NUMBER THEORY: HOMEWORK 2

Homework due on Tuesday September 16.

1. Problems

1) Find the solution of the recurrence relation

$a_n = 3a_{n-1} + 4a_{n-2} - 12a_{n-3}$, where $a_0 = 2, a_1 = 5$, and $a_2 = 13$.

2) Define Lucas numbers by

$L_n = L_{n-1} + L_{n-2}$, $n \geq 3$ with $L_1 = 1$ and $L_2 = 3$.

Use Maple Program to answer questions below:

a) Find the closed form formula of L_n.
b) Solve the identity $L_n^2 - L_{n+1}L_{n-1} = 5(-1)^n$ for all $n \geq 2$.
c) Solve the identity $f_{2n} = f_n L_n$ for all $n \geq 1$ with f_n is the n^{th} Fibonacci numbers.

3) Find all solutions of the linear diophantine equations

$25x + 95y = 970$.

4) How many ways can change be made for five dollars using only dimes and quarters.
(Hint: use the technique to solve diophantine equation, but now consider only positive solutions.)

Also do the problems below
Section 2.3) 6,9
Section 3.5) 44,46

Date: Friday, September 12, 2008.