MATH 579: Combinatorics Exam 1

Please read the following instructions. For the following exam you may not use any papers, books, or computers. You may use a calculator. Please turn in **exactly four** problems. You must do problems 1-3, and one more chosen from 4-6. Number 7 is optional. Please write your answers on separate paper, make clear what work goes with which problem, adequately justify all answers, simplify all numerical answers as best you can, and put your name or initials on every page. You have 50 minutes. Each problem will be graded on a 5-10 scale (as your quizzes), for a total score between 20 and 40. This will then be multiplied by $\frac{5}{2}$ for your exam score.

Turn in problems 1,2,3:

1. How many four-digit numbers are there, with all their digits different? Note that 0123 is not a four-digit number since it leads with zero.

2. An "lc-word" is a string of letters, drawn from the 26 lowercase letters. How many four-letter lc-words are there, containing at least one vowel?

3. How many five-letter lc-words are there, containing exactly four distinct letters?

Turn in exactly one more problem of your choice:

4. How many five-digit numbers are there, containing exactly four distinct digits?

5. How many five-digit numbers are there, whose digits alternate between even and odd? (e.g. 12345)

6. How many five-card hands (from a standard 52-card deck) contain two different pairs, and a fifth, unmatched, card? In poker, this is called "two pair".

You may also turn in the following (optional):

7. Describe your preferences for your next group assignment. (will be kept confidential)

Please keep this sheet for your records.