

MATHS, STATS & REASONING**All Questions is compulsory.**

1. If $A = \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$ and $f(x) = x^2 - 4x$ then find $f(A)$.

(a) $\begin{bmatrix} -1 & 3 \\ 2 & 6 \end{bmatrix}$

(b) $\begin{bmatrix} -1 & 6 \\ 2 & 3 \end{bmatrix}$

(c) $\begin{bmatrix} 1 & 2 \\ -6 & 2 \end{bmatrix}$

(d) $\begin{bmatrix} 1 & 6 \\ 2 & 3 \end{bmatrix}$

2. If $A = \begin{bmatrix} 5 & 2 & a \\ b & c & -3 \\ 4 & d & -7 \end{bmatrix}$ is a symmetric matrix, then the values of a and b are :-

(a) 2,-3

(b) -7,5

(c) 4,2

(d) 2,4

3. Find A^{-1} for $A = \begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$

(a) $\begin{bmatrix} 3 & -5 \\ -1 & 2 \end{bmatrix}$

(b) $\begin{bmatrix} 3 & -1 \\ -5 & 2 \end{bmatrix}$

(c) $\begin{bmatrix} 3 & 0 \\ 2 & 5 \end{bmatrix}$

(d) $\begin{bmatrix} -3 & -5 \\ -1 & -1 \end{bmatrix}$

4. A sum of Rs. 7930 is divided into 3 parts and given on loan at 5% simple interest to A,B and C for 2,3 and 4 years respectively. If the amounts of all three are equal after their respective periods of loan, then the A received a loan of :-
(a) Rs. 2800
(b) Rs. 3050
(c) Rs. 2760
(d) Rs. 2750
5. Two regression lines always intersect at the means.
(a) true
(b) false
(c) both
(d) none
6. r, b_{xy}, b_{yx} all have sign.
(a) different
(b) same
(c) both
(d) none
7. Link relative index number is expressed for period n is
(a) $\frac{P_n}{P_{n+1}}$
(b) $\frac{P_0}{P_{n-1}}$
(c) $\frac{P_n}{P_{n-1}} \times 100$
(d) None of these.
8. Marshall Edge worth Index formula after interchange of p and q is impressed in terms of:
(a) $\frac{\sum q_n(P_0 + q_n)}{\sum q_0(P_0 + q_n)}$
(b) $\frac{\sum P_n(q_0 + q_n)}{\sum P_0(q_0 + q_n)}$
(c) $\frac{\sum q_0(q_0 + q_n)}{\sum P_n(P_0 + P_n)}$
(d) None of these.
9. If $\frac{x-1}{x} = 3$ then the value of $1 + \frac{1}{x^2}$ is :-
(a) 9
(b) 10
(c) 11
(d) None

10. The difference between compound interest and simple interest on a sum for 2 years at 8 per cent is Rs. 768. The sum is
- (a) Rs. 1,00,000
 - (b) Rs. 1,10,000
 - (c) Rs. 1,20,000
 - (d) Rs. 1,70,000

11. The effective annual rate of interest corresponding to a nominal rate of 6% per annum payable half – yearly is
- (a) 6.06%
 - (b) 6.07%
 - (c) 6.08%
 - (d) 6.09%

12. Given below the information about the capital employed and profit earned by a company over the last twenty five years:

		Mean	SD
Capital employed ('0000 Rs.)	:	62	5
Profit earned ('000 Rs.)	:	25	6

Correlation Coefficient between capital and profit = 0.92. The sum of the Regression coefficients for the above data would be:

- (a) 1.871
 - (b) 2.358
 - (c) 1.968
 - (d) 2.346
13. Correlation coefficient is dependent of the change of both origin & the scale of observations.
- (a) True
 - (b) false
 - (c) both
 - (d) none

14. Given the following data:

Variable	:	X	Y
Mean	:	80	98
Variance	:	4	9

Coefficient of correlation = 0.6

What is the most likely value of y when x = 90?

- (a) 90
 - (b) 103
 - (c) 104
 - (d) 107
15. A sum of money put at compound interest amounts in 2 years to Rs. 672 and in 3 years to Rs. 714. The rate of interest per annum is
- (a) 5.5%
 - (b) 6.0%
 - (c) 6.25%
 - (d) 6.75%

16. What is the difference between the compound interests on Rs. 5,000 for 1 year at 4% per annum compounded yearly and half yearly?
- (a) 2
 - (b) 3
 - (c) 4
 - (d) None of these
17. Adam borrowed some money at the rate of 6% p.a. for the first two years, at the rate of 9% p.a. for the next three year, and at the rate of 14% p.a. for the period beyond five years. If he pays a total interest of Rs. 11,440 at the end of the nine years, how much money did he borrow?
- (a) 11,500
 - (b) 12,000
 - (c) 12,500
 - (d) 15,500
18. Multiple axis line chart is applied for
- (a) showing multiple charts
 - (b) Two or more related time series when the variable are expressed in the same unit
 - (c) Two or more related time series when the variables are expressed in different unit
 - (d) Multiple variable in the time series.
19. The no. of observations falling within a class is called
- (a) density
 - (b) frequency
 - (c) both
 - (d) none
20. An area diagram is
- (a) Histogram
 - (b) Frequency Polygon
 - (c) Ogive
 - (d) None
21. G.M. of a set of n observations is the root of their product.
- (a) n th
 - (b) $(n+1)$ th
 - (c) n^2 th
 - (d) $(n-1)$ th
22. If for two events A and B, $P(A \cap B) \neq P(A) \times P(B)$, then the two events A and B are
- (a) Independent
 - (b) Dependent
 - (c) Not equally likely
 - (d) Not exhaustive.

23. The simple interest on a certain sum of money for $2\frac{1}{2}$ year at 12% per annum is Rs. 40 less than the simple interest on the same sum for $3\frac{1}{2}$ years at 10% per annum. Find the sum.
- (a) 1,000
(b) 800
(c) 900
(d) None of these
24. If the compound interest on a certain sum at $16\frac{2}{3}\%$ for 3 years is Rs. 1,270, find the simple interest on the same sum at the same rate and for the same period.
- (a) 1,050
(b) 1,020
(c) 1,080
(d) None of these
25. There are 7 Men and 3 Ladies. Find the number of ways in which a committee of 6 can be formed of them if the committee is to include at least two ladies ?
- (a) 160
(b) 180
(c) 150
(d) None
26. If $A = \{a, b, c\}$ and $R = \{(a, a), (a, b), (b, c), (b, b), (c, c), (c, a)\}$ is a relation on A, then which one of the following is correct?
- (a) R is reflexive, symmetric and transitive
(b) R is reflexive and symmetric, but not transitive
(c) R is reflexive and transitive, but not symmetric
(d) R is reflexive, but neither symmetric nor transitive
27. If all the values taken by a random variable are equal then
- (a) its expected value is zero
(b) its standard deviation is zero
(c) its standard deviation is positive
(d) its standard deviation is a real number
28. The probability that a number selected from $[1, 2, 3, 4, \dots, 100]$ is a perfect cube is
- (a) $\frac{1}{10}$
(b) $\frac{1}{25}$
(c) $\frac{1}{20}$
(d) $\frac{3}{100}$

29. For a standard normal distribution, the points of inflexion are given by
(a) $\mu - \sigma$ and $\mu + \sigma$
(b) $-\sigma$ and σ
(c) -1 and 1
(d) 0 and 1
30. Assuming that the discount rate is 7% per annum, how much would you pay to receive Rs. 80 growing at 5%, annually, forever?
(a) 3000
(b) 2500
(c) 4000
(d) 5000
31. If ${}^{n+2}C_r = {}^{n+2}C_{10-r}$ then nC_6 equals to
(a) 8
(b) 28
(c) 56
(d) None of these
32. If $\log_{10}^2 = 0.3010$ the value of \log_5^{1024} is:-
(a) 4.306
(b) 3.010
(c) 6.931
(d) 1.386
33. The mean proportion between $\frac{a-b}{a+b}$ and $\frac{a^2 b^2}{a^2 - b^2}$ is:-
(a) $\frac{ab}{a-b}$
(b) $\frac{ab}{a+b}$
(c) $\frac{a-b}{ab}$
(d) $\frac{a+b}{ab}$
34. If it is known that the probability of a missile hitting a target is $1/8$, what is the probability that out of 10 missiles fired, at least 2 will hit the target?
(a) 0.4258
(b) 0.3968
(c) 0.5238
(d) 0.3611
35. If four unbiased coins are tossed together, then the probability of getting at least two heads is
(a) $11/16$
(b) $13/16$
(c) $9/16$
(d) $15/16$

36. Mohit picked up a prime number from the set of first 20 natural numbers. What is the probability that it is 7?
(a) $\frac{1}{19}$
(b) $\frac{1}{20}$
(c) $\frac{2}{7}$
(d) $\frac{1}{8}$
37. A distribution in which the values of mean, mode and median coincide is known as -
(a) Asymmetrical distribution
(b) Skewed distribution
(c) Symmetrical distribution
(d) Non-normal distribution
38. Out of the following which is a positional average -
(a) Arithmetic mean
(b) Geocentric mean
(c) Median
(d) Harmonic mean
39. The missing number in the series:- 7, 11, 13, 17, 19, 23, 25, 29, ?
(a) 30
(b) 31
(c) 32
(d) 33
40. In a certain code language "Great solution turn plan" is written "&T5 #N8 @N4 %N4". Then "Tamilnadu" written in that code:-
(a) #u9
(b) &T9
(c) @U9
(d) @T9
41. Rahim started from point X and walked straight 5 km west, then turned left and walked straight 2 km and again, turned left and walked straight 7 km. In which directions is he from the point X ?
(a) North - East
(b) South - West
(c) South - East
(d) North - West
42. $\int \frac{8^{1+x} + 4^{1-x}}{2^x} dx$
(a) $\frac{2^{2x+3}}{\log 3} - \frac{2^{2-3x}}{\log 2} + c$
(b) $\frac{2^{3x+2}}{\log 2} - \frac{2^{3x-2}}{3\log 2} + c$
(c) $\frac{2^{2x+3}}{2\log 2} - \frac{2^{2-3x}}{3\log 2} + c$
(d) None of these

43. If the sum of three consecutive multiples of 13 is 390 then second multiple of 13 is:-
(a) 117
(b) 130
(c) 143
(d) 156
44. If 5th and 12th terms of an AP are 14 and 35 respectively, find the first term of AP.
(a) 4
(b) 2
(c) 1
(d) 3
45. The number of straight lines can be formed out of 10 point of which 7 are collinear
(a) 24
(b) 21
(c) 25
(d) 26
46. If $F: \mathbb{R} \rightarrow \mathbb{R}$ is a bijection function given by $f(x) = (x-1)^3 + 2$ then $f^{-1}(x)$ is
(a) $(x-2)^{1/3} + 1$
(b) $(x-2)^{-1/3} + 1$
(c) $(x+2)^{1/3} - 1$
(d) None of these
47. If $2x^2 + 5xy + 3y^2 = 1$ then $\frac{dy}{dx}$ is
(a) $\frac{-4x-5y}{5x+6y}$
(b) $\frac{4x+5y}{5x-6y}$
(c) $\frac{4x-5y}{5x+6y}$
(d) None
48. Which one of the following cannot be determined by graphic method-
(a) Mean
(b) Median
(c) Quartiles
(d) Mode
49. The measure of central tendency which is most affected by extreme observations is -
(a) Mean
(b) Median
(c) Geometric mean
(d) Mode

50. From the given word, Select the word which cannot be formed using the letter of the given word:-
TOKENISM
(a) STONE
(b) NOISE
(c) EMITS
(d) NAMES
51. Find odd man out of the following series:-
7, 9, 13, 17, 19
(a) 7
(b) 9
(c) 19
(d) 13
52. If α, β are roots of $x^2 + x + 2 = 0$, then the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$:
(a) $-\frac{2}{3}$
(b) $-\frac{3}{4}$
(c) $-\frac{3}{2}$
(d) None of these
53. How many words, with or without meaning can be formed by using all the letters of the word "MACHINE", so that the vowels occurs only the odd positions ?
(a) 1440
(b) 720
(c) 576
(d) 640
54. $\log(a + \sqrt{a^2 + 1}) + \log\left(\frac{1}{a + \sqrt{a^2 + 1}}\right)$ is equal to
(a) 1
(b) 0
(c) 2
(d) $\frac{1}{2}$
55. The average rainfall for a week excluding Sunday was 10 cms. Due to heavy rainfall on Sunday, the average rainfall for the week rose to 15 cms. How much rainfall was there on Sunday?
(a) 40 cm
(b) 45 cm
(c) 50 cm
(d) 165 cm

56. The mean salary paid per week to 1,000 employees of an establishment was found to be Rs. 900. Later on, it was discovered that the salaries of two employees were wrongly recorded as Rs. 750 and Rs. 365 instead of Rs. 570 and Rs. 635. Find the corrected mean salary.
- (a) 280
 - (b) 1000
 - (c) 900.09
 - (d) 800.09
57. A helicopter flies around a square field, the sides of which measure 100 kms. each. The helicopter covers at a speed of 100 kms. per hour the first side, at 200 kms. per hour the second side, at 300 kms. per hour the third side and 400 kms. per hour the fourth side. Find out the average speed round the square.
- (a) 180 km/hr
 - (b) 192 km/hr
 - (c) 210 km/hr
 - (d) 140 km/hr
58. The Sum of all natural numbers between 120 to 480, which are exactly divisible by 4 and 6 ?
- (a) 8820
 - (b) 9300
 - (c) 8700
 - (d) 8600
59. Pointing to an old man, vijay said, "His son is my son's uncle". How is old man related to Vijay?
- (a) Brother
 - (b) Uncle
 - (c) Father
 - (d) Grand father
60. If $P+Q$ means P is the mother of Q, $P \div Q$ Means P is the father of Q, $P-Q$ means P is the sister of Q. Then which of the following relationship show that M is the daughter of R?
- (a) $R \div M+N$
 - (b) $R+N \div M$
 - (c) $R-M \div N$
 - (d) None
61. A man goes 3 km east from point A and then takes a right turn from point B to move 4 km to point C. What is the minimum distance between point A and point C ?
- (a) $2\sqrt{2}km$
 - (b) $5km$
 - (c) $7km$
 - (d) $6km$

62. The value of furniture depreciates by 10% a year, if the present value of the furniture in an office is Rs. 21,870, calculate the value of furniture 3 years ago:-
(a) Rs. 30,000
(b) Rs. 35,000
(c) Rs. 40,000
(d) Rs. 50,000
63. If $a = 1 + \frac{1}{2} + \frac{1}{2^2} + \frac{1}{2^3} + \dots - \infty$
 $b = 1 + \frac{1}{6} + \frac{1}{6^2} + \frac{1}{6^3} + \dots - \infty$
Then the value of ab is:-
(a) $\frac{5}{12}$
(b) $\frac{5}{6}$
(c) $\frac{12}{5}$
(d) 2
64. There are 60 male and 40 female workers in a factory. The standard deviations of their wages were computed at Rs. 8 and Rs. 11 per hour respectively. The mean wages of the two groups were found to be equal. Compute the combined standard deviation of the wages of all the workers.
(a) 9.316
(b) 2.46
(c) 4.12
(d) None
65. The mean and standard deviation of 10 observations are 35 and 2 respectively. Find out the changed mean and standard deviation if each observation is increased by 5.
(a) 40 , 2
(b) 35 , 7
(c) 40 , 7
(d) None
66. Frequencies are also called weights.
(a) True
(b) false
(c) both
(d) none
67. Consecutive rectangles in a Histogram have no space in between
(a) true
(b) false
(c) both
(d) none
68. The value exactly at the middle of a class interval is called
(a) class mark
(b) mid value
(c) both
(d) none

(Directions Q 69 to 72) Two or Three statements are followed by two conclusions I and II, you have to take the two given statements to be true, disregarding the commonly known facts and then decide which of the given conclusions logically follows from the two given statements?

69. **Statements :**

- (i) All pen are rubber.
- (ii) All scale is box.
- (iii) Some rubber are box.

Conclusions :

- (I) Some scale are pen.
- (II) No scale are pen.
- (a) Only Conclusion I follows
- (b) Only Conclusion II follows
- (c) Both Conclusion I and II follows
- (d) Either Conclusion I or II follows

70. **Statements :**

- (i) All A are C.
- (ii) All D are C.

Conclusions :

- (I) Some D are C.
- (II) Some D are not A.
- (a) Only conclusion I follows.
- (b) Only conclusion II follows.
- (c) Either I or II follows.
- (d) Both conclusion I and II follows.

71. **Statements :**

- (i) Some cups are belt.
- (ii) No Belt is black.

Conclusions :

- (I) Some belt are cups.
- (II) Some cups are not black.
- (a) Only conclusion I follows.
- (b) Only conclusion II follows.
- (c) Either I or II follows.
- (d) Both conclusion I and II follows.

72. **Statements :**

- (i) All ships are aeroplanes.
- (ii) All trucks are ships.
- (iii) All cars are trucks.

Conclusions :

- (I) Some ships are not cars.
- (II) All cars are aeroplanes.
- (a) Only conclusion I follows.
- (b) Only conclusion II follows.
- (c) Either I or II follows.
- (d) Neither I nor II follows.

73. Covariance = 60
Variance of x = 100 then
- Variance of Y should less than 25
 - Variance of Y should more than 36
 - Standard deviation of Y should less than 10
 - None of these

74. Fisher Index = 149.94
Dorbish Index is 150
then find Paache Index
- 120
 - 154
 - 170
 - 200

75. In following data-

	Male	Female
Observations	2	2
GM	4	25

then find combined geometric mean-

- 9
 - 6.11
 - 10
 - None of these
76. Which is always true for distinct observations-

- Standard Deviation = $\sqrt{\frac{\sum x^2}{n}}$
- Standard Deviation = $\sum x^2 + n^2$
- $\sum x^2 = n(\sigma^2 + \bar{X}^2)$
- $\bar{X}^2 = \sigma^2 + n^2$

77. Mean of binomial distribution = 3 and variance = 4 find the value of n-
- 8
 - 9
 - $\frac{4}{3}$
 - Not valid

78. $(A \cup B)'$ is equal to:-
- A-B
 - B-A
 - $A' \cup B'$
 - $A' \cup B$

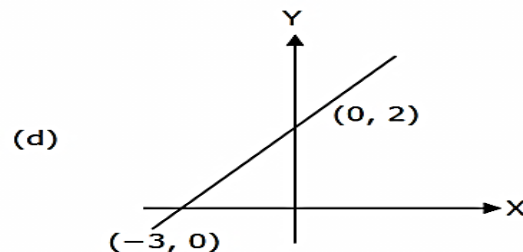
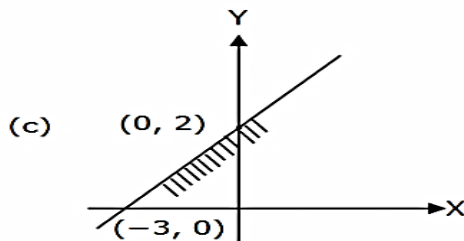
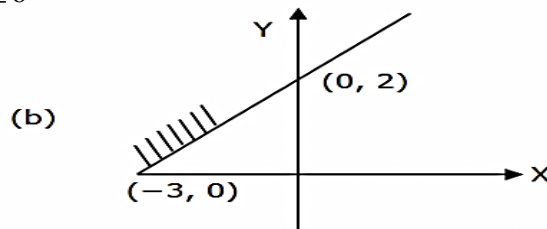
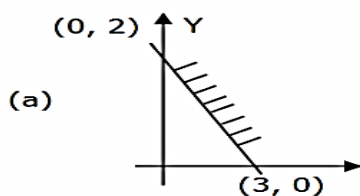
79. If $x = \log t$ and $y = \frac{1}{t}$, then $\frac{d^2y}{dx^2} + \frac{dy}{dx}$ is equal to :

- (a) 0
- (b) 1
- (c) -1
- (d) None of these

80. If A is a skew symmetric matrix of order 3, then the value of $|A|$ is:

- (a) 3
- (b) 9
- (c) 0
- (d) 27

81. Which option shows inequality $-2x + 3y \geq 6$



82. In an organization Employer required maximum ten employees. X and Y are numbers of male and female respectively then which inequality shows right relation.

- (a) $x + y = 10$
- (b) $x + y \leq 10$
- (c) $x + y \geq 10$
- (d) $x \geq 10$

83. How much amount is required to be invested every year so as to accumulate Rs. 4,00,000 at the end of 10 years, if interest is compounded annually at 10%

- (a) Rs. 24506.18
- (b) Rs. 25098.16
- (c) Rs. 22506.18
- (d) Rs. 21098.16

84. If $f(x) = 2x+7$ and $g(x) = x^2+7$, $x \in \mathbb{R}$, then which value of x will satisfy $\text{fog}(x) = 25$?

- (a) -1, 1
- (b) -2, 2
- (c) $-\sqrt{2}, \sqrt{2}$
- (d) None

85. Which of the following elements should come in a place '?' ?

- IR10 KP12 MN14 OL16 ?
(a) RS19
(b) RI19
(c) QR19
(d) QJ18
86. If 'HONEY' is coded as JQPGA.
Which word is code as VCTIGVU?
(a) CARPETS
(b) TRAPETS
(c) TARGETS
(d) UMBRELU
87. Seven person X, Y, Z, P, Q, R and S are sitting around a circular table facing the centre but not necessarily in the same order Q is fourth to the left of Y. P is third to the right of X, Y is to the immediate right of X, Z is fourth to the right of R, R is not an immediate neighbour of P. who is second to the left of S
(a) Q
(b) R
(c) X
(d) Y
88. Identify the single letter, which when removed from the following words form new words.
MINK, WARM, LAMP, TEAM
(a) A
(b) R
(c) M
(d) L
89. Five Friends P, Q, R, S and T are sitting in a row facing North. Here S is between T and Q and Q is to the immediate left of R. P is to the immediate left of T. What is in the middle?
(a) S
(b) T
(c) Q
(d) R
90. Calculate the sum of infinite geometric progression $1, -3, 9, -27, \dots \infty$:
(a) $\frac{1}{4}$
(b) $\frac{3}{4}$
(c) $-\frac{1}{4}$
(d) does not exist
91. What is the present value of Rs. 1 to be received after two years compounded annually at 10% interest rate ?
-

- (a) 0.73
(b) 0.60
(c) 0.90
(d) 0.83
92. The condition that one of $ax^2 + bx + c = 0$ the roots of is thrice the other is :-
(a) $3b^2 = 16ac$
(b) $b^2 = 9ac$
(c) $3b^2 = -16ac$
(d) $b^2 = -9ac$
93. A question and two statements numbered I and II are given below it. You have to decide whether the data provided in the statements are sufficient to answer the question.
How many sons does X have?
Statements:-
I. E and W are only two brothers of P.
II. P is the only daughter of Q and X.
(a) Only statement I is sufficient.
(b) Only statement II is sufficient.
(c) Both statement I and II are sufficient
(d) Both statement I and II are not sufficient
94. Find the odd one out.
(a) C72X
(b) E110V
(c) G140T
(d) J180P
95. H is richer than J. M is richer than P. L is as rich as J, A is richer than H. What conclusion can be definitely drawn from the above statement?
(a) J is more poorer than P
(b) M is richer than A
(c) P is richer than L
(d) L is poorer than H
96. The mean of poisson distribution is 3.20 find the probability of getting variable X of non zero values - $e^{-3.20} = 0.1108$
(a) 0.1108
(b) 0.8892
(c) 0.3264
(d) 0.12
97. The variance of random variable x is-
(a) $E(x - \mu)^2$
(b) $E[x - E(x)]^2$
(c) $E(x^2 - \mu)$
(d) (a) or (b)

98. If $P(\bar{A} \cup \bar{B}) = 5/6$, $P(A) = 1/2$ and $P(\bar{B}) = 2/3$, what is $P(A \cup B)$?
- (a) $1/3$
 - (b) $5/6$
 - (c) $2/3$
 - (d) $4/9$
99. Two lines of regression are given by $5x+7y-22=0$ and $6x+2y-22=0$. If the variance of y is 15 find the standard deviation of x .
- (a) 2.646
 - (b) 6.246
 - (c) 7.612
 - (d) 3.646
100. The multiplicative time series model is:
- (a) $Y = T + S + C + I$
 - (b) $Y = TSCI$
 - (c) $Y = a + bx$
 - (d) $y = a + bx + CX^2$
