Name: Solutions
(PLEASE PRINT)

MTH U230 Discrete Mathematics, Fall 2007, Quiz 5

1) Suppose that a department contains 15 women and 10 men. How many ways are there to form a committee with six members if it must have more women than men?

6W + 0M : $C(15,6)$
5W + 1M : $C(15,5)\cdot 10$
4W + 2M : $C(15,4)\cdot C(10,2)$

A. $C(15,6)+10\cdot C(15,5)+C(15,4)\cdot C(10,2)=$

$$\frac{15!}{6!\,9!}+\frac{10\cdot 15!}{5!\,10!}+\frac{10\cdot 9}{2}\cdot\frac{15!}{4!\,11!}$$

2) There are 10 different coop jobs available for a group of 6 students. How many ways are there to assign one of these jobs to each student, so that no two students will be assigned the same job?

$P(10,6)=10\cdot 9\cdot 8\cdot 7\cdot 6\cdot 5$

3) How many 10-digit strings ~~of six lowercase letters from the English alphabet consist of two distinct vowels and four distinct consonants?~~ contain exactly three 0s and exactly two 1s?

$$C(10,3)\cdot C(7,2)\cdot 8^5=\frac{10\cdot 9\cdot 8}{3\cdot 2}\cdot\frac{7\cdot 6}{2}\cdot 8^5$$

#choices of places for 0s; #choices of places for 1s; #ways to fill the remaining 5 spots with the remaining 8 digits

4) **Bonus problem.** How many different license plates are there consisting of six distinct digits in the increasing order?

$C(10,6)=\frac{10\cdot 9\cdot 8\cdot 7}{4\cdot 3\cdot 2}$

(once 6 digits are chosen, there is only one way to use them)