MATH 120 In-class Activity
Day 8

Question 1. Determine a **set of objects** that is counted by each of the following quantities. You are NOT being asked to evaluate these quantities!!

(a) $\dbinom{19}{5}$

(b) $\left(\!\!\dbinom{5}{19}\!\!\right)$

(c) $\left(\!\!\dbinom{15}{6}\!\!\right) - \left(\!\!\dbinom{13}{6}\!\!\right)$

Question 2. How many multisets of any size can you make using the letters a, b, and c? [*Hint: Try to list them all.*]

Question 3. A bakery produces six different types of cookies, including snickerdoodles, chocolate chip, rainbow, peanut butter, oatmeal, and gingerbread cookies. Assume that there are at least 20 cookies of each kind.

(a) How many different selections of 20 cookies are there?

(b) How many different selections of 20 cookies are there if at least three must be snickerdoodles?

(c) How many different selections of 20 cookies are if **at most one** is a snickerdoodle?

Question 4. Suppose you have 10 identical balls and 8 identical cubes. In how many ways can you put these eighteen objects into four containers labeled A, B, C, and D?

Question 5. How many non-negative integer solutions are there to $x_1 + x_2 + x_3 + 3x_4 = 7$ if x_1 is positive?

Question 6. Let n be a positive integer. How many triples of integers (i, j, k) are there where $1 \leq i \leq j \leq k \leq n$?

[*Hint: Try to find a stars-and-bars argument here.*]