

# Math 501: Combinatorics

## Homework 13

Recall that you must hand in a subset of the problems for which deleting any problem makes the total score less than 10. The maximum possible score on this homework is 10 points. See the syllabus for scoring details.

For any of problems 3 through 7 below, you may use the previous parts without proof.

### Problems

1. (1+) [2 points] Let  $a_1 = (0, 0)$ ,  $a_2 = (1, 0)$ ,  $a_3 = (2, 0)$ ,  $b_1 = (3, 5)$ , and  $b_2 = (5, 5)$ ,  $b_3 = (6, 5)$ . Use the Lindström-Gessel-Viennot lemma to calculate the number of non-intersecting 3-paths in the lattice grid (using only up and right steps) with sources  $a_1, a_2, a_3$  and sinks  $b_1, b_2, b_3$ .
2. (2) [3 points] Sagan chapter 2 problem 11.
3. (2-) [3 points] Stanley chapter 2 problem 34(a)
4. (2-) [3 points] Stanley chapter 2 problem 34(b)
5. (1+) [2 points] Stanley chapter 2 problem 34(c)
6. (2) [3 points] Stanley chapter 2 problem 34(d)
7. (2+) [4 points] Stanley chapter 2 problem 34(e)
8. (3-) [8 points] Stanley chapter 2 problem 37