Exercise 01:

In a game stop store, a manger estimates that the probability that any customer entering the store will make a purchase is 0.2. let us consider the experiment of observing the next three customers who will enter the store.

Required:

- Is this a binomial experiment?
- Draw a tree diagram for this experiment?
- What is the probability that two of the next three customers will make a purchase?
- What is the probability that no one of the next three customers will make purchase?
- What is E(x), V(x) and $\sigma(x)$.

Exercise 02:

Consider a binomial experiment with n=15 and p= 0.4.

- Compute: p(x=0), P(x= 2), $P(x \leq 2), P(x \geq 1), P(x > 14)$
- Compute E(x), Var(x), and σ(x).

Exercise 03:

When a new machine is functioning properly, only 3% of the items produced are defective. Assume that we will randomly select two parts produced on the machine and that we are interested in the number of defective parts found.

1. Describe the conditions under which this situation would be a binomial experiment?
2. Draw a tree diagram, showing this problem as a two-trial experiment?
3. How many experimental outcomes result in exactly one defect being found?
4. Find the probabilities associated with finding no defects, exactly one defect, and two defects?

Exercise 04:

Part 01: Consider Poisson distribution with $\lambda = 3$

1. Write the appropriate Poisson probability function?
2. Compute: $p(x = 2), p(x = 1), P(x \geq 2)$

Part 02: Consider a Poisson distribution with λ of 2 occurrences per time period.

1. Write the appropriate Poisson probability function?
2. What is the expected number of occurrences in three time period?
3. Write the appropriate Poisson probability function to determine the probability of x occurrences in three time period?
4. Compute the probability of 2 occurrences in one time period?

5. Compute the probability of 6 occurrences in three time period?
6. Compute the probability of 5 occurrences in two time period?

Exercise 05:

Phone calls arrive at the rate of 48 per hour at the reservation desk for Air Algerie.

1. Compute the probability of receiving three calls in a 5-minute interval of time?
2. Compute the probability of receiving exactly 10 calls in 15 minutes?
3. Suppose no calls are currently on hold. If the agent takes 5 minutes to complete the current call, how many callers do you expect to be waiting by that time? What is the probability that none will be waiting?
4. If no calls are currently being processed, what is the probability that the agent can take 3 minutes for personal time without being interrupted by a call?

Exercise 06:

Suppose N= 10 and $N_1 = 3$. Compute the hypergeometric probabilities for the following values of n and x.

1. $n = 4\,, x = 1.$
2. $n = 2, x = 2.$
3. $n = 2, x = 0$
4. $n = 4, x = 2.$

Exercise 07:

Suppose we have a group of 10 shoppers: 7 prefer to do their holiday shopping online, and 3 prefer to do their holiday shopping in stores. A random sample of 3 of these 10 shoppers is selected for more in-depth study of how the economy has impacted their shopping behavior.

1. What is the probability that exactly 2 prefer shopping online?
2. What is the probability that the majority (either 2 or 3) prefer shopping online?
3. What is the probability that the minority prefer shopping in stores?

Exercise 08:

Axline Computers manufactures personal computers at two plants, one in Texas plant and the other in Hawaii. The Texas plant has 40 employees, and the Hawaii plant has 20. A random sample of 10 employees is to be asked to fill out a benefits questionnaire.

1. What is the probability that none (0) of the employees in the sample works at the plant in Hawaii?
2. What is the probability that one of the employees in the sample works at the plant in Hawaii?

3. What is the probability that 02 or more of the employees in the sample work at the plant in Hawaii?
4. What is the probability that 09 of the employees in the sample work at the plant in Texas?

Exercise 09:

A survey found that 25% of Algerian Adults say that Facebook is a major source of news for them. You randomly select 04 adults and ask them whether Facebook is a major source of news for them. Find the probability that:

1. Two of them respond Yes.
2. At least two of them respond, yes?
3. Fewer than two of them respond, yes?

Exercise 10:

Suppose that a quality inspector is checking electronic devices according to the following plan:

Each box has 50 electronic devices, the inspector will randomly select 10 devices from each box (without replacement), if the number of defective parts is less than or equal 1, the box is accepted, otherwise the inspector would check the entire box. If the probability of defect for this company is 24%. Find the following:

:

1. the average defect of these electronic devices? And the variance?
2. Compute the probability that a box would be accepted without being entirely checked?