

MATH 421 Q1 WINTER 2017 HOMEWORK 4

Due Feb. 16, 12pm.

Total 20 points.

QUESTION 1. (5 PTS) *Use generating function to count the number of selections of 30 toys from 10 different types of toys if at least two but no more than five of each kind must be selected. Toys of the same type are considered identical. **You can leave the answer as combination numbers and do not need to calculate the numerical value.***

QUESTION 2. (5 PTS) *Use generating function to solve the following: In how many ways can 25 identical balls be distributed to nine different boxes if each box receives an odd number of balls? **Give your answer in numerical value.***

QUESTION 3. (5 PTS) *Use generating functions to find the number of integer solutions to*

$$x_1 + x_2 + x_3 = 16, \quad x_i \geq 0, \quad x_1 \text{ odd}, x_2 \text{ even}, x_3 \text{ prime.} \quad (1)$$

Give your answer in numerical value.

QUESTION 4. (5 PTS) *Show that the number of partitions of n into summands not divisible by 3 is equal to the number of partitions of n where no summand occurs more than twice.*