MAT 375-1
HOMEWORK ASG. #11
HAND IN TUESDAY, DECEMBER 6

For problems #1-3, construct a recurrence relation model for the problem, and then calculate the desired term of the sequence with Maple.

1. How many ways are there to climb 15 steps by taking one, two or three steps with each stride?
2. How many ternary sequences of length 10 contain no pair of consecutive zeros?
3. How many ways are there to make a single stack of 12 poker chips (of three possible colors—red, white or blue) so that:
    a) no adjacent chips have the same color?
    b) no red chip appears anywhere in the stack above a blue one?

For problems #4-6, use the method of characteristic equations to solve the recurrence relations and, of course, show your work.

4. Solve this recurrence relation:
$$a_n = 4a_{n-2}$$
$$a_1 = 1$$
$$a_2 = 3$$
5. Exercise Set 7.3 # 3 (a)
6. Exercise Set 7.3 # 6
7. Exercise Set 8.1 # 10
8. Use the Principle of Inclusion-Exclusion to find the number of 6-digit sequences (repetition allowed) in which the digits 2, 5 and 8 all appear.
9. Use the Principle of Inclusion-Exclusion to find the number of rearrangements of the 26 letters of the English alphabet that contain at least one of the words: "dry," "math," "exclusion"
10. Use the Principle of Inclusion-Exclusion to find the number of integer solutions to:
$$x_1 + x_2 + x_3 + x_4 = 10$$
where $0 \le x_i \le 3$, for $i = 1,\ldots,4$.
11. In how many ways can six married couples pair off to dance so that no wife dances with her own husband?
12. A business letter and an envelope are addressed to each of five different persons. A helpful, but absent-minded, assistant stuffs the envelopes at random (paying no attention to the addressees). What is the probability that no letter is stuffed into the right envelope?