Homework 8 - due 04/22/08

First and Last Name: ....

Show all your work in answering the following questions. Simply writing the answer is not acceptable. Staple all your pages together. The professor is not responsible for lost pages.

1. Which of the following are second-order linear homogeneous recurrence relations with constant coefficients? If they are noe, explain why.
   (a) $a_k = 2a_{k-1} - 5a_{k-2} + 1$
   (b) $b_k = kb_{k-1} + b_{k-2}$
   (c) $c_k = 3c_{k-1} \cdot c_{k-2}^2$
   (d) $d_k = 10d_{k-2}$
2. Let a_0, a_1, a_2, ... be the sequence defined by the explicit formula:
   $$a_n = C \cdot 2^n + D, \quad \text{for all integers } n \geq 0 ,$$
   where C and D are real numbers. Find C and C such that $a_0 = 1$ and $a_1 = 3$. What is a_2 in this case?
3. Find an explicit formula for the sequence:
   $$d_k = 4d_{k-2}, \quad \text{for all integers } k \geq 2$$
   with the initial conditions $d_0 = 1$, $d_1 = -1$
4. Find an explicit formula for the sequence:
   $$d_k = 2d_{k-1} - d_{k-2}, \quad \text{for all integers } k \geq 2$$
   with the initial conditions $d_0 = 1$, $d_1 = 4$
5. Find an explicit formula for the sequence:
   $$d_k = 2d_{k-1} - 2d_{k-2}, \quad \text{for all integers } k \geq 2$$
   with the initial conditions $d_0 = 1$, $d_1 = 2$