SDSC 2102 Statistical Methods and Data Analysis
Assignment 1

Due: Jan 30, 2022 (Sunday) @10:00 pm

1. A and B are two events. Prove $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.

2. You pick up three cards at random (without replacement) from a deck of cards. What is the probability of picking up at least one "spade"?

3. 100 CityU parents completed a survey regarding the music they listen to. Out of these parents, 80 reported that they listen to music on Compact Discs (CDs), 60 reported that they listen to music on the radio, and 50 reported that they listen to music on both CD's and the radio. Find:

(a) the probability that a randomly selected parent listens to music on CDs or on the radio or both?

(b) the probability that a randomly selected parent listens to music on neither CDs nor the radio?

(c) the probability that a randomly selected parent listens to the radio, but does not listen to CDs?

4. True or False - Answer the following questions as either True or False.
(a) One ball is randomly selected out of an urn containing red, blue, green, and black balls. It is possible that the probabilities of selecting a red ball is 0.2, a blue ball is 0.4, a green ball is 0.1, and a black ball is 0.4.

(b) There are 3 red balls, 6 blue balls, 2 green balls, and 4 black balls in an urn. The probability of randomly selecting a ball that begins with the letter "b" is 2/3.

(c) Given the same urn as in part (b). Suppose you select two balls at random from the urn. The probability that the color of both balls begins with the letter "b" is 1/5.

5. Jill has 4 quarters, 5 dimes and 2 nickels in her bag. She starts picking out coins, at random, one by one to pay a parking attendant. What is the probability that she picks a quarter first, then a dime, and then another dime? Note that she picks without replacing the coins in the bag.

6. An urn contains 5 white and 10 black balls. A fair die is rolled and that number of balls is randomly chosen from the urn. What is the probability that all of the balls selected are white? What is the conditional probability that the die landed on 3 if all the balls selected are white?

7. Stores A, B and C have 50, 75, and 100 employees and, respectively, 50, 60, and 70 percent of these are women. Resignations are equally likely among all employees, regardless of sex. One employee resigns, and this is a woman. What is the probability that she works in store C?