

MATH 579 Exam 3; 9/26/13

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 solutions to $a + b + c + d = 16$ are there in odd, nonnegative, integers?
2. (5-10 points) In how many different ways can we place two white, two black, and four red rooks on a standard 8×8 chessboard so that no two rooks attack each other?
3. (5-10 points) We want to select four subsets A, B, C, D of $[n]$ so that $A \subseteq (B \cup C) \subseteq D$ and $B \cap C = \emptyset$. In how many different ways can we do this?
4. (5-10 points) How many four-digit positive integers contain exactly two different digits?
5. (5-12 points) How many 3×3 square matrices are there whose entries are 0 or 1 and which each row and column has an even sum?