HW1, for MATH441, STAT461, STAT561, due August 31st

1. How many ways are there to rearrange the letters in ALBUQUERQUE?

2. How many ways are there to rearrange the letters ABCDEF when (a) A is before B and B is before C?
(b) A is beore B and C is before D?
(c) A is not first?
(d) A is not first and F is not last?

3. In some programming languages variables (also called identifiers) can be mixutres of lower case letters, uppercase letters, digits, and underscores, but the variable name must begin with an upper or lower case letter. How many such variable names are there of length 4?

4. Suppose a class has 50 students, and a committee of 3 students is chosen from the class. How many ways are there to form the committee? If there are 25 women and 25 men in the class, how many ways can the committee be formed if the committee must have at least one man and at least one woman?

5.. Three 6-sided dice are rolled: a yellow die, a red die, and a blue die. How many ways are there for the total to be 6? List all the possibilities. For example let (3,1,2) be one way to roll 6 where yellow is 3, red is 1, and blue is 2. f

6. A standard pack of cards contains 52 cards plus two jokers, for a total of 54 cards. If 5 cards are selected at random, without replacement, from a shuffled deck with jokers, how many possible hands are there?

7. Use the binomial theorem to expand the expression $(x - 2y)^6$.

8. Use the multinomial theorem to expand the expression $(x + y + 2z)^4$.

9. There are 10 professors from which a committee of 3 people is to be chosen. However two of the 10 people are married, and will not be chosen together. How many ways are there to choose the committee such that at most one of the married couple is on the committee?

10. How many solutions are there to the problem $w + x + y + z = 12$ where $w, x, y, z \in \{0, 1, 2, \ldots, 12\}$?