

## CO 330, FALL 2017, ASSIGNMENT 5

DUE WEDNESDAY NOVEMBER 1 AT 4PM VIA CROWDMARK

### PART A

Do all problems in part A.

- (1) Course notes chapter 9 question 1. Also add one more part to the question: Partitions for which parts greater than 10 must be distinct.
- (2) Let  $\mathcal{Y}_{a,b}$  be the set of partitions with first part at most  $a$  and with at most  $b$  parts. Prove that

$$\sum_{\lambda \in \mathcal{Y}_{a,b}} q^{n(\lambda)} = \begin{bmatrix} a+b \\ a \end{bmatrix}_q$$

### PART B

Do **any two** of the following three problems for part B. If you submit more than two only the first two will be graded.

- (1) Course notes chapter 9 question 4
- (2) Course notes chapter 9 question 6
- (3) Make another problem like chapter 9 question 4 or question 5 in the course notes (that is two classes of partitions which are equinumerous by the master theorem and some algebraic manipulations). *We can try as a class to find as many different examples as we can.*