

MATH 579: Combinatorics Exam 5

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 **all three** problems. You must do problems 1-3. Number 4 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 15 and 30. This will then be multiplied by $\frac{10}{3}$ for your exam score.

Turn in problems 1,2,3:

1. Prove that $b_n = 3^n$ satisfies the recurrence relation $a_n = 2a_{n-1} + 3a_{n-2}$.

Problems 2 and 3 both concern the recurrence given by

$$a_0 = 0, a_1 = 0, a_2 = 12, a_n = -3a_{n-1} + 4a_{n-3} + 18 \quad (n \geq 3).$$

Note that there is no a_{n-2} term.

2. Solve this recurrence using the methods of our packet. (not generating functions)
3. Solve this recurrence using generating functions.

You may also turn in the following (optional):

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

Please keep this sheet for your records.