

MATH 579 Exam 7; 4/10/12
Please read the exam instructions.

No books or notes are permitted for this exam; calculators are permitted though. Please indicate what work goes with which problem, 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. Show all necessary work in your solutions; if you are unsure, show it. Simplify all numerical answers to be integers, if possible. You have 40 minutes. If you wish, when handing in your exam you may attach your extra credit problem. For more details, see the syllabus.

Choose three problems only from these five.

1. (5-8 points) How many integers in $[123]$ are relatively prime to 10?
2. (5-10 points) How many permutations of length n contain exactly two 1-cycles?
3. (5-10 points) How many 2×2 matrices are there with entries from the set $\{0, 1, 2, 3\}$ that contain no 0-rows and no 0-columns?
4. (5-10 points) What is the number of integral solutions of the equation $x_1 + x_2 + x_3 = 15$ that satisfy $0 \leq x_1 \leq 5$, $0 \leq x_2 \leq 7$, $0 \leq x_3 \leq 10$?
5. (5-12 points) What is the number of integral solutions of the equation $x_1 + x_2 + x_3 + x_4 + x_5 = 50$ that satisfy $5 \leq x_i \leq 15$ for $i = 1, 2, 3, 4, 5$?