Activity Sheet:

1. Let us suppose, you have tossed two two-sided fair coins.
    a. Compute the PMF for heads in this experiment
    b. Compute Expectation of heads

2. For a given probability density function, calculate

$$f(x) = \begin{cases} 3x^{-4}, & x > 1 \\ 0, & elsewhere \end{cases}$$

    i. P(X = 2)
    ii. P(X <= 4)
    iii. P(X < 1)
    iv. P(2 <= X <= 3)

3. Twelve volunteers were chosen for a blind-fold test to taste 2 soft-drinks A & B. What is the probability that 3 of them were able to correctly identify the drink that they had?

4. Consider the favorite coin toss experiment. If you toss a biased coin, the probability of obtaining heads is 0.6. If you toss the coin 10 times, what is the probability of getting heads exactly 4 times?

5. Customers arrive at a bus station at the rate of 5 per minute following Poisson distribution. What is the probability of 3 arrivals in a one-minute interval?

6. The number of calls coming per minute into a hotel reservation center is Poisson random variable with mean 3. Find the probability that no call come in a given 1 minute period.

7. You are fond of a particular flavor of ice-cream but that is rarely available in the shop. The probability of getting that ice-cream is only 0.15. Obtain a distribution table for getting ice - cream in 1,2,.....,10 visits and generate a plot. What would we observe if x values grow larger?

    How many visits on an average are required to get your favorite ice-cream?

8. If a production line has 20% defective rate. Calculate the probability of obtaining the first defective part after three good parts. What is the average number of inspections to obtain the first defective?

9. The time required to repair a machine is an exponential random variable with rate λ = 0.5 jobs/hour.

a) What is the probability that a repair time exceeds 2 hours?

10. Player A scores an average of 70 runs with SD of 20 runs. Player B scores an average of 40 runs with SD of 10 runs. In a particular game, player A scored 75 runs and player B scored 55 runs. Which of these two players have done better when compared to their own personal track records? Also mention the better player's z-score.

11. A college basketball team has a shortage of one team member and the coach wants to recruit a player. To be selected for training the minimum height for recruitment is 72 inches. The average height of the students is 67.2 inches with a variance of 29.34. What is the probability that the coach finds a player from that college?

12. A certain type of light bulb has an average life of 500 hours, with a standard deviation of 100 hours. The life of the bulb can be closely approximated by a normal curve. An amusement park buys and installs 10,000 such bulbs. Find the probability of a bulb to last for each period of time.

    a. At least 750 hours
    b. Less than equal to 500 hours
    c. Between 350 and 550 hours

13. At what point (x) is the area under the curve to the left of x equal to 0.5? At what point (x) is the area under the curve to the left of x equal to 0.95? At what point (x) is the area under the curve to the left of x equal to 0.995?

14. Compute Z score for the elements in the vector below -
    82, 72, 85, 14, 66, 15, 23, 78, 16, 38, 92, 17