises 15 and 16.

**A.** What is the coefficient of  $x^5$  when one expands  $(x + 2)^7$ ?

**B.** A weekly lottery asks you to choose 5 different numbers between 1 and 45. At the end of the week, 5 such numbers are drawn at random and you win the jackpot if your 5 numbers match the drawn numbers (order does not matter). What is your chance of winning?

**C.** If  $p$  is a prime number of the form  $4n + 3$ , then prove that we cannot solve  $x^2 \equiv -1 \pmod{p}$ . [Hint: Use Fermat's Little theorem.]

**Section 1.9:** Exercises 3, 6, 7, 9.