CSCE 235 **Mar 19, 01**

Quiz #3

Name: .... SSN: .... Row:

Instructions: Do *ONLY* **four** of the following questions. **Circle** the questions which you want to be graded and **cross out** those which you do **not** want to be graded.

NOTE: *If you do not follow the instructions above, you may lose some points.*

Question 1: (5 points) How many six-digit decimal numbers with no repetitions start with 57 or 75?

Solution: $2.P(8,4) = 2.8.7.6.5$.

Question 2: (5 points) If repetitions are not allowed, what is the number of seven-digit odd decimal numbers?

Solution: 8.8.7.6.5.4.5.

Question 3: (5 points) How many eight-digit decimal strings read the same from either side?

Solution: 10^4. Notice that if it is numbers instead of strings, then the answer would be 9.10^3.

Question 4: (5 points) Let $f : \mathbb{N} \times \mathbb{N} \longrightarrow \mathbb{Z}$ be defined by

$$f(m,n) = m^2 - 2n + 5.$$

Prove by a counterexample that f is not one-to-one.

Solution: $f(4,8) = f(2,2)$.

Question 5: (5 points) In how many ways can 5 red (*identical*) balls and 7 blue (*identical*) balls be distributed into 20 distinct boxes with at most one ball to a box?

Solution: $C(20,5).C(15,7)$ or $C(20,7).C(13,5)$. Notice if there is no limit on the numbers of balls in a box, then the answer would be $C(24,5).C(26,7)$.

Question 6 (5 points) Find the coefficient of x^{13} in the binomial expansion of $(3+2x)^{20}$.

Solution: $(3+2x)^{20} = \sum_{k=0}^{20} C(20,k)3^k(2x)^{20-k}$. We want $20-k=13$. This implies $k=7$. Hence, the coefficient of x^{13} is $C(20,7).3^7.2^{13}$.