Name: _____ TA Name: _____ Secret Word: _____

Data 88S

Feb 9, 2024

Python for PMF and CDF

The textbook has everything you guys need to code in Python for this class. Please look at section 3.3.5 for the binomial PMF code, 3.4.3 for the hypergeometric PMF code, and 4.1.2 for both distributions' CDF code.

1. Write "binomial", "hypergeometric", or "neither" for the following (**don't actually solve these, this is just to get in the habit of recognizing what kind of distribution we're working with**)

   (a) I flip a coin 5 times and look for the chance that I get 3 heads.

   (b) I draw five cards from a deck. What's that chance that I draw all spades?

   (c) I roll a die 50 times and look for the chance that I get 1 six.

   (d) I flip a coin 8 times.

   (e) I examine 30 factory products, and for each one, I can tell whether it's defective with chance 40%, regardless of the others. I look for the probability that I find one defective item.

   (f) I flip a coin and find the chance that it takes me 10 flips to get my first head.

   (g) A group of 10 voters is selected at random. What's the chance that 8 of them are over the age of 60?

   (h) 40 people take a COVID test. They each have a 10% chance of being infected, regardless of the others (and the test is always accurate). What's the chance that 4 of the people are infected?

   (i) I have a box of four sweet and six sour candies. What's the chance that I draw 5 candies at random (without replacement) and 3 of them turn out to be sour candies?

   (j) Same box as above, but now I draw candies at random, one at a time. Let X be the number of candies drawn until and including the time I get a sweet candy.

   Chapter 3, Exercise 2a

2. A true-false test has 20 questions.

   (a) Dev hasn't studied at all, so he guesses each answer by tossing a coin. Let R be the number of questions that Dev gets right. Find $P(R > 16)$.

Chapter 3, Exercise 6

3. In a population of 200 voters, 70 are registered with Party A and the other 130 are registered with Party B. A simple random sample of 40 voters is drawn from this population. Let V be the number of sampled voters who are registered with Party A, and let $W = 40 - V$ be the number of sample voters who are registered with Party B. Find:

(a) $P(V = 10)$

(b) $P(V > 10)$

(c) $P(W < 3V)$

Chapter 3, Exercise 3

4. Yi likes to bet on "red" at roulette. Each time she bets, her chance of winning is 18/38 independently of all other times. Suppose she beets repeatedly on red. Find the chance that:

(a) she wins four of the first 10 bets

(b) she wins at most four of the first 10 bets

(c) the third time she wins is on the 10th bet

(d) she needs more than 10 bets to win five times