Homework 1 in Discrete Probability Theory

Variant 1.

Exercise 1.

Question 1. How many different 7-place license plates are possible if the first 5 places are to be occupied by letters and the final 2 by numbers?

Question 2. Ms. Jones has 10 books that she is going to put on her bookshelf. Of these, 2 are mathematics books, 3 are chemistry books, 4 are history books, and 1 is a language book. Ms. Jones wants to arrange her books so that all the books dealing with the same subject are together on the shelf. How many different arrangements are possible?

Exercise 2.

Question 1. From a group of 5 women and 8 men, how many different committees consisting of 3 women and 5 men can be formed?

Question 2. Consider a set of 10 antennas of which 4 are defective and 6 are functional and assume that all of the defectives and all of the functionals are considered indistinguishable. How many linear orderings are there in which no two defectives are consecutive?

Exercise 3.

Question 1. In how many ways can a man divide 7 gifts among his 3 children if the eldest is to receive 3 gifts and the others 2 each?

Question 2. A student is to answer 7 out of 10 questions in an examination. How many choices has she if she must answer at least 3 of the first 5 questions?

Exercise 4.

Question 1. Consider n-digit numbers where each digit is one of the 10 integers 0, 1, ... ,9. How many such numbers are there for which no two consecutive digits are equal?

Question 2. Consider three classes, each consisting of n students. From this group of 3n students, a group of 3 students is to be chosen. How many choices are possible?