

Mathematical and Statistical Techniques

Mathematics

- 1 When the total cost is less than total revenue then the profit is
a) zero b) very high c). positive d). negative
- 2 The formula of total cost is
a) variable cost + fixed cost b) marginal cost + fixed cost
c). marginal cost + variable cost d). variable cost - fixed cost
- 3 In the function $y = f(x)$, x is classified as
a) upper limit variable b) independent variable c) dependent variable d) lower limit variable
- 4 The total revenue is Rs40,000 , the variable cost is Rs10,000 and the fixed cost is Rs 40,000 then the profit or loss is
a) Rs.10000 b) Rs.10,000 c) Rs.90,000 d). Rs.70,000
- 5 Given a real valued function $f(x) = 4x^2 - 2x + 1$ then , $f(3)$ is
a) 24 b) 31 c) 24 d) 20
- 6 If $y = 3x^2 - 7x$ then dy / dx is
a) $3x - 7$ b) $6x - 7$ c) $6x$ d) none of these.
- 7 For $y = 4x + x^2$, dy / dx is
a) $4x \log 4 + 2x$ b) $4x + 2x$ c) $4x \log 4 + x^2$ d) none of these.
- 8 The demand function and the supply function for a commodity are given by $D = 400 - p^2$ and $S = 100 + 2p^2$. The rate of change of demand with respect to price when price at $p = 10$ units is
a) 12 b) -20 c) 14 d) -8 .
- 9 The minimum value for the function $f(x) = 3x^2 - 12x + 9$ is -3 at the point
a) $x = 4$ b) $x = 3$ c) $x = 2$ d) $x = 1$
- 10 The average cost function for the cost function $C = 2x - 2x^2 + x^3$ is

Mathematical and Statistical Techniques

- a) $2x - 2x^2 + x^3$ b) $2x^2 - 2x^3 + x^4$ c) $2 - 2x + x^2$ d) None of these
- 11 If the elasticity of demand is 1 then marginal revenue is
- a) -1 b) 0 c) 1 d) 2
- 12 The values of x for which the function $f(x) = x^2 - 4x + 1$ is decreasing are
- a) all $x > 2$ b) all $x < 2$ c) all $x > -2$ d) all $x < -2$.
- 13 If the cost function and revenue function for a company are given by $C = 20 + 4x$ and $R = 30x - x^2$ then the profit function is
- a) $26x + x^2 - 20$ b) $x^2 - 26x + 20$ c) $26x - x^2 - 20$ d) None of these
- 14 If $y = 8x^2 - 3x$ then dy / dx is
- a) $16x - 3x$ b) $16x - 3$ c) $16x$ d) none of these.
- 15 Find the compound interest on Rs.16,000 at 20% per annum for 9 months, compounded quarterly
- a) Rs 2520 b) Rs 2521 c) Rs 2522 d) Rs 2523
- 16 You paid Rs. 9600 as interest on a loan you took 5 years ago at 16% rate of simple interest. What was the amount you took as loan?
- a) Rs. 16400 b) Rs. 12000 c) Rs. 12500 d) Rs. 18000
- 17 At what rate will Rs. 6,000 get Rs. 1,000 as simple interest in 3 years?
- a) 4% b) 5.5% c) 6% d) 5%
- 18 Relationship between annual nominal rate of interest and annual effective rate of interest, if frequency of compounding is greater than one is
- a) Effective rate $>$ Nominal rate b) Effective rate $<$ Nominal rate
- c) Effective rate = Nominal rate d) None of the above.
- 19 A loan of Rs. 50,000 is to be returned in 3 equal monthly installments (EMI), the rate of interest being 24% p.a. The EMI will be
- a) Rs. 17,667.73 b) Rs. 17733.93 c) Rs.17,337.73 d) none of these.

Mathematical and Statistical Techniques

- 20 With accumulated amount of Rs. 13,923, after 4 years, the immediate annuity per annum to be paid with interest compounded at 10% p.a. is
- a) Rs. 3200 b) Rs. 3000 c) Rs. 3050 d) Rs.

Statistics

21. The least value of correlation coefficient is _____.
- (a) 0 (b) -1 (c) 1 (d) 5
22. If value of correlation coefficient is 0.8, it indicates _____.
- (a) No correlation (b) strong correlation (c) weak correlation (d) perfect correlation
23. The Spearman's correlation coefficient depicts correlation between _____.
- (a) ranks (b) marks (c) heights (d) incomes
24. If decrease in X causes decrease in Y, there exists _____ correlation between the variables.
- (a) positive (b) negative (c) perfect (d) weak
25. The point of intersection of the two regression lines is _____.
- (a) (0,0) (b) (1,1) (c) (\bar{x}, \bar{y}) (d) (-1,0)
26. To estimate y value, when x value is given we use regression line of _____.
- (a) Y on X (b) X on Y (c) X on X (d) Y on Y
27. If two regression coefficients are negative, correlation coefficient is _____.
- (a) positive (b) negative (c) zero (d) non negative
28. When change in y value, causes equal proportionate change in corresponding x value, the two variables are said to have _____ correlation between them.
- (a) positive (b) negative (c) strong (d) perfect
29. The least value of byx is _____.
- (a) -1 (b) 0 (c) 1 (d) can't be decided
30. In regression analysis, the variable being predicted is known as _____ variable.
- (a) independent (b) dependent (c) X (d) Y
31. If two regression lines are $2X - Y - 15 = 0$ and $3X - 4Y + 25 = 0$, mean of X will be _____.

Mathematical and Statistical Techniques

- (a) 7 (b) 14 (c) 17 (d) 0

32. If Variance of X is 0.5 and Covariance of X & Y is 1, byx will be _____.

- (a) 0.5 (b) 0.25 (c) 2 (d) 0.4

33. _____ constitute the major value of Times Series.

- (a) Secular Trend (b) Seasonal Component (c) Cyclical Component (d) Irregular Component

34. The long term tendency of data to increase or to decrease over a period of time is known as _____.

- (a) Secular Trend (b) Seasonal variations (c) Rising trend (d) Cyclical variations

35. Calculate Seasonal Index for the first quarter for following :

	Quarter I	Quarter II	Quarter III	Quarter IV
Quarterly Average	45	48	49.5	47.5

- (a) 94.7 (b) 98.2 (c) 47.5 (d) 90.5.

36. In equation of a straight line $y = a + b x$, _____ is slope of the line.

- (a) y (b) b (c) a (d) x

37. Calculate the trend value for $X = -2$, if the equation of trend line is $y = 58 + 3.4 X$

- (a) 64.8 (b) 51.2 (c) 61.4 (d) 58

38. Price relative is given by _____

- (a) $(P_1 / P_0) \times 100$ (b) $(w_1 / w_0) \times 100$ (c) $(P_1 / Q_0) \times 100$ (d) $(Q_1 / P_0) \times 100$

39. For Paasche's Price Index Number _____ is taken as a weight.

- (a) q_0 (b) q_1 (c) w_1 (d) p_0

40. Fisher's Price Index Number is _____ of Laspeyres' and Paasche's Price Index Numbers

- (a) product (b) arithmetic mean (c) geometric mean (d) ratio

41. Calculate Index number for 1986, with base 1989

Year	1984	1985	1986	1987	1988	1989	1990
Index Number	110	130	160	170	190	200	210

Mathematical and Statistical Techniques

- (a) 80 (b) 150 (c) 100 (d) 160
42. For _____ distribution , mean = variance.
- (a) Binomial (b) Poisson (c) Normal (d) Bernoulli
43. Mean and variance of a Binomial Distribution are 4 and 2.4 respectively , calculate probability of success .
- (a) 0.5 (b) 0.4 (c) 0.6 (d) 0.8
44. It is observed that 1% mangoes are bad in the box of 100 mangoes. Calculate mean of the distribution
- (a) 1 (b) 10 (c) 5 (d) 0.01
45. For Poisson Distribution, is a _____ distribution.
- (a) discrete (b) continuous (c) Bernoulli (d) uniform
46. For Poisson Distribution, with mean 1 and $e^{-1} = 0.3679$, $P(X=0) =$ _____
- (a) 0.3679 (b) 0.7358 (c) -0.3679 (d) 0.1839
47. _____ are the parameters of the Normal Distribution.
- (a) n , p (b) mean , s.d (c) p,q (d) x,y
48. Standard Normal variate is a Normal variate with mean_____ and s.d. _____.
- (a) 1, 0 (b) 0,1 (c) 0,0 (d) 1,1
49. For Normal Distribution mean_____ median.
- (a) equals (b) greater than (c) less than (d) is not equal to
50. Find the probability of 1 head in 5 tosses of a unbiased coin .
- (a) 0.0625 (b) 0.03125 (c) 0.15625 (d) 0.3125

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