Show **all** of your work on this assignment and answer each question fully in the given context.

Please staple your assignment!

1. Consider the following scenario: I am drawing a the top card from a well shuffled deck of playing cards. After I select the top card, I make note of what the card is, and I replace it in the deck and reshuffle. I then select another card, make note of what the card is, replace it in the deck and reshuffle.

   (a) If I repeat this process 3 times, what is the probability that every card is the same suit?

   (b) If I repeat this process 3 times, what is the probability that every card is the same rank?

   (c) If I repeat this process 3 times, what is the probability that every card is the same suit and rank?

2. Suppose that you have two fair six-sided die (meaning each side has the same chance of facing up), one red and one blue, and suppose that each roll of the pair is independent. Define X to be the sum of the number of dots facing up on a single roll of the pair of die, and define T to be the first roll of the pair of die where the sum of the dots facing up is 7.

   (a) Complete the following table for the random variable X:

x	$f(x)$
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	

   (b) If I roll the pair of die 4 times, how many times should I expect the sum of the dots facing up on the two die to be 7? What is the probability that I roll a 7 on three of those

   (c) If I roll the pair of die 6 times, what is the probability that the sum of the dots facing up on the two die will be a 7 on three of those rolls?

   (d) Find $P(T \leq 5)$.

   (e) Find $P(T \geq 2)$.

   (f) How many times should I expect to roll the die before I see my first roll of 7. (i.e., find the *expected value* of T).

3. **Chapter 5, Section 1, Exercise 1 (page 243)**
4. **Chapter 5, Section 1, Exercise 2 (page 243)**
5. **Chapter 5, Section 1, Exercise 5 (page 244)**