CSE21 (summer II 2006)

Sample Midterm

Write down your problem solving process and how you get to the solution. No points are given without explanation.

Name:

ID #: 
1. Two dice are rolled, one blue and one red.
   a) How many outcomes are possible?
   
   b) How many outcomes give the sum of 4?
   
   c) How many outcomes give an even sum?

2. How many positive integers less than or equal to 110 are relatively prime to 110?
3. How many ways are there to put 6 distinct apples and 4 identical oranges in a line?

4. If $n$ is a positive integer, how many 4-tuples of integers from 1 through $n$ can be formed in which the elements of the 4-tuple are written in increasing order but are not necessarily distinct? In other words, how many 4-tupoes of integers $(i, j, k, m)$ are there with $1 \leq i \leq j \leq k \leq m \leq n$?
5. Arrange the letters in word HULLABALOO:
   a) How many distinguishable ways?
   b) L’s not adjacent to each other?

6. Find coefficients:
   a) $x^4y^7$ in $(x+y)^{11}$
   b) $a^2x^3$ in $(a+x+c)^2(a+x+d)^3$
7. An urn contains 4 balls numbered 3, 4, 2, 5. If a person selects 3 balls at random, what is the expected value of the sum of the numbers on the balls?

8. A drug-screening test is used in a large population of people of whom 5% actually use drugs. Suppose the false positive rate is 3% and the false negative rate is 2%. What is the probability that a randomly chosen person who gets positive test result actually uses drugs?