Statistics I Lab 4 March 3, 2021

Submission Instructions: This lab is due *March 14, 2021.* A lab submitted beyond the due date will not be accepted *except for a documentable and valid excuse.* Upon completion, you *must upload* your **Word Document** and **Minitab Project files** to Blackboard by 11:59 PM of the due date.

Problems
The purpose of this lab is to simulate random samples from the discrete probability distribution below and explore the concepts of binomial probability.

X	0	1	2	3	4	5	6
P(X)	0.001	0.003	0.025	0.111	0.279	0.303	0.278

1. **Question 1** (60 points)
   In Minitab, place the "X" values in column C1. Place the "P(X)" values in column C2.

   To simulate a random sample of size $n = 12$ from this population, follow the steps in Minitab:

   - From the top menu, select "Calc,Random Data,Discrete...".
   - Set number of rows to generate: 2100
   - Store in column(s): C3-C14
   - Values in: C1, Probabilities in C2, Click OK.

   To average the sample observations, follow the steps in Minitab:

   - From the top menu, select "Calc,Row Statistics....".
   - Select "Mean"
   - Click in the box "input Varianbles". Enter: C3-C14.
   - Store result in C16, Click OK.

   Note: Each row represents a sample of observations. The values in C16 are the sample means of the sample observations in C3 through C14.

   - Use Minitab to find the following decriptive statistics for the sample means in C16. The mean and the standard deviation. Copy your result to a Word document.
   - Create a histogram and normal probability plot for the sample means in C16. Is the distribution of C16 approximately normal? Explain your answer by referring to both the graph of the distribution and the normal probability plot. Provide your answer in a Word document.
   - Estimate the chance of observing a sample mean that is at least 5.0. Explain your answer.
   - Submit all relevant graphs and output from the session in a Word document.

2. **Question 2** (40 points)
   The U.S. Department of Transportation reported that in 2009, Southwest led all domestic airlnes in on-time arrivals for domestic flights, with a rate of 0.825. Using the binomial distribution, what is the probability that in the next six flights:

- four flights will be on time?
- all six flights will be on time?
- at least four flights will be on time?
- What are the mean and standard devisation of the number of on-time arrivals?
- Submit all relevant graphs and output from the session in a Word document.

Have fun!