1. The distribution of the number of home runs in soft-ball games is shown here. Number of home runs 0, 1, 2, 3, 4, and 5 with respective probabilites 0.05, 0.16, 0.41, 0.27, 0.07, 0.04. a. Calculate the mean number of home runs. b. Find the standard deviation.
2. The leading brand of dishwasher detergent has a 30% market share. A sample of 5 dishwasher detergent customers was taken. What is the probability that 4 or fewer customers chose the leading brand?
3. A certain type of tomato seed germinates 90% of the time. A backyard farmer planted 20 seeds. a. What is the probability that exactly 18 germinate? b. What is the probability that 18 or more germinate? c. What is the probability that 19 or fewer germinate?
4. According to the American Academy of Cosmetic Dentistry, 75% of adults believe that an unattractive smile hurts career success. Suppose that 20 adults are randomly selected. What is the probability that 18 or more of them would agree with the claim?
5. A student majoring in accounting is trying to decide on the number of firms to which he should apply. Given his work experience and grades, he can expect to receive a job offer from 70% of the firms to which he applies. The student decides to apply to only four firms. What is the probability that he receives no job offers?
6. Comment on the following that mean and variance of Binomial distribution are 7 and 11 respectively.
7. Find p if n = 6 and 9 P (X = 4) =P(X=2). (1/4)
8. In a Binomial distribution with 6 independent trials, the probability of 3 and 4 success is found to be 0.2457 and 0.08189 respectively. Find the parameters. **(4/13)**
9. The mean and variance of Binomial distribution are 3 and 2 respectively. Find the probability of (i) less than or equal to 2 (ii) greater than or equal to 7. **(0.3767, 0.0083)**
10. 12% of the items produced by a machine are defective. What is the probability that out of a random sample of 20 items produced by the machine, 5 are defective? **($^{20}C_5$ $(0.12)^5$ $(0.88)^{15}$)**
11. The average number of defective pieces, in the manufacturing of an article, is 1 in 10. Find the probability of getting exactly 3 defective articles in a packet of 10 articles selected at random. **($^{10}C_3$ $(0.1)^3$ $(0.9)^7$)**
12. In a bombing campaign there is the probability of hitting the target is 50%. How many bombs should be drooped so there is 99.9% chance of hitting the target if (i) one hit is enough to destroy the target?
13. The probability that a student will graduate is 0.4. Determine the probability that out of 5 students:(i) none;(ii)1;(iii) atleast1; and (iv) all will graduate.**{(i) 0.07776(ii)0.2592(iii)0.92224 (iv) 0.01024}**
14. From the past experience a stock broker finds that 70% of the telephone calls he receives during the business hours, are orders and the remaining are for other business. What is the probability that out of first 8 telephone calls during a day—
    (i) exactly 5 calls are order calls?
    (ii) at least 6 are order calls ? **{(i) 0.2542 (ii) 0.5515)**
15. The number of accidents that occur at a busy intersection is Poisson distributed with a mean of 3.5 per week. Find the probability of the following events. a. No accidents in one week b. Five or more accidents in one week c. One accident today
16. Snowfalls occur randomly and independently over the course of winter in a Minnesota city. The average is one snowfall every 3 days. a. What is the probability of five snowfalls in 2 weeks? b. Find the probability of a snowfall today.
17. The number of students who seek assistance with their statistics assignments is Poisson distributed with a mean of two per day. a. What is the probability that no students seek assistance tomorrow? b. Find the probability that 10 students seek assistance in a week.

18. Hits on a personal website occur quite infrequently. They occur randomly and independently with an average of five per week. a. Find the probability that the site gets 10 or more hits in a week. b. Determine the probability that the site gets 20 or more hits in 2 weeks.
19. In older cities across North America, infrastructure is deteriorating, including water lines that supply homes and businesses. A report to the Toronto city council stated that there are on average 30 water line breaks per 100 kilometers per year in the city of Toronto. Outside of Toronto, the average number of breaks is 15 per 100 kilometers per year. a. Find the probability that in a stretch of 100 kilometers in Toronto there are 35 or more breaks next year. b. Find the probability that there are 12 or fewer breaks in a stretch of 100 kilometers outside of Toronto next year.
20. The number of bank robberies that occur in a large North American city is Poisson distributed with a mean of 1.8 per day. Find the probabilities of the following events. a. Three or more bank robberies in a day b. Between 10 and 15 (inclusive) robberies during a 5-day period
21. Flaws in a carpet tend to occur randomly and independently at a rate of one every 200 square feet. What is the probability that a carpet that is 8 feet by 10 feet contains no flaws?
22. Complaints about an Internet brokerage firm occur at a rate of five per day. The number of complaints appears to be Poisson distributed. a. Find the probability that the firm receives 10 or more complaints in a day. b. Find the probability that the firm receives 25 or more complaints in a 5-day period.

23. A discrete random variable X has mean equal to 6 and variance equal to 2. If it is assumed that the underlying distribution of X is binomial, what is the probability that $5 < X < 7$?
24. Fit the Binomial distribution and find the expected frequencies for the following data.

X	0	1	2	3	4	5	6	total
f	7	6	19	35	23	7	1	91

25. 192 families had following distribution of girl child among the first three children. Find the expected frequencies on the basis that (i) both sex are equally probable (ii) the probability may vary.

No. of girl child	0	1	2	3	Total
No. of families	77	90	20	5	192

26. A car hire firm have two cars which it hires out day by day at the average of 1.5. Calculate the proportion of days on which none of the cars are used and some demands are refused. **(0.2231, 0.19126)**
27. An automatic machine makes paper clips from coils of wire. On the average, 1 in 400 paper clips is defective. If the paper clips are packed in boxes of 100, assuming that the process follows Poisson distribution, what is the probability that any given box of clips will contain, (i) no defective, *(ii)* one or more defectives, *(iii)* less than two defectives?**{(i) 0.7787, (ii)0.2213,(iii) 0.9734}**
28. A hospital have an average of 4 emergency calls in 10 minutes interval. What is the probability that (i) there are at most 2 emergency calls in a minute (ii) there are exactly 3 telephone calls in 10 minutes?
29. If a random variable X follows Poisson distribution such that $P(X = 1) = P(X = 2)$, find the mean and variance of the distribution. (Mean = Variance = 2.)
30. Suppose that the number of telephone calls between 10 A.M. and 11 A.M., denoted by X, is Poisson variate with mean 2 and the number of telephone calls between 11 A.M. and 12noon, denoted by Y, is Poisson variate with mean 4. If X and Y are independent what is the probability that there are at least 5 telephone calls between 10 A.M. to 12 noon?
31. Fit the Poisson distribution.

Mistakes per page	0	1	2	3	4	5
No. of pages	142	156	69	27	5	1

32. Fit Poisson distribution and find the expected frequencies.

X	0	1	2	3	4	5	6	7
f	71	112	117	57	27	11	3	1

33. The mean yield for one acre plot is 662 kilos with ***st.dev.*** 32 kilos**.** Assuming normal distribution. How many one-acre plots in a batch ***of 1000*** plots would you expect to have yield ***(i)*** over 700 kilos**,** ***(ii)*** below 650 kilosand ***(iii)*** what is the lowest yield of the best 100 plots***?***

34. In a distribution exactly normal, 7% of the items are under 35 and 89% are under 63. What are the mean and standard deviation of the distribution?

35. Of a large group of men, 5% are under 60 inches in height and 40% are between 60 and 65 inches. Assuming a normal distribution, find the mean height and standard deviation.

36. In an examination it is laid down that a student passes if he secures 30 per cent or more marks. He is placed in the first, second or third division according as he secures 60% or more marks, between 45% and 60% marks and marks between 30% and 45% respectively. He gets a distinction in case he secures 80% or more marks. It is noticed from the results that 10% of the students failed in the examination, whereas 5% of them obtained distinction. Calculate the percentage of students placed in the second division. (Assume normal distribution of marks.)

37. The local authorities in a certain city install 1000 electric lamps in the streets of the city. If these lamps have an average life of 1000 burning hours with a standard deviation of 200 hours, assuming normality, what number of lamps might be expected to fail (i) in the first 800 burning hours ? (ii) between 800 and 1,200 burning hours ? After what period of burning hours would you expect that (a) 10% of the lamps would fail? (b) 10% of the lamps would be still burning?

38. The following rules are followed in a certain examination. "A candidate is awarded a first division if his aggregate marks are 60% or above, a second division if his aggregate marks are 45% or above but less than 60% and a third division if the aggregate marks are 30% or above but less than 45%. A candidate is declared failed if his aggregate marks are below 30%. A candidate is awarded distinction if his aggregate marks are 80% or above. At such an examination, it is found that 10% of the candidates have failed and 5% of them obtained distinction. Calculate the percentage of students who are placed in the second division. (Assume normal distribution of marks).

39. The mean I.Q. test scores of a large number of children of age 14 was 100 and the standard deviation 16. Assuming that the distribution was normal, find,
    (i) What percent of the children had I.Q. under 80?
    (ii) Between what limit the I.Q. of middle 40% of the children lay?
    (iii) What percent of the children had I.Q. with the range $\mu \pm 1.96\sigma$. **(10.56%, 91.6, 108.6, 0.95)**

40. The standard deviation of a certain group of 1000 high school grades was 11% and the mean grade 78%. Assuming the distribution to be normal, find
    (i) How many grades were 90%?
    (ii) What was the highest grade of the lowest 10?
    (iii) What was the interquartile range?
    (iv) Within what limit did the middle 90% lie?

(138, 52, 70.575, 85.425, 60 – 96.2%)