CMSC 250 Fall 2004 — Homework 10

Due Wed., Nov. 10 at the beginning of your discussion section.

You must write the solutions to the problems single-sided on your own lined paper, with all sheets stapled together, and with all answers written in sequential order or you will lose points.

1. How many ways can the letters of the word JANPLANE be arranged in a row?

2. How many integers from 1 through 100000 is the sum of their digits equal to 9?

3. *Leap* years occur in years exactly divisible by four, except that years ending in 00 are leap years only if they are divisible by 400. How many leap years are in between 1563 and 2004 inclusive?

4. Let $n = p_1^{k_1} p_2^{k_2} \cdots p_m^{k_m}$ where $p_1, p_2, ..., p_m$ are distinct prime numbers and $k_1, k_2, ..., k_m$ are positive integers. How many ways can n be written as a product of two positive integers that have no common factors?
   (a) assuming that order matters (i.e. $8 \cdot 15$ and $15 \cdot 8$ are regarded as different)?
   (b) assuming that order does not matter (i.e. $8 \cdot 15$ and $15 \cdot 8$ are regarded as the same)?

5. A calculator has an n-digit display and a decimal point that is located at the extreme right of the number displayed, at the extreme left, or between any pair of digits. The calculator can also display a minus sign at the extreme left of the number. How many distinct numbers can the calculator display? (Note that certain numbers are equal, such as 1.9, 1.90, and 01.900, and should, therefore, not be counted twice.)