EE 503

Homework 2

Due Wednesday September 11, 2019 at 6 p.m.

Work all 4 problems.

Problem 1. Ordering a "deluxe" pizza from a certain restaurant means you have 4 choices from 15 available toppings. How many combinations are possible if toppings can be repeated? If they cannot be repeated? Note the order in which the 4 toppings are selected does not matter so in both cases we have sampling without order.

Problem 2. A certain deck of cards contains 10 red cards numbered 1 to 10 and 10 black cards numbered 1 to 10. How many ways are there of arranging the 20 cards in a row? Suppose we draw the cards at random and lay them in a row. What is the probability that red and black cards alternate?

Problem 3. An urn contains 3 red balls, 5 white balls and 4 black balls. Three balls are chosen at random. What is the probability of choosing 2 red balls if

a. the sampling is done without replacement?

b. the sampling is done with replacement?

Problem 4. Suppose you are dealt a hand in poker as discussed in class. Let A be the event getting 5 cards of the same suit (this is called a flush). Let B be the event getting a pair (exactly 2 of the same face value). Let C be the event getting a full house (exactly 3 of one face value and exactly 2 of another face value).

For event A you should exclude the probability of a royal flush (this is 5 cards of the same suit with face values Ace, King, Queen, Jack, 10) and also exclude the probability of a straight flush (this is 5 cards of the same suit with consecutive face values but excludes the royal flush). An example of a straight flush is Jack,10,9,8,7 all of the same suit and another example is 5,4,3,2,Ace all of the same suit where in this latter case the Ace has a face value of 1.

Find

a. $P(A)$.

b. $P(B)$.

c. $P(C)$.

In each case show the expression you used to get your answer.