PRC - 2

QUANTITATIVE ANALYSIS FOR BUSINESS

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The Institute of Chartered Accountants of Pakistan
Chartered Accountants Avenue
Clifton
Karachi – 75600 Pakistan
Email: ipd@icap.org.pk
www.icap.org.pk

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QUESTION BANK

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CHAPTER 1

LINEAR AND QUADRATIC EQUATIONS

1. Zain is thrice as old as his son today. Form an algebraic expression for this information (where x represents zain's age and y represents age of his son)

   a) X = 3Y
   b) Y = 3X
   c) XY = 3
   d) X =

2. Ahmed is 26 years older than his son today. Form an algebraic expression for this information (where x represents Ahmed's age and y represents age of his son)

   a) X = Y – 26
   b) X = Y + 26
   c) X = Y/26
   d) X = 36Y

3. A worker saves 70% of his total earnings daily. What will be the total saving for one week if he works for seven days and earns Rs. 2,000 per day for the first five days of the week and Rs. 3,000 per day for the remaining two days

   a) Rs. 12,200
   b) Rs. 11,200
   c) Rs. 13,200

4. Rs. 14,200A car is travelling at a speed of 40km per hour. How much time will it take to cover a distance of 200 km?

   a) 3 hours
   b) 4 hours
   c) 5 hours
   d) 6 hours

5. Ali and Ahmed are two friends and the sum of their ages is 72 years. If Ahmed is 10 years younger than Ali. Find the age of Ali.

   a) 41 years
   b) 21 years
   c) 31 years
   d) 20 years

6. A worker is paid Rs. 1,000 per hour during the first eight hours of work every day and his overtime payment is Rs 500 per hour more than the normal rate. On a particular day he received total of Rs. 11,000. How many hours did he work?

   a) 8 hours
   b) 9 hours
   c) 10 hours
   d) 12 hours

7. Find out the point of intersection of following lines:

   $Y = 3X + 2$ and $2Y = 3X + 10$

   a) (2, 8)
   b) (8, 2)
   c) (10, 2)
   d) (6, 8)

8. The product of two positive integers is 70 and the difference between the two integers is 9. Find the integers

   a) 7 and 10
   b) 5 and 14
   c) 35 and 2
   d) 70 and 1

9. A person earns Rs. 25,000 per day and saves 30% of his earnings every day. How many days will he need to have accumulated savings of Rs. 112,500?

   a) 10 days
   b) 15 days
   c) 20 days
   d) 25 days

10. Twice of a number when added to itself results in 36. Represent this information in an algebraic equation

    a) $2x = 36$
    b) $2x + x = 36$
    c) $4x = 36$
    d) $5x = 36$

11. A person wants to buy tables and chairs in a total budget of Rs. 65,000. Cost of one table is Rs. 35,000 and the cost per chair is Rs. 5,000. How many chairs will he be able to buy?

    a) 5 chairs
    b) 6 chairs
    c) 7 chairs
    d) 10 chairs

12. Solve for x when 7x = 45 + 2x

    a) 9
    b) 10
    c) 8
    d) 12

13. Solve for x when 12x = 55 + x

    a) 5
    b) 6
    c) 12
    d) 15

14. Solve for x when 3(x+2) = 12

    a) 1
    b) 2
    c) 3
    d) 4

15. Total sum of Rs. 3,000 is divided between Arsalan, Shahid, Sarim and Raheem in such a way that Arsalan will receive Rs. 500 more than others. Compute the amount that Arsalan will receive in total

    a) Rs. 500
    b) Rs. 1,000
    c) Rs. 1,125
    d) Rs. 2,000

16. A car will travel at an average speed of 45km/hour for first three hours and thereafter at 65km/hour. How many hours will it take to complete total journey of 590km.

    a) 8 hours
    b) 10 hours
    c) 7 hours
    d) 9 hours

17. Which of the following statement is correct?

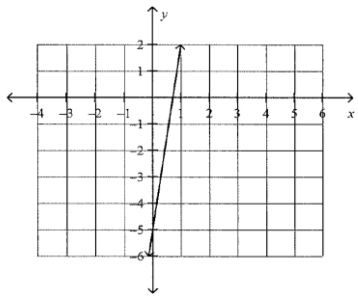
    a) Speed = Distance x Time
    b) Speed = Distance / Time
    c) Time = Distance x Speed
    d) Distance = Time / Speed

18. Two numbers are such that when they are added together they result in 24 and the difference between two is 20. What are the two numbers?

    a) 22 and 2
    b) 10 and 14
    c) 13 and 11
    d) 6 and 18

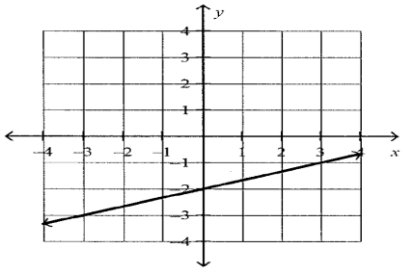
19. Find the slope and y- intercept of the graph of the following equation.

    a) Slope = 5/7, y-intercept = 5
    b) Slope = −5/7, y-intercept = 5
    c) Slope = 7, y-intercept = −5
    d) Slope = 5/7, y-intercept = −5



20. Which of the following equations represent the following graph?

    a) y = 3x+2
    b) y = −1/3x+2
    c) y = 1/3x−2
    d) y = −3x−2



21. A quadratic expression is one in which the degree of variable is two

    a) True
    b) False

22. Expanded form of (x+4) (x-2) is:

    a) X^2+4X-8
    b) X^2+3X-3
    c) X^2+2X-8
    d) X^2+4X-2

23. When a number is multiplied by itself and twice the number is added to it the result is 20. Form equation for this data assuming the number is x.

    a) X^2 + 10X = 20
    b) 2X + 2X = 20
    c) $2X^2$ + 2X =20
    d) X^2 + 2X = 20

24. The values of x for the equation $X^2 - 28X + 195 = 0$ are:

    a) 10 and 15
    b) 13 and 15
    c) 14 and 15
    d) 13 and 16

25. Which of the following are possible approaches of solving quadratic equations

    a) Factorisation
    b) Completing the square
    c) Formula
    d) All of the above

26. What is the denominator of a quadratic formula?

    a) 2b
    b) 2a
    c) 2c
    d) None of these

27. Solution of the equation $(X+3)^2 = 25$ is:

    a) 2 and 3
    b) 3 and -8
    c) 3 and 4
    d) 2 and -8

28. Formula to solve quadratic equation is:

    a) $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$
    b) $x = \frac{-b \pm \sqrt{b^2-4ac}}{2b}$
    c) $x = \frac{-b \pm \sqrt{b^2-4ac}}{2c}$
    d) $x = \frac{-b \pm \sqrt{b^2-4ac}}{2ac}$

29. All quadratic equations can be factorised

    a) True
    b) False

30. The quadratic equation $5x^2+x+2 = 0$ has

    a) Two distinct roots
    b) Two equal roots
    c) No real roots
    d) None of the above

31. A quadratic equation has two distinct roots means:
    a) It has two x-intercepts
    b) It has two y-intercepts
    c) It has no x-intercept
    d) It has not y-intercept

32. A quadratic equation has two equal real roots means:
    a) It has one x-intercept
    b) The value of x-intercept and y-intercept is same
    c) There is no x-intercept
    d) There is no y-intercept

33. The discriminant formula is used to determine the nature of the roots of a ___ equation
    a) Straight line
    b) Quadratic
    c) Cubic
    d) None of these

34. The discriminant formula is:
    a) $b^3 - 4ac$
    b) $b^2 - 4ac$
    c) $b^4 - 4a$
    d) $b^2 - 2ac$

35. The discriminant of a quadratic equation is negative, suggesting that it has ___
    a) No real roots
    b) Two distinct real roots
    c) Only one real root
    d) All of the above

36. The discriminant of a quadratic equation is zero, suggesting that it has ___
    a) No real roots
    b) Two distinct real roots
    c) Only one real root
    d) All of the above

37. The total area of a rectangle is 50 square units with its length being 5 units more than its width. Form a quadratic equation to represent this situation
    a) $X^2 + 5x^2 - 50 = 0$
    b) $X^2 + 5x - 50 = 0$
    c) $5X^2 + 5x - 50 = 0$
    d) $X^2 + 5x^2 - 50 = 0$

38. $5x^2+(a+2)x+4$ is a quadratic equation with coefficient of x^2 equal to coefficient of x. Find the value of a
    a) 5
    b) -3
    c) -4
    d) 3

39. Which of the following statement is correct?
    a) If the value of b^2-4ac is equal to zero, there are two real roots of the quadratic equation
    b) If the value of b^2-4ac is greater than zero, there is no real root of the quadratic equation
    c) If the value of b^2-4ac is less than zero, there are two real roots of the quadratic equation
    d) If the value of b^2-4ac is greater than zero, there are two real roots of the quadratic equation

40. A number is such that when five times the square of the number is added to twice of itself the result is 24. Express this in form of quadratic equation
    a) $5x^2+2x=24$
    b) $5x^2+2x^2=24$
    c) $5x^2+2x^3=24$
    d) $5x+2x^2=24$

41. The roots of the equation (x-5)(ax-2) = 0 are 5 and 1. Find the value of a
    a) 4
    b) 3
    c) 2
    d) 1

42. The quadratic equation (x-a)(x-b) = 0 has two equal real roots. Find the value of a in terms of b
    a) a = 0b
    b) a = b
    c) a = 2b
    d) There is insufficient date to express a in terms of b

43. The age of a person is such that five times square of his age is equal to 3,125. Express this information in form of equation:
    a) $5x^2 = 3,125$
    b) $2x^5 = 3,125$
    c) $5x^2 = -3,125$
    d) $2x^2 = -3,125$

44. A quadratic equation cannot have any negative roots
    a) True
    b) False

45. A graph of a quadratic equation is such that it is passing through the points (4, 0) and (8, 0). Which of the following factorised form represents this information?

    a) (x-4)(x+8) = 0
    b) (x-4)(x-8) = 0
    c) (x+4)(x+8) = 0
    d) (x+4)(x-8) = 0

46. A graph of a quadratic equation is such that it cuts x-axis at (2, 0) only. Which of the following factorised form represents this information?

    a) $(x+2)^2 = 0$
    b) $(x-2)^2 = 0$
    c) (x+2) (x-2) = 0
    d) (x-2) (x+2) = 0

47. In case of a quadratic equation if $B^2 = -4ac$. The quadratic equation will have ____

    a) Two distinct real roots
    b) Only one real root
    c) No real roots
    d) None of the above

48. For a quadratic equation $y = ax^2 + bx + c$, if a=b=c the quadratic equation will have ____

    a) Two distinct roots
    b) Only one real root
    c) No real roots
    d) None of the above

49. If a quadratic equation (ax+b)(cx+d) = 0 has two equal real roots than

    a) a/b = d/c
    b) b = d
    c) –b/a = -d/c
    d) a = c

50. Determine the quadratic equation whose solutions are -2 and 8

    a) $X^2 + 6x - 16 = 0$
    b) $X^2 - 6x + 16 = 0$
    c) $X^2 - 3x - 16 = 0$
    d) $X^2 - 6x - 16 = 0$

51. Which of the following is a possible answer for roots of quadratic equation?

    i. x = 3 and x = 5
    ii. x = 2 and x = 1
    iii. x = 0 and x = -1
    a) 1 and 2
    b) 1 and 3
    c) 2 and 3
    d) All three are possible

52. Is x(x+2) + 10 = (x+2)(x-1) a quadratic equation

    a) Yes
    b) No

53. Which of the following is not a possible method to solve quadratic function?

    a) Factorization
    b) Completing the square
    c) Quadratic formula
    d) Adding x^2 to both sides

54. Which of the following is incorrect?

    a) $x^2 + x - 6 = (x-2)(x+3)$
    b) $x^2 - 6x + 8 = (x-4)(x-2)$
    c) $x^2 - 7x + 12 = (x-3)(x-4)$
    d) $x^2 - 6x + 12 = (x-3)(x-4)$

55. Find value of a, if one of the roots of equation $ax^2 + 3x - 12 = 0$ is 2

    a) 4/5
    b) 2
    c) 3/2
    d) 1

56. Three sides of a triangular plot of land are x metre (first side), x+1 metre(second side) and 15 metre(third side) long. Also the square of first side's length when added to second side's length is equal to value of third side's length. Represent this in form of quadratic equation

    a) $X^2 + X - 14 = 0$
    b) $X^2 + X - 15 = 0$
    c) $X^2 + 2X - 14 = 0$
    d) $X^2 + 2X - 15 = 0$

57. There are two positive integers x and y. When added together the sum is 10 and when square of first is added to the square of second it results in 68. Represent above data in form of quadratic simultaneous equations

    a) X + Y = 10 and $x + y^2 = 68$
    b) X + Y = 10 and $x^2 + y = 68$
    c) X + Y = 10 and $x^2 + y^2 = 68$
    d) X + Y = 10 and x + y = 68

58. Which of the following statements is correct for the equation $3x^2 + 5x = 9$?

    a) Coefficient of x is 2
    b) Constant = -9
    c) The equation contains two variables
    d) It is a linear equation

59. Which of the following is not linear?

    a) 2x+y=1
    b) $2 + \sqrt{2}y = 3$
    c) $(x + 1)^2 = 2$ (C)
    d) All of these

60. Find the whole number such that twice its square is 11 more than 21 times the original number.

    a) 10
    b) 12
    c) 11
    d) 13

61. A certain number added to the square of the number results in 8.75. What is the number?

    a) 1
    b) 2
    c) 2.5
    d) 3

62. The area of a Plot of land is 126 square meters. If the breadth of the plot is 5 meters less than its length, what will be its length?

    a) 14 meters
    b) 9 meters
    c) 7 meters
    d) 8 meters

63. The perimeter of a rectangular garden is 24 meters, and its area is 35 square meters. What are the dimensions of the garden?

    a) 7 meters by 5 meters
    b) 10 meters by 3.5 meters
    c) 8 meters by 4.5 meters
    d) 9 meters by 4 meters

64. A ball is thrown upward from a height of 2 meters with an initial velocity of 15 meters per second. The height of the ball above the ground at any time t can be modeled by the equation h = -5t^2 + 15t + 2. When does the ball hit the ground?

    a) 3 seconds
    b) 4 seconds
    c) 5 seconds
    d) 6 seconds

65. A rectangular box has a volume of 240 cubic centimeters. Its height is 2 centimeters more than its length, and its width is 4 centimeters less than its length. What are the dimensions of the box?

    a) 6 cm by 8 cm by 5 cm
    b) 8 cm by 10 cm by 3 cm
    c) 6 cm by 10 cm by 4 cm
    d) 8 cm by 12 cm by 2 cm

ANSWERS TO SELF TEST QUESTIONS

1	a	15	c	29	b	43	a	57	c
2	b	16	b	30	c	44	b	58	b
3	b	17	b	31	a	45	b	59	c
4	c	18	a	32	a	46	b	60	c
5	a	19	c	33	b	47	b	61	c
6	c	20	c	34	b	48	c	62	a
7	a	21	a	35	a	49	c	63	c
8	b	22	c	36	c	50	d	64	b
9	b	23	d	37	b	51	d	65	a
10	b	24	b	38	d	52	b		
11	b	25	d	39	d	53	d		
12	a	26	b	40	a	54	b		
13	a	27	d	41	d	55	c		
14	b	28	a	42	b	56	a		

CHAPTER 2

COORDINATE SYSTEM AND ITS APPLICATION

1. For the function y = 2x2+3x+2. Find the value of y when x = 2
   a) 12
   b) 14
   c) 16
   d) 18

2. Plots of a ____ function are always U shaped or inverted U shaped
   a) Cubic
   b) Straight line
   c) Quadratic
   d) None of the above

3. Not all quadratic equations can be factorised
   a) True
   b) False

4. A quadratic function cannot have two x-intercepts
   a) True
   b) False

5. Which of the following statement is correct?
   a) U-shaped graph will have no x-intercepts
   b) U-shaped graph will have no y-intercept
   c) U-shaped graph may have two x-intercepts
   d) U-shaped graph is always above x-axis

6. General form of function is:
   a) $y = ax^2 + bx + c$
   b) $y = ax^3 + bx + c$
   c) $y = ax^4 + bx + c$
   d) $y = ax^2 + bx^3 + c$

7. The y-coordinate of x-intercept/x-intercepts of a quadratic function is always:
   a) 0
   b) 1
   c) 2
   d) 3

8. For a quadratic function $y = ax^2+bx+c$ the value of a cannot be
   a) 0
   b) 1
   c) 2
   d) 3

9. The profit function of a company is represented by a quadratic function as:
   $P(x) = 10x^2+5x-100$, where x is the number of units
   What will be the profit of the company if it sells 5 units?
   a) 200
   b) 225
   c) 175
   d) 150

10. A graph of a quadratic function is such that it cuts y-axis at (0, 4). Which of the following is the possible equation?
   a) $Y = x^2 + 4x + 4$
   b) $Y = 2x^2 + 4x - 4$
   c) $Y = 2x^2 + 4x + 6$
   d) $Y = 2x^2 + 4x + 8$

11. For the quadratic function
   $y = 2x^2 + 3x + 4$
   Find value of y when x = -5
   a) 39
   b) 49
   c) 59
   d) 29

12. For the quadratic function
   $y = 5x^2 + 2x -1$
   Y-intercept will be above x-axis
   a) True
   b) False

13. For a quadratic function $y = ax^2 +bx + c$, y-intercept is represented by value of
   a) a
   b) b
   c) c
   d) y

14. You are given the following function

    $y = 2x^2 - x + 7$

    Which of the following is correct?

    a) It is a linear function
    b) Its slope is 2x
    c) Its coefficient of x^2 is 2
    d) All of these

15. Parabola of $y = ax^2 + b$ will be open upward if

    a) a>0
    b) b>0
    c) a<0
    d) b<0

16. A U shaped curve:

    a) Departs from symmetry and the frequencies tend to pileup at one or the other end of the curve
    b) Represent values that are at equal distance from a central maximum value
    c) Has the maximum frequencies occurring at both ends of the range and a minimum frequency towards the center
    d) Has frequencies that run up to a maximum at one end of the range

17. Average cost function per unit for a firm is given below:

    $AC = 0.02x^2 + 60x$, where x is the number of units produced

    Find the percentage change in average cost if units produced increases from 2 to 3

    a) Increase of 45%
    b) Decrease of 50%
    c) Increase of 50%
    a) Decrease of 45%

18. Revenue function for a firm is given below:

    $R = -50p^2 + 500p$, where p is the selling price per unit

    How many units must be sold if company wants to earn a revenue of Rs. 1,250?

    a) 5 units
    b) 50 units
    c) 150 units
    d) 250 units

19. Total cost of manufacturing "x" units of a certain product in the year 2023 is given as follows:

    $C = 3x^2 + x + 48$.

    In the year 2024 following changes took place:

    Fixed production cost which is 30% of total fixed cost increased by 10%.

    Compute average cost of producing 10 units in 2024

    a) 25.9
    b) 30.9
    c) 32.9
    d) 35.9

20. Find the point of intersection of two quadratic graphs with following functions

    $y = 2x^2 - 2x + 5$ and $y = 3x^2 - 11x + 25$

    a) (5, 45) and (3, 29)
    b) (4, 45) and (5, 45)
    c) (2, 29) and (3, 45)
    d) (4, 29) and (5, 45)

21. Observe the following set of data:

X	0	1	2
Y	6	12	20

    Identify the applicable quadratic function:

    a) $y = 3x^2 + 6x + 6$
    b) $y = x^2 + 6x + 6$
    c) $y = 4x^2 + 2x + 6$
    d) $y = x^2 + 5x + 6$

22. A ball is dropped vertically downwards from a height of 28m. It will hit the ground and bounce back multiple times before coming to rest. The height of the ball from the ground at a particular time is represented by:

    $y = -2x^2 + 10x + 28$, where y is the height of the ball in metres and x represents the time in seconds.

    How long will it take ball to come to rest?

    a) 2 seconds
    b) 3 second
    c) 5 seconds
    d) 7 seconds

23. What is the value of the gradient of a downward sloping line?

    a) Zero
    b) Greater than zero
    c) Less than zero
    d) Greater than or is equal to zero

24. A straight line passes through the points (2, 5) and (4, 9). What will be the value of y-intercept?

    a) 5
    b) 4
    c) 3
    d) 1

25. Which of the following statements about gradient is correct?

    a) Gradient of a line parallel to x-axis cannot be computed
    b) Gradient of a line parallel to x-axis is always zero
    c) Gradient of a line parallel to y-axis is always zero
    d) Gradient of a line parallel to x-axis may be zero

26. Which of the following statement is incorrect?
    a) An upward sloping line has a gradient which is greater than zero
    b) The slope-intercept form of a straight line is y = mx + c
    c) Y-intercept is the point where a straight line cuts Y-axis
    d) A downward sloping line has a gradient which is greater than zero

27. A line passes through origin and has a positive gradient. Which of following points cannot fall on the line?
    a) (2, 3)
    b) (1, 4)
    c) (-1, -2)
    d) (3, -1)

28. Which of the following statements are correct?
    a) Parallel lines have only one point of intersection
    b) The sum of gradients of two parallel lines is always equal to zero
    c) Gradient of two parallel lines is always equal to each other
    d) All of the above

29. Which of the following statements are correct?
    a) Perpendicular lines have only one point of intersection
    b) Parallel lines never intersect
    c) Gradients of two perpendicular lines are always equal but opposite in signs
    d) All of the above

30. The slope of the line y = 3x + 2 is:
    a) 3
    b) 2
    c) 5
    d) Cannot be determined

31. The slope of a line passing through origin and a point (4,5) will be:
    a) 5
    b) 0
    c) 4
    d) 1.25

32. An upward sloping line is such that at each point the x and y value of each of its coordinates is equal to each other. What will be the slope of this upward sloping line?
    a) -1
    b) 0
    c) 1
    d) Cannot be determined

33. Line A is such that it is parallel to x-axis. Which statement about this line is correct?

    a) There will be no y-intercept for this line
    b) There will be no x-intercept for this line
    c) The line will have a positive gradient
    d) The line will have a negative gradient

34. Fixed cost is

    a) A cost that does not change with the level of activity
    b) A cost that does change with the level of activity
    c) A cost that is fixed per unit
    d) A cost that is not incurred by the entity

35. Variable cost is

    a) A cost that does not change with the level of activity
    b) A cost that does change with the level of activity
    c) A cost that that is not fixed per unit
    d) A cost that is not incurred by the entity

36. A company sells a single product with a selling price of Rs. 35. If variable cost per unit is Rs. 10 and fixed cost is Rs. 250. Compute the amount of total contribution needed to break-even

    a) Rs. 25
    b) Rs. 250
    c) Rs. 10
    d) Rs. 350

37. A company sells a single product with a selling price of Rs. 45 and variable cost per unit of Rs. 20. For the coming year selling price and variable cost per unit each are going to increase by Rs. 2. Compute percentage change in contribution per unit for the two years under discussion

    a) Rs. 25
    b) 55.55%
    c) 10%
    d) 0%

38. Which of the following statements are correct?

    a) A company will break-even if total contribution is same as total fixed cost
    b) A company will make a profit if total contribution is same as total fixed cost
    c) A company will make a loss if total contribution is same as total fixed cost
    d) All of the above are correct

39. A company sells a single product with a selling price of Rs. 50 and earns contribution per unit of Rs. 30. Which of the following change will result in a Rs. 2 increase in contribution per unit?

    a) Decrease of Rs. 2 in selling price
    b) Decrease of Rs. 2 in variable cost per unit
    c) Increase of Rs. 2 in variable cost per unit
    d) Increase of Rs. 500 in fixed cost

40. Which TWO of the following will result in a decrease in contribution per unit
    a) Decrease in number of units sold
    b) Decrease in selling price
    c) Increase in variable cost per unit
    d) Increase in selling price

41. Other things being constant an increase in fixed cost will
    a) Decrease total profit
    b) Decrease total contribution
    c) Increase total profit
    d) Increase total contribution

42. Which of the following line will not have any x-intercept?
    a) A line parallel to y-axis
    b) A line parallel to x-axis
    c) A line with the equation y = 3x + 5
    d) A line with the equation y = -2x + 5

43. Which of the following line will be parallel to the line y = 4x + 5?
    a) y = 5x + 4
    b) y = 4x + 7
    c) y = -3x + 7
    d) y = 2x + 5

44. Which of the following line will be perpendicular to the line y = 3x + 7?
    a) Y = 3x + 8
    b) Y = -3x + 9
    c) Y = -1/3x + 8
    d) Y = -1/7x + 9

45. Can a straight line have two x-intercepts
    a) Yes
    b) No

46. Calculate variable cost per unit from following information:

Units	Total cost (Rs.)
7	340
9	380

    a) 10
    b) 20
    c) 30
    d) 40

47. Calculate total fixed cost from following information:

Units	Total cost (Rs.)
7	340
9	380

a) 200
b) 300
c) 400
d) 500

48. Identify whether following cost is variable or fixed

Units	Cost per unit
5	40
8	25

a) Fixed cost
b) Variable cost

49. A company sells a single product with contribution per unit of Rs. 75 and variable cost per unit of Rs. 25. Compute sales revenue from sale of 13 units

a) Rs. 1,300
b) Rs. 100
c) Rs. 1,400
d) Rs. 125

50. Which of the following statement in correct?

a) Fixed cost can never be more than total contribution
b) Contribution can never be more than fixed cost
c) Fixed cost can never be equal to contribution
d) Contribution can be less than fixed cost

51. The point of intersection between the straight lines $3x + 2y = 6$ and $3x – y = 12$ lie in

a) 1st Quadrant
b) 2nd Quadrant
c) 3rd Quadrant
d) 4th Quadrant

52. The equation of the line passing through the point of intersection of $2x+3y-5=0$ and $7x-5y-2=0$ and parallel to the lines $2x-3y+14=0$ is

a) $2x-3y+1=0$
b) $2x-3y-1=0$
c) $3x+2y+1=0$
d) $3x+2y-1=0$

53. The equation of the line passing through the point of intersection of 2x+3y-5=0 and 7x-5y-2=0 and perpendicular to the lines 2x-3y+14=0 is

    a) 3x+2y+5=0
    b) 3x+2y-5=0
    c) 3x+2y-7=0
    d) 2x-3y-5=0

54. The lining joining (-1, 1) and (2, -2) and the line joining (1, 2) and (2, k) are parallel to each other for the following value of k

    a) 1
    b) 0
    c) -1
    d) None

55. The lining joining (-1, 1) and (2, -2) and the line joining (1, 2) and (2, k) are perpendicular to each other for the following value of k

    a) 1
    b) 0
    c) -1
    d) 3

56. Data Question: 57 to 58: A company always makes exactly as many units of its product as it sells. Its fixed costs are Rs. 5,000 a year. In addition, it costs Rs. 3 to make one unit, and each unit sells for Rs. 8.50.

    At what level of output and sales per year will the company be at break-even point?

    a) 588
    b) 909
    c) 1,100
    d) 1,700

57. At what level of output and sales per year will the company make a profit of Rs. 8,300 per year?

    a) 1,157
    b) 1,509
    c) 1,565
    d) 2,418

58. A firm knows the per unit cost of output for a particular product at two of its factories. Daily output at factory A is 3500 units. At factory B daily output is 5400 units. Cost per unit at factory A is Rs. 228 and at factory B is Rs. 190. Assuming cost per unit is a linear function of output, determine the function.

    a) C= -0.02x-298
    b) C= -0.02x+298
    c) C=0.02x-298
    d) None of these

59. Data for question 60 to 63

The equation: $y = -50{,}000x + 1{,}000{,}000$, represents the value of a car after x years.

Find the slope of the line and

a) 50,000
b) –50,000
c) 1,000,000
d) None of these

60. Interpret the meaning of slope.

a) The value of car increases at the rate of 50,000/ year
b) The value of car decreases at the rate of 50,000/ year
c) The value of car increases at the rate of 1,000,000/ year
d) The value of car increases at the rate of 1,000,000/ year

61. Find the y-intercept

a) 50,000
b) –50,000
c) 1,000,000
d) None of these

62. Explain the meaning of y-intercept.

a) The value of original car is 50,000
b) The value of original car is 1,000,000
c) The value of original car is –50,000
d) None of these

63. A company currently produces 50 units and earns total profit of Rs. 1,480. The value of contribution at break-even point is Rs. 520. What will be the profit if company sells 75 units?

a) 2,000
b) 2,280
c) 2,380
d) 2,480

64. Compute contribution per unit from following data:

i. Selling price: Rs. 120
ii. Variable production cost per unit: Rs. 50
iii. Variable selling cost per unit: Rs. 20
iv. Material cost per unit: Rs. 10
v. Sales commission per unit: Rs. 5
vi. Fixed cost per unit: Rs. 20

a) Rs. 70
b) Rs. 15
c) Rs. 35
d) Rs. 50

65. Which of the following can be a possible set of points on a straight line graph?
    a) (1, 3), (2, 7) and (3, 13)
    b) (3, 5), (4, 7) and (5, 10)
    c) (10, 15), (11, 20) and (12,30)
    d) (3, 9), (4, 11) and (5, 13)

66. The difference between value of contribution and fixed cost is Rs. 100 and contribution per unit is Rs. 20. This implies that:
    a) Actual output is same as break-even units
    b) Actual output is below break-even units
    c) Actual output is above break-even units
    d) Actual output is not equal to break-even units

67. A straight line passing through the point (2, 4) is such that its gradient is twice its y-intercept. Find the value of gradient.
    a) 0.4
    b) 1.6
    c) 1.8
    d) 0.8

68. The cost of production of a product in rupees is: C = 15x + 10,000 where x is the number of units produced. Compute revised cost function to incorporate following changes:
    i. Variable production cost which is 50% of total variable cost, increases by 10%
    ii. Fixed production cost which is 40% of total fixed cost, increases by 20%.
    a) C = 15.75x + 12,000
    b) C = 16.5x + 10,800
    c) C = 15.75x + 10,800
    d) C = 16.5x + 12,000

69. Two straight lines are such that the sum of y-intercepts of both the lines is 15 and both the lines have a positive slope. Which of the following is correct statement for the lines?
    a) Both lines must have positive y-intercept values
    b) One of the two lines can have a negative y-intercept value
    c) Both lines must have negative y-intercept values
    d) The two lines can never intersect each other

70. A line passes through the points (a, 2a) and (a+2, 3a) and has a gradient of 2. Find the value of a.
    a) 2
    b) 3
    c) 4
    d) 6

71. Equation of a straight line is such that at every point value of y is twice the value of x. Find y-intercept of this line

a) (0, 2)
b) (2, 0)
c) (1, 2)
d) (0, 0)

72. Consider following information:

Units	Total Cost
5	150
12	230

Provided that fixed cost increases by 10% if units increase by 10. Compute total cost for 25 units

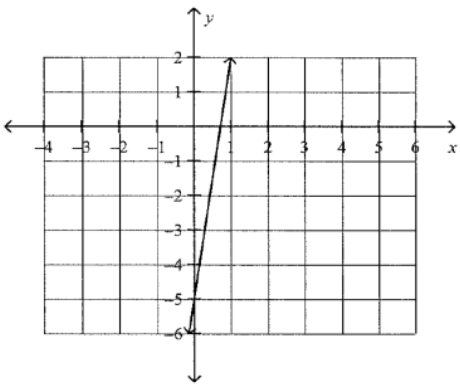
a) 345
b) 385
c) 350
d) 360

73. Maniya owns a clothing outlet with fixed costs of Rs. 150,000 per week and variable cost of Rs. 2,500 per unit. Total cost function for the outlet is:

a) C(x) = 2,500x + 150,000
b) C(x) = 150,000 – 2,500x
c) C(x) = 2,500x – 150,000
d) C(x) = 150,000x + 2,500

74. Find the slope and y- intercept of the graph of the following equation.

a) Slope = 5/7, y-intercept = 5
b) Slope = −5/7, y-intercept = 5
c) Slope = 7, y-intercept = −5
d) Slope = 5/7, y-intercept = −5



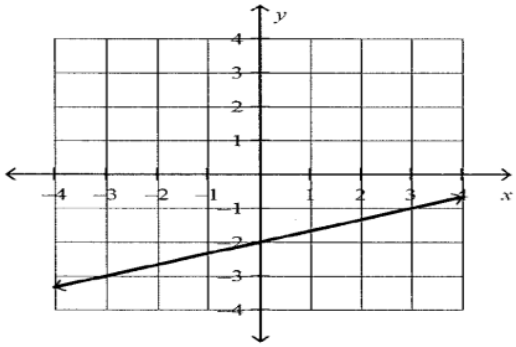
75. Which of the following equations represent the following graph?

a) y = 3x+2

b) y = −1/3x+2

c) y = 1/3x−2

d) y = −3x−2



ANSWERS TO SELF TEST QUESTIONS

1	c	15	c	29	a	43	b	57	d	71	d
2	c	16	c	30	a	44	c	58	b	72	d
3	a	17	c	31	d	45	b	59	b	73	a
4	b	18	d	32	c	46	b	60	b	74	b
5	c	19	d	33	b	47	a	61	c	75	a
6	a	20	d	34	a	48	a	62	b		
7	a	21	d	35	b	49	a	63	d		
8	a	22	d	36	b	50	d	64	d		
9	c	23	c	37	d	51	d	65	d		
10	a	24	d	38	a	52	a	66	d		
11	a	25	c	39	b	53	b	67	b		
12	b	26	d	40	b,c	54	a	68	c		
13	c	27	d	41	d	55	d	69	b		
14	c	29	c	42	b	56	b	70	c		

CHAPTER 3

MATHEMATICAL PROGRESSION

1. 12, 6, 3 are in ___ progression
   a) Geometric
   b) Arithmetic
   c) Harmonic
   d) None of these

2. 12, 15, 18 are in ___ progression
   a) Geometric
   b) Arithmetic
   c) Harmonic
   d) None of these

3. The value of x such that $4x, 8x, 8x^2$ will form a GP is:
   a) 2
   b) 3
   c) 4
   d) 5

4. The value of x such that $5+x, 11-x, 11$ will form an AP is:
   a) 1
   b) 2
   c) 3
   d) 4

5. Which of the following statement is correct?
   a) 5, 10, 15 are in geometric progression
   b) 5, 10, 20 are in geometric progression
   c) 5, 50, 55 are in geometric progression
   d) 5, 55, 1 are in geometric progression

6. Which of the following statement is correct?
   a) 5, 7, 9 are in arithmetic progression
   b) 5, 7, 9 are in geometric progression
   c) 10, 15, 20 are in geometric progression
   d) All of the above

7. Arithmetic progression is a sequence of numbers in order, in which the difference between any two consecutive numbers is a constant value.

   a) True
   b) False

8. In a geometric progression the common ratio between two numbers has to be non-zero

   a) True
   b) False

9. In a geometric progression the common ratio can be calculated by dividing second term by first term

   a) True
   b) False

10. In an arithmetic progression the common difference can be calculated by subtracting first term from second term

    a) Trues
    b) False

11. A person saves Rs. 100 in the first month, Rs. 200 in the second month, Rs. 400 in the third month and so on for twelve months. Compute total amount saved by him at the end of twelve months

    a) Rs. 410,000
    b) Rs. 400,000
    c) Rs. 350,000
    d) Rs. 409,500

12. A person saves Rs. 100 in the first month, Rs. 50 in the second month, Rs. 25 in the third month and so on for six months. Compute total amount saved by him at the end of sixth month

    a) Rs. 200.195
    b) Rs. 195.875
    c) Rs. 196.875
    d) Rs. 210.875

13. Historical revenue details of a company are as follows:

Year	Revenue (Rs. In millions)
2020	45
2021	51.75
2022	59.5125

    Forecast revenue for 2023

    a) Rs. 68.44 million
    b) Rs. 73.45 million
    c) Rs. 69.44 million
    d) Rs. 72.56 million

14. The share price of a company's share is decreasing by 15% every year. If the share price today is Rs. 200, what will be the share price after 4 years

    a) Rs. 170
    b) Rs. 144.5
    c) Rs. 122.825
    d) Rs. 104.40125

15. A company is expected to pay Rs. 2 per share dividend in the first quarter of its financial year. The dividend per share will decrease by 10% every quarter. Find the amount of dividend that company will pay in last quarter of its financial year

    a) Rs. 1.46
    b) Rs. 1.62
    c) Rs. 1.5
    d) Rs. 1.7

16. Tahir, Arsalan and Raheem want to divide total of Rs. 180 between themselves in such a way that Tahir receives least amount and the difference between the amount received by Tahir and Raheem is Rs. 10 more than the difference between the amount received by Tahir and Arsalan. Provided Raheem receives Rs. 70. What amount is received by Arsalan

    a) Rs. 50
    b) Rs. 60
    c) Rs. 70
    d) Rs. 80

17. A company sells milk powder in three sizes namely small, medium and large. Medium packet is twice that of small and large packet is twice that of medium. Which of the following statement is correct?

    a) Milk powder contained in 2 medium packets is same as 4 large packets
    b) Milk powder contained in 4 medium packets is same as 2 large packets
    c) Milk powder contained in 2 medium packets is same as 8 small packets
    d) Milk powder contained in 2 medium packets is same as 6 small packets

18. The numbers X, 8 and Y are in G.P. Represent X in terms of Y

    a) X = 8Y
    b) X = 64Y
    c) X = 64/Y
    d) X = Y/64

19. The numbers X, 10 and Y are in G.P. Represent Y in terms of X

    a) Y = X/100
    b) Y = X/10
    c) Y = 10/X
    d) Y = 100/X

20. The sum of an A.P. with first term 3, common difference 2 and total 5 terms is:

    a) 30
    b) 40
    c) 35
    d) 45

21. The sum of a G.P with first term 3, common ratio 2 and total 5 terms is:

    a) 90
    b) 93
    c) 96
    d) 106

22. Compute 3rd term of an A.P. with first term 10 and common difference of 3

    a) 6
    b) 36
    c) 26
    d) 16

23. Compute 3rd term of a G.P. with first term 10 and common ratio of 3

    a) 80
    b) 99
    c) 90
    d) 100

24. The first two terms of an A.P. are identical to first two terms of G.P. If the third term of the G.P. is 20 and the second term of A.P. is 10. Compute 4th term of A.P.

    a) 5
    b) 10
    c) 15
    d) 20

25. The first two terms of an A.P. are identical to first two terms of G.P. If the third term of the G.P. is 20 and the second term of A.P. is 10. Compute 4th term of G.P.

    a) 40
    b) 20
    c) 10
    d) 5

26. The first and last term of an A.P. is equal in magnitude but opposite in sign. If there are three terms in total. What will be the value of middle term

    a) 1
    b) 0
    c) -1
    d) Cannot be determined

27. The first and last term of an A.P. are X and -X respectively and there are three terms in total. State common difference in terms of x

    a) X
    b) –X
    c) 0
    d) 2X

28. The first and last term of an A.P. are X and –X respectively. If there are three terms in total. Compute sum of all three terms

    a) 1
    b) 2
    c) 0
    d) Cannot be determined

29. Which of the following is not a possible value of common ratio in geometric progression

    a) 0
    b) 1
    c) 2
    d) 3

30. If common ratio is same as first term the second term will be twice the first term

    a) True
    b) False

31. Three consecutive terms are such that if second term is divided by the first term the answer is exactly same as if third term is divided by second term. These terms are in ___ progression

    a) Arithmetic
    b) Geometric
    c) Harmonic
    d) None of the above

32. Three consecutive terms are such that if first term is subtracted from second term the answer is exactly same as if second term is subtracted from third term. These terms are in ___ progression

    a) Arithmetic
    b) Geometric
    c) Harmonic
    d) None of the above

33. Sum of A.P. with first term 5 and common difference 3 up to 5^{th} term is:

    a) 45
    b) 55
    c) 65
    d) 75

34. There are 5 terms in an A.P. and sum of all terms is 0. What will be the value of 3rd term?

    a) 5
    b) -5
    c) 0
    d) Cannot be determined

35. A company's production doubles every day. If 30 units are produced on first day of the week. How many units will be produced in entire week

    a) 3,510
    b) 3,710
    c) 3,610
    d) 3,810

36. TP Limited invested Rs. 35,000 in a company at 1st January 2015. The investment is increasing at a rate of 10% every year. Compute the amount of investment at 31st December 2017

    a) Rs. 46,585
    b) Rs. 36,585
    c) Rs. 26,585
    d) Rs. 10,585

37. A ball is thrown down vertically from a height of 4 feet, each time it hits the floor it bounces back to 75% of the height it fell from. Calculate total distance covered by the ball till it hits floor for the 4th time

    a) 15.875 feet
    b) 16.875 feet
    c) 17.875 feet
    d) 18.875 feet

38. A Company's profit is increasing at 30% every year. If first year's profit is represented by "a". In which year company will make a profit of 1.69 times of its first year's profit

    a) 1
    b) 2
    c) 3
    d) 4

39. The first term and common difference of an A.P. are 75 and 10 respectively. If there are 10 terms in total. Calculate sum of six terms starting from 2nd term onwards

    a) 660
    b) 560
    c) 460
    d) 360

40. Which of the following statement is correct?

    a) The first and last terms of an arithmetic progression are always equal to each other
    b) The first and last terms of an arithmetic progression are always positive integers
    c) The first and last terms of an arithmetic progression are always negative integers
    d) The first and last terms of an arithmetic progression may be positive integers

41. Which of the following statement is correct?

    a) The value of common difference of a particular arithmetic progression cannot be same as the value of first term
    b) The value of common difference cannot be negative
    c) The value of common difference cannot be positive
    d) The value of common difference can be negative

42. Which of the following statements is correct?

    a) For an arithmetic progression third term can be computed by adding common difference to second term
    b) For an arithmetic progression third term can be computed by subtracting common difference to second term
    c) For an arithmetic progression third term can be computed by multiplying common difference with second term
    d) For an arithmetic progression third term can be computed by dividing second term by common difference

43. Which of the following statement is correct?

    a) The second term of a geometric progression is always greater than first term
    b) The first term of a geometric progression is always greater than second term
    c) The second term of a geometric progression cannot be greater than first term
    d) The second term of a geometric progression can be less than first term

44. If the first and last term of an arithmetic progression are 15 and 85 respectively and total sum is 250. Find the number of terms

    a) 1
    b) 3
    c) 5
    d) 7

45. If the first and last term of an arithmetic progression are 15 and 85 respectively and total sum is 250. Find the common difference

    a) 15
    b) 17.5
    c) 20
    d) 22.5

46. A company received an order for supply of 70 units in one weeks' time. The company operates for 6 days from Monday to Saturday. It has decided to produce 2 units on Monday, 5 units on Tuesday, 8 units on Wednesday and so on. Will the company be able to produce the ordered quantity in time?

    a) Yes
    b) No

47. A company has launched a new product. The selling price for the first year is Rs. 250 per unit and will increase by 10% every year. Number of units sold each year will be constant at 500 units. Compute total sales revenue for third year

    a) Rs. 145,250
    b) Rs. 150,250
    c) Rs. 148,250
    d) Rs. 151,250

48. The first two terms of an A.P. are in the ratio of 2:3. Which TWO of the following statements about this A.P. are correct

    a) First term is 2/3 times of second term
    b) Second term is 2/3 times of first term
    c) First term is 3/2 times of second term
    d) Second term is 3/2 times of first term

49. If the first two terms of a G.P are x and y. What will be the third term in terms of x and y?

    a) y/x
    b) y^2/x
    c) 2y/x
    d) y/2x

50. For sum to infinity common ratio cannot be more than 1

    a) True
    b) False

51. Which of the following is the possible value for common ratio in case of sum to infinity?

    a) 1.2
    b) 1.5
    c) 0.8
    d) 1.3

52. If the third term of an A.P is 7 and its 7^{th} term is 2 more than 3 times of its third term, then the sum of first 20 terms is

    a) 228
    b) 74
    c) 740
    d) 1090

53. The sum of the interior angles of a triangle is 180º, of a quadrilateral is 360º and of a pentagon is 540º. Assuming this pattern continues, find the sum of the interior angles of a dodecagon (12 sides)

    a) 1800
    b) 1804
    c) 1802
    d) 1806

54. Each term in the following sequence is six more than the previous term. What is the value of x+z? x, y, z, 7, 13,

    a) 10
    b) ±5
    c) -100
    d) -10

55. If x, 4, y are successive terms in an arithmetic sequence and x, 3, y are successive terms in a geometric sequence, Calculate 1/x+1/y.

    a) 11/9
    b) 8/9
    c) 8/11
    d) 9/7

56. The sum of the fourth and twelfth term of an arithmetic progression is 20. What is the sum of the first 15 terms of the arithmetic progression?

    a) 150
    b) 160
    c) 155
    d) 165

57. A person has Salary scale of 10000-100-20000. Find his total salary after 6 years and 10 months

    a) 738,000
    b) 800,000
    c) 802,000
    d) 844,000

Data for question 58 & 59

A company has received an order for 228,000 units of their product, which will use all available capacity for a number of weeks. Production will be 7,200 units in the first week, 7,400 units in the second week, and 7,600 units in the third week, and so on.

58. How many weeks will it take to complete production for the order of 228,000?

    a) 24
    b) 25
    c) 95
    d) 94

59. If the availability of temporary staff is restricted that after 8 weeks' weekly production remains constant at the level achieved in 8th week, how many weeks, to the nearest week, would it take to complete the order?

    a) 24
    b) 25
    c) 26
    d) 27

Data for question 60 to 62

The Hart Company limited have decided to change their mix of sales of two products – Reds and Blues. Sales of Blues are to be gradually reduced to zero and replaced by increase of sales of Reds. Blues sold in December amounted to 4,096 units. Sales volume will be halved each month, beginning in January. The first month when only one unit is sold, will be the last month of sales of Blues. 1,000 units of Reds will be sold in January, and sales will be increased by 20% per month.

60. How many units of Blues will be sold in total over the period January-September?
    a) 4,080
    b) 4,088
    c) 4,092
    d) 4,095

61. How many units of Reds will be sold in October next year, to the nearest whole unit?
    a) 4,300
    b) 5,160
    c) 6,190
    d) 7,430

62. How many units of Reds in total will be sold in next year?
    a) 32,150
    b) 38,580
    c) 39,580
    d) 47,520

63. Nasim Electronics Limited has designed a household appliance. It has estimated that 1000 units would be produced during the first month. Thereafter, the production would increase at 5% per month for the next 24 months and then start declining by 12% per month till it reaches 250 units per month after which the production would be discontinued. Compute the total number of units that the company would produce.
    a) 72,767
    b) 69,544
    c) 21,816
    d) None of these

64. If a clock strikes once at 1 O'clock, thrice at 3 O'clock and so on and again once at one O'clock and so on, then how many times will the bell be struck in the course of 2 days?
    a) 78
    b) 156
    c) 288
    d) 312

65. If a rubber ball consistently bounces back ⅔ of the height from which it is dropped, what fraction of its original height will the ball bounce after being dropped and bounced four times without being stopped?

    a) 16/81
    b) 16/27
    c) 4/9
    d) 37/81

66. Mr. Adeel saved Rs x in January, then each subsequent month he saved Rs 100 more than the previous month. If his total savings at the end of December stood at Rs 16,200 how much did he save in January?

    a) 700
    b) 800
    c) 900
    d) 1000

67. Sum of $3^{1/2} \times 9^{1/8} \times 27^{1/24}$..... =

    a) 1
    b) 2
    c) 3
    d) Cannot be determined

68. A ball is dropped vertically downwards from a height of 10m on a ground. Each time it hits the ground it bounces back to $1/4^{th}$ of the height it fell from. Find the distance covered by ball when it comes to rest.

    a) 11.33
    b) 12.33
    c) 13.33
    d) 14.33

69. A tank is filled with 500 litres of water. The consumption rate per hour is 10% of water in the tank at the start of each hour. Compute amount of water left in the tank at the end of fourth hour.

    a) 450
    b) 405
    c) 364.5
    d) 328.05

70. The second term of an arithmetic progression is half of the first term. If first term is denoted by letter a and common difference is denoted by letter d, represent a in terms of d

    a) a = 3d
    b) a = 2d
    c) a = -2d
    d) a = -3d

71. The second term of a geometric progression is half of the first term. If first term is denoted by letter a and common ratio is denoted by letter r, find the value of r

a) ½
b) 2
c) ¼
d) 4

72. The sum of the first three terms of an arithmetic progression is 54 and the sum of next three terms is 36. Find the common difference

a) -4
b) -3
c) -2
d) -1

73. Two arithmetic progressions are represented such that the addition of the first terms of each of the two arithmetic progressions is 25 and multiplication is 156. Find the first term of each of the arithmetic progressions.

a) 10 and 15
b) 5 and 20
c) 12 and 13
d) 18 and 7

74. Following is the saving plan of an individual:

Year	2024	2025	2026	2027	2028	2029
Amount in Rs.	500,000	550,000	600,000	650,000	700,000	750,000

If he continues as per above plan, How much will he be able to save in years 2035 and 2036 in total.

a) Rs. 2,050,000
b) Rs. 2,550,000
c) Rs. 2,150,000
d) Rs. 2,350,000

75. The first two terms of an arithmetic progression and geometric progression are same and equal to each other. If letters a, d and r are used to represent first term, common difference of arithmetic progression and common ratio of geometric progression respectively. Express d in terms of a and r

a) d = r
b) d = ar
c) d = ar – a
d) d = ar/a

76. Find sum of (4 x 5) + (2 x 5) + (1 x 5) + (0.5 x 5) + ……

a) 35
b) 37.5
c) 40
d) Cannot be determined

ANSWERS TO SELF TEST QUESTIONS

1	a	15	a	29	a	43	d	57	d	71	a
2	b	16	b	30	b	44	c	58	a	72	c
3	a	17	b	31	b	45	b	59	d	73	c
4	b	18	c	32	a	46	b	60	b	74	c
5	b	19	d	33	b	47	d	61	b	75	c
6	a	20	c	34	c	48	a, d	62	c	76	c
7	a	21	b	35	d	49	b	63	b		
8	a	22	d	36	a	50	a	64	d		
9	a	23	c	37	c	51	c	65	a		
10	b	24	d	38	c	52	c	66	b		
11	d	25	a	39	a	53	a	67	c		
12	c	26	b	40	d	54	d	68	c		
13	a	27	b	41	d	55	b	69	d		
14	d	28	c	42	a	56	a	70	c		

CHAPTER 4

LINEAR PROGRAMMING

1. ___ is a mathematical method for determining a way to achieve the best outcome (such as maximum profit or lowest cost) subject to a number of limiting factors (constraints).
   a) Geometric progression
   b) Quadratic formula
   c) Linear programming
   d) Sampling

2. Linear programming is used when there is only one limiting factor.
   a) True
   b) False

3. Identify TWO of the below mentioned conditions when linear programming is used.
   a) Finding minimum cost to produce a finished good
   b) Finding out point of intersection of two or more linear constraints (limiting factor lines).
   c) Finding combination of units to be sold to maximise profit
   d) Finding the x-intercepts of a quadratic graph

4. Following are the steps involved in linear programming:
   i. Plot the graph and identify feasible region.
   ii. Construct objective function and identify optimum value of objective function.
   iii. Define variables and construct inequalities.

   What is the correct order of above steps?
   a) 1, 2 and 3
   b) 3, 2 and 1
   c) 3, 1 and 2
   d) 1, 3 and 2

5. The ___ in a linear programming problem can be drawn as straight lines on a graph. The line represents a boundary of what is possible (feasible)
   a) Objective function
   b) Constraints
   c) Profit maximisation
   d) Cost minimisation

6. The optimal combination of values of x and y can be found using:
   i. Quadratic equations.
   ii. Corner point theorem.
   iii. Slope of the objective function.
   a) 1 and 2
   b) 2 and 3
   c) 1 and 3
   d) None of these

7. Which of the following is not an inequality?
   a) $X = 4$
   b) $X \leq 4$
   c) $X \geq 4$
   d) $X < 4$

8. Which set of integers satisfies $4 < x \leq 9$
   a) 4, 5, 6, 7, 8 and 9
   b) 5, 6, 7, 8 and 9
   c) 5, 6, 7, 8, 9 and 10
   d) 4, 6, 7 and 8

9. Which set of integers satisfies $5 \leq x \leq 10$.
   a) 5, 6, 7, 8, 9 and 10
   b) 6, 7, 8, 9 and 10
   c) 6, 7, 8 and 9
   d) 6, 7, 8 and 9

10. Which inequality given below can be used to represent the set of integers 6, 7, 8 and 9.
   a) $6 < x < 9$
   b) $6 \leq x \leq 9$
   c) $6 < x \leq 9$
   d) $6 \leq x < 9$

11. $15 < x < 20$ represents same set of integers as $16 \leq x \leq 19$.
   a) True
   b) False

12. Which of the following statement is correct?
   a) The linear inequalities or restrictions on the variable of a linear programming problem are called objective function
   b) The linear inequalities or restrictions on the variable of a linear programming problem are called feasible region
   c) The linear inequalities or restrictions on the variable of a linear programming problem are called optimum solution
   d) The linear inequalities or restrictions on the variable of a linear programming problem are called constraints

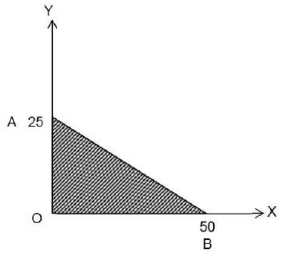
13. A company has three workers with each worker working for eight hours per day. Workers produce handmade footballs. Each football takes 2 hours of labour time. Represent the daily production of the company using inequality

    a) $X \leq 8$ and $x \leq 0$
    b) $X \leq 8$ and $x \geq 0$
    c) $X \leq 24$ and $x \leq 0$
    d) $X \leq 12$ and $x \geq 0$

14. ___ indicate that all values of x and y must be positive

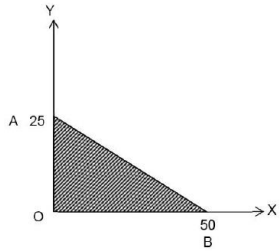
    a) Feasible region
    b) Non-negativity constraints
    c) Linear programming
    d) Optimum solution

15. Which of the inequalities represent following graph?



    a) $X \geq 0, y \geq 0$ and $x+2y \geq 0$
    b) $X \geq 0, y \geq 0$ and $x+2y \leq 50$
    c) $X \geq 0, y \leq 0$ and $x+2y \geq 0$
    d) $X \leq 0, y \geq 0$ and $x+2y \geq 0$

16. The object function for above feasible region is Profit = 500x + 400y. What is the maximum achievable profit for the company.



    a) 10,000
    b) 25,000
    c) Unlimited
    d) Depends upon units produced

17. According to corner point theorem the optimum solution lies _____.

    a) At origin
    b) Outside the feasible region
    c) Inside the feasible region
    d) at a corner of the feasible region

18. What is the slope of the objective function

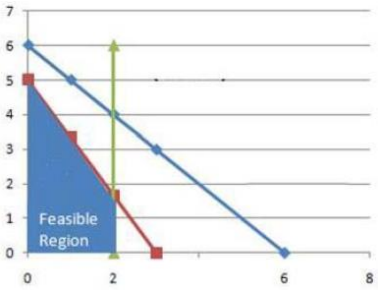
    C = 60x + 30y

    a) c/30
    b) -2
    c) -60
    d) -30

19. A ____ constraint is a constraint which plays no part in the optimal solution because it lies outside the feasibility region

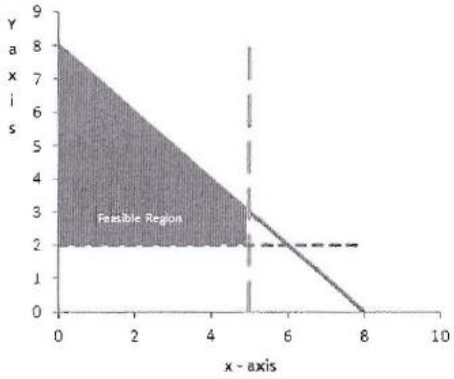
    a) Redundant
    b) Non-negativity
    c) Positive
    d) Negative

20. Identify the redundant constraint



    a) $x + y \leq 6$
    b) $2x + y \leq 5$
    c) $x \leq 2$
    d) $x \geq 0$

21. Identify inequalities that define above feasible region

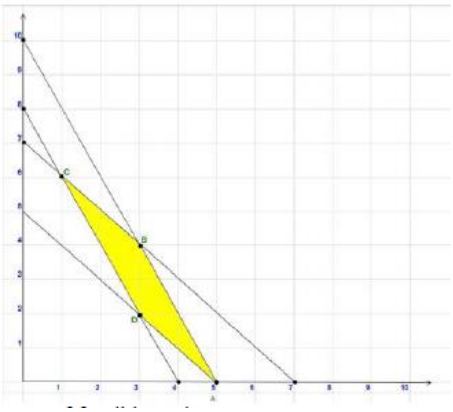


    a) $y \leq 2, x \leq 5, x \geq 0$ and $x + y \leq 8$
    b) $y \geq 2, x \geq 5, x \geq 0$ and $x + y \leq 8$
    c) $y \geq 2, x \leq 5, x \geq 0$ and $x + y \leq 8$
    d) $y \leq 2, x \leq 5, x \geq 0$ and $x + y \geq 8$

22. From graph, the co-ordinates of feasible region ABCD are:

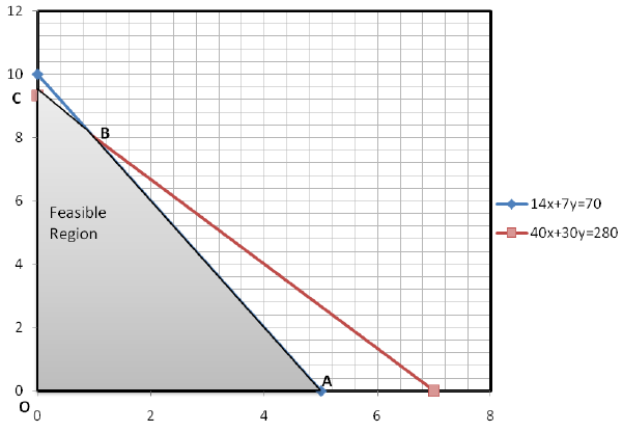
    A(5, 0), B(3, 4), C(1, 6) and D(3, 2)

    Find minimum value of objective function C = 6x + 4y



a) 30
b) 34
c) 32
d) 26

23. What will be the coordinates of point b?



a) (8, 8)
b) (1, 8)
c) (1, 1)
d) (8, 1)

24. Identify profit maximising output for the following information:

    Objective function: P = 500x + 200y

    Corner points of feasible region: (0,10), (5,0) and (4, 5)

a) (0,10)
b) (5,0)
c) (4,5)
d) None of these

25. Identify cost minimising output for the following information:

    Objective function: C = 200x + 100y

    Corner points of feasible region: (2,7), (4,0) and (6,7)

    a) (2,7)
    b) (4,0)
    c) (6,7)
    d) None of these

26. The feasible region for following inequalities will be unbounded:

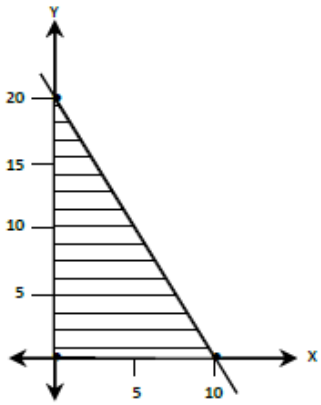
    X ≤3 and y≤ 2

    a) True
    b) False

27. A labour works for maximum eight hours per day and produces one unit in two hours. Form a constraint representing daily output of labour.

    a) X ≤ 4 and x ≥ 0
    b) X < 4 and x ≥ 0
    c) X ≥4 and x ≥ 0
    d) None of these

28. Which of the following point does not lie within feasible region?



    a) (0,15)
    b) (5,0)
    c) (10,20)
    d) All of these

29. Y ≤ X is same as

    a) Y ≤ 0
    b) X ≥ Y
    c) X ≤ y
    d) None of these

30. A shaded region is such that it is below a straight line which passes through points where each x coordinate is exactly same as each y-coordinate. The inequality representing this is:

    a) $X \leq y$
    b) $Y \leq x$
    c) $X \geq y$
    d) $Y \geq x$

31. Feasible region can lie in any one of the four quadrants

    a) True
    b) False

32. A company manufactures two different products x and y. Maximum demand for x and y is 400 units and 300 units respectively. This information can be represented by inequalities as follows:

    a) $X \geq 0, y \geq 0, x \leq 400$ and $y \leq 300$
    b) $X \geq 0, y \geq 0, x \geq 400$ and $y \geq 300$
    c) $X \geq 0, y \geq 0, x \geq 400$ and $y \leq 300$
    d) $X \geq 0, y \geq 0, x \leq 400$ and $y \geq 300$

33. A factory produces data cable and mobile covers. The profit margin on a data cable is Rs. 30 and on a mobile cover is Rs. 20. The objective function for profit maximisation is:

    a) $P = 30x + 20y$
    b) $P = 50$
    c) $P = 50x$
    d) $P = 50/(x+y)$

34. A firm manufactures two products, x and y. Each x requires 2.5 hours in department A and 3 hours in department B. Each y requires 1 hour in department A and 2 hours in department B. The firm can use no more than 10 hours in department A and 12 hours in department B. The constraints to express this information are:

    a) $2.5x + y \leq 10, 3x + 2y \leq 12, x \leq 0$ and $y \leq 0$
    b) $2.5x + y \leq 10, 3x + 2y \leq 12, x \geq 0$ and $y \geq 0$
    c) $2.5x + y \geq 10, 3x + 2y \leq 12, x \geq 0$ and $y \geq 0$
    d) $2.5x + y \leq 22, 3x + 2y \leq 22, x \geq 0$ and $y \geq 0$

35. A classroom consists of boys and girls. If B is the number of boys and G is the number of girls, what will be the inequality constraint to represent that the number of boys must be atleast 5 more than the number of girls

    a) $B \leq 5 + G$
    b) $B \geq 5 - G$
    c) $B \geq -5 + G$
    d) $B \geq 5 + G$

36. For a feasible region with following inequalities:

    $X \leq 7, y \leq 8, x \geq 2$ and $y \geq 1$

    The highest value of (x, y) will be:

    a) (1, 2)
    b) (2, 1)
    c) (7, 8)
    d) (8, 7)

37. Find the maximum value of the objective function Z = 5x + 2y, by determining the corner points of the feasible region for following constraints:

    X ≤ 10, y ≤ 9, x ≥ 3 and y ≥ 1

    a) 48
    b) 58
    c) 68
    d) 78

38. Find the minimum value of the objective function Z = 5x + 2y, by determining the corner points of the feasibility region for following constraints:

    X ≤ 10, y ≤ 9, x ≥ 3 and y ≥ 1

    a) 7
    b) 17
    c) 27
    d) 37

39. For the following information:

    Objective function: Z = 5x + 2y
    Constraints: X ≤ 10, y ≤ 9, x ≥ 3 and y ≥ 1
    Which of the values of objective function is not possible to achieve?

    a) 73
    b) 56
    c) 68
    d) 50

40. For the following information:

    Objective function: Z = 5x + 2y
    Constraints: X ≤ 10, y ≤ 9, x ≥ 3 and y ≥ 1
    Which of the values of objective function is possible to achieve?

    a) 68
    b) 73
    c) 75
    d) 77

41. For an objective function Z = 500x + 300y, maximum z value was 5,500 when x was 5. Find the value of y at that point

    a) 8
    b) 9
    c) 10
    d) 11

42. For a constraint x+y ≤ 100. The value of x cannot:

    a) Exceed 50
    b) Exceed 100
    c) Exceed 49
    d) Exceed 90

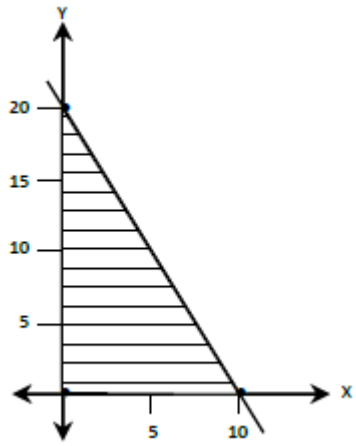
43. X ≥ 5 will have a feasible region:
    a) To the left hand side of x = 5 line
    b) In the 2nd quadrant
    c) In the 3rd quadrant
    d) To the right hand side of x = 5 line

44. The feasible region for 5x + 10y ≤ 15 will be same as feasible region for:
    a) X + 2y ≤ 3
    b) X + 3y ≤ 2
    c) 2x + 3y ≤ 15
    d) None of the above

45. Y axis represents x = 0 and hence area to the right side of y-axis can be represented.
    a) X ≥ 0
    b) X ≤ 0
    c) X ≤ 1
    d) X ≥ 1

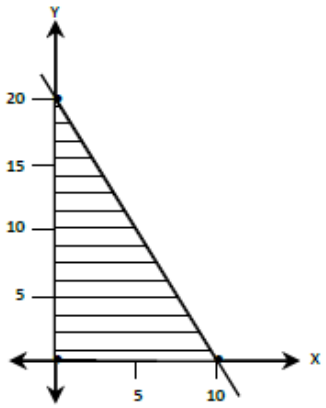
46. A company produces two products a and b. Production of a will always be 10 more that the production of b. The situation can be expressed as:
    a) a ≥ b + 10
    b) a ≤ b + 10
    c) a ≥ b - 10
    d) a ≤ b - 10

47. Above feasible region represents that it is possible for the company to produce 5 units of x and 10 units of y at the same time



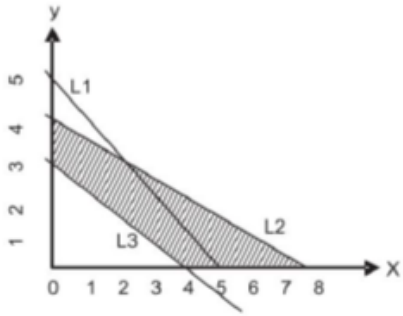
    a) True
    b) False

48. Considering above feasible region the maximum value of the objective function z = 500x + 300y is



a) 5,000
b) 6,000
c) 8,000
d) 4,000

49. For the above feasible region. Identify the inequality representing line L3



a) 4x + 3y ≥ 12
b) 3x + 4y ≥ 12
c) 3x + 3y ≥ 12
d) 4x + 4y ≥ 12

50. The inequality x + y ≤ 200 represents

a) That the combined production of x and y can be more than 200 units
b) That the combined production of x and y cannot be more than 199 units
c) That the combined production of x and y cannot be more than 200 units
d) That the combined production of x and y cannot be less than 200 units

51. If 3x+7 ≥ x+5 ≥ 5x – 3, then the inequality holds when x lies in the range

a) 7 ≤ x ≤ – 3
b) 5 ≥ x ≥ 7
c) 3 ≤ x ≤ 5
d) 2 ≥ x ≥ – 1

52. If $3x+7 \leq 5x - 3$, then the inequality holds when x lies in the range.

    a) Less than or equal to 7
    b) Greater than or equal to 5
    c) Less than or equal to 5
    d) Greater than or equal to 2

53. A factory prod A company owns a machine which runs for 208 hours a month. The machine is used to make two parts X and Y. each part X takes 1 hour of machine time and each part Y takes 2 hours of machine time. If x represents the number of part X made in a month and y represents the number of part Y made in a month, which of the following statements/ inequalities is correct?

    a) The company could make any quantity of X and Y but the total machine hours in a month cannot exceed 208.
    b) $x+2y<208$ represents the boundary of maximum production in a month
    c) $y \leq 208$ if $x=0$, represents the maximum production of Y in a month
    d) both (a) and (b)

54. Alpha Company uses two products x and y. Each product passes through two departments A and B which have a capacity of 1120 hours and 1400 hours The Product X requires 4 hours in department A and 7 hours in department B, the product Y requires 5 hours in department A and 8 hours in department B. The constraints representing the above data:

    a) $4x+5y \leq 1120$ and $7x+8y \leq 1400$
    b) $4x+7y \leq 14000$ and $5x+8y \leq 1120$
    c) $7x+5y \leq 1400$ and $8x+4y \leq 1120$
    d) $7x+8y \leq 1120$ and $4x+5y \leq 1400$

55. A company earns profit of Rs 250 and Rs 375 per unit on product X and Y respectively. Find the maximum profit that the company could earn if the company is subject to the following constraints:

    $4x+2y \leq 25,000$

    $3x+2y \leq 20,000$

    a) Rs 1,666,667
    b) Rs 2,187,500
    c) Rs 3,750,000
    d) Rs 4,687,500

56. A company makes and sells two products X and Y. the contribution per unit is Rs 250 for product X and 375 for product Y. due to various constraints, the company cannot make more than 750 units of X and 500 units of Y in a month. If x represents the number of product X, y represents the number of product Y and C represents contribution, which of the following relationship represents maximum contribution?

    a) $C=250x+375y$
    b) $C=750x+500y$
    c) $C=500x+125y$
    d) $C=3x+1.33y$

57. A company owns a machine which runs for 208 hours a month. The machine is used to make two parts X and Y. each part X takes 1 hour of machine time and each part Y takes 2 hours of machine time. If x represents the number of part X made in a month and y represents the number of part Y made in a month, which of the following statements/ inequalities is correct?

    a) The company could make any quantity of X and Y but the total machine hours in a month cannot exceed 208.
    b) $x+2y<208$ represents the boundary of maximum production in a month
    c) $y \leq 208$ if $x=0$, represents the maximum production of Y in a month
    d) both (a) and (b)

58. Total profits are maximised when the objective function (as a straight line on a graph) is:

    a) Nearest to the origin irrespective of the 'feasible region'
    b) Furthest from the origin and tangent to the 'feasible region'
    c) Nearest to the origin and tangent to the 'feasible region'
    d) Furthest from the origin irrespective of the 'feasible region'

59. How many steps are involved in an overall approach of solving LP problem?

    a) 5
    b) 6
    c) 7
    d) 8

60. Which of the following is a redundant constraint?

    L1 $5x + 3y \leq 9,000$
    L2 $3x + 2y \leq 8,400$
    L3 $x \leq 1,000$
    L4 $y \leq 1,000$
    a) L-1 and L-3
    b) L-1 and L-2
    c) L-1 and L-4
    d) L-2 and L-4

61. Which of the following is a redundant constraint?

    L1 $5x + 3y \leq 9,000$
    L2 $3x + 2y \leq 8,400$
    L3 $x \geq 1,000$
    L4 $y \geq 1,000$
    a) L-1
    b) L-2
    c) L-3
    d) L-4

62. An animal feed is prepared by mixing two products A and B. Products A contains 5 units of vitamin C while product B contains 8 units of Vitamin. Each feed should not be more than 30 kg in weight and should contain at least 180 units of vitamin C. The cost of products A and B are Rs. 3 per kg and Rs. 6 per kg respectively. How much should products A and B be mixed such that the cost of the feed be minimum?

    a) 20kg and 10kg
    b) 30kg and 20kg
    c) 10kg and 20kg
    d) 40kg and 20kg

63. In a linear programming problem, a constraint is said to be **redundant** if:

    a) It has no variables
    b) It intersects all other constraints
    c) It does not affect the feasible region
    d) It always forms the optimal solution

64. Which of the following best describes a **redundant constraint**?

    a) A constraint that is violated by all feasible solutions
    b) A constraint that defines the boundary of the feasible region
    c) A constraint that can be removed without changing the feasible region
    d) A constraint that changes the objective function value

65. A linear programming problem is **unbounded** when:

    a) There is no solution to the problem
    b) The objective function can increase indefinitely without violating any constraints
    c) There are too many constraints
    d) The feasible region is empty

66. Unbounded solutions occur when:

    a) There are more variables than constraints
    b) The feasible region extends infinitely in the direction of optimization
    c) The constraints form a closed polygon
    d) The objective function is non-linear

67. A linear inequality passes through the origin if:

    a) The inequality sign is "≥" or "≤"
    b) The constant term is zero
    c) All coefficients are positive
    d) The line is vertical

68. Which of the following lines **passes through the origin**?

    a) $x + y = 5$
    b) $2x - 3y = 6$
    c) $4x + 2y = 0$
    d) $y = x + 1$

ANSWERS TO SELF TEST QUESTIONS

1	c	15	b	29	b	43	d	57	a
2	b	16	b	30	b	44	a	58	b
3	a, c	17	d	31	a	45	a	59	b
4	c	18	b	32	a	46	a	60	b
5	b	19	a	33	a	47	a	61	b
6	b	20	a	34	b	48	b	62	a
7	a	21	c	35	d	49	b	63	c
8	b	22	b	36	c	50	c	64	c
9	a	23	b	37	c	51	d	65	b
10	b	24	c	38	b	52	b	66	b
11	a	25	b	39	a	53	a	67	b
12	d	26	a	40	a	54	a	68	c
13	d	27	a	41	c	55	c		
14	b	28	c	42	b	56	a		

CHAPTER 5

FINANCIAL MATHEMATICS

1. A person borrows Rs. 30,000 at 10% per annum simple interest for a period of 3 years. Calculate the total amount he will have to repay at the end of 3rd year.

   a) Rs. 39,000
   b) Rs. 30,000
   c) Rs. 36,000
   d) Rs. 34,000

2. A person borrows Rs. 30,000 at 10% per annum compound interest for a period of 3 years. Calculate the total amount he will have to repay at the end of 3rd year.

   a) Rs. 39,930
   b) Rs. 42,930
   c) Rs. 35,930
   d) Rs. 39,000

3. A person invests Rs. 20,000 at 10% per annum simple interest and Rs. 25,000 at 10% compound interest. Both investments are for a period of two years. Calculate the total amount he will have after two years.

   a) Rs. 54,250
   b) Rs. 55,250
   c) Rs. 53,250
   d) Rs. 52,250

4. A person invested certain amount for a period of 5 years at 15% per annum simple interest. If the interest amount per annum is Rs. 150,000. Compute total amount invested

   a) Rs. 1,000,000
   b) Rs. 1,500,000
   c) Rs. 2,000,000
   d) Rs. 2,500,000

5. A person invested certain amount for a period of 4 years at 10% per annum compound interest. If the total amount received by him at the end of 4th year is Rs. 366,025 compute the amount that was invested by him

   a) Rs. 200,000
   b) Rs. 250,000
   c) Rs. 300,000
   d) Rs. 350,000

6. Which of the following will have highest future value/sum?

   a) Rs. 100,000 invested at 10% simple interest for 4 years
   b) Rs. 250,000 invested at 8% simple interest for 3 years
   c) Rs. 300,000 invested at 10% simple interest for 2 years
   d) Rs. 100,000 invested at 12% simple interest for 3 years

7. Which of the following will have highest future value/sum?
   a) Rs. 100,000 invested at 10% compound interest for 3 years
   b) Rs. 200,000 invested at 12% compound interest for 2 years
   c) Rs. 300,000 invested at 15% compound interest for 1 year
   d) Rs. 250,000 invested at 12% compound interest for 4 years

8. Which of the following future values will have highest present value?
   a) Rs. 250,000 at the end of 3 years with 10% per annum compounded interest
   b) Rs. 200,000 at the end of 2 years with 12% per annum compound interest
   c) Rs. 300,000 at the end of 4 years with 15% per annum compound interest
   d) Rs. 350,000 at the end of 5 years with 12% per annum compound interest

9. Which of the following future values / sum will have highest principal investment?
   a) Rs. 200,000 at the end of 3 years with 10% per annum simple interest
   b) Rs. 250,000 at the end of 4 years with 12% per annum simple interest
   c) Rs. 300,000 at the end of 5 years with 15% per annum simple interest
   d) Rs. 500,000 at the end of 2 years with 20% per annum simple interest

10. Which of the following will have highest effective annual rate?
    a) 10% per annum compounded semi-annually
    b) 12% per annum compounded annually
    c) 9.5% per annum compounded quarterly
    d) 9% per annum compounded monthly

11. Which of the following will have least effective annual rate?
    a) 8% per annum compounded semi-annually
    b) 10% per annum compounded quarterly
    c) 7% per annum compounded monthly
    d) 10% per annum compounded annually

12. What will be the effective annual rate for 12% per annum compounded semi-annually?
    a) 10.36%
    b) 11.36%
    c) 12.36%
    a) d) 12.76%

13. What will be the nominal rate compounded semi-annually for 10% per annum effective annual rate?
    a) 8.50%
    b) 9.15%
    c) 9.76%
    d) 9.95%

14. Which of the following statement is correct?
    a) Effective annual rate for 10% per annum compounded semi-annually will be more than 10%
    b) Effective annual rate for 10% per annum compounded semi-annually will be less than 10%
    c) Effective annual rate for 10% per annum compounded semi-annually will be equal to 10%
    d) All of the above

15. A person has two investment options:

    i. Invest Rs. 500,000 for 3 years at 10% per annum compounded semi-annually
    ii. Invest Rs. 500,000 for 3 years at 8% per annum compounded quarterly

    He has to select one of the options for investment. Where he must invest?

    a) Option # 1
    b) Option # 2
    c) Both options are indifferent and hence he can opt for any one of the options
    d) Cannot be determined with the data available

16. A person needs loan and has two options available:

    i. Borrow Rs 500,000 for 3 years at 10% per annum compounded semi-annually
    ii. Borrow Rs 500,000 for 3 years at 8% per annum compounded quarterly

    He has two select one of the options. Which option must he go for?

    a) Option # 1
    b) Option # 2
    c) Both options are indifferent and hence he can opt for any one of the options
    d) Cannot be determined with the data available

17. Which of the following statement is correct?

    a) Discounting estimates future value of a particular amount invested today
    b) Discounting tells us actual funds that a particular investment will yield in future
    c) Discounting estimates the present day equivalent of an amount at a specified time in the future at a given rate of interest
    d) All of the above

18. What is the present value of Rs. 85,000 to be received three years from now if interest rate is 10%?

    a) Rs. 53,862
    b) Rs. 63,862
    c) Rs. 65,385
    d) Rs. 43,862

19. The present value of a future value is always less than the future value itself

    a) True
    b) False

20. The present value of a future value of Rs. _____ five years from today at 10% per annum compounded annually is Rs. 150,000.

    a) Rs. 241,577
    b) Rs. 231,577
    c) Rs. 221,577
    d) Rs. 211,577

21. The ____ of a future cash flows is the amount that an investor would need to invest today to receive that amount in the future

    a) Future value
    b) Present value
    c) Effective annual rate
    d) Nominal rate

22. ___ is where the annual interest is a fixed percentage of the original amount borrowed or invested
    a) Compound interest
    b) Simple interest
    c) Discounting
    d) Compounding

23. ___ is the process of accumulating interest on an investment over time to earn more interest.
    a) Compounding
    b) Discounting
    c) Promoting
    d) All of the above

24. If future value is multiplied with ___ the result is present value
    a) Discount factor
    b) Compound factor
    c) Rate of interest
    d) Number of years

25. Discount factor can be calculated by dividing present value by ___
    a) Rate of interest
    b) Number of years
    c) Future value
    d) None of the above

26. A person invested Rs 100,000, his investment is losing value at 6% per annum. Compute the amount he is left behind with after two years.
    a) Rs. 98,360
    b) Rs. 88,360
    c) Rs. 78,360
    d) Rs. 95,360

27. A person invested Rs. 100,000, his investment increased by 6% per annum for 2 years and thereafter decreased by 6% per annum for 2 years. Compute the amount he is left behind with after four years
    a) Rs. 99,281
    b) Rs. 89,281
    c) Rs. 100,000
    d) Rs. 106,000

28. If a two year investment leads to 10% increase in first year and a 10% decrease in second year. What will be the effective gain/loss to investor over two years
    a) Break-even
    b) Loss of 1%
    c) Gain of 1%
    d) Cannot be determined with the information provided above

29. A person made two investments of equal amounts at same time, one at 10% per annum compounded annually and another at 10% per annum compounded semi-annually. The second investment will be greater than the first investment at the end of first year by ___ percentage.

    a) 0.23%
    b) 0.25%
    c) 10.25%
    d) 1.25%

30. A person made investment of Rs. 250,000 some years ago at 15% per annum compounded annually for seven years with the agreement to withdraw entire amount at maturity only. If it is worth Rs. 330,625 today how many years he will have to wait more before he can withdraw the amount at maturity of contract

    a) Seven years
    b) Five years
    c) Four years
    d) Two years

31. A person made certain investment three years ago at 12% per annum compounded annually for eight years with the agreement to withdraw entire amount at maturity only. If it is worth Rs. 351,232 today what was the amount he originally invested?

    a) Rs. 251,232
    b) Rs. 351,232
    c) Rs. 250,000
    d) Rs. 431,232

32. A person invested Rs. 300,000 four years ago and received Rs. 455,422 today. Compute effective annual rate for his investment

    a) 10%
    b) 9%
    c) 12%
    d) 11%

33. A person invested Rs. 300,000 four years ago and received following returns:

    Year 1: 10%
    Year 2: -10%
    Year 3: 8%
    Year 4: 0%
    Compute effective annual gain over four years

    a) 1.69%
    b) 8%
    c) 2%
    d) 1.79%

34. TP invested Rs. 250,000 for two years. If his investment increased first year by 10% and decreases in second year by 9%. He will make a total return of Rs. 250 in two years

    a) True
    b) False

35. Effective annual rate can be greater than nominal rate

    a) True
    b) False

36. Compute discount factor for discounting cash flow at second year at 10% per annum discount rate

    a) 0.91
    b) 0.826
    c) 0.751
    d) 0.88

37. What will be the sum of present values of Rs. 500 at year 1 and Rs. 600 at year 2 if discount rate is 13%

    a) Rs. 912.4
    b) Rs. 812.4
    c) Rs. 512.4
    d) Rs. 612.4

38. Hamza invested Rs. 120,000 on 1st January 2015, Rs. 150,000 on 1st January 2016 and Rs. 200,000 on 1st January 2017. These investments were kept to grow till 31st December 2020 and entire accumulated amount was withdrawn together, if interest rate is 10% per annum compounded annually compute the total amount that was withdrawn on 31st December 2019

    a) Rs. 479,076
    b) Rs. 579,076
    c) Rs. 679,076
    d) Rs. 779,076

39. Future value of Rs 330,000 invested at 7% per annum compounded quarterly for three years is ___

    a) 406,375
    b) 306,375
    c) 506,375
    d) 366,375

40. Future value of Rs. 500,000 invested at 9% per annum compounded quarterly for three years is greater than future value of Rs. 500,000 invested at 7% per annum compounded semi-annually for three years by Rs. ___

    a) Rs. 48,396
    b) Rs. 58,396
    c) Rs. 38,396
    d) Rs. 28,396

41. Which of the following statement is correct?

    a) A person who wants to invest funds must go for lowest available interest rate
    b) A person who wants to invest funds must invest funds at simple interest instead of compound interest if all other conditions are same
    c) A person who wants to invest funds must invest funds at compound interest instead of simple interest if all other conditions are same
    d) None of the above

42. Which of the following has higher effective annual rate:

    i. 9% per annum compounded quarterly
    ii. 10% per annum compounded semi-annually
    iii. 8% per annum compounded monthly

    a) Option # 1
    b) Option # 2
    c) Option # 3
    d) All are same

43. A person invested total Rs. 900,000 in two different investment plans one yielding 6% return per annum compounded annually and the other yielding 9% return per annum compounded annually, both for three years. If maturity value of first investment plan (6% plan) at the end of three years is Rs. 357,305 compute the amount that was invested in second investment plan

    a) Rs. 300,000
    b) Rs. 600,000
    c) Rs. 500,000
    d) Rs. 100,000

44. A person invested Rs. 300,000 each in two investment plans at 20% per annum compounded annually. The first amount was left to grow to a future value of Rs. 518,400 and the second amount was left to grow for one additional year. How many years was second investment left to grow for?

    a) Three years
    b) Four years
    c) Five years
    d) Six years

45. Taha bought a machine for Rs. 1,000,000. The value of machine is expected to reduce by 14% per annum. What will be the value of machine after three years from today?

    a) Rs. 636,056
    b) Rs. 536,056
    c) Rs. 1,481,544
    d) Rs. 547,008

46. A three-year bank deposit will yield 17% in total on initial investment. If the total maturity value at the end of third year is Rs. 936,000 find the amount invested initially.

    a) Rs. 584,410
    b) Rs. 484,410
    c) Rs. 800,000
    d) Rs. 700,000

47. Compute the amount of interest earned if Rs. 400,000 is invested at 13% per annum compounded semi-annually for six years.

    a) Rs. 451,638
    b) Rs. 551,638
    c) Rs. 351,638
    d) Rs. 751,638

48. What will be the future value of Rs. X invested today at 15% per annum compounded annually for four years?

    a) 1.45X
    b) 1.75X
    c) 1.65X
    d) 1.55X

49. What will be the future value of Rs. X invested today at 15% per annum simple interest for four years?

    a) 1.6X
    b) 1.7X
    c) 1.5X
    d) 1.4X

50. Farhan bought a car for Rs. 1,000,000 financed from a bank loan. It has been agreed to repay bank loan along with interest at 10% per annum compounded annually five years from the date car was bought. The agreement stated that in case of default the car will be sold for repayment and any remaining amount will be contributed by Farhan over a grace period. The market value of car is increasing at the rate of 5% per annum. Assuming Farhan defaults on repayment date, what funds will he have to contribute over the grace period?

    a) Rs. 334,228
    b) Rs. 343,228
    c) Rs. 243,228
    d) Rs. 434,228

51. Which of the following statement is correct?

    a) Future value of Rs 300,000 invested at 10% per annum for three years is Rs. 395,300
    b) Future value of Rs. 400,000 invested at 9% per annum for four years is Rs. 563,500
    c) Future value of Rs. 200,000 invested at 8% per annum for three years is Rs. 251,942
    d) Future value of Rs. 100,000 invested at 7% per annum for two years is Rs. 110,000

52. What is the difference between the simple interest and the compound interest for 3 years on a sum of Rs.8000 at 10% per annum?

    a) Rs. 812
    b) Rs. 820
    c) Rs. 824
    d) Rs. 832

53. What is the difference between the simple interest and the compound interest for 3 years on a sum of Rs. 8000 at 10% per annum?

    a) Rs. 812
    b) Rs. 820
    c) Rs. 824
    d) Rs. 832

54. If a sum of money becomes 3 times in 6 years at a certain rate of interest, what is the rate of interest?

    a) 12%
    b) 15%
    c) 18%
    d) 20%

55. A sum of money becomes 5 times in 20 years at a certain rate of interest. What is the rate of interest?

    a) 8%
    b) 10%
    c) 12%
    d) 15%

56. Aslam borrowed Rs. 900,000 at simple interest of 8.34% per annum. At the end of the loan period he repaid a total of Rs. 1,500,000. Period of the loan was"

    a) 7 years
    b) 7 years and 3 months
    c) 7 years and 9 months
    d) 8 years

57. Akhter borrowed Rs. 500,000 from a bank at a simple interest of 1.5% per month for a period of 5 years. Principal is repayable at the end of five years. Which of the following statement is correct?

    a) His monthly instalment would be Rs. 15,000
    b) He would pay Rs. 75,000 per annum in interest
    c) He would have paid an additional amount of Rs. 450,000 by the end of 5 years
    d) Both (a) and (b)

58. A certain sum of money at simple interest amounts to Rs. 1,012 in 2 years and to Rs. 1,067.2 in 4 years. The rate of interest per annum is:

    a) 2.5%
    b) 2.88%
    c) 3.20%
    d) 5%

59. A sum of money which amounts to 3/2 times of the original sum in 5 years and Rs 960/- in 6 years is:

    a) Rs 900
    b) Rs 800
    c) Rs 700
    d) Rs 600

60. If A lends Rs. 3,500 to B at 10% p.a. and B lends the same sum to C at 11.5% p.a., then the gain of B (in Rs.) in a period of 3 years is

    a) Rs 157.50
    b) Rs 155.50
    c) Rs 156.50
    d) Rs 154.50

61. A sum of Rs.725 is lent in the beginning of a year at a certain rate of interest. After 8 months, a sum of Rs.362.50 more is lent but at the rate twice the former. At the end of the year, Rs.33.50 is earned as interest from both the loans. What was the original rate of interest?

    a) 3.6%
    b) 4.5%
    c) 5%
    d) None of these

62. Mr. Abrar invested two sums of money on simple interest. The first was Rs. 22,000 invested at 8% per annum and the second Rs. 19,600 at 10% per annum. The two sums were allowed to grow till both amounted to the same figure. In how many years did this happen and what was the final amount?

    a) 8 years and Rs 50,000
    b) 7.5 years and Rs 56,320
    c) 15 years and Rs 56,120
    d) 12 years and Rs 43,120

63. Mr. Azhar opened two accounts to grow up by simple interest. The first account with a principal of Rs. 25,000 grew at 8% annually and the second account with a principal of Rs. 44,000 at 10% annually till such time that the second amount became double of the first amount. In how many years this happened?

    a) 12 years
    b) 10 years
    c) 15 years
    d) 17 years

64. Mr. Ali owes Rs. 200,000 due in 3 months and Rs. 400,000 in 7 months. He and his creditor agreed to settle the debts by 2 equal payments, one in 5 months and other in 11 months from now, if money is worth 6% and the comparison date is 5 months from now then find the size of each payment?

    a) Rs 303,439
    b) Rs 300,000
    c) Rs 345,236
    d) Rs 425,123

65. Mr. Imtiaz owes Rs. 10,000 due in 2 months, Rs. 24,000 due in 6 months and Rs. 6,000 due in 8 months. In how many months he should make a single payment of Rs. 40,000 to discharge the three debts if interest rate is 6%?

    a) 5 months and 3 days
    b) 9 months and 15 days
    c) 9months and 5 days
    d) 5 months and 9 days

66. A man borrowed Rs. 200,000 on January 1, and agreed to repay the money plus 8% interest in 6 months. Two months after the money was borrowed the creditor agreed to settle the debt by discounting it at the rate of 9%. How much the creditor received when he discounted the debt?

    a) 202359
    b) 212,453
    c) 201,942
    d) 201,345

67. Mr. X invested Rs. 10,000 in Bank A at 8% interest and Rs. 15,000 in Bank B carrying interest at X%. If the interest for first year is Rs. 2,150, the investment in scheme B carries rate of interest?

    a) 8.9%
    b) 9.5%
    c) 9.0%
    d) None of these

68. Mr. C made investment in two schemes A and B. investment in scheme A is Rs. 2,000 more than in scheme B. Investment in scheme A carries 6% rate of interest whereas investment in scheme B carries 8% rate of interest. What is the sum invested in scheme A if the difference in interest for three years is Rs.120?

    a) Rs 4,000
    b) Rs 6,000
    c) Rs 5,000
    d) Cannot be determined

69. Mr. Ali owes Mr. Ahmed Rs. 40,000 due in 3 years and Rs. 60,000 due in 5 years. Mr Ali wants to pay off both the loans at the end of 4 years. If money is worth 10% compounded semi-annually, how much Mr. Ahmed should accept?

    a) Rs 98,522
    b) Rs 100,000
    c) Rs 95,252
    d) Rs 92,125

70. Mr. Akbar invested Rs. 10,000 for which he will receive interest at the rate of 6% compounded semi-annually for the first 5 years and 8% compounded quarterly for the next 4 years. What compound amount would he receive at the end of ninth year?

    a) Rs 12,250
    b) Rs 21,360
    c) Rs 18,450
    d) Rs 25,125

71. A person invests Rs 25,000 in a saving account paying 12% interest compounded semiannually. After 3 years he withdraws Rs 20,000 from the account and invests in a certificate of deposit paying 12% interest compounded monthly, leaving the remainder in the saving account. How much is his total compound amount two years after the purchase of Certificate of deposits?

    a) Rs. 45,916
    b) 44,916
    c) Rs. 44,817.8
    d) 44,100

72. To clear up a debt, a person agrees to pay Rs 1000 now, another Rs 1000 a year from now and 'another Rs 1000 in two years. If the future payments are discounted at 8% compounded quarterly, what is the present value of these three payments?

    a) Rs. 2,777.3354
    b) Rs. 2,787.4356
    c) Rs. 2,900.334
    d) Rs. 2,577.4344

73. If annual interest rate falls from 12 to 8 percent per annum, how much more be deposited in an account to have Rs. 600,000 in 5 years, if both rates are compounded semi-annually?

    a) Rs. 75,000.6351
    b) Rs. 80,301.6351
    c) Rs. 70,301.6351
    d) None

74. Total sales revenue and total cost of a particular company are Rs. 500,000 and Rs. 600,000 today respectively and the rate of annual growth in costs is 10%. Calculate by how much the sales revenue must grow every year to achieve break-even in 5th year.

    a) 12.09%
    b) 13.09%
    c) 14.09%
    d) 15.09%

75. Taha invested an amount of Rs. 500,000 in a mutual fund on 1st January 2022. The amount is expected to grow by 10% every year. Consider following information:

    i. Actual growth rate was 2% above expected growth rate for the year 2022.
    ii. Actual growth rate was 2% below expected growth rate for the year 2023.

    Calculate amount to his credit at the end of year 2023

    a) Rs. 500,000
    b) Rs. 616,000
    c) Rs. 605,000
    d) Rs. 604,800

76. Mr. Dawood invested certain amount in shares of a particular company. The share prices grew by 2% in first year and decreased by 2% in second year. Compute percentage gain/(loss) over the period of two years

    a) No gain no loss
    b) 4% gain
    c) 4% loss
    d) 0.04% loss

77. Mr Naveed invested Rs. 500,000 in mutual fund and Rs. 600,000 in stock market. The investment in mutual funds grew by 10% in first year whereas the investment in stock market lost its value over a period of one year such that at the end of first year the total investment in both mutual funds and stock market totalled Rs. 1,100,000. Compute the percentage decrease in value of investment in stock market

    a) 10%
    b) 8.33%
    c) 9.33%
    d) 10.33%

78. An investment increased in value by 10% in first year and decreased in value by a certain percentage in second year such that the net increase in value of investment over two years was nil. Find the percentage decrease in second year

    a) 10%
    b) 8.09%
    c) 7.09%
    d) 9.09%

79. TP limited incurred a loss of Rs. 5,000,000 in the first year of its operation. The sales revenue for the first year of operation was Rs. 15,000,000 and is expected to grow by 12% every year.

    Which of the following statements is/are correct?

    i. The company can never earn profits
    ii. The company will be in profits if the growth rate of total costs is less than 12%
    iii. Total costs in first year of operations is Rs. 20,000,000
    iv. The company will be at break even in 5th year if the growth rate in total costs is more than 6% but less than 8%

    a) 1 only
    b) 2 and 3
    c) 2, 3 and 4
    d) 3 only

80. Total sales revenue of a particular company is Rs. 5 million today and is expected to grow every year due to increase in sales units and inflation such that after one year it will be Rs. 6.16 million. If the growth rate in number of units is 2% more than the rate of inflation. Compute the rate of inflation for the year

    a) 8%
    b) 10%
    c) 12%
    d) 14%

81. A person invested certain amount for three years at simple interest such that the rate of interest for the first year was 10% but increased by 2% for the next two years. Also the new rate is applied on the funds available in the investment account at the end of each year. Compute total percentage growth in investment over three years period.

    a) 36.98%
    b) 37.98%
    c) 34%
    d) 36.4%

82. Which of the following statements is/are true?

    i. Simple interest is calculated on the principal amount and accumulated interest of previous periods
    ii. Compound interest is calculated on the principal or original amount of a loan
    iii. The growth in compound interest is quite rapid as compared to simple interest

    a) 1 only
    b) 2 only
    c) 1 and 3
    d) 3 only

83. A person invested Rs. 4,000,000 for four years at 10% simple interest today. After four years 25% of the total amount that was initially invested was spent on higher education of his son and the entire remaining amount with him was further invested for two years at 10% simple interest. Compute the amount to his credit after six years from today

    a) Rs. 5,314,683
    b) Rs. 7,086,244
    c) Rs. 5,040,000
    d) Rs. 5,520,000

84. Sabeen plans to retire in 15 years. She wants to receive an annual retirement income of $20,000 for 10 years **starting at age 60**. If the interest rate is 6% compounded annually, **how much should she invest today** in a deferred annuity to meet her retirement goal?

    a) $93,050
    b) $105,460
    c) $111,505
    d) $123,640

85. A deferred annuity begins payments of $5,000 a year for 8 years **starting in year 6**. If the interest rate is 7% compounded annually, what is the present value **at the end of year 0**?

    a) $20,390
    b) $22,795
    c) $25,600
    d) $27,340

86. Saad Ltd purchases machinery for $100,000, with a useful life of 5 years and no salvage value. If the company uses the **double declining balance method**, what is the depreciation expense in **year 2**?

    a) $24,000
    b) $20,000
    c) $16,000
    d) $36,000

87. An equipment costing $60,000 depreciates using **straight-line** over 10 years, with a salvage value of $10,000. After 4 years, what is the **book value**?

    a) 36,000
    b) $40,000
    c) $46,000
    d) $50,000

88. An investor deposits $10,000 in a fund that compounds interest **continuously** at an annual rate of 8%. What is the value of the investment after 7 years?

    a) $16,000
    b) $17,021
    c) 17,226
    d) $18,000

89. A company needs $250,000 in 6 years to upgrade equipment. If the investment account offers **continuous compounding at 6.5%**, how much must it invest today?

    a) $165,450
    b) $170,250
    c) $175,980
    d) $182,310

90. An insurance company offers a deferred annuity where payments of $12,000 will begin **10 years from now** and continue annually for **15 years**. If the interest rate is 5% compounded annually, what is the **present value of this deferred annuity today**?

    a) $75,690
    b) $83,270
    c) $89,100
    d) $92,800

91. A person buys a product for Rs. 270 which is at 10% discount on list price. Compute list price

    a) Rs. 270
    b) Rs. 300
    c) Rs. 310
    d) Rs. 243

92. A company purchases raw material from a supplier for Rs. 500 per kg (list price). The supplier is willing to give a discount of 10% (bulk discount on list price) if total purchase quantity is more than 10kg. Compute total cost if the purchase quantity is 13kg

    a) Rs. 6,500
    b) Rs. 5,850
    c) Rs. 7,150
    d) Rs. 7,000

93. List price of a particular item is Rs. 5,000. How much will it cost for the buyer if the product is on 30% sale discount?

    a) Rs. 1,500
    b) Rs. 3,500
    c) Rs. 4,000
    d) Rs. 3,000

ANSWERS TO SELF TEST QUESTIONS

1	a	15	a	29	a	43	b	57	c	71	b	85	b
2	a	16	b	30	b	44	b	58	b	72	a	86	a
3	a	17	c	31	c	45	a	59	d	73	c	87	b
4	a	18	c	32	d	46	c	60	a	74	c	88	c
5	b	19	a	33	a	47	a	61	d	75	d	89	b
6	c	20	a	34	a	48	b	62	d	76	d	90	b
7	d	21	b	35	a	49	a	63	c	77	b	91	b
8	d	22	b	36	b	50	a	64	a	78	d	92	b
9	d	23	a	37	a	51	c	65	d	79	b	93	b
10	b	24	a	38	c	52	c	66	c	80	b		
11	c	25	c	39	a	53	c	67	c	81	b		
12	c	26	b	40	c	54	c	68	b	82	d		
13	c	27	a	41	c	55	b	69	a	83	d		
14	a	28	b	42	b	56	d	70	c	84	c		

CHAPTER 6

DISCOUNTED CASH FLOWS

1. If internal rate of return is used to discount project cash flows, the net present value will be equal to zero

   a) True
   b) False

2. If net present value of a project is negative one must invest in the project

   a) True
   b) False

3. Net present value can never be negative

   a) True
   b) False

4. A project requires investment of Rs. 480,366 today. It will yield Rs. 200,000 at the end of each year for three years. Compute Internal rate of return for the project

   a) 10%
   b) 11%
   c) 12%
   d) 13%

5. A company is considering whether to invest in a project which would result in an investment of Rs 75,000 today. The project would earn annual cash inflows of Rs. 25,000 per year for four years (at the end of each year) and Rs. 10,000 at the end of fifth year. Calculate NPV of the project using a discount rate of 10%

   a) Rs. 8,000
   b) Rs. 9,455
   c) Rs. 10,456
   d) Rs. 11,455

6. A company is considering whether to invest in a project which would result in an investment of Rs. 200,000 today. The project would earn annual cash flows of Rs. 25,000 per year in perpetuity (at the end of each year). Calculate NPV of the project using a discount rate of 12%

   a) Rs. 7,333
   b) Rs. 8,333
   c) Rs. 9,333
   d) Rs. 10,333

7. A company has limited funds available for investment and has to pick one of the following projects for investment:

Project	Net Present Value (Rs million)
A	(5)
B	3
C	7
D	8

In which of the above projects must the company invest funds in?

a) A
b) B
c) C
d) D

8. A company has limited funds available for investment and has to pick one of the following projects for investment:

Project	IRR
A	5%
B	7%
C	8%
D	12%

In which of the above projects must the company invest funds in?

a) A
b) B
c) C
d) D

9. When company has limited funds available for investment and has multiple investment opportunities with positive net present value the company must select one with the lowest net present value

a) True
b) False

10. Present value of a perpetual stream of payments of Rs 7,500 at the end of each year starting three years from now using 12% discounting rate is ___

a) Rs. 29,825
b) Rs. 39,825
c) Rs. 49,825
d) Rs. 59,825

11. Mr. Naveed made investments in a bank account as follow:

Date	Amount in Rupees
1st January 2015	500,000
31st December 2015	200,000
31st December 2016	200,000

What will be his bank balance as at 31st December 2016 if the rate of interest is 12% per annum

a) Rs. 1,051,200
b) Rs. 1,151,200
c) Rs. 1,251,200
d) Rs. 1,351,200

12. Which of the following statement is correct?

a) IRR is a discount rate that makes the net present value of a project equal to zero
b) IRR is a discount rate that makes the net present value of a project equal to inflows.
c) IRR is a discount rate that makes the net present value of a project equal to outflows.
d) None of the above

13. Which of the following statement is correct?

a) If discount rate for a project is increased, then net present value will increase as well
b) If discount rate for a project is increased, then net present value will decrease.
c) If discount rate for a project is decreased, then net present value will decrease as well
d) All of the above

14. ___ is a series of regular periodic payments of equal amount for limited time.

a) Net present value
b) perpetuity
c) Discounting
d) Annuity

15. Which of the following is correct?

a) Project is considered worthy for investment if the required rate of return is less than internal rate of return
b) Project is considered worthy for investment if the required rate of return is greater than internal rate of return
c) Project is considered worthy for investment if the required rate of return is same as internal rate of return
d) None of the above

16. ___ is a fund formed by periodically setting aside money to achieve a specific Amount at some future point in time

a) Charity fund
b) Accelerated fund
c) Sinking fund
d) None of the above

17. Cost of capital is the return required by investors
    a) True
    b) False

18. Following are the cash flows of a particular project:

Year	Cash flow amount in Rs. 000s	Type
0	5,000	Outflow
1	3,000	Outflow
2	8,000	Inflow
3	6,000	Inflow
4	5,000	Inflow

    The IRR of the project is: ___
    a) 43.53%
    b) 33.53%
    c) 23.53%
    d) 53.53%

19. There cannot be any cash outflow in a project after initial investment
    a) True
    b) False

20. Correct formula for calculation of net present value is:
    a) Present value of cash inflows + present value of cash outflows
    b) Present value of cash outflows – present value of cash inflows
    c) Present value of cash inflows – present value of cash outflows
    d) None of the above

21. Net present value of a particular project @ 12% discount rate is Rs 300,000. The internal rate of return for the project will be: ___
    a) 12%
    b) Greater than 12%
    c) Less than 12%
    d) Cannot be determined

22. Mr. Dawood is planning to invest in a scheme whereby he would be required to invest Rs. 120,000 annually (at the end of each year) for 3 years. If the interest rate is 13% compounded annually, he would receive Rs. 368,123 at the end of the 3rd year.
    a) True
    b) False

23. A bank has offered Mr. Ikram to provide Rs. 500,000 at the end of each year forever (starting from the end of 4 years) if he invests Rs. ____ in the bank today. (assume interest rate is 13%)

    a) Rs. 2,846,154
    b) Rs. 2,665,578
    c) Rs. 4,846,154
    d) Rs. 5,846,154

24. A machine costing Rs. 700,000 today is bought on instalments. The agreed term is to pay Rs. 200,000 at the end of each year for four years. Compute the amount of interest charged over the term.

    a) Rs. 50,000
    b) Rs. 100,000
    c) Rs. 150,000
    d) Rs. 200,000

25. A project has present value of cash inflows Rs. 800,000 and present value of cash outflows as Rs. 350,000. The net present value of the project is ____.

    a) Rs. 550,000
    b) Rs. 650,000
    c) Rs. 1,150,000
    d) Rs. 450,000

26. A company wants to purchase equipment. The seller has offered two options:

    i. Payment of full amount today
    ii. Pay Rs. 125,000 at the end of each year for four years

    If interest rate is 10% per annum compute the cash price to be paid today under option # 1 to make both options equally viable

    a) Rs. 296,233
    b) Rs. 396,233
    c) Rs. 496,233
    d) Rs. 596,233

27. Arsalan wants to have sufficient funds to pay off a loan of Rs. 500,000 four years from now. For this purpose he deposits certain amount at the end of each month into a fund till the loan repayment date. If interest rate is 12% per annum compounded monthly, the monthly deposits are:

    a) Rs. 7,167
    b) Rs. 8,167
    c) Rs. 9,167
    d) Rs.10,167

28. Following are investments of a company today:

    i. Rs. 500,000 invested for four years
    ii. Rs. 100,000 invested at the end of each year for four years
    iii. Rs. 50,000 invested at the start of each year for four years

    Accumulated investment inclusive of interest at the end of fourth year is (interest rate 12% per annum):

    a) Rs. 1,132,335
    b) Rs. 1,332,335
    c) Rs. 1,532,335
    d) Rs. 1,432,335

29. Difference between future values of:

    i. Rs. 500 invested at the end of each year for five years.
    ii. Rs. 100 invested at the end of each year for five years.

    At the end of fifth year if interest rate is 15% is:

    a) Rs. 3,697
    b) Rs. 2,697
    c) Rs. 2,597
    d) Rs. 2,497

30. There is no future value of perpetuity

    a) True
    b) False

31. Mr. Naveed invested Rs. 500,000 into Dawood Investment bank when he was 25 years old. He also invested Rs. 200,000 per annum for three years, starting one year after he made investment of Rs. 500,000. The accumulated amount was withdrawn when he was 32 years old. If applicable interest rate for the entire time period is 13% per annum he will be able to withdraw ___ at the age of 32.

    a) Rs. 2,287,275
    b) Rs. 2,187,275
    c) Rs. 2,387,275
    d) Rs. 3,387,275

32. A person bought a laptop worth Rs. 300,000 on instalments. He made down payment of 30% and the remaining amount was paid in 2 equal annual instalments at the end of each year (applicable interest rate of 14%). The amount of each instalment will be ___

    a) Rs. 117,531
    b) Rs. 147,531
    c) Rs. 127,531
    d) Rs. 137,531

33. Value of repayments that are going to be paid in three annual instalments at the end of each year. The amount of down payment is ___.

    a) Rs. 1,200,000
    b) Rs. 300,000
    c) Rs. 200,000
    d) Cannot be determined with data available

34. Mr. Ikram wants to buy a car. He has approached two different banks. The offers from banks are as follows:

    Bank A: Rs. 250,000 to be paid at the end of each year for four years at an interest rate of 10% per annum
    Bank B: Rs. 200,000 to be paid at the end of each year for five years at an interest rate of 12% per annum
    Which option is better for him if he wants to minimise interest cost

    a) Bank A
    b) Bank B
    c) Both are same
    d) Cannot be determined with available information

35. Mr. Atif wants to buy a house. The bank has offered him following terms:

    Down payment: Rs 800,000
    Repayments: Rs. 200,000 per annum for five years at the end of each year
    Interest rate: 8% per annum
    How much interest will he have to pay in total if he buys the house from above bank?

    a) Rs. 231,458
    b) Rs. 221,458
    c) Rs. 211,458
    d) Rs. 201,458

36. Which of the following present value will be highest? (present value of ordinary annuity)

    a) Rs. 50,000 at the end of each year for four years at 12% per annum interest rate
    b) Rs. 70,000 at the end of each year for three years at 10% per annum interest rate
    c) Rs. 90,000 at the end of each year for five years at 15% per annum interest rate
    d) All present values are equal.

37. Which of the following present value will be highest? (present value of annuity due)

    a) Rs. 25,000 at the start of each year for four years at 15% per annum interest rate
    b) Rs. 30,000 at the start of each year for five years at 10% per annum interest rate
    c) Rs. 40,000 at the start of each year for two years at 12% per annum interest rate
    d) All present values are equal

38. Which of the following future values will be highest? (future value of ordinary annuity)

    a) Rs. 30,000 invested at the end of each year for four years at 10% per annum interest rate
    b) Rs. 20,000 invested at the end of each year for five years at 12% per annum interest rate
    c) Rs. 25,000 invested at the end of each year for three years at 15% per annum interest rate
    d) All future values are equal

39. Which of the following future values will be highest? (future value of annuity due)

    a) Rs. 25,000 invested at the start of each year for two years at 10% per annum interest rate
    b) Rs. 30,000 invested at the start of each year for three years at 12% per annum interest rate
    c) Rs. 40,000 invested at the start of each year for four years at 15% per annum interest rate
    d) All future values are equal

40. Which of the following present values is highest?
    a) A perpetuity of Rs. 100,000 at the end of each year at 12% per annum interest rate
    b) A perpetuity of Rs. 120,000 at the end of each year at 15% per annum interest rate
    c) A perpetuity of Rs. 150,000 at the end of each year at 10% per annum interest rate
    d) All present values are equal

41. What is the difference between ordinary perpetuity and perpetuity due?
    a) There is no difference at all
    b) The interest rate for ordinary perpetuity is higher than perpetuity due
    c) There is one additional cash flow at year 0 / today in perpetuity due
    d) There is no difference

42. The present value of an ordinary annuity is Rs 400,000. Other things being constant what will be the impact of increase in interest rate on present value of Rs. 400,000
    a) It will decrease
    b) It will increase
    c) Nothing will happen
    d) Cannot be determined with available data

43. Ikram invested Rs. 150,000 at the end of each year for three years at 12% per annum interest rate. Taha invested Rs. 200,000 at the end of each year for three years at 15% per annum interest rate.

    At the end of three years, amount with Taha will be greater by Rs. ___ as compared to amount with Ikram.
    a) 188,340
    b) 178,340
    c) 168,340
    d) 198,340

44. Net present value of a project is Rs. 400,000. There was only one cash outflow of Rs. 100,000 at year 0. The present value of cash inflows will be Rs. ___
    a) 400,000
    b) 300,000
    c) 500,000
    d) 600,000

45. A project will require an investment today and will yield regular annual returns at the end of each year for four years. If the present value of cash inflows is Rs. 800,000. What will be the maximum amount of cash outflows today to make project viable based on Net present value approach
    a) Rs. 900,000
    b) Rs. 1,000,000
    c) Rs. 800,000
    d) Rs. 950,000

46. Following are forecast cash flows for a project:

Year	Cash inflows (Rs.)	Cash outflows (Rs.)
0	-	(200,000)
1	250,000	(10,000)
2	350,000	(5,000)
3	5,000	(1,000)

The Net present value of the above project at 15% per annum interest rate is Rs. ___

a) 282,195
b) 292,195
c) 272,195
d) 252,195

47. A newly appointed accountant calculated net present value of a project as Rs. 500,000 negative. Upon review it was revealed that the amount of initial investment was incorrectly taken as Rs. 900,000 whereas it was Rs. 90,000 only. What will be the new net present value after correction?

a) Rs. 1,310,000
b) Rs. 310,000
c) Rs. 1,400,000
d) Rs. 900,000

48. Following net present value working is performed by a trainee accountant:

	Rs. in '000s
Present value of cash inflows	9,000
Present value of cash outflows	(5,000)
Net present value	14,000

Identify the error in the working if any

a) There is no error
b) Cash outflows cannot be negative
c) Correct net present value must be Rs. 4,000,000 positive. PVCO needs to be subtracted
d) Format of net present value is as per applicable law

49. Following internal rate of return working is performed by a trainee accountant:

A: 10%, NPVa: 500, B: 15% and NPVb: -500

IRR = 10% + (500/500-(-500)) x (15%-10%) = 10% + (500/500) x (15%-10%) = 15%

Identify error in the working if any

a) There is no error
b) Format of IRR is not as per applicable law
c) Correct IRR must be 12.50%. There is an error in the denominator 500-(-500) = 1,000
d) IRR is not mentioned in %

50. Arrange following steps to calculate net present value in correct order:

    i. Discount cash flows to their present values

    ii. List all cash flows expected to arise from the project

    iii. Compute difference between present value of cash inflows and present value of cash outflows

    a) i,ii andiii

    b) i,iii and ii

    c) iiii and ii

    d) ii,i and iii

51. Identify incorrect statement/statements:

    i. Ordinary annuity are payments / receipts in arrears

    ii. Annuity due are payments /receipts in arrears

    iii. Annuity due are payments / receipts is advance

    iv. Ordinary annuity are payments / receipts in advance

    a) 2 and 4

    b) 1 and 2

    c) 2 and 3

    d) 3 and 1

52. Mr. Ikram establishes a special retirement fund at age of 40 by depositing Rs. 1,000 per month into an account which pays 9% interest compounded monthly. After 20 years he retires, He decides to make equal monthly withdrawals from the retirement fund over the next ten years. Determine the size of monthly withdrawals.

    a) Rs.8,460.51

    b) Rs.8,360.51

    c) Rs.7,765.51

    d) None

53. Naveed Limited (NL) has borrowed an amount of Rs. 100,000 at an interest of 10% per annum compounded semi-annually. To pay off the loan at the end of four years, YL has created a sinking fund, which yields a return of 8% per annum compounded quarterly. Determine the amount which YL must deposit at the end of each quarter, in the sinking fund, to settle the loan at the end of four years?

    a) Rs.7,926.56

    b) Rs.5,225

    c) Rs.7,945.23

    d) None

54. Kiran deposited Rs. 5,000 per month (first day of the month) in a saving account in the year 2011 and Rs7,500 per month in the year 2012.Find the total amount saved by her at the end of year 2012 if she earned @8% compounded monthly.

    a) Rs 161,864

    b) Rs 171,240

    c) Rs 101,240

    d) None

55. Miss Saman has invested Rs. 700,000 in an investment scheme. In return, she would receive Rs. 74,587 semi-annually in arrears, for the six years. She would not receive any amount afterwards. Find the nominal and effective rate of return of the scheme.

    a) 8% and 8.16%
    b) 8% and 9.16%
    c) 8% and 10.16%
    d) None

56. A building society offers a low start mortgage of Rs 40,000 with 10 annual repayments starting one year from the loan being taken out. The interest rate applying throughout will be 11% per annum, but the repayments will be only Rs 5,000 per annum for the first five years. To the nearest Rs, what equal annual repayments will be required in each of the last five years of the mortgage?

    a) Rs 5,815
    b) Rs 7,710
    c) Rs 9,817
    d) Rs 11,810

57. A debt of Rs. 12000 is to be amortized by equal payments at the end of every six months for 3 years. If the interest charged is 6% compounded semi-annually, find the outstanding loan after the 4^{th} payment?

    a) 4500.59
    b) 4238.67
    c) 4327.59
    d) 4651.26

58. A bank is planning to offer a unique product to its customers whereby it would pay Rs 250,000 per annum for an indefinite period commencing from the end of year 6. How much amount should the bank ask its customers to pay now, if the rate of interest that the bank can pay, is 5% compounded annually?

    a) Rs 3,191,221
    b) Rs 3,547,829
    c) Rs 3,917,631
    d) Rs 3,960,498

59. A company invested 3 million. Interest rate was 10%, 12% and 14% per year for first, second and third year respectively. Find NPV if cost of capital is 10%

    a) 0.15 million
    b) 0.1656 million
    c) 0.10 million
    d) 0.765 million

60. Find the IRR of an investment having initial cash outflow of Rs. 213,000. The cash inflows during the first, second, third and fourth years are expected to be Rs. 65,200, Rs. 96,000, Rs. 73,100 and Rs. 55,400 respectively.

    a) 11%
    b) 12%
    c) 13.12%
    d) 14.67%

61. Calculate the net present value of a project which requires an initial investment of Rs. 243,000 and it is expected to generate a cash inflow of Rs. 50,000 each month for 12 months. Assume that the salvage value of the project is zero. The target rate of return is 12% per annum.

    a) Rs 319,754
    b) Rs 319,123
    c) Rs 419,754
    d) Rs 219,744

62. Ikram investment corporation is considering a project which requires an investment of Rs. 1,200,000 now and Rs. 300,000 at the end of the 1st year. It will earn Rs. 200,000 at the end of 2nd year and thereafter it will earn a fixed annual amount up to the 7th year. If interest rate is 11%, find the amount that the project should earn annually i.e. from year 3 to year 7 if the company desires to earn a net present value of Rs. 100,000.

    a) Rs 469,366
    b) Rs 470,367
    c) Rs 569,367
    d) None

63. Project A would provide annual inflows of Rs. 525,000 Rs. 648,000, Rs 853,000 and Rs 2,844,000 at the end of year 1 to 4 respectively, whereas project B would yield annual inflows of Rs 947,000, Rs 1,155,000 and Rs 2,068,000 from year 1 to 3 respectively. The discount rate at which both projects would have same net present value is:

    a) 18.27%
    b) 18.83%
    c) 19.31%
    d) 19.73%

64. Mr. Saadi deposited Rs 3000 per month (at the start of the month) into a saving account for 10 months. If the bank offers 6% interest compounded monthly, the total amount Imran would have saved at the end of three years would be:

    a) Rs 30,838
    b) Rs 34,759
    c) Rs 35,107
    d) Rs 34,586

65. Raza wants to save money over a period of ten years in order to meet the expenses to be incurred on higher education of his son. He has recently invested a sum of Rs 200,000 and plans to further invest Rs 20,000 at the end of each quarter, which of the following amount will be available to him at the end of 10^{th} year if he earns a profit of 6% per annum compounded quarterly?

    a) Rs 1,448,161.56
    b) Rs 1,321,027.61
    c) Rs 992,497.74
    d) Rs 718,018.61

66. Mr. Abdullah is keen to purchase a garden of apples which is expected to produce its first crop at the end of 6 years. It is estimated that the net annual income from the crop will yield Rs. 60,000 for 15 years after which its resale value will be Rs. 100,000 only. If the money is worth 6% compounded annually, what maximum amount he would pay now for the garden?

    a) Rs 404,273
    b) Rs 466,634
    c) Rs 624,461
    d) Rs 530,545

67. Mr. Usman purchased a new car and made a down payment of Rs. 50,000. He is further required to pay Rs. 30,000 at the end of each quarter for five years. You are required to:

    i. Find the cash purchase price of the car, if the quarterly payments include 12% interest per annum compounded quarterly.
    ii. Find the total amount of interest Ashraf has to pay.

    a) Rs.496,324.2458, Rs.153,675.7542
    b) Rs.696,324.2458,Rs.153,675.7542
    c) Rs.486,324.2458,Rs.153,675.7542
    d) None

68. Sara bought shares in a listed company. The company is expected to pay 25% of their annual earnings in form of dividend every year. Assuming that annual earnings of the company will be Rs. 7,500,000 for the foreseeable future, what is the present value of dividends if money is worth 10%.

    a) Rs. 15,750,000
    b) Rs. 16,750,000
    c) Rs. 17,750,000
    d) Rs. 18,750,000

69. A net cash inflow of Rs. 235,000 is expected at the end of first year from a particular project and is expected to rise by 12% annually until the end of fourth year. If the cash outflows are expected to be Rs. 100,000 at the end of first year and expected to increase by 6% each year. Compute the amount of cash inflows at the end of third year

    a) Rs. 411,144
    b) Rs. 407,144
    c) Rs. 439,260
    d) Rs. 449,260

70. Which of the TWO state.ments below are correct

    a) Present value of cash inflows and present value of cash outflows can never be equal to each other.
    b) The discount rate to be used for computing net present value is cost of capital
    c) Cash outflows always occur at the start of a project
    d) Cash outflows may occur at the end of the project

71. Consider following net present value working

Year	0	1	2	3	4
Cash inflow		1,000,000	Y	2,000,000	3,000,000
Cash outflow	(500,000)	(400,000)	(x)	-	-
Net cash flow	(500,000)	600,000	?	2,000,000	3,000,000
Discount factor	1	0.909	0.826	0.751	0.683
Present values	(500,000)	545,400	908,600	1,502,000	2,049,000
NPV	4,505,000				

Provided that the cash inflow at year 2 is Rs. 1,500,000. What is the cash outflow at year 2

a) Rs. 300,000
b) Rs. 350,000
c) Rs. 400,000
d) Rs. 450,000

72. Mr. Ikram has decided to purchase a field of vegetables. The field will yield its first crop after four years. It is expected that the net cash income from the field will be Rs 700,000 per annum for four years annually after it starts to yield crop. If market rate of return is 10%, what maximum price must Mr. Ikram pay to acquire the field today?

a) Rs. 1,467,097
b) Rs. 1,567,097
c) Rs. 1,667,097
d) Rs. 1,767,097

73. Mr. Dawood bought a property on 1st January 2020. The price of the property increased by 40% at the end of first year and then reduced by 20% due to economic downturn at the end of second year. If the value of the property is Rs. 5,600,000 on 1st January 2022, what was the cost at which it was bought?

a) Rs. 3,000,000
b) Rs. 4,000,000
c) Rs. 4,500,000
d) Rs. 5,000,000

74. A one year investment with an outflow at year 0 and an inflow at year 1 has an internal rate of return of 20%. If the cost of capital is 10% which of the following statement is correct?

a) Present value of cash inflow is 20% more than present value of cash outflow
b) Present value of cash inflow is 10% more than present value of cash outflow
c) Present value of cash inflow is 9.09% more than present value of cash outflow
d) Present value of cash inflow is 8.33% more than present value of cash outflow

75. A project has an internal rate of return 3% more than its cost of capital. Consider following information to compute internal rate of return for the project:

Year	Cash flow (Rs.)	Present value of cash flow (Rs.)
0	(70,000)	(70,000)
1	50,000	43,478
2	40,000	30,246
Net present value		3,724

a) 15%
b) 16%
c) 17%
d) 18%

76. A project is such that the sum of cash inflows is equivalent to the amount of cash outflows. Which of the following statement is TRUE for the project?

a) Net present value of the project will be zero
b) Net present value of the project will be negative
c) Net present value of the project may be zero
d) Net present value of the project will be positive

77. IRR of a project may increase if:

a) The cost of capital increases
b) The cost of capital decreases
c) Cash inflows increase
d) Cash outflows increase

78. A company plans to replace a machine costing **$250,000** in **7 years**. If it sets up a sinking fund that earns **6% interest compounded annually**, how much should it **deposit at the end of each year**?

a) $30,400
b) $31,250
c) $32,680
d) $34,570

79. A government wants to repay a **$5 million bond** in 10 years using a **sinking fund** earning 4.5% compounded annually. What **annual payment** must it make?

a) $420,560
b) $432,570
c) $456,700
d) $478,900

80. A university wants to build a new lab in 8 years that will cost $2 million. It sets up a **quarterly sinking fund** at **5% compounded quarterly**. How much must it contribute **every quarter**?

    a) $52,980
    b) $54,760
    c) $55,820
    d) $57,690

81. An investor wants to receive **$20,000 annually** from a trust fund. If the fund earns **5% annually**, how much must the trust fund be worth today?

    a) $300,00
    b) $400,000
    c) $500,000
    d) $600,000

82. A company issues a **preferred stock** that pays an **annual dividend of $12 forever**. If the required rate of return is **8%**, what is the **price** of the stock?

    a) $120
    b) $130
    c) $140
    d) $150

83. An investor is offered an investment that will pay **$1,000 per year forever**, starting one year from now. If the investor's required return is **7%**, what is the **maximum price** the investor should pay?

    a) $13,000
    b) $14,000
    c) $15,000
    d) $16,000

84. A bank is selling a perpetual bond that pays **interest of $750 annually**, starting next year. If the bond is priced at **$10,000**, what is the implied interest rate (yield)?

    a) 6.5%
    b) 7.0%
    c) 7.5%
    d) 8.0%

85. You want to create a **perpetual scholarship fund** that pays **$5,000 per year forever**, starting next year. If the investment fund earns **4.5% annually**, how much do you need to donate now?

    a) $105,000
    b) $110,00
    c) $111,11
    d) $115,000

86. A real estate investment offers a **perpetual annual cash flow of $25,000**. If market interest rates increase from **6% to 8%**, what happens to the present value?

a) Increases by 25%

b) Decreases by 25%

c) Increases by 33%

d) Decreases by 33%

ANSWERS TO SELF TEST QUESTIONS

1	a	15	a	29	b	43	a	57	b	71	c	85	c
2	b	16	c	30	b	44	c	58	c	72	c	86	b
3	b	17	a	31	a	45	c	59	b	73	d		
4	c	18	a	32	c	46	c	60	d	74	c		
5	c	19	b	33	b	47	b	61	a	75	d		
6	b	20	c	34	a	48	c	62	a	76	c		
7	d	21	b	35	d	49	c	63	a	77	c		
8	d	22	b	36	c	50	d	64	c	78	c		
9	b	23	b	37	c	51	a	65	a	79	B		
10	c	24	b	38	a	52	a	66	b	80	b		
11	a	25	d	39	c	53	a	67	a	81	B		
12	a	26	b	40	c	54	a	68	d	82	d		
13	b	27	b	41	c	55	a	69	b	83	C		
14	d	28	c	42	a	56	c	70	b,d	84	c		

CHAPTER 7

DATA - COLLECTION AND REPRESENTATION

1. ___ is a term that refers to facts or figures or known terms or values.
   a) Data
   b) Information
   c) Histogram
   d) Collections

2. ___ data can be referred to as quantitative (including or of numerical values) whereas categorical data can be qualitative in nature.
   a) Nominal
   b) Ordinal
   c) Numerical
   d) Discrete

3. ___ data variables are those that can only take on certain and separate values (results from a count).
   a) Discrete
   b) Continuous
   c) Nominal
   d) Ordinal

4. Example of discrete data is:
   a) Height of a building
   b) Weight of a vegetable bag
   c) Number of seats in a room
   d) Neck size

5. Example of continuous data is:
   a) Number of seats in a room
   b) Number of students in a class
   c) Height of a building
   d) Collar size

6. ___ data are collected and tracked over a period of time.
   a) Discrete
   b) Cross-sectional
   c) Time series
   d) None of the above

7. ___ data is data resulting from investigating every member of a population.
   a) Population
   b) Sample
   c) Time series
   d) Cross-sectional

8. Which of the following is not a quality of good data?
   a) Completeness
   b) Relevant
   c) Timely
   d) Vague

9. The data collection methods are:
   1. Surveys
   2. Interviews
   3. Direct observations
   a) 1 only
   b) 1 and 2
   c) 1 and 3
   d) All of them

10. ___ order means to arrange numbers in increasing order, that is, from smallest to largest.
    a) Ascending
    b) Descending
    c) Array
    d) None of the above

11. ___ shows various values a group of items may take, and the frequency with which each value arises within the group.
    a) Frequency distribution
    b) Array
    c) Tally
    d) None of the above

12. A ___ chart is a chart with rectangular bars with lengths proportional to the values that they represent.
    a) Pie
    b) Bar
    c) Histogram
    d) Ogives

13. A ___ chart is a circular chart that displays variables in proportion of the quantity within a circle
    a) Pie
    b) Bar
    c) Histogram
    d) Ogives

14. A ___ is a graph that shows the frequency of numerical data using rectangles.
    a) Pie
    b) Bar
    c) Histogram
    d) Ogive

15. An ___ is a graph of a cumulative frequency distribution. Frequencies are accumulated at each level and are plotted against upper class limits of each class, and the points are joined with a smooth curve.
    a) Pie
    b) Bar
    c) Histogram
    d) Ogive

16. A ___ display is drawn as two columns separated by a line. The stem sits on the left hand side of the line and the leaf on the right hand side
    a) Stem and leaf
    b) Rose and petal
    c) Pie and bar
    d) None of the above

17. Box and whisker plot is also known as:
    a) Stem and leaf
    b) Histogram
    c) Five digit summary
    d) Lowest to highest value diagram

18. The box in the boxplot encloses lower quartile to the upper quartile containing ___ 50% of the distribution
    a) Central
    b) Highest
    c) Lowest
    d) None of the above

19. In a box and whisker plot whiskers from each end of the box are drawn to the maximum and minimum values respectively
    a) True
    b) False

20. A ___ graph is one that has time on the horizontal axis and a variable on the vertical axis
    a) Histogram
    b) Pie
    c) Box and whisker
    d) Time series

21. Coefficient of skewness can be calculated as:
    a) 3(mean-median)/standard deviation
    b) 3(mean-median)/median
    c) 3(mean-median)
    d) 3(mean-standard deviation)/median

22. Graphically, data can be represented using:
    a) Box and whisker
    b) Pie charts
    c) Histograms
    d) All of the above

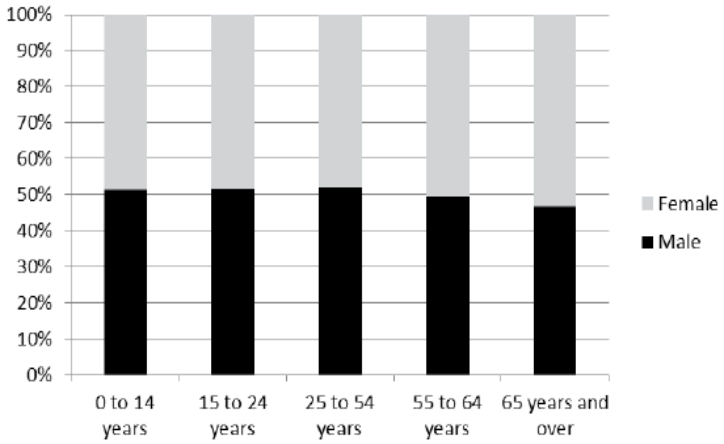
23. Calculate coefficient of skewness for the following data:

    Mean = 25, median = 10 and standard deviation = 5
    a) 3
    b) 6
    c) 9
    d) Cannot be calculated

24. Arrange following data in ascending order:

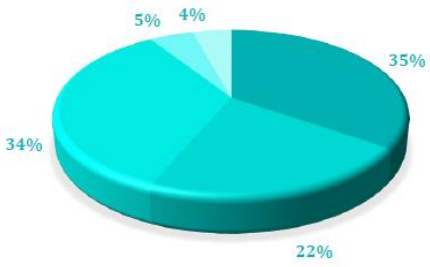
    25, 39, 45, 20 and 18
    a) 18, 20, 25, 39 and 45
    b) 20, 18, 25, 45 and 39
    c) 25, 39, 45, 20 and 18
    d) 45, 39, 25, 20 and 18

25. Identify the type of bar chart shown below:



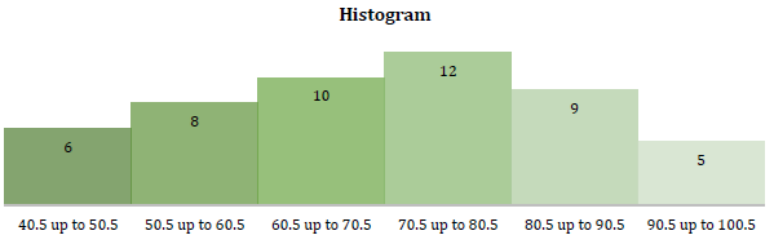
    a) Component bar chart
    b) Multiple bar chart
    c) Simple bar chart
    d) Percentage component bar chart

26. Following pie chart represents cost composition of a finished good. Cost of material of Rs. 200,000 is represented by 35%. Calculate cost of labour that is represented by 22%



a) Rs. 115,714
b) Rs. 135,714
c) Rs. 125,714
d) Rs. 105,714

27. Following histogram represents time taken in minutes to complete a particular examination by students at a university. How many students were able to complete test within 70.5 minutes?



a) 6
b) 14
c) 24
d) 10

28. A Fractile can be percentile, decile or quartile

a) True
b) False

29. Which diagram is represented below?

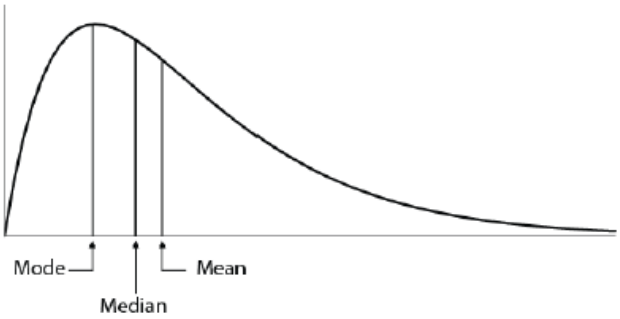
a) Stem and leaf
b) Histogram
c) Box and whiskers
d) ogive

30. ___ skewed graphs are where tail of the graph is towards right side and most of the data values are clustered around the left side of the distribution

a) Positively
b) Negatively
c) Symmetrically
d) None of the above

31. Degree of skewness of a symmetrical graph is/near to:
    a) -1
    b) 0
    c) 1
    d) None of these

32. Above graph represents:



    a) Symmetrical data
    b) Positively skewed data
    c) Negatively skewed data
    d) None of these

33. Which five values are needed to draw a box and whisker plot
    a) Lowest value, lower quartile, median, upper quartile and highest value
    b) Lowest value, lower quartile, mean, upper quartile and highest value
    c) Lowest value, lower quartile, mode, upper quartile and highest value
    d) Lowest value, median, median, mode and highest value

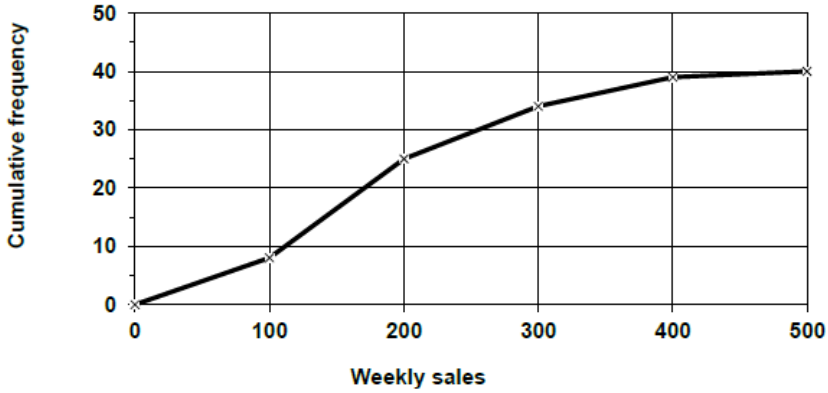
34. ___ is an example of categorical data
    a) Age
    b) Salary
    c) Gender
    d) None of the above

35. Fill the blanks in following table:

Weekly sales (units)	Frequency	Blank # 1
0 to under 100	5	5
100 to under 200	15	Blank # 2
200 to under 300	20	40
300 to under 400	7	47

    a) Cumulative frequency and 20
    b) Cumulative frequency and 15
    c) Cumulative frequency and 10
    d) None of the above

36. What is the median of the distribution on the following ogive?



a) 110
b) 180
c) 250
d) 500

37. The ___ quartile is the value under which 25% of data points are found when they are arranged in increasing order

a) First
b) Second
c) Third
d) Fourth

38. The first quartile is the 25th percentile

a) True
b) False

39. Median can be obtained by taking arithmetic average of first and third quartile

a) True
b) False

40. The width of the box in a box and whisker plot shows ___

a) Lower quartile
b) Upper quartile
c) Interquartile range
d) Median

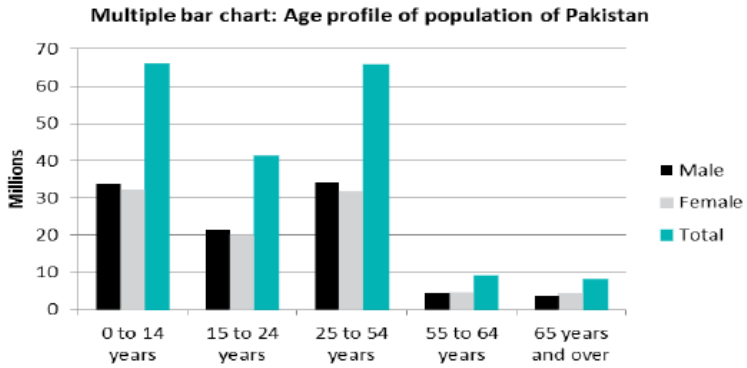
41. Identify median for the following data:

39, 35, 40, 50, 32, 33 and 90

a) 40
b) 50
c) 39
d) 32

42. Example of primary data is:
    a) Company websites
    b) Government statistics
    c) Surveys
    d) Trade publications

43. Following bar chart shows age population of Pakistan



Total population of country as per above chart is:
    a) Around 120 million
    b) Around 195 million
    c) Around 250 million
    d) Around 376 million

44. In case of unequal class intervals following method can be used to draw a histogram
    a) Adjusted frequency method
    b) Frequency density method
    c) Adjusting class interval method
    d) All of these

45. Compute coefficient of skewness for a data with:

    Mean = 5
    Median = 5
    a) -1
    b) 0
    c) 1
    d) Cannot be calculated as standard deviation is not available

46. A person erroneously calculated coefficient of skewness as 6 using formula:

    Coefficient of skewness = standard deviation / (3x (mean-median)). The correct value:
    a) Cannot be calculated due to insufficient data
    b) 1/6
    c) 18
    d) 2

47. Example of time series data is:
    a) Year-wise sales revenue over a period of time
    b) Quarterly production of units over a period of time
    c) None of the above
    d) Both A and B

48. Which of the statement is incorrect?
    a) Median is the middle number in a sorted, ascending or descending list of numbers
    b) Box and whisker plot is also known as five number summary
    c) Stem and leaf diagram is also known as five number summary
    d) None of the above

49. Types of data includes:
    a) Numerical and Categorical
    b) Discrete and continuous
    c) Ordinal and Nominal
    d) All of the above

50. Which of the following is correct?
    a) Results of sampling enquiries or a census is called raw data
    b) The data which is collected specifically for the ongoing investigation is called primary data
    c) The data which is stored after classification is called secondary data
    d) Both (a) and (b)

51. Data can be collected through which of the following method(s):
    a) Direct Observation
    b) National Census
    c) CCTV recordings
    d) All of the above

52. Which of the following statements is/are correct?
    1. A grouped frequency distribution of discrete data has gaps between the classes.
    2. Discrete data can be converted into continuous data.
    a) Only statement 1 is correct
    b) Only statement 2 is correct
    c) Both statements are correct
    d) None of the above are correct

53. Which of the following statements is correct?
    a) Bar charts are usually used for plotting continuous data
    b) Bar charts are usually used for plotting discrete data
    c) Bar charts can be plotted horizontally or vertically.
    d) Both (b) and (c)

54. Which of the following statements as regards Histogram is correct?

a) A vertical rectangle is drawn to represent each class of the frequency distribution
b) The frequency of the class is represented by the height of rectangles
c) Histogram cannot represent continuous data
d) Both (a) and (b)

55. The following stem and leaf display show the number of pizza slices eaten by contestants in a recent pizza eating contest.

3	1
4	0
5	4 7
6	2 2 6
7	0 2 5 6 9 9
8	5 7 9

Based on above data, which of the following statement is/are true?

1. The range is 57
2. The median is 71]
3. The mean is 66

a) Statement (I) only
b) Statement (II) only
c) Statement (III) only
d) All statements are correct

56. Which of the following is correct?

a) The data which is collected specifically for ongoing investigation is called raw data
b) Results of sampling enquiries or a census is called primary data
c) The data which is relevant to the investigation but was collected previously for some other purpose is called secondary data
d) Both (b) and (c)

57. If the peak of the histogram is in the middle and the frequencies on either side are similar to each other, the distribution is said to be:

a) Normal
b) Balanced
c) Binomial
d) Symmetrical

58. Which of the following statements is correct?
    a) An Ogive is the graph of a cumulative frequency distribution
    b) Median of a grouped frequency distribution can be found by constructing an Ogive
    c) An Ogive is constructed by joining the mid points of the top of each rectangle histogram with straight lines
    d) Both (a) and (b)

59. Which of the following statements is correct?
    a) A frequency polygon can be constructed by joining two symmetrical ogives
    b) A histogram can be converted to an ogive by joining the mid-point of the top of each of its rectangle with a straight line
    c) An ogive is the graph of a cumulative frequency distribution
    d) Both (a) and (b)

60. Which two of the following statements are correct?
    a) An ogive is the graph of a cumulative frequency distribution
    b) Median of a grouped frequency distribution can be found by constructing an ogive.
    c) An ogive is constructed by joining the mid points of the top of each rectangle of a histogram with straight lines
    d) An ogive is the least desirable method of presentation of data

61. Consider the following statements about mean.
    i. It must be one of the values found in the data
    ii. In case of ungrouped data, there may be more than one mean

    Which of the above statement is/are correct?
    a) Only statement 1 is correct
    b) Only statement 2 is correct
    c) Both statements are correct
    d) None of the above are correct

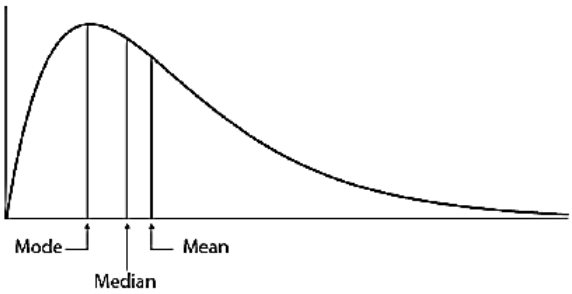
62. For a positively skewed data the difference between mean and median is 3 and standard deviation of the data is 2. Compute coefficient of skewness.
    a) 2.5
    b) 3.5
    c) 4.5
    d) 5.5

63. Following are the marks obtained by students in a twenty marks test:

    10, 15, 15, 15, 15, 18, 18, 18, 20.

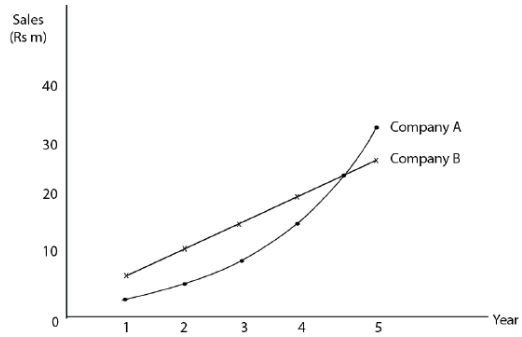
    Compute coefficient of skewness for the above data
    a) 1.09
    b) 2.09
    c) 3.09
    d) 4.09

64. The above graph represents:



a) Symmetric data
b) Negatively skewed data
c) Positively skewed data
d) Cannot be determined

65. Using above time series graph. Compute annual growth rate in sales of company B between year 4 and year 5



a) 100%
b) 75%
c) 50%
d) 25%

66. In a box and whisker diagram if the box plot is dividend in five equal parts, how much data will be covered by each part?

a) 10% of the total data
b) 10% of the data in the box
c) 20% of the data in the box
d) Both A and C

67. What is the difference between frequency polygons and frequency curve?

a) Frequency polygons represent data using smooth curve, while frequency curves represent data using straight line segments
b) Both represent data using smooth curve
c) Frequency polygons represent data using straight line segments, while frequency curves represent data using a smooth curve
d) Both represent data using straight line segments

68. Numbers on the uniform of cricket team members represent:
    a) Categorical
    b) Structured
    c) Nominal
    d) Ordinal

69. Properties of ordinal data are:
    1. Shows relative ranking of the variables
    2. Numbers have meaningful order
    3. Magnitude of the values is not important, but the order is
    a) 1 only
    b) 1 and 2 only
    c) All of the above
    d) None of the above

70. A person wants to prepare a bar chart which shows percentage of male and female population of a country bifurcated into various age groups. Which bar chart is most appropriate to represent such data?
    a) Multiple bar chart
    b) Component bar chart
    c) Simple bar chart
    d) Percentage bar chart

71. Frequency density is calculated to:
    a) Draw ogive when class intervals are not same
    b) Draw histogram when class intervals are not same
    c) Draw ogive when class intervals are same
    d) Draw histogram when class intervals are same

ANSWERS TO SELF TEST QUESTIONS

1	a	15	d	29	c	43	b	57	d	71	b
2	c	16	a	30	a	44	d	58	d		
3	a	17	c	31	b	45	b	59	c		
4	c	18	a	32	b	46	b	60	a,b		
5	c	19	a	33	a	47	d	61	d		
6	c	20	d	34	c	48	c	62	c		
7	a	21	a	35	a	49	d	63	a		
8	d	22	d	36	b	50	d	64	c		
9	d	23	c	37	a	51	d	65	d		
10	a	24	a	38	a	52	a	66	b		
11	a	25	d	39	b	53	d	67	c		
12	c	26	c	40	c	54	d	68	c		
13	a	27	c	41	c	55	b	69	c		
14	c	28	a	42	c	56	c	70	d		

CHAPTER 8

STATISTICAL MEASURES OF DATA

1. Find median for following data:

   32, 30, 35, 40 and 42

   a) 30
   b) 32
   c) 35
   d) 40

2. Identify median class for following data:

Class interval	Frequency	Cumulative frequency
5 – 10	2	2
10 – 15	10	12
15 – 20	12	24
20 – 25	5	29

   a) Class interval 5-10
   b) Class interval 10-15
   c) Class interval 15-20
   d) Class interval 20-25

3. Which of the following statement is incorrect?

   1. Median is the mid value
   2. Mode is the most frequent value
   3. Median is the most frequent value
   4. Arithmetic mean is computed as the sum of the numbers in the series divided by the count of numbers in that series

   a) 1
   b) 2
   c) 3
   d) 4

4. Calculate mean for the following data:

   30, 40, 50 and 60

   a) 35
   b) 45
   c) 55
   d) 65

5. What is the mode for the following data:

   30, 30, 45, 45, 45, 55, 55 and 60

   a) 30
   b) 45
   c) 55
   d) 60

6. For grouped data, the mean can be calculated by multiplying the ___ with the class frequencies and dividing it by sum of all frequencies

   a) Class interval
   b) Midpoints
   c) Median
   d) Mode

7. Calculate mean for following grouped data:

Class interval	Frequency
2-4	5
4-6	4
6-8	7
8-10	2

   a) 4.67
   b) 5.67
   c) 6.67
   d) 7.67

8. ___ is the number of occurrences of a particular event.

   a) Frequency
   b) Class width
   c) Class interval
   d) Midpoint

9. Calculate combined arithmetic mean for following data:

	Group A	Group B
Number of students	500	900
Mean score	40	70

   a) 58.29
   b) 59.29
   c) 60.29
   d) 61.29

10. Which of the following statement is correct?

    1. Geometric mean is useful whenever several quantities are multiplied together to arrive at a product.
    2. Harmonic mean is calculated as number of observations divided by the sum of the reciprocals of the values of each observation

    a) 1
    b) 2
    c) Both are correct
    d) Both are incorrect

11. Mr. A invested Rs. 500,000 in a mutual fund. The fund value increased by 10%, 15% and 20% in first three years respective. Therefore, the average growth rate over the three-year period is:

    a) 14.8%
    b) 14.9%
    c) 15%
    d) 15.1%

12. Calculate weighted arithmetic mean for following data:

Type of exam	Weightage	Marks
Monthly test # 1	20%	45
Monthly test # 2	20%	50
Final exam	60%	95

    a) 76
    b) 66
    c) 56
    d) 86

13. Following are the weights (in kilograms) of five bags at an airport:

    15, 20, 22, 28 and 33

    What is the range of weights of these bags?

    a) 15
    b) 33
    c) 18
    d) 13

14. ___ is the difference between the highest and lowest value in a distribution.

    a) Mean
    b) Frequency
    c) Range
    d) Median

15. Which of the following statement/statements is/are correct?

    1. Mean uses every value in the distribution
    2. Standard deviation uses every value in the distribution
    3. Median is not influenced by extreme values
    4. Mean of a discrete data may result in a figure that is not part of the data

    a) 1
    b) 1 and 2
    c) 1, 2 and 4
    d) All are correct

16. Identify mode from the following table:

Number of laptops sold per day	Frequency (days)
0	5
1	6
2	13
3	10
4	8

    a) 13
    b) 2
    c) 4
    d) 8

17. Consider the following data:

x	3	4	5	6	7
f	10	12	12	15	20

    The standard deviation of the above data is:

    a) 1.22
    b) 1.42
    c) 1.62
    d) 1.82

18. Consider the following data:

Mean	200
Standard deviation	20

    The coefficient of variation of the above data is:

    a) 20%
    b) 10%
    c) 15%
    d) 12%

19. If mean and standard deviation of a particular data increases by 10% each the coefficient of variation will:

    a) Increase
    b) Decrease
    c) Will not change
    d) Cannot be determined

20. The arithmetic mean of two observations is 50. Provided both observations are equal to each other. What is the value of each observation?

    a) 100
    b) 50
    c) 25
    d) 150

21. The arithmetic mean of two observations is 90. Provided that none of the observations is a negative value. What is the maximum value a particular observation can have?

    a) 0
    b) 90
    c) 180
    d) 20

22. The ___ the coefficient of variation, the greater the level of dispersion around the mean

    a) Higher
    b) Lower
    c) Better
    d) Shorter

23. Consider the following data:

	Coefficient of variation
Test # 1	30%
Test # 2	50%

    Above results show that:

    a) Test # 2 has greater level of dispersion around the mean in comparison to test # 1
    b) Test # 1 has greater level of dispersion around the mean in comparison to test # 2
    c) Both statements are correct
    d) Both statements are incorrect

24. Which of the following statement is/are correct?

    1. Generally if the shape of distribution is perfectly symmetric, the mean equals the median.
    2. Generally if the shape of distribution is skewed to the left, the mean is smaller than the median
    3. Generally if the shape of distribution is skewed to the right, the mean is larger than the median

    a) 1
    b) 2
    c) 3
    d) All of the above

25. Standard deviation can be calculated as mean multiplied by coefficient of variation
    a) True
    b) False

26. The mean of a particular set of observations is 25. If an individual value of 20 is deleted and mean is recalculated for remaining observations the new mean will be:
    a) Less than 25
    b) More than 25
    c) 25
    d) 20

27. Consider following data:

X
30
40
60
80

    The harmonic mean is:
    a) 44.71
    b) 45.71
    c) 46.71
    d) 47.71

28. Harmonic mean is useful in working out average speed
    a) True
    b) False

29. For grouped data ___ can be calculated by taking the difference between the "upper limit of the last class of data and the lower limit of the first class of data"
    a) Range
    b) Class interval
    c) Inter-quartile range
    d) None of these

30. The inter-quartile range is the range of the ___ 50% of the data.
    a) Last
    b) First
    c) Middle
    d) None of the above

31. Formula for inter-quartile range is:
    a) Upper quartile – Lower quartile
    b) (Upper quartile – Lower quartile) / 2
    c) Highest value – Lowest value
    d) None of the above

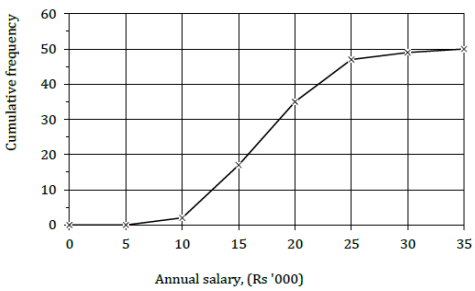
32. Which of the following statement is correct?
    1. Value of variance can be negative
    2. Value of variance can never be positive
    3. Value of variance can be positive
    4. Value of variance is always positive
    a) 1
    b) 2
    c) 3
    d) 4

33. For a set of observations the value of mean is twice the value of standard deviation. The coefficient of variation for this data will be
    a) 25%
    b) 50%
    c) 75%
    d) 100%

34. Upper quartile is equivalent to:
    a) 25th percentile
    b) 50th percentile
    c) 75th percentile
    d) 100th percentile

35. Semi interquartile range is ____ of inter-quartile range
    a) Quarter
    b) Half
    c) Two third
    d) None of the above

36. Consider the following ogive:



Calculate interquartile range:

a) Approximately 9
b) Approximately 19
c) Approximately 25
d) Approximately 37.5

37. Consider the following data:

	X	F
	5	5
	6	4
	7	2
	8	2
Total	**26**	**13**

Compute mean for above data

a) 2
b) 26
c) 6.07
d) 7.07

38. The most commonly used measure of central tendency is:

a) Mean
b) Median
c) Mode
d) None of the above

39. Which of the following statement is incorrect?

1. Mean is the most commonly used measure of central tendency
2. Advantage of calculating mean is that it takes all values into account
3. If each observation in a data set is multiplied by a constant, mean will not change
4. If each observation in a data set is multiplied by a constant, median will change

a) 1
b) 2
c) 3
d) 4

40. If all individual observations in a data set are exactly equal to each other:

a) The mean will be sum of all observations
b) The mean will be zero
c) The mean will have same value as that of any individual observation
d) None of the above

41. If all of the values in the sample are identical, the sample ___ will be zero
    a) Mean
    b) Median
    c) Mode
    d) Standard deviation

42. Mean of a perfectly symmetrical distribution is 30. The value of median:
    a) Will also be 30
    b) Will be less than 30
    c) Will be more than 30
    d) Can take any value

43. If the mean score obtained by three students in a class is 80, which of the following statement is correct?
    a) The maximum possible score of a single student cannot be more than 80
    b) The maximum possible score of a single student cannot be more than 240
    c) All students will have marks above 80
    d) None of the above statement is correct

44. Which of the following is/are correct?
    a) Mean can never be greater than median
    b) Mean can never be greater than mode
    c) Mean, median and mode are always equal to each other
    d) Mean, median and mode can be equal to each other

45. A computer while calculating mean of 5 observations obtained sum of all observations as 60. The following mistakes were discovered at the time of checking:

Wrong values recorded	Correct values that need to be recorded
12	2
15	5
10	1

    Find out the correct value of mean
    a) 6
    b) 6.2
    c) 12
    d) 6.3

46. The mean of the numbers 6, 10, a and 15 is 10.75. Find the value of a
    a) 12
    b) 10
    c) 15
    d) 15

47. Consider following data:

Class interval	15-19	20-24	25-29
Frequency	5	10	15

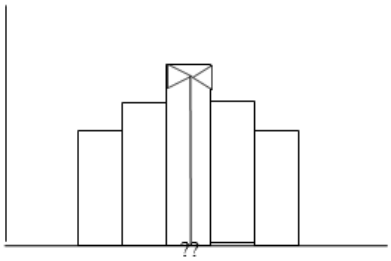
Calculate standard deviation

a) 3.63
b) 3.73
c) 3.83
d) 4.03

48. The positive square root of variance is called ___

a) Mean
b) Median
c) Standard deviation
d) None of the above

49. What is shown by the following graph?



a) Mean
b) Median
c) Mode
d) Standard deviation

50. Mean can be calculated as standard deviation divided by coefficient of variation.

a) True
b) False

51. Following is the data related to number of persons per house in a village town:

No. of persons per house	1	2	3	4	5	6	7	8	9	10
No. of houses	25	114	120	90	50	41	20	12	3	2

The mean, median and modal number of persons per house are:

a) 3.67, 3, 3
b) 3.62, 4, 5
c) 3.67, 3, 5
d) 3.42, 3, 3

52. For the following incomplete distribution of marks of 100 pupils, median mark is known to be 32.

Marks	0–10	10–20	20–30	30–40	40–50	50–60
No. of students	10	?	25	30	?	10

What is the mean mark?

a) 30.7
b) 31
c) 31.30
d) 31.50

53. Following is an incomplete distribution having modal mark as 44

Marks	0–20	20–40	40–60	60–80	80–100
No. of students	5	18	?	12	5

What would be the mean marks?

a) 45
b) 46
c) 47
d) 48

54. The mean of 100 observations is 50. If one of the observations, which was 50 is replaced by 60, the resulting mean will be:

a) 50
b) 40
c) 49.9
d) 50.1

55. The average salary of a group of unskilled workers is Rs.10000 and that of a group of skilled workers is Rs.15,000. If the combined salary is Rs.12000, then what is the percentage of skilled workers?

a) 40%
b) 50%
c) 60%
d) None of these

56. The mean annual salary of all employees in a company is Rs. 150,000. The mean annual salary of male and female employees is Rs. 162,000 and Rs. 102,000 respectively. Find the ratio of male and female employees in the company.

a) 5:4
b) 4:1
c) 6:2
d) 8:3

57. Mean of 38 values is 62, mean of 10 values is 57, find the mean of remaining 28 values:

    a) 62.58
    b) 65.27
    c) 63.12
    d) 63.786

58. Sales of product Pin May and June were 58 units and 48 units respectively. The arithmetic mean of monthly sales for the period January to April was 44 units per month. The arithmetic mean of monthly sales for the period January to June is…

    a) 39 units
    b) 40 units
    c) 47 units
    d) 50 units

59. The arithmetic mean of nine positive numbers 7, 2, q, 10, 3q, 8, q2, 10 and 5 is equal to 7. The value of q is

    a) 3
    b) 4
    c) 6
    d) 7

60. While computing the AM from a grouped frequency distribution, we assume that

    a) The classes are of equal length
    b) The classes have equal frequency
    c) All the values of a class are equal to the mid-value of that class
    d) All of these.

61. Bashir got a rise of 12%, 20% and 18% in 2021, 2022 and 2023 respectively. The average annual increase rate is:

    a) 16.5%
    b) 16.62%
    c) 17.1%
    d) 17.33%

62. A company budgets to achieve equal total sales revenue from each of its three products. The unit selling prices of the products are Rs. 15, Rs. 16 and Rs. 24 respectively. What is the budgeted mean selling price per unit?

    a) Rs 18.33
    b) Rs 17.93
    c) Rs 17.56
    d) Rs 15.85

63. In which situation, will arithmetic Mean, Harmonic Mean and Geometric Mean give the same result?

    a) When Sample size equals Population size
    b) When there are constant values in given data.
    c) When values are multiple of 2.
    d) When there are two values occurring the most number of times.

64. Consider following distribution

Daily wages (Rs.):	30–40	40–50	50–60	60–70	70–80	80–90
Frequency	8	16	22	28	?	12

The mode of the distribution is Rs. 66. What would be the median wage?

a) Rs 64
b) Rs 64.56
c) Rs 63.21
d) Rs 64.25

65. Detail of minor claims of an automobile insurance company is as follows:

Claims (Rs.000)	1-1,000	1,001-2,000	2,001-3,000	3,001-4,000	4,001-5,000
No. of Claims	5	30	60	70	80

The standard deviation and variance for the insurance companies above data is:

a) 3,276 and 57
b) 1,093 and 33
c) 1,194,502 and 1,093
d) 1,093 and 1,194,502

66. Team A scored an average of 205 runs in twenty-one-day international matches with a standard deviation of 10 whereas Team B scored an average of 190 runs in same one-day international matches with a standard deviation of 8. Which of the following is correct?

a) Team A is more consistent
b) Team B is more consistent
c) Both teams are equally consistent
d) Consistency cannot be determined from the above information

67. Consider the following statements about the frequency distribution shown below:

a) Statement
b) The lower quartile is 3
c) The median is 7
d) The upper quartile is 11

Frequency distribution

Value	1	2	3	6	7	10	11	15	20
Frequency	1	1	3	6	8	9	8	5	3

Which of the statement is/are correct?

a) Statement 1 and 2 only
b) Statement 1 and 3 only
c) Statement 2 and 3 only
d) Statement 3 only

Question Number 68 and 69 refers to following data:

The following distribution gives the marks obtained by the students in an examination.

Marks	10 – 19	20 – 29	30 – 39	40 – 49	50 – 59	60 – 69	70 – 79	80 – 89	90 – 99
Students	4	12	23	37	43	32	19	8	2

68. Calculate median (rounded) of the distribution.

a) 53
b) 48
c) 47
d) 57

69. If 10% of the students are to receive grade A, what minimum marks are required for grade A?

a) 90%
b) 75.3%
c) 65%
d) 95%

70. A moderately skewed distribution has mean = 87 and mode = 96. Using empirical relation determine median.

a) 65
b) 85
c) 90
d) 77

71. The mean of the numbers 3, 6, 7, a, 14 is 8. Find the standard deviation of the set of above numbers.

a) 2.77
b) 1.025
c) 3.74
d) 4.54

72. The mean temperature in Karachi in the month of January is 16°C with a standard deviation of 0.5°C. On January 15, the temperature is 4°C standard deviation above the mean. What is the temperature on January 15?

a) 5^0C
b) 25^0C
c) 11^0C
d) 18^0C

73. The mean and standard deviation of a sample of 100 values were found to be 104 and 4.7 respectively. Later, errors were discovered in three records enumerated below:

Sr. no.	Correct values (as per original record)	Amount taken (for computation)
58	151	115
72	78	87
89	98	89

The correct mean and standard deviation is:

a) 105.21 and 6.2
b) 107.5 and 7.2
c) 104.36 and 6.7
d) None of the above

74. The following stem and leaf display show the number of pizza slices eaten by contestants in a recent pizza eating contest.

3	1
4	0
5	4 7
6	2 2 6
7	0 2 5 6 9 9
8	5 7 9

Based on above data, which of the following statement is/are true?

i. The range is 57
ii. The median is 71
iii. The mean is 66

a) Statement (I) only
b) Statement (II) only
c) Statement (III) only
d) All statements are correct

75. Following are the ages of four students:

13, 15, 14 and 19

If one more student is added to the above list aged 21. What will be the percentage increase in range?

a) 20%
b) 25%
c) 33.33%
d) 40%

76. Consider following data:

Year	Share price in Rupees
2021	130
2022	145
2023	X
2024	Y

If the geometric mean of above data is 10%. Compute the value of x. Provided that x is 5 less than the value of y.

a) 158.03
b) 163.03
c) 168.03
d) 173.03

77. Which of the following statements is/are true:

    1. Range considers all values in the data set
    2. Geometric mean uses the value at start and value at end of period of n years
    3. Arithmetic mean can be calculated for ungrouped data only

    a) 1 only
    b) 2 only
    c) 1 and 2
    d) All of the above

78. A person will save certain amount from his salary every month for three months such that the mean saving for the first three months is Rs 60,000 per month. Provided his maximum monthly saving was Rs. 100,000 in first month and he saved 70% less in second month as compared to first month. What was his saving in the third month?

    a) Rs. 20,000
    b) Rs. 30,000
    c) Rs. 40,000
    d) Rs. 50,000

79. There are five workers working in a factory. The mean, median and mode salary of workers is Rs 31,000, Rs. 30,000 and Rs. 30,000 respectively. What is the amount of salary for the worker who is paid least provided that the range of salary is Rs 15,000

    a) Rs. 15,000
    b) Rs. 20,000
    c) Rs. 25,000
    d) Rs. 45,000

80. Two numbers are such that their standard deviation is one-third of their mean. What are the two numbers?

    a) 2 and 4
    b) 5 and 9
    c) 10 and 20
    d) None of the above

81. There are two sets of two numbers, such that the mean of the means of each set is more than the mean of the first set by 0.5 but less than the mean of the second set by 0.5. Also the standard deviation of second set of numbers is 0 and one of the two numbers in second set is 4. Which of the following statement is/are true for the above sets of numbers?

    1. One of the numbers in the second set must be 0
    2. Sum of all numbers in the first set is 6
    3. Sum of all numbers in the second set is 8

    a) 1 only
    b) 2 only
    c) 2 and 3
    d) All of the above

82. The mean value calculated for a set of three observations was found to be 3. Upon investigation it was found that each of the individual observations was understated by 1. The correction of this will:

    1. Increase sum of all numbers by 3
    2. Increase mean by 3
    3. Increase standard deviation by 1

    a) 1 only
    b) 1 and 2 only
    c) 1 and 3 only
    d) All of the above

83. Consider following data for a particular student:

Description	Weightage	Marks
Class test # 1	25%	X
Class test # 2	25%	40
Final exam	50%	90
Weighted arithmetic mean: 62.5		

    Weighted arithmetic mean: 62.5

    What marks were secured by the student in class test # 1

    a) 10
    b) 20
    c) 30
    d) 40

84. Identify acceptable limit of standard deviation for a given set of data if the coefficient of variation cannot exceed 25%.

    a) Standard deviation must be more than 25% of mean
    b) Standard deviation must be equal to 25% of mean
    c) Standard deviation must be less than or equal to 25% of mean
    d) Standard deviation must be less than 25% of mean

85. A company tracks monthly sales revenue (in $1000s) for 12 months. The average is $150,000 and SD is $5,000. If one month's revenue is $165,000, which statement is true?

    a) The revenue is 1 SD below the mean
    b) The revenue is 3 SDs above the mean
    c) The revenue is exactly 1 SD above the mean
    d) The revenue is the median

86. A marketing team measures the number of leads generated by three campaigns. If Campaign A has the highest mean but also the highest SD, what does it suggest?

    a) It's the most consistent performer
    b) It has the most stable results
    c) It has high average performance but variable results
    d) It underperforms on average

87. Two factories report the same average number of defective items per day (mean = 10), but Factory A has SD = 2 and Factory B has SD = 6. Which conclusion is correct?

    a) Factory B has more consistent production quality
    b) Factory A has more consistent production quality
    c) Both have the same production consistency
    d) SD is irrelevant in this context

88. An investor compares returns on two portfolios over 5 years. Both have the same mean annual return of 8%, but Portfolio X has a lower SD than Portfolio Y. What does this imply?

    a) Portfolio X is riskier
    b) Portfolio Y is more stable
    c) Portfolio X has more consistent returns
    d) Both portfolios have identical risk

89. A retail manager compares weekly footfall for two stores. Store A's mean footfall is 2000 with SD = 150. Store B has the same mean but SD = 600. Which is more reliable for forecasting staff needs?

    a) Store A
    b) Store B
    c) Both equally
    d) Cannot be determined

90. A data scientist is evaluating the click-through rate (CTR) on two different web ads. Both have the same mean CTR of 2.5%. Ad A has a standard deviation of 0.3%, while Ad B has a standard deviation of 1.2%. What can be inferred?

    a) Ad A's CTR is more predictable
    b) Ad B has a better average performance
    c) Ad A performs worse due to lower variability
    d) Standard deviation doesn't apply to CTR

91. A professor calculates the average test score for two classes. Class X has a mean of 75 and SD of 10, Class Y has a mean of 75 and SD of 3. What does this suggest about Class Y?

    a) Class Y has more high achievers
    b) Class Y's students are more consistent in their scores
    c) Class Y is underperforming
    d) Class Y has more variance in learning styles

92. A logistics company records delivery times. If the mean is 2 days and SD is 0.5 days, what is the delivery time range within 2 standard deviations (assuming normal distribution)?

    a) 0.5 to 2.5 days
    b) 1 to 3 days
    c) 1.5 to 2.5 days
    d) 1 to 2 days

93. A startup's monthly expenses have a mean of $50,000. In the past 12 months, one month saw $120,000 in expenses. This value is:

    a) An outlier likely affecting the mean
    b) A good sign of business expansion
    c) Indicative of a decrease in SD
    d) Proof of financial stability

94. Two machines produce metal rods. Both produce rods with an average length of 50cm. Machine A's SD is 0.2 cm; Machine B's SD is 0.8 cm. Which machine is more precise?

    a) Machine A
    b) Machine B
    c) Both are equally precise
    d) Cannot be determined

95. An HR manager checks employee satisfaction scores across departments. Mean score = 7/10. SD in Department X is 0.5 and in Department Y is 2.2. What does this imply?

    a) Department Y has more divided opinions
    b) Department X has higher satisfaction
    c) Department X needs training
    d) Mean is irrelevant here

96. In investment analysis, a portfolio has a mean annual return of 10% and a standard deviation of 0%. What does this indicate?

    a) Portfolio is risky
    b) Portfolio has fluctuating returns
    c) Portfolio returns are constant every year
    d) There is insufficient data

97. A company's salary distribution shows a mean salary of $80,000, median of $65,000, and mode of $60,000. What can be inferred about the distribution?

    a) It is symmetric
    b) It is negatively skewed
    c) It is positively skewed
    d) Cannot determine from this data

98. In a health study, the distribution of age at death shows a long left tail. What type of skewness is present?

    a) Symmetric
    b) Positive skew
    c) Negative skew
    d) Bimodal distribution

99. Which of the following best describes a negatively skewed distribution?

    a) Most data are concentrated at the lower end
    b) Mean is greater than median
    c) Tail is stretched toward positive values
    d) Median is greater than mean

100. A real estate analyst finds the distribution of home prices has a high positive skew. What is the best measure of central tendency to report?

a) Mean
b) Median
c) Mode
d) Range

101. A histogram of customer waiting times at a bank is heavily right-skewed. What does this indicate about most customers' experience?

a) Most customers wait a long time
b) Most customers wait a short time, but a few wait a lot longer
c) Wait times are evenly distributed
d) The mean and median are equal

102. A skewness value of -2.3 for a data set implies:

a) Strong positive skew
b) Symmetry in the data
c) Strong negative skew
d) No skew

103. The distribution of exam scores in a course is negatively skewed. Which of the following is most likely true?

a) Most students failed the exam
b) A few students got very low scores, dragging the mean down
c) Mean = Median = Mode
d) There are no outliers

104. Which of the following data types is most likely to be positively skewed?

a) Heights of adult men
b) Daily temperatures in spring
c) Incomes in a large city
d) Number of goals in football matches

ANSWERS TO SELF TEST QUESTIONS

1	c	16	b	31	a	46	a	61	b	76	c	91	b
2	c	17	b	32	d	47	b	62	c	77	b	92	b
3	c	18	b	33	b	48	c	63	b	78	d	93	a
4	b	19	c	34	c	49	c	64	c	79	c	94	a
5	b	20	b	35	b	50	a	65	d	80	a	95	a
6	b	21	c	36	a	51	a	66	b	81	c	96	c
7	b	22	a	37	c	52	c	67	d	82	a	97	c
8	a	23	a	38	a	53	d	68	a	83	c	98	c
9	b	24	d	39	c	54	d	69	b	84	c	99	d
10	c	25	a	40	c	55	a	70	c	85	b	100	b
11	b	26	b	41	d	56	b	71	c	86	c	101	b
12	a	27	b	42	a	57	d	72	d	87	b	102	c
13	c	28	a	43	b	58	c	73	c	88	c	103	b
14	c	29	a	44	d	59	a	74	b	89	a	104	c
15	d	30	c	45	b	60	c	75	c	90	a		

CHAPTER 9

INDICES

1. Which of the following are uses of index numbers?

   1. It can help in determining purchasing powers and real income.
   2. It can help in exploring trends prevailing at the market.
   3. It can be used to get feel of the economic tendencies, inflation and deflation.

   a) 1 and 2
   b) 1 and 3
   c) 2 and 3
   d) All of the above

2. Purchasing power can be calculated as:

   a) 100/consumer price index
   b) Consumer price index x 100
   c) Consumer price index / 100
   d) None of the above

3. Real wages can be calculated as:

   a) Purchasing power x nominal wages
   b) Purchasing power / nominal wages
   c) 100 / nominal wages
   d) 100 / purchasing power

4. Purchasing power can be calculated as:

   a) Real wages / nominal wages
   b) Nominal wages / real wages
   c) Consumer price index x real wages
   d) None of the above

5. The following data represents the price of a product over a number of years:

	Price
2020	200
2021	250
2022	270
2023	300

   Compute percentage price increase between 2020 and 2023.

   a) 25%
   b) 100%
   c) 50%
   d) 30%

6. The following data represents the price of a product over a period of two years:

	Price
2022	200
2023	250

Considering 2022 as base year calculate simple price index for 2023.

a) 105
b) 115
c) 125
d) None of the above

7. ___ measures price changes with base year quantities taken as weights.

a) Laspeyre price index
b) Paasche price index
c) Fisher price index
d) None of the above

8. ___ measures price changes with current year quantities as weights.

a) Laspeyre price index
b) Paasche price index
c) Fisher price index
d) None of the above

9. ___ are statistical devices that are used to express the relationship between quantitative variables

a) Index numbers
b) Real wages
c) Nominal wages
d) None of the above

10. Indices are calculated with reference to a __ number which is usually given a value of 100 or 1,000

a) Base
b) Chain
c) Odd
d) Even

11. Fishers index is said to be ___ mean of Paasche and Laspeyre index

a) Harmonic
b) Arithmetic
c) Geometric
d) None of the above

12. In order to calculate Laspeyre quantity index we need_____ as weights:

a) Base year prices
b) Current year prices
c) Prices of a future year
d) None of the above

13. In order to calculate Laspeyre price index we need _____ as weights:

    a) Base year quantities
    b) Current year quantities
    c) Quantities of a future year
    d) None of the above

14. Calculate Paasche's quantity index if:

    1. $\Sigma(P1 \times Q1) = 250$
    2. $\Sigma(P1 \times Qo) = 200$

    a) 105
    b) 115
    c) 125
    d) 135

15. Calculate Laspeyre price index if:

    1. $\Sigma(P1 \times Qo) = 300$
    2. $\Sigma(Po \times Qo) = 200$

    a) 125
    b) 150
    c) 175
    d) 200

16. The index number for base year is mostly:

    a) 200
    b) 300
    c) 100
    d) 5

17. Consider following data:

	2022	2023
Nominal wages	15,000	20,000
Real wages	15,000	16,000

    Compute consumer price index for the year 2023

    a) 110
    b) 125
    c) 135
    d) 145

18. Use the following consumer price indices to find purchasing power of Rupee for each year:

Year	2021	2022	2023
CPI	100	115	150

a) 2021: 1, 2022: 0.77 and 2023: 0.67
b) 2021: 1, 2022: 0.87 and 2023: 0.67
c) 2021: 1, 2022: 0.57 and 2023: 0.67
d) 2021: 1, 2022: 0.87 and 2023: 0.67

19. Use the following purchasing power of rupee to find consumer price indices for each year:

Year	2021	2022	2023
Purchasing power	1	0.57	0.67

a) 2021: 100, 2022: 175.44 and 2023: 149.25
b) 2021: 100, 2022: 149.25 and 2023: 175.44
c) 2021: 100, 2022: 149.25 and 2023: 159.25
d) 2021: 100, 2022: 175.44 and 2023: 137.25

20. Purchasing power x consumer price index =

a) 50
b) 100
c) 150
d) 200

21. Fisher index number =

a) Geometric mean of (Laspeyre index x Paasche index)
b) Geometric mean of (Laspeyre index / Paasche index)
c) Geometric mean of (Laspeyre index x 250)
d) None of the above

22. Calculate simple aggregate price index for the year 2023 for following data considering 2022 as base year

Product	Prices in 2022	Prices in 2023
A	50	55
B	60	64
C	70	79

a) 105
b) 110
c) 115
d) 120

23. Consider following data:

Product	Prices in 2022	Prices in 2023
A	50	54
B	60	?
C	70	72

Simple aggregate price index for the year 2023 taking 2022 as base year is 110. Compute the price of product B in the year 2023.

a) 66
b) 72
c) 54
d) 65

24. Index numbers calculated for the price of a particular product assuming 2023 as base year are as under:

2021	100
2022	110
2023	126

This suggests that:

a) The price of the product has increased by 26% between 2021 and 2022
b) The price of the product has increased by 10% between 2021 and 2022
c) The price of the product has increased by 16% between 2022 and 2023
d) All above statements are incorrect

25. Index numbers calculated for the price of a particular product assuming 2021 as base year are as under:

2021	100
2022	110
2023	126

What is the percentage price increase between 2022 and 2023?

a) 14.55%
b) 13.55%
c) 15.55%
d) 14%

26. A ___ index is an index number in which the value of any given period is related to the value of its immediately preceding period.

a) Chain
b) Base
c) Linked
d) None of the above

27. A ___ base index is an index number in which the value of any given period is related to the value in the initial time period and this base remains unchanged throughout the index.

    a) Chain
    b) Linked
    c) Fixed
    d) None of the above

28. Consumer price index measures the cost of a consumer basket (goods and services) purchased by a typical urban family at a point in time as compared to the base year.

    a) True
    b) False

29. Index numbers assuming 2019 as base year are as under:

2019	100
2020	105
2021	109
2022	115
2023	140

    Calculate the index for 2022 on Chain base Method:

    a) 105.5
    b) 106
    c) 121.74
    d) 103.81

30. A company increased the wages of its workers by 20% between 2022 and 2023, whereas the consumer price index changed from 150 to 180. The real wages has:

    a) Decreased by 20%
    b) Increased by 20%
    c) Remained unchanged
    d) Cannot be determined

31. A company increased the wages of its workers from Rs. 300,000 to Rs. 360,000 per annum, whereas the consumer price index changed from 115 to 140. The real wages has:

    a) Decreased
    b) Increased
    c) Remained unchanged
    d) Cannot be determined

32. If Laspeyre index is same and equal to Paasche index then Fisher index will:

    a) Also be same and equal to Laspeyre index
    b) Not be same and less than Laspeyre index
    c) Be twice of the Laspeyre index
    d) Be thrice of the Laspeyre index

33. If Laspeyre index is 120 and Paasche index is twice Laspeyre index then Fisher index will be:

    a) 139.71

    b) 149.71

    c) 159.71

    d) 169.71

34. Which of the following is/are correct?

    1. Consumer price indices measure changes in price levels over time.
    2. Laspeyre price index measures price changes with reference to the quantities of goods in the basket at the date that the index was first established.
    3. Paasche price index measures price changes with reference to current quantities of goods in the basket.

    a) 1 and 2

    b) 2 and 3

    c) 1 and 3

    d) All three are correct

35. Which of the following is/are correct?

    1. Fisher index is computed for a given period by taking the square root of the product of the Paasche index value and the Laspeyre index value.
    2. Fisher index is said to be geometric mean of the Paasche and Laspeyre indices.
    3. Purchasing power can be calculated if consumer price index is given.

    a) 1 and 2

    b) 1 and 3

    c) 2 and 3

    d) All three are correct

36. Consider following data:

Year	Index
2020	90
2021	100
2022	110
2023	120

    The data suggests that base year is:

    a) 2020

    b) 2021

    c) 2022

    d) 2023

37. The index number for the year 2018 is 120, if there is a 20% increase in prices during 2018 and 2019 what will be the index number for 2019?

    a) 140

    b) 143

    c) 144

    d) 145

38. Deflation is:
    a) Same as inflation
    b) Reduction in the purchasing power
    c) Reduction of the general level of prices in an economy
    d) Increase in the general level of prices in an economy

39. Real wages is income expressed in terms of purchasing power as opposed to actual money received.
    a) True
    b) False

40. Which of the following is correct?
    1. Nominal wage is the literal amount of money you get paid.
    2. Real wage is income expressed in terms of purchasing power as opposed to actual money received.
    3. Real wages is always less than nominal wages.
    a) 1 and 2
    b) 1 and 3
    c) 2 and 3
    d) All three are correct

41. ___ is the sum of gross value added by all resident producers in the economy.
    a) Consumer price index
    b) Purchasing power
    c) Gross domestic product
    d) None of the above

42. Nominal GDP for the year 2022 is 260 and the price of output has increased significantly from base year for each of the product produced. This implies that Real GDP will be:
    a) Same as nominal GDP
    b) More than nominal GDP
    c) Less than nominal GDP
    d) 50% less than nominal GDP

43. Real GDP can be calculated as:
    a) Quantity of output in the current year x price of output in the current year
    b) Quantity of output in the base year x price of output in the current year
    c) Quantity of output in the base year x price of output in the base year
    d) Quantity of output in the current year x price of output in the base year

44. GDP deflator can be calculated as:
    a) Nominal GDP x Real GDP
    b) Real GDP / Nominal GDP
    c) Nominal GDP / Real GDP
    d) Real GDP x Nominal GDP

45. In the calculation of ____ price index, the denominator does not change from year to year.

    a) Laspeyre
    b) Paasche
    c) Fisher
    d) Wages

46. In the calculation of ____ price index, the denominator has to be recalculated every year to take account of the most recent quantities consumed.

    a) Laspeyre
    b) Paasche
    c) Fisher
    d) Wages

47. Laspeyre price index tends to overstate inflation whereas the Paasche price index tends to understate it. This is because consumers react to price increases by changing what they buy.

    a) True
    b) False

48. Fishers index is also known as:

    a) Ideal index
    b) Real index
    c) Trusted index
    d) None of the above

49. Which of the following is / are correct?

    1. Sometimes an index is adjusted to change its base year.
    2. Base year of index is never changed.
    3. Fisher index is known as ideal index.

    a) 1 and 2
    b) 1 and 3
    c) 2 and 3
    d) All are correct

50. Index Numbers assuming 2019 as base year are as under:

2019	100
2020	110
2021	125
2022	145
2023	150

    Calculate the index for each year on Chain Base Method.

    a) 100, 110, 113.62, 116, 103.51
    b) N/A, 110, 113.64, 116, 103.45
    c) 100, 110, 113.64, 116, 103.41
    d) 100, 110, 113.64, 116, 103.45

Data for questions 51 to 53

The following data represents the average monthly take-home salary of the employees of an organization:

Year	2015	2016	2017	2018
Pay (Rs.)	12,350	13,500	14,800	16,500
Price Index	110.1	122.3	137.6	160.2

51. Compute the real wages for each of the above years.

a) 11217, 11038, 10766, 10300
b) 11217, 11038, 10756, 10330
c) 11217, 11138, 10756, 10300
d) 11217, 11038, 10756, 10300

52. Compute the amount of pay needed in 2018 to provide buying power equal to that enjoyed in 2016.

a) 10,300
b) 17,864
c) 17,684
d) None of these

53. If the current year's weighted index is 5% higher than the base year and Fisher's Ideal Index Number is 250, find out the Laspeyre's Price Index Number and Paasche's Price Index Number.

a) 243 and 256
b) 244 and 256
c) 243 and 255
d) None of these

54. The _____ index fails to account for the fact that people will buy less of those items which have risen in price more than others. These are retained in the index with the same weighting even though the volume of consumption has fallen.

a) Paasche
b) Laspeyre
c) Fisher
d) Marshal

55. The _____ index is based on the most recent quantities purchased. This means that it has a focus which is biased to the cheaper items bought by consumers as a result of inflation.

a) Paasche
b) Laspeyre
c) Fisher
d) Marshal

56. Consider following data

Ingredients	Jan 20x2 (Base Period)		Dec 20x5 (current period)	
	Price per kg	Kg per unit	Price per kg	Kg per unit
A	3.00	10.00	3.95	11.00
B	9.00	3.00	9.90	2.50
C	1.00	2.00	0.95	3.00
D	2.00	2.00	4.50	5.00

Using Paasche Quantity index as at Dec 20x5, which of the following statement is correct?

a) Prices have risen by 8.73% between Jan 20x2 and Dec 20x5

b) Prices have risen by 16.79% between Jan 20x2 and Dec 20x5

c) Prices have risen by 27.14% between Jan 20x2 and Dec 20x5

d) Prices have risen by 36.57% between Jan 20x2 and Dec 20x5

57. Chemical King Company (CKC) produces a special industrial chemical that is a blend of four chemical ingredients. The prices at the beginning and the end of year of each material and quantities required to make one unit of finished product are given below:

Ingredients	Jan 20X2 (Base Period)		Dec 20X5 (Current Period)	
	Price per kg	Kg per unit	Price per kg	Kg per unit
A	2.50	10.00	3.95	11.00
B	8.75	3.00	9.90	2.50
C	0.99	2.00	0.95	3.00
D	4.00	2.00	4.50	5.00

Using Laspeyre price index as at Dec 20X5, which of the following statement is correct?

a) Prices have risen by 30.82% between Jan 20X2 and Dec 20X5
Prices have risen by 23.56% between Jan 20X2 and Dec 20X5

b) Prices have risen by 22.67% between Jan 20X2 and Dec 20X5
Prices have risen by 29.31% between Jan 20X2 and Dec 20X5

58. The price relatives of three commodities are given below:

Year	A	B	C
2013	100	105	102
2014	106	100	100

The chain indices for each commodity are:

a) 94, 105 and 102 respectively

b) 106, 95 and 98 respectively

c) 106, 105 and 102 respectively

d) 106, 95 and 102 respectively

59. Which of the following statements is correct about Laspeyre price index?

a) It fails to account for the fact that people will buy less of those items which have risen in price

b) The denominator in the Laspeyre price index has to be recalculated every year to take account of the most recent quantities consumed.

c) It is based on most recent quantities purchased.

d) It tends to understate inflation

60. Which of the following is correct about Laspeyre price index?

a) It has a focus which is biased to the cheaper items bought by consumers as a result of inflation.

b) The denominator in the Laspeyre price index has to be recalculated every year to take account of the most recent quantities consumed.

c) It is based on quantities bought in the base year

d) It tends to understate inflation

61. Which of the following is correct about Paasche index?

a) It fails to account for the fact that people will buy less of those items which have risen in prices.

b) The denominator in the Paasche price index does not change from year to year.

c) It is based on the most recent quantities purchased

d) It tends to overstate inflation

62. Taha wants to find out the real growth in his sales revenue. Using following information compute real growth in sales revenue:

	Sales (Rs million)	Inflation index
Year 1	24	120
Year 2	60	150

a) 80%

b) 120%

c) 150%

d) 100%

63. Following are the details about Annual salary of a person:

Year	Salary (Rs)	Inflation index
2023	3,000,000	110
2024	?	120

Compute the percentage increment in salary if the company's policy is to increase salary every year by inflation rate + 2%

a) 2%

b) 22%

c) 12%

d) 11.09%

64. The real wages of a person decreases if:

a) the rate of increment in nominal wages is more than the rate of inflation
b) the rate of inflation is less than the rate of increment in nominal wages
c) the rate of increment in nominal wages is less than the rate of inflation
d) the rate of increment in nominal wages is same as rate of inflation

65. A laspeyre price index of 90 shows that prices have:

a) increased by 10% if same quantity of goods are bought this year as base year
b) increased by 90% if same quantity of goods are bought this year as base year
c) decreased by 10% if same quantity of goods are bought this year as base year
d) decreased by 90% if same quantity of goods are bought this year as base year

66. Which of the following values for Paasche price index is impossible:

a) 118
b) 120
c) 82
d) All values are possible

67. An increase in the price of commodities may suggest an increase in the value of GDP, however this must be adjusted for changes in cost of commodities to determine real GDP.

a) True
b) False

68. A company gives annual increment to its workers such that the increment counters inflation as well as increases the real wages of workers by 20%. If the rate of inflation between years 2023 and 2024 is 10%. By what percentage must the nominal wages increase to abide by company policy?

a) 20%
b) 10%
c) 30%
d) 32%

69. Consider following information:

Year	Units sold	Sales revenue (Rs.)
2023	150	37,500
2024	300	

Inflation between two years is 10%. The company wants to increase selling price by 3% + the rate inflation. Compute sales revenue for 2024.

a) Rs. 74,750
b) Rs. 80,750
c) Rs. 84,750
d) Rs. 94,750

70. Which of the following values is not used to calculate Paasche price index?

    a) Current year price
    b) Base year price
    c) Current year quantity
    d) Base year quantity

71. Annual inflation can be calculated as:

    a) Change in consumer price index from previous year / consumer price index of previous year x 100
    b) Consumer price index of previous year / Change in consumer price index from previous year x 100
    c) Consumer price index for current year / 2
    d) Change in consumer price index from previous year x consumer price index of previous year

72. Sarah works in a company that has offered her a 5% raise. However, the CPI increased from 180 to 198 over the year. Should she accept the raise based on real wage calculation?

    a) Yes, because 5% is higher than inflation
    b) No, because real wages are falling
    c) Yes, because CPI is not relevant to salaries
    d) No, because CPI increase means salary stays same

73. In 2010, Alex earned $40,000 when the CPI was 100. In 2020, he earns $55,000, but the CPI has risen to 150. Has Alex's purchasing power improved?

    a) Yes, real wage increased
    b) No, real wage decreased
    c) Stayed the same
    d) Insufficient data

74. Ali is offered a job in 2024 with a salary of $70,000. The CPI is 175 (base year = 100). What is the real wage in base-year dollars?

    a) $40,000
    b) $60,000
    c) $80,000
    d) $70,000

75. An expat in Country A earns $60,000 (CPI = 120). A friend in Country B earns $55,000 (CPI = 100). Who has more purchasing power?

    a) Country A's worker
    b) Country B's worker
    c) Both have equal
    d) Cannot be compared

76. A pensioner receives $30,000 fixed yearly since 2015. CPI was 100 in 2015 and is now 160. What has happened to their purchasing power?

    a) Increased
    b) Remained the same
    c) Decreased
    d) Not affected

77. A 3-year job contract offers a fixed annual salary of $60,000. CPI at the start is 100, and at the end of the 3 years is 130. What happens to the employee's real income?

    a) It increases by 30%
    b) It remains unchanged
    c) It decreases due to inflation
    d) It increases due to job security

78. A company includes a salary adjustment clause: "Annual salary will rise with inflation." CPI increases from 200 to 220 over the year. If the salary last year was $100,000, what should the adjusted salary be?

    a) $110,000
    b) $102,000
    c) $120,000
    d) $110,500

79. Last year, a company gave a $5,000 bonus. This year, it gives the same bonus, but CPI rose from 150 to 180. What is the real value of this year's bonus compared to last year?

    a) Increased
    b) Decreased
    c) Remained the same
    d) Cannot be determined

80. You compare two job offers:

    - Job A: $75,000 salary, CPI = 150
    - Job B: $85,000 salary, CPI = 180

    Which job offers better purchasing power?

    a) Job A
    b) Job B
    c) Both equal
    d) Depends on taxation

81. A retired teacher receives a pension that does not adjust for inflation. In 5 years, CPI rises from 110 to 150. By what percentage has their purchasing power dropped?

    a) 27%
    b) 40%
    c) 36%
    d) 30%

ANSWERS TO SELF TEST QUESTIONS

1	d	15	b	29	a	43	d	57	a	71	a
2	a	16	c	30	c	44	c	58	b	72	b
3	a	17	b	31	a	45	a	59	a	73	a
4	a	18	b	32	a	46	b	60	c	74	b
5	c	19	a	33	d	47	a	61	c	75	b
6	c	20	b	34	d	48	a	62	d	76	c
7	a	21	a	35	d	49	b	63	d	77	c
8	b	22	b	36	b	50	d	64	c	78	c
9	a	23	b	37	c	51	d	65	c	79	b
10	a	24	b	38	c	52	c	66	d	80	a
11	c	25	a	39	a	53	b	67	a	81	a
12	a	26	a	40	a	54	b	68	d		
13	a	27	c	41	c	55	a	69	c		
14	c	28	a	42	c	56	d	70	d		

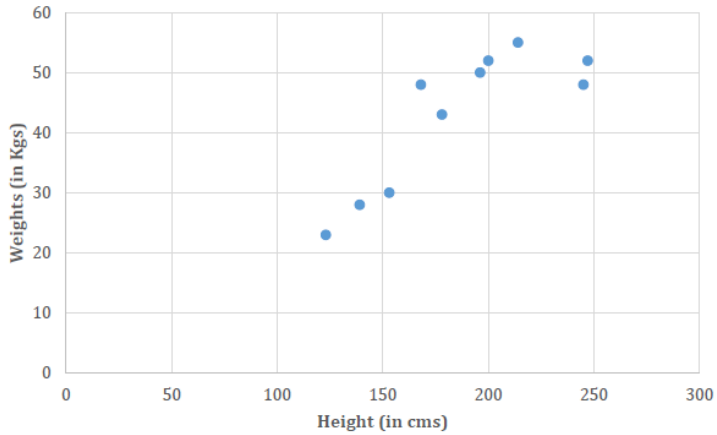
CHAPTER 10

CORRELATION AND REGRESSION

1. A scatterplot is a graphical display for two quantitative variables using the horizontal axis for independent variable and the vertical axis for the dependent variable

   a) True
   b) False

2. Consider following scatter plot:



   It can be inferred that:

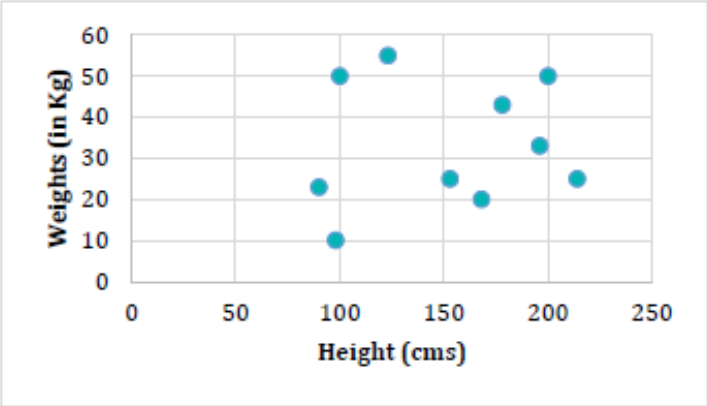
   a) People with greater heights are weighing more
   b) People with shorter heights are weighing more
   c) People with greater heights are weighing less
   d) None of the above

3. Which of the following is/are correct?

   1. Positive association is when value of y goes up with the increasing value of x
   2. Negative association is when value of y goes down with the increasing value of x
   3. There seems to be no association between variables if values of y fail to follow any pattern with changing values of x.

   a) 1 and 2
   b) 1 and 3
   c) 2 and 3
   d) All of the above

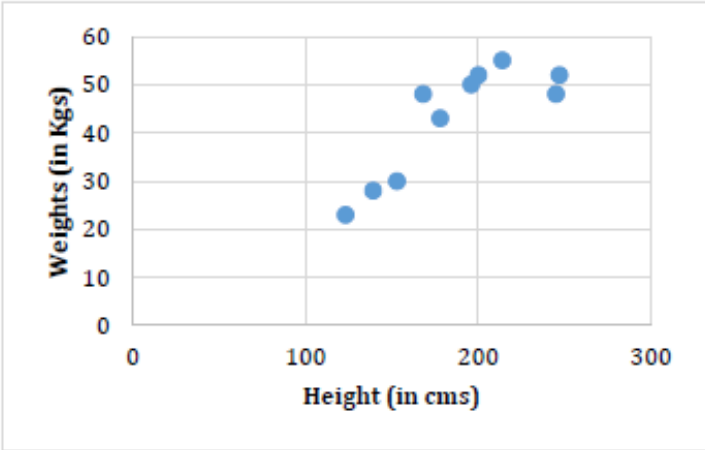
4. Consider following scatter plot:



The scatter plot suggests:

a) Positive association between height and weight.
b) Negative association between height and weight.
c) No association between height and weight.
d) None of the above.

5. Consider following scatter plot:



The scatter plot suggests:

a) Positive association between height and weight
b) Negative association between height and weight
c) No association between height and weight
d) None of the above

6. If scatter diagram for units on x-axis and total cost incurred to produce units on y-axis is plotted. It will show:

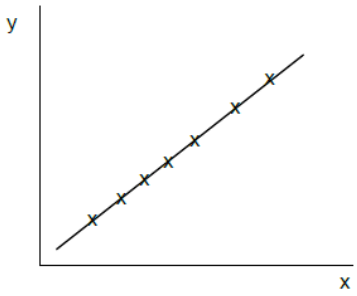
a) Positive association
b) Negative association
c) No association
d) None of these

7. For a positive association the dots' pattern on scatter diagram slopes from lower to upper ___
   a) right ,left
   b) left, right
   c) right, right
   d) left, left

8. Examples of positive correlations are
   a) The higher the temperature, the more ice creams are sold
   b) The older the car, more maintenance cost is needed
   c) None of the above
   d) Both A and B

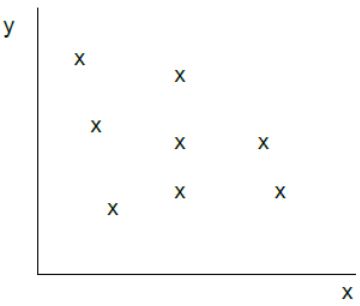
9. Identify correct statement
   a) A positive value of correlation coefficient indicates negative association
   b) A negative value of correlation coefficient indicates negative association
   c) A negative value of correlation coefficient indicates positive association
   d) No association is indicated by a negative value of correlation coefficient

10. Consider following:



Correlation coefficient for above data will be:
   a) -1
   b) 0S
   c) +1
   d) It can be between 0 and +1

11. Consider following:



Above diagram may represent:

a) Number of units produced on x-axis and total cost of production on y-axis
b) Age of car on x-axis and value of car on y-axis
c) IQ level of students in a class on x-axis and weight of students on y-axis
d) None of the above

12. For a negative correlation. The value of correlation coefficient is:

a) Closer to +1
b) Equal to 1
c) Equal to 0
d) Closer to -1

13. Correlation does indicate causation

a) True
b) False

14. ___ means there is a statistical association between variables. ___ means that a change in one variable causes a change in another variable

a) Blank # 1: correlation and blank # 2: causation
b) Blank # 1: causation and blank # 2: correlation
c) Blank # 1: causation and blank # 2: causation
d) Blank # 1: correlation and blank # 2: correlation

15. Consider the following formula to calculate correlation coefficient:

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{(n\sum x^2 - (\sum x)^2)(n\sum y^2 - (\sum y)^2)}}$$

n in the formula represents:

a) Sum of x values
b) Sum of y values
c) The number of pairs of value for x and y
d) None of the above

16. Coefficient of determination is the ___ of the correlation coefficient

a) Cube root
b) Square root
c) Cube
d) Square

17. The value of ___ shows how much variations in the value of y are explained by variations in the value of x

a) Coefficient of determination
b) Coefficient of non-determination
c) Coefficient of correlation
d) Coefficient of non-correlation

18. Which of the following is not a possible value of Correlation coefficient?
    a) -1
    b) 0.5
    c) 0
    d) +1.5

19. Which of the following is not a possible value of coefficient of determination?
    a) 25%
    b) 50%
    c) 100%
    d) 120%

20. Consider following formula:

$$r = 1 - \frac{6\sum d^2}{n(n^2 - 1)}$$

    The formula is used to calculate:
    a) Coefficient of determination
    b) Correlation coefficient
    c) Spearman's rank correlation coefficient
    d) None of the above

21. Line of best fit is the line that:
    a) Minimises the sum of the squared deviations or residuals between line and the actual values
    b) Maximises the sum of the squared deviations or residuals between line and the actual values
    c) Equates the sum of the squared deviations or residuals between line and the actual values
    d) None of the above

22. Calculate coefficient of determination for a data with correlation coefficient of 0.7
    a) 70%
    b) 29%
    c) 39%
    d) 49%

23. Coefficient of determination can be negative if correlation coefficient is negative and vice versa.
    a) True
    b) False

24. Consider following data:

X	Y
1	3
2	2
3	1

The value of spearman's rank correlation for data is:

a) -1
b) 0
c) +1
d) 0.5

25. Consider following data:

X	Y
1	150
2	170
3	190

The value of correlation coefficient for data is:

a) +1
b) -1
c) 0
d) 0.5

26. If coefficient of determination is 64%, the value of correlation coefficient will be:

a) 0.8
b) -0.8
c) None of the above
d) Both A and B are possible

27. Line of best fit can be:

a) Upward sloping
b) Downward sloping
c) None of the above
d) Both A and B are possible

28. Which TWO of the following statements are correct?

a) A scatterplot is a graphical display for two quantitative variables
b) A positive value for Correlation coefficient indicates positive association
c) Coefficient of determination is the square root of the correlation coefficient
d) The value of the coefficient of determination must always be in the range -1 to +1

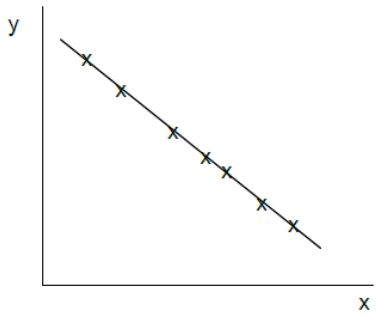
29. Which TWO of the following statements are correct?

a) A regression line should only be used for forecasting if there is a good fit between the line and the data
b) The coefficient of determination can take negative values
c) Spearman's rank correlation coefficient is calculated when variables are based on rank or order rather than their magnitude
d) Correlation coefficient might be greater than +1 in some special circumstances

30. Which of the following correlation coefficient values indicates perfectly positive correlation:

a) -1
b) 0
c) +1
d) None of these

31. Consider following scatter diagram:



The pair of values that possibly represent above scatter diagram are:

a) (1, 150), (2, 130), (3, 110) and (4, 90)
b) (1, 150), (2, 140), (3, 110) and (4, 90)
c) (1, 150), (2, 130), (3, 120) and (4, 90)
d) (1, 150), (2, 130), (3, 110) and (4, 60)

32. If Σ = 21, Σ = 21, Σ = 87, = 6, Σ2 = 91 and Σ2 = 91 the correlation coefficient would be:

a) 0.67
b) 0.77
c) 0.87
d) 0.97

33. If $\Sigma x = 21$ then Σx^2 would be:

a) 42
b) 4.58
c) 441
d) Cannot be determined

34. If $\Sigma y = 20$ then $(\Sigma y)^2$ would be:

a) 40
b) 4.47
c) 400
d) Cannot be determined

35. If y = 150 + 20x then value of x+5 when value of x = 4 would be:

a) 230
b) 235
c) 9
d) 5

36. Formula for spearman's rank correlation is:

a) $r = \frac{\Sigma(x-\bar{x})(y-\bar{y})}{n(s_x s_y)}$

b) $r = \frac{n\Sigma xy - \Sigma x \Sigma y}{\sqrt{(n\Sigma x^2 - (\Sigma x)^2)(n\Sigma y^2 - (\Sigma y)^2)}}$

c) $r = 1 - \frac{6\Sigma d^2}{n(n^2-1)}$

d) None of the above

37. Formula for correlation coefficient is:

a) $r = \frac{\Sigma(x-\bar{x})(y-\bar{y})}{n(s_x s_y)}$

b) $r = \frac{n\Sigma xy - \Sigma x \Sigma y}{\sqrt{(n\Sigma x^2 - (\Sigma x)^2)(n\Sigma y^2 - (\Sigma y)^2)}}$

c) $r = 1 - \frac{6\Sigma d^2}{n(n^2-1)}$

d) Both A and B

38. Consider following equation of line of best fit:

$\hat{y} = a + bx$.

b can be calculated as:

a) $\frac{\Sigma(x-\bar{x})(y-\bar{y})}{\Sigma(x-\bar{x})^2}$

b) $\frac{n\Sigma xy - \Sigma x \Sigma y}{n\Sigma x^2 - (\Sigma x)^2}$

c) None of the above

d) Both A and B are correct

39. Consider following data:

X
4
5
6

Σ□^{2} =

a) 125

b) 225

c) 77

d) None of the above

40. Consider following data:

$\Sigma x = 41.8$, $\Sigma y = 268.3$, $\Sigma xy = 1{,}885.91$, $n = 6$ and $\Sigma x^2 = 295.88$

The value of b for line of best fit would be:

a) 3.585
b) 3.485
c) 3.385
d) 3.285

41. A line of best fit equation y = 200 + 20x was formed using different pair of values of x and y. The maximum and minimum x values in the data used to form the equation was 2 and 25. Which of the following estimates of values of y will be unreliable?

a) Estimating value of y when x = 3
b) Estimating value of y when x = 13
c) Estimating value of y when x = 23
d) Estimating value of y when x = 33

42. In regression analysis, if correlation coefficient is positive then the value of coefficient of determination:

a) Will also be positive
b) Will be negative
c) Can be either positive or negative
d) Will be zero

43. Following are the details about Tee Limited's monthly production and total cost:

Month	Units	Cost
June	80	950,000
July	90	1,000,000
August	95	1,040,000

Using the line of best fit, calculate estimated fixed cost

a) 479,285.7
b) 489,285.7
c) 389,285.7
d) 379,285.7

44. Following are the details about Ikram Limited's monthly production and total cost:

Month	Units	Cost
June	80	950,000
July	90	1,000,000
August	95	1,040,000

Using the line of best fit, calculate estimated variable cost per unit

a) 7,857.14
b) 6,857.14
c) 5,857.14
d) 4,857.14

45. The regression line of Y on X is represented as:

    5Y – 15X = 50

    Value of a is:

    a) 10
    b) 3
    c) 50
    d) 5

46. The regression line of Y on X is represented as:

    Y = 10 + 5x

    If value of x changes by 1 then the value of y will change by:

    a) 20
    b) 15
    c) 10
    d) 5

47. Σy/n represents:

    a) Mean of all x values
    b) Mean of all y values
    c) Sum of y values
    d) Number of y values

48. For a regression equation y = a + bx the value of "a" can be calculated as:

    a = Σy/n – b Σx/n

    a) True
    b) False

49. Consider the data:

X	Y
5	6
4	7
a	8

    If Σx = 15 then the value of a is:

    a) 4
    b) 5
    c) 6
    d) 7

50. Consider the data:

X	Y
5	6
4	7
a	8

If Σxy = 98 then the value of a is:

a) 9
b) 8
c) 4
d) 5

51. Which of the following is correct?

a) If there is a strong relationship between two variables, the points on the scatter diagram concentrated around a curve
b) Linear regression analysis is used to calculate values of "a" and "b" in the linear cost equation
c) The standard regression equation is y= a – bx
d) Both (a) and (b)

52. Which of the following is correct?

a) If there is a strong relationship between two variables, the points on the scatter diagram would be concentrated around a curve
b) The standard regression equation is y= a – bx
c) Scatter diagram leads to correct conclusions even if there are few data points
d) Both (a) and (b)

53. Which of the following statements about scatter diagram is/are correct?

1. It is important to establish which variable is independent before plotting.
2. It might indicate a relationship where there is none

a) Only statement 1 is correct
b) Only statement 2 is correct
c) Both statements are correct
d) None of the above are correct

54. Find the coefficient of correlation between x and y if:

Regression line of x on y is: 5x-4y+2=0 and
Regression line of y on x is: x-5y+3=0

a) 0.4
b) -0.4
c) ±0.4
d) ±0.16

55. For $r^2 = 0.6$ the explained variation in dependent variable due to independent variable is:

a) 0.6
b) 0.4
c) 0.36
d) 0.16

56. If the regression line is a perfect estimator of the dependent variable, then which of the following is false.
    a) Co – efficient of determination is one
    b) Co – efficient of correlation is zero
    c) All the data points fall on regression line
    d) None of these

57. r= 0.524 then find n=?
    a) 20
    b) 7
    c) 9
    d) 8

58. For a number of towns, the coefficient of rank correlation between the people living below the poverty line and increase of population is 0.50. If the sum of squares of the differences in ranks awarded to these factors is 82.50, find the number of towns.
    a) 8
    b) 10
    c) 9
    d) 6

59. While computing rank correlation coefficient between profits and investment for 10 years of a firm, the difference in rank for a year was taken as 7 instead of 5 by mistake and the value of rank correlation coefficient was computed as 0.80. What would be the correct value of rank correlation coefficient after rectifying the mistake?
    a) 0.80
    b) 0.85
    c) 0.95
    d) 0.75

60. $\sum X^2 = 364 n = 6 \sum XY = 1174 \sum Y = 142 \sum Y^2 = 3910 \overline{X} = ??$
    a) 42
    b) 7
    c) 12
    d) None of these

61. You are analyzing the relationship between advertising expenditure and sales for a company over the past year. You have calculated the correlation coefficient (r) and found that r = 0.85, indicating a strong positive relationship between advertising and sales. **Based on the given correlation coefficient (r = 0.85), what can you conclude about the relationship between advertising and sales?**
    a) There is a very weak positive relationship
    b) There is a strong positive relationship
    c) There is a weak negative relationship
    d) There is no linear relationship

62. You are given the following data points for advertising expenditure (X) and sales (Y) for a company:

Advertising Expenditure (X)	Sales (Y)
10	30
20	50
30	70
40	90
50	110

You decide to run a simple linear regression to predict sales based on advertising expenditure. **If you were to fit a regression line to the data using the least squares method, what would the slope of the regression line represent?**

a) The change in sales when advertising expenditure increases by 1 unit
b) The change in advertising expenditure when sales increase by 1 unit
c) The total sales generated from advertising
d) The intercept of the regression line

63. You are performing a linear regression analysis to predict the weight (in kilograms) of individuals based on their height (in centimeters). After running the regression analysis, you find the equation of the regression line: **Weight = 0.45 * Height - 40**

In this regression equation, what does the intercept (−40) represent?

a) The predicted weight of an individual with a height of 0 cm
b) The predicted height of an individual with a weight of 0 kg
c) average weight of all individuals
d) The total error in the model

64. A school is analyzing the relationship between the number of hours students study and their exam scores. After conducting a regression analysis, the correlation coefficient is found to be -0.7. The regression line is used to predict exam scores based on study hours**. What can you conclude about the relationship between study hours and exam scores based on the correlation coefficient of -0.7?**

a) There is a strong positive relationship between study hours and exam score
b) There is a moderate negative relationship between study hours and exam scores
c) There is no relationship between study hours and exam score
d) There is a perfect negative relationship between study hours and exam scores

65. You are analyzing a dataset of customer ages and their corresponding spending habits on a particular product. After applying the least squares method for regression analysis, you find that the R^2 value is 0.92 **What does the R^2 value of 0.92 tell you about the regression model?**

a) 92% of the variation in spending is explained by age
b) 92% of the variation in age is explained by spending
c) 92% of the residuals are minimized in the regression mode
d) The regression model is incorrect because the R^2 is too high

66. A company wants to predict the sales revenue based on the number of units sold. After applying the least squares regression method, you notice that the residuals (differences between observed and predicted sales) are large for higher unit sales, but small for lower unit sale **What might this indicate about the regression model's effectiveness for higher sales?**

    a) The model is equally effective for both low and high sales

    b) The model underpredicts sales for higher unit sale

    c) The model overpredicts sales for higher unit sale

    d) The model is more accurate for higher sales than for lower sales

67. You are working with data on hours worked per week (X) and weekly earnings (Y) for a group of employees. After conducting a regression analysis, the correlation coefficient (r) is calculated to be 0.95 **Given the correlation coefficient of 0.95, what can you infer about the relationship between hours worked and weekly earnings?**

    a) Hours worked has a weak negative relationship with weekly earnings

    b) Hours worked has a strong positive relationship with weekly earnings

    c) There is no linear relationship between hours worked and weekly earnings

    d) The correlation coefficient value indicates an error in the data

ANSWERS TO SELF TEST QUESTIONS

1	a	15	c	29	a,c	43	a	57	d
2	a	16	d	30	c	44	c	58	b
3	d	17	a	31	d	45	a	59	c
4	c	18	d	32	b	46	d	60	b
5	a	19	d	33	d	47	b	61	b
6	a	20	c	34	c	48	a	62	a
7	b	21	a	35	c	49	c	63	a
8	d	22	d	36	c	50	d	64	b
9	b	23	b	37	d	51	d	65	a
10	c	24	a	38	d	52	a	66	b
11	c	25	a	39	c	53	c	67	b
12	d	26	d	40	a	54	a		
13	b	27	d	41	d	55	a		
14	a	28	a,b	42	a	56	b		

CHAPTER 11

PROBABILITY CONCEPTS

1. A fair six sided dice is rolled twice. What is the probability of getting an odd number on first roll and an even number on second roll?

   a) 1/4
   b) 2/4
   c) 6/6
   d) 6/36

2. A bag contains six identical balls numbered 5, 6, 7, 8, 9 and 10. A ball is taken from the bag at random, find the probability that the number on the ball is a multiple of 2

   a) 2/6
   b) 4/6
   c) 3/6
   d) 1/6

3. A biased dice is rolled once. The probability of each number on the dice is as follows:

Number	1	2	3	4	5	6
Probability	1/10	1/10	2/10	3/10	1/10	x

   Find the value of x

   a) 1/10
   b) 2/10
   c) 3/10
   d) 4/10

4. Events are said to be ___ if they have no elements in common.

   a) Mutually exclusive
   b) Non-mutually exclusive
   c) Independent
   d) Dependent

5. Sample space for a fair coin can be represented as:

   a) {Head}
   b) {Tail}
   c) {Head, Tail}
   d) Both A and B

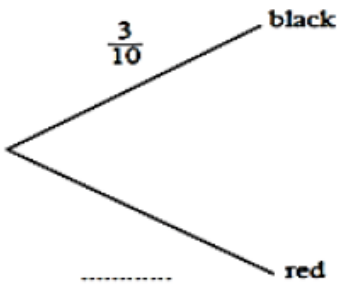
6. Which TWO of the following statements are correct?

   a) Combination is a set of several possible ways in which a set or number of things can be ordered or arranged
   b) Events are said to be non-mutually exclusive if they have no elements in common
   c) Sample space is the set of all possible outcomes of an experiment
   d) Events are said to be mutually exclusive if they have no elements in common

7. A person wants to go for vacations from Karachi to Lahore. There are 3 different train services available. In how many ways can he go to Lahore and return provided he will not use the same train service on his return journey

   a) 6
   b) 9
   c) 2
   d) 3

8. A bag contains black and red balls. Following tree diagram represents probability of selecting a black or a red ball



   Find the probability of selecting a red ball from the bag

   a) 0
   b) 1
   c) 7/10
   d) 3/10

9. A person wants to travel from Karachi to Lahore. He will either travel by train or bus. The probability of travelling by train is twice than that of travelling by bus. What is the probability of travelling by train?

   a) 1
   b) 3/3
   c) 1/3
   d) 2/3

10. A fair five-faced dice with numbers 1, 2, 3, 4 and 5 written is rolled once. What is the probability of an odd number?

    a) 3
    b) 3/6
    c) 2/5
    d) 3/5

11. Sum of all probabilities is:

    a) 0
    b) 1
    c) 100
    d) 2

12. 5! Is equal to:

    a) 120
    b) 25
    c) 125
    d) 5 x 4

13. A team of 4 people is to be chosen from 5 men and 4 women. In how many ways can this be done if there must be 2 men and 2 women on the committee

    a) 60
    b) 50
    c) 40
    d) 30

14. Probability is normal expressed as a number between ____.

    a) 1 and 100
    b) 1 and 10
    c) 0 and 1
    d) 0 and 100

15. The probability of an event occurring plus the probability of that event not occurring must equal:

    a) 0
    b) 1
    c) 2
    d) 100

16. Probability of an event occurring =

    a) Probability of that event occurring twice
    b) Probability of that event not occurring
    c) 0.5
    d) 1

17. A coin is tossed and a dice is rolled together. How many different outcomes are possible?

    a) 8
    b) 2
    c) 6
    d) 12

18. If a dice is rolled twice, the number on the second roll is ____ of the number on the first roll

    a) Dependent
    b) Mutually exclusive
    c) Independent
    d) Non-mutually exclusive

19. If a dice is rolled, then, an outcome being an even or odd is ___
    a) Dependent
    b) Independent
    c) Mutually exclusive
    d) Non-mutually exclusive

20. Two fair dice are rolled together. List all possible outcomes that will result in sum 4
    a) (1,3), (2,2) and (3,1)
    b) (0,4), (4,0), (1,3), (2,2) and (3,1)
    c) None of the above
    d) Both A and B are correct

21. When all possible outcomes are equally likely the probability of an event can be estimated as: P(event) = Number of outcomes where the event occurs / Total number of possible outcomes
    a) True
    b) False

22. A bag contains 4 black and 6 red balls. Two balls are drawn from the bag one after another. What is the probability that the first ball is black and second ball is red?
    a) 12/15
    b) 10/15
    c) 4/15
    d) 6/15

23. The probability of an event is 1. Which of the following statements is correct?
    a) The event is going to occur for sure
    b) The event is unlikely to occur
    c) The event cannot occur
    d) None of the above

24. An event is expected to occur about 50% of the time. The probability of the event occurring can be expressed as?
    a) 0.50
    b) 0.25
    c) 0.05
    d) None of the above

25. A company has 60 technicians. On an average once in five days' entire staff is present. Which of the following statements is correct?
    a) The probability of less than 60 technicians being available on any particular day is 0.80
    b) The probability of less than 60 technicians being available on any particular day is 0.20
    c) The probability of less than 60 technicians being available on any particular day is 59/60
    d) The probability of less than 60 technicians being available on any particular day is 1/60

26. The probability of an event is 2/10. This means
    a) That the event is expected to occur once every five times
    b) That the event is expected to occur twice every ten times
    c) That the event is expected to occur thrice every fifteen times
    d) All of the above

27. Consider following probability distribution:

X	1	2	3	4
Probability (X)	a	1/20	b	3/30

    Which of the following statement is correct?
    a) a + b = 17/20
    b) a +b = 1
    c) a + b = 3/20
    d) None of the above

28. Sara bought a car. The probability that she will make payment by:
    1. Cash is 5/50
    2. Pay order is 3/10
    3. Cross cheque is 3/5

    What is the probability that the payment will be made by either cash or cross cheque?
    a) 7/10
    b) 45/50
    c) 2/50
    d) None of the above

29. Example of mutually exclusive events while rolling a dice is:
    a) Event # 1: Getting an even number

       Event # 2: Getting a number less than three
    b) Event # 1: Getting an even number

       Event # 2: Getting a number more than three
    c) Event # 1: Getting an even number

       Event # 2: Getting an odd number
    d) Event # 1: Getting a number more than one

       Event # 2: Getting a number less than three

30. Sum of two mutually exclusive events will add up to 1
    a) True
    b) False

31. Example of independent event:

    a) Event # 1: Rolling a dice and getting a 4
       Event # 2: Tossing a coin and getting a head
    b) Event # 1: Rolling a dice and getting a 3
       Event # 2: Rolling another dice and getting a 4
    c) Event # 1: Picking a blue ball from a bag containing blue and black balls with replacement
       Event # 2: Picking another blue ball from the same bag
    d) All of the above

32. Define dependent events:

    a) Two events are dependent when they cannot occur together
    b) Two events are dependent when the outcome of the first event does not influence the outcome of the second event
    c) Two events are dependent when the outcome of the first event influences the outcome of the second event
    d) Two events are dependent when they can occur together

33. A box contains ten balls numbered 0 to 9. What is the probability of getting a ball with a prime number?

    a) 3/9
    b) 3/10
    c) 4/10
    d) 2/9

34. Two fair six sided dice are rolled. Find the probability that the first die shows 3 and the second die does not show 3:

    a) 6/36
    b) 1/36
    c) 5/36
    d) None of the above

35. In a class of 15 students there are 10 boys and 5 girls. Two students are chosen at random. Find the probability that both students are boys

    a) 4/10
    b) 4/9
    c) 2/5
    d) 3/7

36. A mathematics problem is given to two students. Their probability of solving and not solving the question are given below:

Student name	Probability of solving	Probability of not solving
Mr. Naveed	8/10	2/10
Mr. Ikram	9/10	1/10

    Based on professional judgement identify which of the following statement is correct

    a) It is highly likely that both the students will not be able to solve the problem
    b) It is highly likely that one of the students will be able to solve the problem
    c) It is highly likely that both the students will be able to solve the problem
    d) it is impossible to solve the question.

37. One card is drawn from a pack of 52 standard playing cards. What is the probability that it will be a red card?
    a) 26/52
    b) 13/52
    c) 39/52
    d) 52/52

38. Taha owns seven laptops. How many different ways can these be arranged if three of them are identical?
    a) 640
    b) 740
    c) 840
    d) 940

39. Mr. Ikram can select a team of eleven cricketers from seven batsmen, five bowlers, two wicket keepers and three all-rounders. How many possible teams can be formed provided that there must be four batsmen, three bowlers, one wicket-keeper and three all-rounders?
    a) 400
    b) 500
    c) 600
    d) 700

40. A ___ is a picture indicating probabilities for combination of two or more events.
    a) Probability tree
    b) Permutation
    c) Combination
    d) None of the above

41. There are five runners in a race, how many different arrangements of three winning positions are possible
    a) 40
    b) 50
    c) 60
    d) 70

42. A committee of 4 teachers is to be formed from 5 mathematics teachers and 6 statistics teachers. How many committees can be formed, if there must be 2 mathematics teachers and 2 statistics teachers provided that 1 particular mathematics teacher must be part of committee?
    a) 40
    b) 50
    c) 60
    d) 80

43. A bag contains 5 red, 5 green and 4 blue balls. If 2 balls are drawn at random from the bag, with replacement, find the probability that both balls are of same colour
    a) 23/98
    b) 33/98
    c) 43/98
    d) 53/98

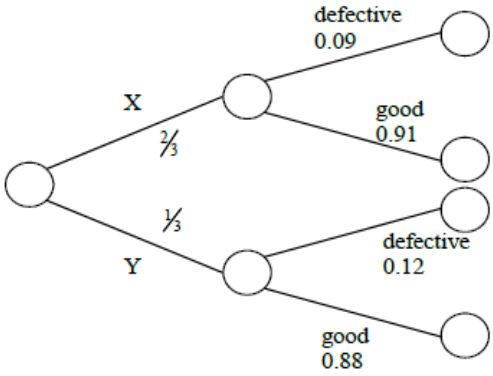
44. A bag contains 5 red, 5 green and 4 blue balls. If 2 balls are drawn at random from the bag, without replacement, find the probability that both balls are of same colour

    a) 2/7
    b) 3/7
    c) 4/7
    d) 5/7

45. ___ is the probability of an event occurring given that another event has occurred

    a) Conditional probability
    b) Unconditional probability
    c) Permutation
    d) Combination

46. Following decision tree represents units produced by a company at its' two factories x and y and the quality of units produced:



    If total units produced by the company are 6,000. What is the number of units produced at factory x?

    a) 6,000
    b) 4,000
    c) 2,000
    d) None of the above

47. Following contingency table represents units produced by a company at its' two factories x and y and the quality of units produced:

	Good units	Defective units
Factory X	40	60
Factory Y	120	300

    If the units produced at each factory are mixed together and one is selected at random, the probability that it is defective is:

    a) 9/13
    b) 8/13
    c) 5/13
    d) 6/13

48. Two cards are picked from a standard pack of 52 cards at random. What is the probability that the first is a red card and the second is a black card?

    a) 13/51
    b) 13/52
    c) 13/50
    d) 25/102

49. Three cards are picked from a standard pack of 52 cards with replacement. The number of possible outcomes is:

    a) 140,608
    b) 140,708
    c) 140,808
    d) 140,908

50. ___ is the likelihood of something happening

    a) Probability
    b) Permutation
    c) Combination
    d) None of the above

51. The events A and B are mutually exclusive if P(A)=0.5 and P(B)=0.4 then P (A or B) is:

    a) 0.1
    b) 0.54
    c) 0.2
    d) 0.9

52. A 4-digit pin code can begin with any number except 0 ,1,2. If repetition of the same digit is allowed the probability that the pin will begin with 3 is?

    a) 1/7
    b) 1/90
    c) 1/8
    d) 1/49

53. A 4-digit pin code can begin with any number except 0,1 & 2. If repetition of the same digit is allowed, the probability of a pin code begin with 5 and end with a 3 is?

    a) 1/70
    b) 1/90
    c) 1/80
    d) 1/49

54. The table below describes the smoking habits of a group of asthma sufferers:

Gender	Non smokers	Light smokers	Heavy Smokers	Total
Men	353	42	49	444
Women	352	32	40	424
Total	705	74	89	868

If a person is randomly selected from the group, the probability that selected person is either Women or Light Smoker Male, is:

a) 0.5737
b) 0.5369
c) 0.5115
d) 0.0373

55. How many 3-digit numbers can be formed from the digits 1, 3, 4, 5, 7 and 9, which are divisible by 2 and none of the digits is repeated?

a) 6
b) 20
c) 30
d) 120

56. There are 6 red and 9 black cars for sale at fast wheels. If 2 cars are sold, what is the probability that first is red & second is black?

a) 0.6364
b) 0.1515
c) 0.7429
d) 0.257

57. Three dices rolled together. The probability of rolling a 3 on atleast one of three dices is:

a) 0.3333
b) 0.3472
c) 0.4212
d) 0.5787

58. Three dices rolled together. The probability of rolling a 2 on atleast one of three dices is:

a) 0.3333
b) 0.3472
c) 0.4212
d) 0.5787

59. Three dices rolled together. The probability of rolling a 4,5,6 on each dice respectively is:

a) 1/216
b) 6/216
c) 3/216
d) None of these

60. Three dices rolled together. The probability of rolling a 4,5,6 on them is:

a) 1/216
b) 1/36
c) 3/216
d) None of these

61. Four dices are rolled together. The probability of rolling a 1,2,3,4 on them is:

    a) 1/54
    b) 1/27
    c) 1/36
    d) 1/216

62. Mr. Naveed wishes to plant flowers in front of his house. His father has brought him a box containing 3 tulips, 4 roses and 3 jasmines. If he selects five flowers at random, the probability that 1 tulip, 2 roses and 2 jasmines are selected is:

    a) 1/9
    b) 2/27
    c) 3/14
    d) 3/28

63. If a coin is flipped three times, the possible sample will be:

    a) HHH, HTT, HTH, TTT, HTT, THH, HHT, THT
    b) HTT, THT, HTH, HHH, TTH, TTT
    c) HHH, THT, HTH, HTT, THH, THT, TTH, TTT
    d) HHH, TTT, THT, HTH, HHT, TTH, HTH

64. A loaded coin is tossed 5 times and the probability of all head appear is 0.16807. what is the probability of one head tossed once?

    a) 0.7
    b) 0.4
    c) 0.3
    d) 0.6

65. A problem in statistics is given to three students A, B, C whose chances of solving are ½, ¾,1/4 respectively. What is the probability that problem will be solved?

    a) 3/32
    b) 29/32
    c) 3/7
    d) ½

66. If two dice are rolled, what is the probability that either the sum of the two will be seven or at least one of the dice will show the number 5

    a) 18/36
    b) 6/36
    c) 15/36
    d) 12/36

67. There are 12 runners in marathon and all runners have equal chance of winning. What is the probability that a person may win a bet on the race if he has to correctly select the top 3 runners and the order they finish in?

    a) 1/1320
    b) 1/1728
    c) 3/1728
    d) 1/12

68. A firm installed two machines U and V, on January 1, 2023. The probability that the machines will break down during first year of operations is 0.2 and 0.1 for machines U and V respectively. The probability that one of two machines will break down during the year is:

    a) 0.02
    b) 0.26
    c) 0.28
    d) Cannot be calculated

69. There are 7 green and 3 white balls in a bag. Two balls are drawn from the bag one by one.

    If the ball drawn is a white ball it is put back in the bag but if it is a green ball it is not put back into the bag.

    Find the probability that the first ball drawn is a white ball and the second ball is a green ball

    a) 7/100
    b) 21/30
    c) 7/30
    d) 21/100

70. A bag contains five balls numbered 1, 2, 3, 4 and 5 respectively. Two balls are drawn from the bag without replacement.

    Find the probability that the two balls drawn are such that the sum of the numbers on two balls is more than 5

    a) 2/5
    b) 1/20
    c) 1/5
    d) 1/10

71. A bag contains five balls numbered 1, 2, 3, 4 and 5 respectively. Two balls are drawn from the bag without replacement.

    Find the probability that the two balls drawn are such that the product of the numbers on two balls is 6

    a) 2/5
    b) 1/20
    c) 1/5
    d) 1/10

72. In how many ways can 4 boys and 3 girls stand in a straight line if the boys stand next to each other?

    a) 5040
    b) 144
    c) 576
    d) 288

73. In how many ways can 5 boys and 3 girls stand in a straight line if no two of the girls are standing next to each other?

    a) 12,400
    b) 28,400
    c) 14,400
    d) 24,400

74. Mr. Ikram decides to go for shopping. The probabilities that he will go to north mall, east mall or west mall are 0.3, 0.2 and 0.5 respectively. The probabilities of him buying something if he goes to north mall, east mall or west mall are 0.9, 0.5 and 0.8 respectively. Find the probability that he will not buy anything

    a) 0.77
    b) 0.23
    c) 0.33
    d) 0.43

75. 70% students in a particular university are boys. It is known that 10% of boys are in second year of their university and 50% of the boys in second year select mathematics as their optional course. If the number of boys in second year who select mathematics in the university is 21. Compute the number of girls in the university

    a) 280
    b) 180
    c) 80
    d) Cannot be determined

76. Hamza is planning for vacations. He is twice likely to travel by airplane as compared to train while going for vacations. He is going to return by airplane if he travelled by train while going for vacations, otherwise he will return by either airplane or train with 50% probability for each. What is the probability that he will use airplane for both ways?

    a) 1/3
    b) 2/3
    c) 1
    d) 2/9

77. Three friends Ikram, Dawood and Naveed go for a dinner. The probability that the bill will be paid by Naveed is twice of the combined probability of bill being paid by either Ikram or Dawood and the probability of Dawood paying bill is twice than that of Ikram. What is the probability that Ikram will pay the bill

    a) 1/8
    b) 2/9
    c) 6/9
    d) 1/9

78. A team of 4 people is to be formed from 5 men and 7 women. In how many ways can this be done if there must be more women than men in the team?

    a) 175
    b) 35
    c) 210
    d) 495

ANSWERS TO SELF TEST QUESTIONS

1	a	15	b	29	c	43	b	57	c	71	d
2	c	16	b	30	b	44	a	58	c	72	c
3	b	17	d	31	d	45	a	59	a	73	c
4	a	18	c	32	c	46	b	60	b	74	b
5	c	19	c	33	c	47	a	61	a	75	b
6	c,d	20	a	34	c	48	a	62	c	76	a
7	a	21	a	35	d	49	a	63	d	77	d
8	c	22	c	36	c	50	a	64	a	78	c
9	d	23	a	37	a	51	d	65	b		
10	d	24	a	38	c	52	a	66	c		
11	b	25	b	39	d	53	a	67	a		
12	a	26	d	40	a	54	b	68	b		
13	a	27	a	41	c	55	b	69	d		
14	c	28	a	42	c	56	d	70	d		

CHAPTER 12

PROBABILITY DISTRIBUTIONS

1. Which TWO of the following statements are correct?

   a) Binomial distribution applies to continuous random variables.
   b) Binomial distribution applies to discrete random variables.
   c) In case of binomial distribution each trial is independent.
   d) In case of binomial distribution each trial is dependent.

2. Which TWO of the following statements are correct?

   a) Hyper-geometric distribution applies when a sample of items is randomly selected without replacement from a population.
   b) Hyper-geometric distribution applies when a sample of items is randomly selected with replacement from a population.
   c) Hyper-geometric distribution assumes that outcomes are independent.
   d) Hyper-geometric distribution assumes that outcomes are dependent.

3. Which TWO of the following statements are correct?

   a) Poisson distribution is a discrete probability distribution.
   b) Poisson distribution is a continuous probability distribution.
   c) In a Poisson distribution events are independent of each other.
   d) In a Poisson distribution events are dependent of each other.

4. Which TWO of the following statements are correct?

   a) Normal distribution is a probability distribution of a continuous variable.
   b) Normal distribution is a probability distribution of a discrete variable.
   c) Normal distribution is described by its mean and standard deviation.
   d) Normal distribution is described by its mean and mode.

5. Conditions of binomial distribution include:

   1. Fixed number of trials
   2. Each trial is independent
   3. Each trial has two possible outcomes
   4. Probability of success and failure is known

   a) 1 and 2
   b) 1, 2 and 3
   c) 1 and 4
   d) All of the above

6. ___ distribution assumes that outcomes are not independent

   a) Hyper-geometric
   b) Binomial
   c) Poisson
   d) Normal

7. Conditions of poisson distribution include:

   1. Events occur randomly
   2. Events are independent of each other
   3. Events happen on average at a constant rate

   a) 1 and 2
   b) 3 only
   c) 1 and 3
   d) All of the above

8. The plot of a normal distribution (normal curve) has the following characteristics:

   1. It is symmetrical and bell shaped.
   2. Both tails of the distribution approach but never meet the horizontal axis.
   3. The area under the normal curve represents probability and so totals to 1

   a) 1 and 2
   b) 2 and 3
   c) 1 and 3
   d) All of the above

9. Which of the probability distribution applies in case of continuous variables?

   a) Hyper-geometric
   b) Poisson
   c) Normal
   d) Binomial

10. Which of the probability distribution will apply to find probability in following case:

    Probability that three heads will appear when a coin is tossed five times

    a) Hyper-geometric
    b) Poisson
    c) Normal
    d) Binomial

11. Which of the probability distribution will apply to find probability in following case:

    Probability that three red balls and two green balls will be randomly selected from a bag containing five red and five green balls

    a) Hyper-geometric
    b) Poisson
    c) Normal
    d) Binomial

12. Which of the probability distribution will apply to find probability in following case:

    Probability that there will be 2 patients arriving at a hospital in next 6 hours provided that on average 3 patients arrive at a hospital in every 6 hours

    a) Hyper-geometric
    b) Poisson
    c) Normal
    d) Binomial

13. Which of the probability distributions will apply to find probability in following case:

    Probability that the weight of a particular bag is more than 5kg provided than mean weight of bags is 4kg with standard deviation of 1kg

    a) Hyper-geometric
    b) Poisson
    c) Normal
    d) Binomial

14. The area under the normal curve represents probability and totals to 1. The distribution is symmetrical so ___ of the area under the curve is to the left and 50% to the right of the mean.

    a) 25%
    b) 50%
    c) 75%
    d) 100%

15. The variance of the poisson distribution is equal to its mean

    a) True
    b) False

16. Which of the probability distributions will apply to find probability in following case:

    3 cards are drawn from a deck of 52 playing cards with replacement. What is the probability of getting 2 red and 1 black card

    a) Hyper-geometric
    b) Poisson
    c) Normal
    d) Binomial

17. Which of the probability distributions will apply to find probability in following case:

    3 cards are drawn from a deck of 52 playing cards without replacement. What is the probability of getting 2 red and 1 black card

    a) Hyper-geometric
    b) Poisson
    c) Normal
    d) Binomial

18. A box contains 10 red, 4 black and 6 white balls. If 3 balls are selected what is the probability that there will be one ball of each colour?

    a) 0.11
    b) 0.21
    c) 0.31
    d) 0.41

19. A committee of 4 students is to be formed from 5 male and 5 female students. What is the probability that the committee will have equal number of male and female students?

    a) 0.50
    b) 0.48
    c) 0.40
    d) 0.68

20. A dice is rolled five times. What is the probability that number 3 will appear exactly three times in the five rolls?

    a) 0.022
    b) 0.032
    c) 0.042
    d) 0.052

21. 70% burgers sold by restaurant are beef burgers and remaining 30% are chicken burgers. Find the probability that only one out of next four customers will buy a beef burger

    a) 0.05
    b) 0.06
    c) 0.07
    d) 0.08

22. A box contains 15 key chains of which 5 are black and 10 are white. A random sample of 3 key chains is taken. Find the probability that all three are black

    a) 0.022
    b) 0.032
    c) 0.042
    d) 0.052

23. A biased coin is tossed five times. The probability that a head appears on any toss is 1/3. Find the probability that there will be only one head on five tosses

    a) 0.03
    b) 0.13
    c) 0.23
    d) 0.33

24. For a binomial distribution standard deviation can be calculated as square root of:

    a) Number of trials x probability of success x probability of failure
    b) Number of trials x probability of success
    c) Number of trials x probability of failure
    d) Probability of success x probability of failure

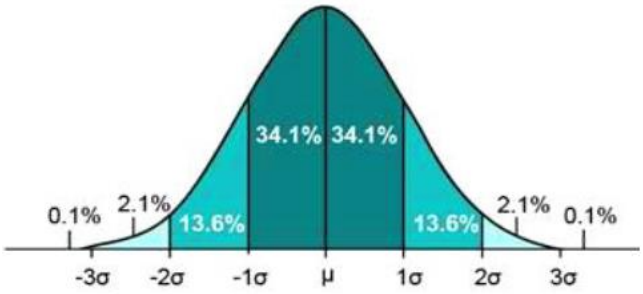
25. For a binomial distribution mean can be calculated as:

    a) Number of trials x probability of success
    b) Number of trials x probability of failure
    c) Probability of success x probability of failure
    d) None of the above

26. For a binomial distribution:

    a) Probability of success x probability of failure = 1
    b) Probability of success / probability of failure = 1
    c) Probability of success + probability of failure = 1
    d) Probability of success – probability of failure = 1

27. Consider following diagram:



Which of the following statement is correct?

a) 68.2% of the area of all normal curves lie in between one standard deviation on either side of the mean
b) 95.52% of the area of all normal curves lie in between one standard deviation on either side of the mean
c) 47.76% of the area of all normal curves lie in between one standard deviation on either side of the mean
d) 13.6% of the area of all normal curves lie in between one standard deviation on either side of the mean

28. Normal distribution can be used as an approximation to the binomial distribution. A continuity correction factor needs to be taken into account while approximation. Apply continuity correction to following:

P(x>5)

Where x represents binominal distribution and represents normal distribution

a) P(y>5.5)
b) P(y>4.5)
c) P(y>5)
d) P(y≥5)

29. In a normal distribution, 50% of the distribution is less than 30. Find the mean of the distribution

a) 30
b) 30 x 50%
c) 15
d) None of the above

30. A box of light bulbs contains 24 bulbs of which 4 are defective. A person picks 4 bulbs randomly, what is the probability that all 4 bulbs are in working condition?

a) 0.26
b) 0.36
c) 0.46
d) 0.56

31. The lengths of tree in a specific forest have a normal distribution with mean 60 feet and standard deviation of 5 feet. Find the probability that a particular tree will be shorter than 52 feet

a) 0.044
b) 0.055
c) 0.065
d) 0.075

32. Following is an example of a variable which could be modelled by a normal distribution:
    a) Weights
    b) Heights
    c) Lengths
    d) All of the above

33. Following conditions must be satisfied for a situation to be modelled by a binomial distribution:
    a) Constant probability
    b) Independent trials
    c) Only two possible outcomes
    d) All of the above

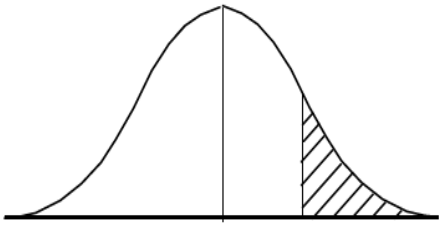
34. Trains arrive at a railway station with mean 3 trains per hour. What is the probability that only 1 train will arrive between 2pm and 3pm?
    a) 0.15
    b) 0.16
    c) 0.17
    d) 0.18

35. A multiple choice question exam paper with four options for each question has 10 questions. A student passes if he answers 8 questions correctly. What is the probability that a particular student will answer 3 questions correctly?
    a) 0.1515
    b) 0.2503
    c) 0.5525
    d) 0.6575

36. A salesman makes phone calls randomly to customers for sales. On a particular day he made 100 phone calls, 50% before lunch break and 50% after lunch break. The probability of any customer buying the product is 40%. Find the probability that 25 customers will buy the product before break
    a) 0.0176
    b) 0.0255
    c) 0.0367
    d) 0.0446

37. There are 50 bags at an airport with average weight of 50kg and standard deviation of 2.5kg. Three bags are selected one by one. Find the probability that none of the bags is greater than 47.5kg
    a) 0.10%
    b) 0.20%
    c) 0.30%
    d) 0.40%

38. Consider following graph:



The possible area represented by the shaded region:
Cannot be less than 50%

a) Cannot be more than 50%
b) It will be 25%
c) None of the above

39. A ___ is similar to frequency distributions but it uses probabilities instead of frequencies

a) Normal distribution
b) Binomial distribution
c) Probability distributions
d) None of the above

40. For a normally distributed data if probability represented by $P(0 \leq z \leq a) = 0.3$ than $P(z \geq a) =$

a) 0.3
b) 0.7
c) 0.2
d) None of the above

41. Consider following table:

Monthly savings (Rs. '000)	Frequency distribution	Probability distribution
25,001 to 30,000	17	0.38
30,001 to 35,000	15	a
35,001 to 40,000	13	0.29
	45	**1.00**

Find the value of a

a) 0.23
b) 0.33
c) 0.43
d) 0.53

42. A manufacturer of chips produces 4 times as many salty flavoured chips as spicy ones. The production is well shuffled before packing them in the box. Find the probability that a box containing 5 packs of chips in total will have 4 salty chips and 1 spicy chips packs

a) 0.4096
b) 0.3096
c) 0.2096
d) 0.1096

43. Five cards are selected from a deck of 52 playing cards without replacement. Find the probability that all cards will be of same colour

    a) 0.0145
    b) 0.0355
    c) 0.0506
    d) 0.0787

44. The probability that a bowler will take a wicket on any ball is 5%. Calculate probability of taking 5 wickets in 60 balls

    a) 0.10
    b) 0.20
    c) 0.30
    d) 0.40

45. A test was conducted in a class of 25 students. The probability of any particular student securing 100% marks is 20%. What is the probability that 5 students got full marks in the class?

    a) 0.14
    b) 0.16
    c) 0.18
    d) 0.20

46. Mean and standard deviation are always equal to each other in a binomial distribution

    a) True
    b) False

47. Consider following data:

    Mean = 5a
    Standard deviation = a
    Calculate P(x < 7a)

    a) 0.78
    b) 0.88
    c) 0.98
    d) None of the above

48. A person sleeps for 7 hours on an average per day with a standard deviation of 0.5 hours. Calculate the probability that the person will sleep for more than 8 hours on any particular day.

    a) 0.01
    b) 0.02
    c) 0.03
    d) 0.04

49. Total of probability distribution is always:

    a) 0
    b) 1
    c) 0.5
    d) None of the above

50. In a normal distribution, z-score:
    a) Indicates mean
    a) Indicates standard deviation
    b) Indicates the number of standard deviations a given data point lies above or below mean
    c) None of the above

51. Which of the following statement as regard to normal distribution is/are correct?
    i. Both tails of the distribution approach and meet the horizontal axis at a finite but high value
    ii. Lower Standard Deviation leads to a flatter curve
    a) Only statement 1 is correct
    b) Only statement 2 is correct
    c) Both statements are correct
    d) None of the above are correct

52. An IQ test is administered by a well-known testing center. The test has a mean scores of 100 and standard deviation of 15. If Ali's z-score is -1.20, what was his score on the test?
    a) 82
    b) 100
    c) 112
    d) 118

53. If the sample mean of a data set is 15 and the sample standard deviation is 9 what percent of the data would you expect to fall between 6 and 24 assuming that distribution is fairly symmetric
    a) 81.5%
    b) 68.3%
    c) 95%
    d) 99.73%

54. A sample of 4 different calculators is randomly selected from a group containing 57 calculators out of which 36 are defective. The probability that all the selected calculators are defective is:
    a) 0.1400
    b) 0.1491
    c) 0.0184
    d) 0

55. 8 people are selected at random from the group of 10 men and 11 women to form a committee. The probability that at least 5 men would be selected on the committee is 0.1401
    a) True
    b) False

56. If a student randomly guesses 20 multiple choice questions with four possible choices. The probability that the student would get exactly four right answers is 46.23%.
    a) True
    b) False

57. Which two of the following statements as regards the Normal Distribution are not correct?

    a) Area under the Curve represents probability and so totals to 1
    b) Lower standard deviation leads to Flatter curve
    c) Both tails of the normal distribution curve always meet the horizontal axis.
    d) It is described by its Mean and Standard deviation

58. Of the bolts produced by a factory, 2% are defective. In a shipment of 3600 bolts from the factory, find the expected number of defective bolts and the standard deviation.

    a) Mean 72 and SD 8.49
    b) Mean 72 and SD 8.40
    c) Mean 7.2 and SD 8.4
    d) None of these

59. A section of a tunnel is lit by 2000 electric bulbs which are kept burning day and night. The manufacturer says that the lives of the bulbs are normally distributed about a mean of 820 hours with standard deviation of 90 hours. How many electric bulbs will be expected to fail before 1000 hours?

    a) 1954
    b) 820
    c) 1000
    d) 1545

60. A multiple choice examination consists of ten questions and each question is followed by four choices. A student will pass the exam if he answers five questions correctly. Assuming that a student knows two correct answers and chooses the remaining answers at random, what is the probability that he will pass the test?

    a) 0.3219
    b) 0.3108
    c) 0.2672
    d) 0.1001

61. 6 cards are drawn at random from a deck of 52 cards. What is the probability of getting 3 kings if the cards are drawn: With replacement?

    a) 0.009
    b) 0.066
    c) 0.006
    d) 0.00717

62. 6 cards are drawn at random from a deck of 52 cards. What is the probability of getting 3 kings if the cards are drawn? Without replacement

    a) 0.009
    a) 0.0067
    b) 0.006
    c) 0.0034

63. A binomial random variable has a mean of 200 and a standard deviation of 10. Find the values of n and p.

    a) n=400 and p = 0.10
    b) n=400 and p = 0.5
    c) n=40 and p = 0.10
    d) n=400 and p = 0.05

64. A buyer of logs from a wood company must determine whether to buy a piece of land containing 5000 pine trees. If 1000 of the trees are at least 40 feet tall, the buyer will purchase the land; otherwise, he will not. The owner of the land reports that the distribution of heights of the trees is normal has a mean of 30 feet and has a standard deviation of 4 feet. Based on this information what should the buyer decide.

    a) Purchase the land
    b) Don't purchase the land
    c) Can't decide on available information
    d) None of these

65. A large corporation requires all new employees to go through a 1-year training program. Personnel files show that 3 out of every 5 trainees complete the program and stay with the company for at least 3 years. If the company hires 6 new employees and the dropout rate remains unchanged. What is the probability that at least 3 trainees will be with the company after 3 years?

    a) 0.08308
    b) 0.8108
    c) 0.8408
    d) 0.8208

66. A clerk leaves his house at 7.00 am. For his office. The time taken to reach the office is normally distributed with mean of 45 minutes and standard deviation of 10 minutes. What is the probability that he will be late in the office on a randomly selected day if the office starts at 8.00 Am. [P $(0 \leq Z \leq 1.5)$].

    a) 0.0668
    b) 0.069
    c) 0.0657
    d) 0.0568

67. A firm of Chartered Accountants has two vacancies for trainee students and is trying to recruit CAF passed students. In the past, 40% of students who were offered the training contract have not reported to join. If 2 students are offered training contract, what is the probability that at least one will join?

    a) 0.12
    b) 0.15
    c) 0.84
    d) 0.56

68. The probability of a high jumper clearing 1.8m on any jump is 0.6. What is the probability of his clearing 1.8m in precisely three out of seven jumps?

    a) 0.006
    b) 0.194
    c) 0.273
    d) 0.290

69. APZ Limited produces a component having a diameter of 3.0 cm. A customer has ordered 100,000 units and has indicated that he would be willing to accept a variation of up to 0.01 cm. The diameter of the component has a normal distribution with mean of 3.0 cm and standard deviation = 0.005 cm. Estimate the number of components that the customer would reject.

    a) 95,440
    b) 47,720
    c) 4560
    d) All will be rejected

70. You are creating a tree house and have made the doorway into the structure 71 inches tall. Suppose the average height of adult males is 68 inches with a standard deviation of 3 inches. What percentage of men will have to bend their heads to get into the house?

    a) 68%
    b) 84%
    c) 16%
    d) 32%

71. The binomial distribution is negatively skewed if:

    a) $p < 1/2$
    b) $p = 1/2$
    c) $p > 1/2$
    d) $p = 1$

72. In a binomial probability distribution, the skewness is positive for:

    a) $p < 1/2$
    b) $p = 1/4$
    c) $np = npq$
    d) $np = nq$

73. Which of the following statements is false?

    a) Expected value of a constant
    b) In a binomial distribution the standard deviation is always less than its variance
    c) In a binomial distribution the mean is always greater than its variance
    d) In binomial experiment the probability of success remains constant from trial to trial

74. If a binomial probability distribution has parameters (n, p)= (5, 0.6), the probability of x = 3.5 is:

    a) 0
    b) 1
    c) 0.6
    d) 0.4

75. In a binomial experiment n= 4, P(x=2) = 216/625 and P(x=3) = 216/625. P(x=-2) is:

    a) 216/625
    b) 1
    c) 0.6
    d) Difficult to tell

76. If n = 6 and p= 0.9 then the value of P(x=7) is:
    a) Zero
    b) Less than zero
    c) More than zero
    d) One

77. In a binomial probability distribution, coefficient of skewness = 0, it means that the distribution is:
    a) Symmetrical
    b) Skewed to the left
    c) Skewed to the right
    d) Highly skewed

78. For a binomial distribution with n = 10, p = 0.5, the probability of zero or more successes is:
    a) 1
    b) 0.5
    c) 0.25
    d) 0.75

79. In a binomial distribution, the mean, median and mode coincide when:
    a) $p < 1/2$
    b) $p > ½$
    c) $p \neq 1/2$
    d) $p = 1/2$

80. In which distribution, the probability of success remains constant from trial to trial?
    a) Hypergeometric distribution
    b) Binomial distribution
    c) Sampling distribution
    d) Frequency distribution

81. In a binomial experiment when n = 5, the maximum number of successes will be:
    a) 0
    b) 2.5
    c) 4
    d) 5

82. In a binomial experiment when n = 10, the minimum number of successes will be:
    a) 0
    b) 5
    c) 10
    d) 11

ANSWERS TO SELF TEST QUESTIONS

1	b,c	15	a	29	a	43	c	57	b,c	71	c
2	a,d	16	d	30	c	44	a	58	a	72	a
3	a,c	17	a	31	b	45	d	59	a	73	b
4	a,c	18	b	32	d	46	b	60	a	74	a
5	d	19	b	33	d	47	c	61	d	75	c
6	a	20	b	34	a	48	b	62	d	76	a
7	d	21	d	35	b	49	b	63	b	77	a
8	d	22	a	36	d	50	c	64	b	78	a
9	c	23	d	37	d	51	d	65	d	79	d
10	d	24	a	38	b	52	a	66	a	80	b
11	a	25	a	39	c	53	b	67	c	81	d
12	b	26	c	40	c	54	b	68	b	82	a
13	c	27	a	41	b	55	b	69	c		
14	b	28	a	42	a	56	d	70	C		