

Homework 1

1. Chapter 2, exercise 1
2. Chapter 2, exercise 2
3. Chapter 2, exercise 4
4. Chapter 2, exercise 6
5. Chapter 2, exercise 12 (a and b only)
6. Chapter 2, exercise 14
7. Chapter 2, exercise 21
8. Suppose that a committee of four people is randomly selected from a group of 20, consisting of 8 men and 12 women. Assume that each person is equally likely to be chosen. Let X denote the number of women on the committee.
 - a. Write out the probability mass function for X . Include only the possible values that X can take.
 - b. What is the expectation of X ?
 - c. What is the standard deviation of X ?
9. Suppose that you throw two six-sided dice. Let X be the sum of the two dice.
 - a. Write out the probability mass function for X . Include only the possible values that X can take.
 - b. What is the expectation of X ?
 - c. What is the standard deviation of X ?
10. Chapter 2 exercise 16
11. From Chapter 2, exercise 16; what is the expected value of the total amount of money lost?
12. Suppose that a financial services company creates a security instrument that combines 10 individual securities. Each individual security has a 1% chance of defaulting each year. For this exercise, please include your code.
 - a. Suppose that the securities are independent. Run 1000 simulations to estimate the expected number of securities that will default in a 10 year period. Plot the 1000 simulated number of defaults in a histogram (the command in R is `hist`).
 - b. Now suppose that a default in one year increases the chance that any of the remaining individual securities defaults by 1% (e.g. if one defaults the first year, the remaining 9 each have a 2% chance of defaulting the next year). Estimate the expected number of securities that will default in a 10 year period and plot the 1000 simulated number of defaults in a histogram.