Math 4281

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.