CS 1050 Section B, Spring 2001

Homework 4 – due Thursday, February 22

Part I

Problem 1 Exercise 10, page 200.

Problem 2 Exercise 12, page 200.

Problem 3 Supplementary exercise 10, page 227.

Problem 4 Exercise 18, page 228.

Part II

Problem 5 Exercise 56, page 201.

Problem 6 Prove that

$$\frac{1}{1 \cdot 2} + \frac{1}{2 \cdot 3} + \frac{1}{3 \cdot 4} + \cdots + \frac{1}{n(n+1)} = \frac{n}{n+1}$$

using a proof by induction.

Problem 7 Prove that

$$\frac{1}{1 \cdot 2} + \frac{1}{2 \cdot 3} + \frac{1}{3 \cdot 4} + \cdots + \frac{1}{n(n+1)} = \frac{n}{n+1}$$

using a direct proof. (Hint: what is $\frac{1}{i} - \frac{1}{i+1}$?)

Problem 8 Show that every amount of postage of 108 cents or more can be formed exactly using only 10- and 13-cent stamps.

Extra Credit

Problem 9 Show that for all $m, n \geq 1$ such that $gcd(m, n) = 1$, there exists an integer k such that any amount of postage of k cents or more can be formed exactly using only m- and n-cent stamps. What is the smallest value of k when $m = 6$ and $n = 11$?