STAT 315 Chapter 3 Review Questions

For the following questions, define the relevant random variable, indicate the appropriate probability distribution, specify any relevant parameters, and answer the question.

Scenario A:

1. A farmer evaluates chicken eggs as either "acceptable for sale" or "unacceptable for sale". Previous experience has taught her that 7% of eggs are unacceptable. What is the probability that in 3 cartons of eggs, no more than 5 are "unacceptable" (a carton holds 12 eggs)?

2. On average, the farmer's hens lay 15 eggs per hour, and there are enough hens that each egg lay is unaffected by the other egg lays. If the farmer waits for 1 hour, how likely is it her hens will lay 13 eggs?

3. If the farmer waits for 2 hours, how likely is it that her hens will lay 13 eggs?

4. How likely is it that she will check at least 4 eggs before finding an "unacceptable" one?

5. The farmer needs to administer vaccines to newborn chicks. There are 100 chicks in the litter, and the first 10 are from the farmer's favorite breeding hen. If she selects a chick at random, what's the probability it will be from her favorite hen?

Scenario B

A survey of 600 people asked "In a perfect world, how many pets would you prefer?" A summary of their responses is below:

Number of Pets	0	1	2	3	4
Frequency	77	161	165	110	87

1. Compute the probability of falling into each group (0 pets, 1 pet, 2 pets, etc.).

2. Using this data set, what is the expected number of pets preferred by the respondents?

3. Using this data set, what is the variance in the number of pets?

4. Would it be appropriate to model these responses using a geometric random variable? Why or why not?

5. Would it be appropriate to model these responses using a Poisson random variable? Why or why not?

6. Plot the Cumulative Distribution Function for these data