Math 338 **Lab Assignment #2** Fall 2019

Let's consider the probability experiment in which we roll a fair six-sided die.

Question #1 What is the sample space, S, for our experiment? That is, list all the possible outcomes.

Our sample space is all of the possible numbers that can be rolled, which range from 1 to 6.

Question #2 What is the probability associated with each outcome?

There is a 1 in 6 chance to roll any given number, as this is not a physically weighted dice.

Question #3 What is the probability that you roll an even number?

There is a 1 in 2 chance tho roll an even number as there are 2, 4, 6 for the possible outcomes.

Question #4 What is the probability that you roll a number less than 5?

There is a 4 in 6 chance (2/3) for rolling something less than 5 and not including 5.

Question #5 What is the probability that you roll an even number AND a number less than 5?

There is a 2 in 6 chance. The numbers that are even are 2, 4, 6 and the numbers in that range less than 5 are 2 and 4.

Question #6 What is the probability that you roll an even number OR a number less than 5?

There is a 5 in 6 chance.

Let a be an ordered list = [2, 4, 6]
Let b be an ordered list = [1, 2, 3, 4]

a + b = [1, 2, 2, 3, 4, 4, 6]

Make a+ b into set as such: {1, 2, 3, 4, 6}

Question #7 Are the events "roll an even number" and "roll a number less than 5" disjoint? Why or why not?

These two events can be disjoint because it is possible to roll an even number and it being less than five. Please see above solution for more details.

Question #8 Are the events "roll an even number" and "roll a number less than 5" independent? Why or why not?

These events cannot be independent because a roll cannot discredit either event as they are agnostic from one another.

Now let X be the discrete random variable representing the outcome of rolling a fair six-sided die; that is, X = 1 if you roll a 1, X = 2 if you roll a 2, etc.

Question #9 Fill in the table to describe the Probability Distribution of X:

X = x	P(X =x)
1	1/6
2	1/6
3	1/6
4	1/6
5	1/6
6	1/6

Question #10 Use the table to find $P(1 < X \leq 4)$.

Interval notation: (1, 4]

We are interested in values 2, 3, 4 but not 1.

Since the value of the dice directly correspond to it's chance of probability, we can simply sum up those probabilities which will be 3/6.