MATH-3012-QHS
Homework 5

Taiyun

Professor Dr. Kalila Lehmann

Note: These problems are often a little challenging the first time around so there is an extra point available on this homework. That is, 24 points are available but you'll still be graded out of 23.

For each part, please simplify your answer to a single integer; you may use a calculator. If it is helpful, you may use your answer to any part in any subsequent part. Please remember to give some verbal indication of your process in addition to just doing the necessary calculations.

1. (6 points) Amal needs to sort the distinct numbers 1-8 into 3 different groups.

   (a) If there needs to be at least one number in each group, in how many ways could this be done?
   Answer:

   [Your answer here.]

   (b) Suppose there needs to be at least one number in each group, and the groups are labeled A, B, and C. How many options are there now?
   Answer:

   [Your answer here.]

   (c) How many options for sorting does Amal have if he now is allowed to sort the numbers into at most 3 groups, i.e., some of the 3 groups could be empty?
   Answer:

   [Your answer here.]

2. (5 points) How many nine-digit sequences have each of the numbers 2, 5, and 8 appearing at least once? You do not need to simplify your answer.

   Answer:

   [Your answer here.]

3. (5 points) Find the number of integer solutions to the equation $A + B + C = 15$, where

$$0 \leq A \leq 6$$
$$0 \leq B \leq 11$$
$$2 \leq C \leq 7$$

Answer:

[Your answer here.]

■

4. (5 points) In how many ways can the letters of the word ARRANGEMENT be arranged so that there are exactly two pairs of consecutive identical letters?

Answer:

[Your answer here.]

■