

MATH 579 Exam 3 Part I
Assigned 2/23/10, Due by classtime 2/25/10
Please read the exam instructions.

Please write your answers on separate paper and put your name or initials on every sheet. Cross out work you do not wish graded; incorrect work can lower your grade, even compared with no work at all. Keep this sheet for your records. Show all necessary work in your solutions; if you are unsure, show it. Simplify all numerical answers to be integers, if possible. You are welcome to use your book, notes, calculators, computers, etc. This problem is worth 10-20 points.

You may *NOT* discuss possible solutions to this exam with any human prior to submission. Violations of this policy will cause catastrophic course failure.

Part I: Let $n, k \in \mathbb{N}_0$. We choose k subsets of $[n]$, namely S_1, S_2, \dots, S_k . We insist that $S_1 \cap S_2 \cap \dots \cap S_k = \emptyset$. How many ways can this be done, as a function $f(n, k)$?

For example, if $n = 1, k = 2$ then $\{S_1 = \{1\}, S_2 = \emptyset\}, \{S_1 = \emptyset, S_2 = \{1\}\}, \{S_1 = S_2 = \emptyset\}$ are the three possibilities; hence $f(1, 2) = 3$.