
Math 135: Discrete Mathematics, Fall 2012

Homework 2

Due *in class* on Friday, Sept. 14, 2010

1. Prove that if n is a positive integer, then n is even if and only if $7n + 4$ is even.

2. Prove that if m and n are integers and mn is even, then m is even or n is even.

3. (a) Prove that the sum of two rational numbers is rational. (Hint: try a direct proof!)
(b) Prove or disprove that the product of a (nonzero) rational number and an irrational number is irrational.

4. (a) Prove that the square of an integer ends with 0, 1, 4, 5, 6, or 9. (Hint: Let $n = 10k + l$ where $l = 0, 1, 2, \dots, 9$).
(b) What are the possible values of the ones digit of the fourth power of an integer? Prove your answer.