MA117 - Worksheet 4
Random Variables
March 5, 2021 - Week 1, Friday

Problem 1. Your friend hands you a coin and tells you to flip it. If you get heads, she will give you \$10. If you get tails, you will have to give her \$5. Seems like a great deal! But, unbeknownst to you, the coin your friend has handed you is actually biased and lands heads with probability 1/5.

(a) What is the expected value of your winnings?
(b) Calculate the standard deviation of your winninngs.

Problem 2. There are 10 questions on a multiple-choice test, and each question has 4 options. You didn't study very much for the test, though. For two of the questions, you're pretty confident you can rule out 2 of the possible answers; you then guess randomly between the remaining two options. For the remaining 8 questions, you just guess randomly out of all four options. What is your expected score on this exam?

Problem 3. A portfolio's value increases by 18% during a financial boom and by 9% during normal times. It decreases by 12% during a recession. What is the expected return on this portfolio if each scenario is equally likely?

Problem 4. Ice cream usually comes in boxes with volume 48 fluid ounces, with a variance of 1. Ice cream scoops hold about 2 ounces, with a variance of 0.0625. What is the variance of the amount of ice cream left in the box after you scoop out one scoop of ice cream?