

Worksheet 8.4-6

Max's Lecture
MATH 55

July 25, 2019

Exercise A. Give an expression for the generating function of the number of ways to distribute n identical toys to 3 children such that each child gets at least 2 toys.

Exercise B. All the sets considered below are finite:

1. Write a formula for $|A \cup B|$ in terms of $|A|, |B|, |A \cap B|$.
2. Write a formula for $|A \cup B \cup C|$ terms of $|A|, |B|, |C|, |A \cap B|, |B \cap C|, |A \cap C|, |A \cap B \cap C|$
3. Write a similar formula for $|A \cup B \cup C \cup D|$
4. Do you notice any patterns?

Exercise C. How many elements are in the union of four sets if the sets have 50, 60, 70, and 80 elements respectively, each pair of the sets has 5 elements in common, each triple of the sets has 1 element in common, and no element is in all 4 sets?

Exercise D. Use the principle of inclusion exclusion to find the number of solutions to $x_1 + x_2 + x_3 = 11$ with $x_1 \leq 3$ and $x_2 \leq 4$ and $x_3 \leq 6$.