CS1382 Discrete Computational Structures
Fall 2019 Homework III
10 points

(Due Date: Apr 26, 2019 at 11:59pm)

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1. Let A be the set of all bit strings of length 10.
    a. How many bit strings of length 10 are there?
    b. How many bit strings of length 10 begin with 1101?
    c. How many bit strings of length 10 have exactly six 0's?
    d. How many bit strings of length 10 have equal numbers of 0's and 1's?
    e. How many bit strings of length 10 have more 0's than 1's?

2. A class consists of 20 sophomores and 15 freshmen. The class needs to form a committee of size five.
    a. How many committees are possible?
    b. How many committees are possible if the committee must have three sophomores and two freshmen?

3. A club with 20 women and 17 men needs to form a committee of size six.
    a. How many committees are possible if the committee must have three women and three men?
    b. How many committees are possible if the committee must have at least two men?
    c. How many committees are possible if the committee must consist of all women or all men?

4. Use the binomial theorem to expand $(x^2 + \frac{1}{x})^7$

5. Suppose you have a class with 30 students — 10 freshmen, 12 sophomores, and 8 juniors.
    a. You pick one student at random. What is the probability that the student is not a junior?
    b. You pick two students at random, one at a time. What is the probability that both are freshmen?
    c. You pick two students at random, one at a time. What is the probability that the second student is a freshman, given that the first is a freshman?

6. A red and a green die are rolled.
    a. What is the probability of getting a sum of six, given that the number on the red die is even?
    b. What is the probability of getting a sum of six, given that the number on the green die is odd?