Math 574, Exam 3, Summer 2007

Write your answers as legibly as you can on the blank sheets of paper provided. Use only **one side** of each sheet. Be sure to number your pages. Put your solution to problem 1 first, and then your solution to number 2, etc.; although, by using enough paper, you can do the problems in any order that suits you.

Please leave room in the upper left corner for the staple.

There are 5 problems. The exam is worth a total of 50 points. SHOW your work. $\boxed{\mathit{CIRCLE}}$ your answer. **CHECK** your answer whenever possible. **No Calculators.**

If I know your e-mail address, I will e-mail your grade to you. If I don't already know your e-mail address and you want me to know it, then **send me an e-mail**.

You should **KEEP** this copy of your exam.

I will post the solutions on my website sometime after 3:15 today.

1. (7 points) How many monomials of degree less than or equal to d are there in n variables. (Recall that the monomial $x_1^{e_1}x_2^{e_2}\cdots x_n^{e_n}$ has degree equal to $e_1+e_2+\cdots+e_n$.)

2. (7 points) A candy store has three flavors: chocolate, vanilla, and strawberry. Every bag of candy contains 10 pieces of candy all together and at least 3 pieces of chocolate candy. How many possible bags of candy can be made?

3. (7 points) Twenty people have formed a club. The club has four committees: The Steering Committee has 5 people, the Issues Committee has 2 people, the Fund Raising Committee has 3 people, and the Entertainment Committee has 10 people. How many ways can the committee assignments be distributed, if every person lands on exactly one committee?

4. (7 points) Find a recurrence relation which counts the number of strings of length n which are made out of 0's and 1's and contain at least 3 consecutive zeros.

5. (22 points) Find the general solution of recurrence relation

$$a_n = 5a_{n-1} - 8a_{n-2} + 4a_{n-3} + 2^n.$$