

## Homework 4

due October 27, 2010

**1. Rosen 3.6 #4 (a)-(c), pg. 131**

Using the Fermat factorization method, factor each of the following positive integers: 8051, 73, 46009.

**2. Rosen 3.6 #20, pg. 132**

Find all primes of the form  $2^{2^n} + 5$ , where  $n$  is a nonnegative integer.

**3. Rosen 3.6 #24, pg. 133**

Factoring  $kn$  by the Fermat factorization method, where  $k$  is a small integer, is sometimes easier than factoring  $n$  by this method. Show that it is easier to factor  $3 \cdot 901$  than to factor 901.

**4. Rosen 3.7 #11, pg. 139**

Find all integer solutions of each of the following linear diophantine equations:

(a)  $2x + 3y + 4z = 5$

(b)  $7x + 21y + 35z = 8$

(c)  $101x + 102y + 103z = 1$ .

**5. Rosen 3.7 #16, pg. 139**

A piggy bank contains 24 coins, all of which are nickels, dimes, or quarters. If the total value of the coins is two dollars, what combinations of coins are possible?

**6. Rosen 3.7 #22, pg. 140**

The post office of Davis is left with stamps of only two values. They discover that there are exactly 33 postage amounts that cannot be made up using these stamps, including 46 cents. What are the values of the remaining stamps?