Stat 400 Homework 2

Due: Tues Feb 16, 2021 - 11:59pm CST

via Gradescope

Please show steps in your work for full credit!

Exercise 1

Let **X** denote the number of times Ninki Minjaj goes to the beach in a given week. Suppose X has the following probability distribution:

x	f(x)
0	0.2
1	0.2
2	0.2
3	0.3
4	0.1

a) Find the probability that Ninki will go to the beach at least 2 times in any given week. (0.5 points)

b) Find the expected number of times that Ninki will go to the beach in a given week. (0.5 points)

c) Find the standard deviation of beach trips in a week, σ_X. (1 point)

d) The doctor tells Ninki that she is at high risk of skin cancer and should avoid going to the beach more than once per 2 weeks, but Ninki doesn't care. What is the probability that Ninki will go to the beach fewer than 2 times total in any 2 week period? (Assume the frequency of beach visits each week is independent) (1 point)

e) Cole has been to the beach twice this week and has seen Ninki there both times. Based on this information, what is the probability that Ninki went to the beach at least 3 times that week? (1 point)

Exercise 2

Suppose that Miss Fortune is running a booth at the county fair. Guests flip a coin until the first **tails** appears. If the number of tosses equals n, they are paid n dollars. What is the expected value of money that a guest will make? Show your work for full credit. You may solve this question algebraically or using R. (2 points)

Hint: Define a random variable X to represent the number of coin flips.

Exercise 3

Consider a random variable Y with the probability mass function:

$$f(y) = c \cdot \frac{3^y}{y!}, \quad y = 2, 3, 4...$$

a) Find E[Y]. (1.5 points)

b) Find P[Y > 3]. (0.5 points)

c) Find Var[Y]. (2 points)

Hint: Find E[Y(Y-1)].