

**Math 579 Exam 5 (part I): 3/13/7**

Please read the exam instructions.

Please write your answers on **separate paper**, indicate clearly what work goes with which problem, and put your name 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 list of problems for your records. Show all necessary work in your solutions; if you are unsure, show it. Each problem is worth a minimum of 5 points, and a maximum that is indicated. You have 40 minutes. *Choose three problems.*

1. (8 points) First, find the number of compositions of 100 into even parts. Then, find the number of integer partitions of 100 into even parts. Finally, find the number of integer partitions of 100 into three distinct even parts. NOTE: give your answers in terms of the functions we've studied, not as integers.
2. (10 points) For all  $n \geq 1$ , prove that  $B(n) \geq n$ .
3. (10 points) For all  $n \geq 2$ , prove that  $S(3n, n) > (n!)^2$ .
4. (10 points) Find a formula for  $S(n, 2)$ .
5. (12 points) Find a formula for  $S(n, n - 3)$ .