

1. You are interested in the average lifetime of desktop computers. You collected data from 80 randomly selected desktop computers. The average lifetime of these computers is 5.3 years. Identify (i) population (ii) sample (iii) parameter and (iv) statistic in this context.
2. In the 2006 gubernatorial election in California, an exit poll sampled 2705 of the 7 million people who voted. The poll stated that 56.5% reported voting for the Republican candidate, Arnold Schwarzenegger. Of all 7 million voters, 55.9% voted for Schwarzenegger. Identify (i) population (ii) sample (iii) parameter and (iv) statistic in this context.
3. Classify the following variables (categorical / discrete / continuous) and mention their levels of measurement (nominal / ordinal / interval / ratio).
 - a. Number of emails sent by users daily.
 - b. Home districts of students.
 - c. Economic status of people (recorded as very poor, poor, middle class, rich, very rich).
 - d. Weights of patients.
 - e. Number of hospital visits made by cancer patients.
 - f. Place of residence.
 - g. Number of pens bought per month.
 - h. Amount of money spent monthly in fast food stores.
 - i. Number of days absent from work for illness.
 - j. Year of birth.
 - k. Blood group.
 - l. Lifetime of an electronic component.
4. Respondents in a study are categorized as single (S), married (M), divorced (D) and widowed (W). Data for 20 respondents are given below. Construct a frequency table and draw an appropriate graph.
 M, M, W, D, S, D, M, S, S, W, W, W, D, D, M, M, S, S, M, S
5. The following table is constructed from a sample of families that live in a suburb. Obtain cumulative frequencies, relative frequencies and cumulative relative frequencies. What percent of families in the sample have less than 2 children? Calculate mean, median and mode. Also calculate range, mean deviation and standard deviation.

Number of children	Number of families
0	10
1	27
2	15
3	18
4	9

6. The daily emissions of sulfur dioxide from an industrial plant are presented in the following table (tons/day). Draw a histogram and a frequency polygon on the same plot. Calculate mean, median and mode. Also calculate range, mean deviation and standard deviation.

Class	Frequency
3.0 – 4.0	4
4.0 – 5.0	16
5.0 – 6.0	12
6.0 – 7.0	8

7. For the following data, compute mean, median and mode. Comment on the shape of the distribution.

102, 104, 110, 110, 112, 106, 111, 112, 112, 108

8. Calculate 5-number summary from the following 20 sample observations. Draw a box plot. Comment on the shape of the distribution.

8.2, 10.8, 8.1, 8.7, 9.8, 9.7, 9.7, 10.4, 11.6, 10.2,
11.9, 9.8, 10.2, 10.2, 10.7, 8.9, 8.4, 8.7, 9.9, 9.8

9. Write down the sample observations from the stem-and-leaf plot given below.

The decimal point is at the |
8 | 124779
9 | 778889
10 | 222478
11 | 69

10. A coin is tossed until a head occurs. Write down the sample space of this experiment.

11. Two coins and a die are tossed. Write down the elements of the event that the second coin falls heads.

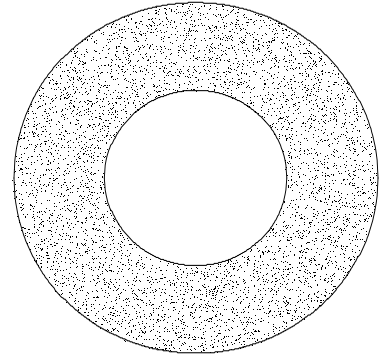
12. A population has 4 elements: a , b , c and d . You will select 2 elements from this population at random with replacement. Write down the sample space of this experiment if the order of selection is important.

13. Two dice are thrown. Find the probability that sum of the two numbers is seven.

14. Two dice are thrown. What is the probability that the range (larger value minus the smaller value) will be more than 3?

15. Suppose that A and B are mutually exclusive events for which $P(A) = 0.3$ and $P(B) = 0.5$. What is the probability that (a) either A or B occurs (b) A occurs but B does not and (c) both A and B occur?

16. Refer to the Figure. The bigger circle has radius 2 and the smaller circle has radius 1. A particle is dropped such that it is equally likely to fall at any point inside the bigger circle. What is the probability that it will fall in the shaded area?



17. Probability that the extinguishing system works is 0.90, probability that the alarm system works is 0.70 and probability that both systems work is 0.50. Determine the probability that (i) at least one of the systems will be working? (ii) neither of the systems will be working?
18. Let $P(A) = 0.4$, $P(B) = 0.3$, $P(A \cap B) = 0.1$. Find $P(A | A \cup B)$.
19. For an unfair dice, $P(x) = \frac{x}{21}$; $x = 1, 2, 3, 4, 5, 6$. Find $P(3 | 3 \text{ or } 4)$.
20. Of flights from Saskatoon to Winnipeg, 89.5% leave on time and arrive on time, 3.5% leave on time and arrive late, 1.5% leave late and arrive on time, and 5.5% leave late and arrive late. What is the probability that, given that a flight leaves on time, it will arrive late? What is the probability that, given a flight leaves late, it will arrive on time?
21. Party A or Party B will win the next election with probabilities 0.4 and 0.6, respectively. If Party A wins, it will pass the Equity Bill with probability 0.8. If Party B wins, it will pass the Equity Bill with probability 0.3. What is the probability that the Equity Bill will be passed? If the Equity Bill is NOT passed, what is the probability that Party A has won the election?
22. If $A \subset B$, simplify (a) $P(A | B)$ (b) $P(A | B^c)$ and (c) $P(B | A)$.
23. A system functions if all of the four components A, B, C and D work. Each component works independently with probability 0.8. What is the probability that the system works?
24. The probability that a certain type of missile will hit the target on any one firing is 0.80. What is the minimum number of missiles that should be fired so that there is at least 0.99 probability of hitting the target at least once?

25. Maruf has a blue car and a red car. He drives the blue car 80% of days, and the red car on the other days. If he takes the blue car, it gives trouble 5% of times, while the red car gives trouble 20% of the times. Maruf is driving to Sylhet today. What is the probability that he will have car trouble? If he has car trouble, what is the probability that he has taken the red car?
26. The probability function of X is given below. Find (a) $P(X = 1 \text{ or } 13)$ (b) $P(2 < X \leq 9)$ (c) the distribution function of X .

x	1	2	9	13
$P(x)$	1/7	2/7	3/7	1/7

27. The density of X is given below. Determine the value of k , $P(X > 2)$, $P(0.7 < X < 2.7)$, density at $X = 2.0$ and $P(X = 0.5)$.

$$f(x) = kx^3, \quad 0 < x < 4.$$

28. The density of X is given below. Find the distribution function of X . Hence find $P(X \leq 1.5)$, $P(X < 0.4)$, $P(X > 0.6)$ and $P(0.5 < X < 1.7)$.

$$f(x) = \frac{3}{8}x^2, \quad 0 < x < 2.$$

29. The cumulative distribution function of X is given below. Calculate $P(X \leq 5)$, $P(X > 6)$ and $P(5 < X \leq 7)$.

$$F(x) = \begin{cases} 0 & x \leq 2 \\ \frac{x-2}{7} & 2 < x < 9 \\ 1 & x \geq 9 \end{cases}$$