Mathematics for College Liberal Arts
Unit 7 Project
Probability

Instructions: Answer **ALL** questions. You **MUST** show all calculations and/or explanations to justify your answers. Upload the completed project as a Word or PDF file.

1. Compute $\frac{8!}{2!3!3!}$

2. Compute ${}_7C_4$

3. You are putting together a social committee for your club. You'd like broad representation, so you will choose one person from each class. If there are 8 seniors, 12 juniors, 10 sophomores, and 6 first-years, how many committees are possible?

4. If you draw 2 Scrabble tiles in order without replacement from a bag containing E, E, L, S, what is the sample space?

5. If someone tells you that there is a 40% chance that a Democrat wins the U.S. Presidential election in 2132, is that probability most likely theoretical, empirical, or subjective?

6. If you roll a standard 20-sided die (with faces numbered 1–20), what are the odds in favor of rolling greater than a 5?

7. You are playing a game where you roll a pair of standard 6-sided dice. You win $32 if you get a sum of 12 and lose $1 otherwise.
   a. What is the expected value of this game?
   b. Interpret your answer.

8. You roll a standard 20-sided die. If you roll the die 40 times, what is the probability that 20 comes up fewer than 2 times? Round answers to 4 decimal places.

9. You draw Scrabble tiles from a bag without replacement; the bag contains the letters

   A, A, C, E, E, E, L, L, N, O, R, S, S, S, T, X.

   a. What is the probability of drawing the letters E-A-R, in order?
   b. What is the probability of drawing 3 tiles that are all consonants?