

(GCF-1,2,3,4,5+6,19,20,21,22,23, VDCF-1 & 2, VCF-1,2 & 4,
SCF-1,2,6,7 & 8, Nov.-20 PD & GD, Foundation Nov.-19 Rep.)
DATE: 13.10.2020 MAXIMUM MARKS: 100 TIMING: 3 Hours

BUSINESS MATHEMATICS, REASONING & STATISTICS

1. $\log(1+2+3)$ is equal to :-
(a) $\log 1 + \log 2 + \log 3$
(b) $\log(1 \times 2 \times 3)$
(c) Both the above
(d) None
2. Using the digits 1, 2, 3, 4 and 5 only once, how many numbers greater than 41000 can be formed?
(a) 41
(b) 48
(c) 50
(d) 60
3. A Polygon has 27 diagonals. Number of sides of this polygon is:
(a) 12
(b) 15
(c) 16
(d) 9
4. $x^y = e^{x+y}$ then $\frac{dy}{dx} =$
(a) $\frac{2 \log x}{(\log x - 1)^2}$
(b) $\frac{-\log x - 2}{(\log x - 1)}$
(c) $\frac{\log x}{(\log x - 1)}$
(d) $\frac{\log x - 2}{(\log x - 1)^2}$
5. A, B, C, D are four numbers so that A:B=2:3, B:C=4:5, C:D=5:8 then A:D is :-
(a) 2:3
(b) 3:2
(c) 1:3
(d) 3:1
6. In a city, three daily news paper A, B and C are published, 42% read A, 51% read B, 68% read C, 30% read A and B, 28% read B and C, 36% read A and C, 8% do not read any of the three newspapers. What is the percentage of person who read only one paper ?
(a) 38%
(b) 48%
(c) 51%
(d) None

7. What is the sum of $\sqrt{3} + \frac{1}{\sqrt{3}} + \frac{1}{3\sqrt{3}} + \dots \infty$?

- (a) $\frac{\sqrt{3}}{2}$
- (b) $\frac{3\sqrt{3}}{2}$
- (c) $\frac{2\sqrt{3}}{3}$
- (d) $\sqrt{3}$

8. The difference between C.I and S.I on a certain sum of money invested for 3 years at 6% p.a is Rs. 110.16. The sum is

- (a) Rs. 3,000
- (b) Rs. 3,700
- (c) Rs. 12,000
- (d) Rs. 10,000

Seven friends T, U, V, W, X, Y and Z are sitting in a straight line facing north. W sits fifth to the right of T. W does not sit at any of extreme ends. Two people sit between Z and X. Y sits third to the left of U. Y sits exactly in the middle. Z is not an immediate neighbour of Y.

9. What is Z's position with respect to W ?

- (a) Second to the left
- (b) Third to the right
- (c) Fourth to the left
- (d) Third to the left

10. If P is the husband of Q and R is the mother of S and Q. What is R to P ?

- (a) Mother
- (b) Sister
- (c) Aunt
- (d) Mother-in-law

11. X and Y are the children of A. A is the father of X but Y is not his son. How is Y related to A?

- (a) Sister
- (b) Brother
- (c) Son
- (d) Daughter

Number Series-

12. 4, 9, 25, 49, ?, 169, 289, 361

- (a) 120
- (b) 121
- (c) 122
- (d) 164

13. 4, 12, 36, ?, 324
(a) 107
(b) 109
(c) 108
(d) 110
14. If '+' means '÷', '÷' means 'x', 'x' means '-' and '-' means '+' what will be the value of the following expression ?
 $15 \div 5 \times 9 + 3 - 6 = ?$
(a) 78
(b) 72
(c) 28
(d) 30
15. For a variable the mean is 10 and the coefficient of variation is 50. Then the variance is
(a) 5
(b) 20
(c) 400
(d) 25
16. If Fisher's index = 150 and Paasche's index = 144, then Laspeyre's index is _____
(a) 147
(b) 156.25
(c) 160.17
(d) 138
17. Age of applicants for life insurance and the premium of insurance-correlation are :
(a) positive
(b) negative
(c) zero
(d) None
18. If $u = 2x+5$, $v = -3y + 1$, and the regression coefficient of y on x is -1.2 , the regression coefficient of v on u is :
(a) 1.8
(b) -1.8
(c) 3.26
(d) 0.8
19. The odds are 9:5 against a person who is 50 years living till he is 70 and 8:6 against a person who is 60 living till he is 80. Find the probability that at least one of them will be alive after 20 years:
(a) $\frac{11}{14}$
(b) $\frac{22}{49}$
(c) $\frac{31}{49}$
(d) $\frac{35}{49}$

20. The area of a normal Curve is
(a) 90%
(b) 95%
(c) Unity
(d) Infinity
21. Laspeyre's index is based on
(a) Base Year Quantities
(b) Current Year Quantities
(c) Average of base and current year Quantity
(d) None of these.
22. For the data given calculate Fisher's index
 $\Sigma P_1 Q_0 = 3365$, $\Sigma P_0 Q_0 = 3530$,
 $\Sigma P_1 Q_1 = 3400$, $\Sigma P_0 Q_1 = 3600$
(a) 99
(b) 90
(c) 90.25
(d) 94.88
23. Chain index is equal to:
(a) $\text{link relative of current year} \times \frac{\text{Chain index of the current year}}{100}$
(b) $\text{link relative of current year} \times \frac{\text{Chain index of the previous year}}{100}$
(c) $\text{link relative of previous year} \times \frac{\text{Chain index of the current year}}{100}$
(d) None of these
24. _____ is the entire upper part of the table which includes columns and sub-column and unit of measurement.
(a) Stub
(b) Box-head
(c) Body
(d) Caption
25. An annuity consisting of equal payments at the end of each month for 2 years is to be purchased for Rs. 2000. If the interest rate is 6% compounded monthly, how much is each payment?
(a) 78.61
(b) 76.80
(c) 68.70
(d) 68.50
26. The sum of all odd natural numbers between 36 and 120 is:
(a) 2000
(b) 2040
(c) 3276
(d) 3726

27. An examination paper consists of 12 questions divided into two parts A and B. Part A contains 7 questions and part B contains 5 questions. A candidate is required to attempt 8 questions selecting at least 3 from each part. In how many maximum ways can the candidate select the questions?
- (a) 350
(b) 210
(c) 520
(d) None
28. The C.I on Rs. 16000 for $1\frac{1}{2}$ years at 10% p.a payable half -yearly is
- (a) Rs. 2,222
(b) Rs. 2,522
(c) Rs. 2,500
(d) None of these
29. During a certain period the cost of living Index number goes up from 110 to 200 and the salary of the worker is also raised form Rs. 325 to Rs. 500. Does the worker :
- (a) gain
(b) looses
(c) fully compensated
(d) gain lay 10%
30. For Finding correlation between two attributes, we consider
- (a) Pearson's correlation coefficient
(b) Scatter diagram
(c) Spearman's rank correlation coefficient
(d) Coefficient of document deviations.
31. Purchasing power of money is
- (a) Inversely proportional to price index number
(b) Directly proportional to price index number
(c) Both (a) and (b)
(d) None of these
32. The gradient of the curve $y = 2x^3 - 3x^2 - 12x + 8$ at $x = 0$ is : –
- (a) -12
(b) 12
(c) 0
(d) None
33. $\int (e^{3\log x} + e^{x\log 3}) dx$
- (a) $\frac{x^4}{4} + \frac{3^x}{\log 3} + C$
(b) $\frac{x^4}{4} + 3^x \log 3 + C$
(c) $\frac{1}{4} e^{3\log x} + \frac{1}{3} e^{x\log 3} + C$
(d) None

34. Rs. 2,600 were given on interest in two parts. If simple interest of first part in 3 years with 5% interest rate is equal to simple interest of second part in 6 years with 4% interest rate. What is the second part?
- (a) Rs. 1,600
 - (b) Rs. 1,300
 - (c) Rs. 900
 - (d) Rs. 1,000
35. Which number should be subtracted from 23, 30, 57 and 78 so that remaining numbers are in proportion?
- (a) 4
 - (b) 5
 - (c) 6
 - (d) 7
36. If $K = 11$ and $STEP = 15$, how will you code 'SISTRUM' ?
- (a) 16
 - (b) 17
 - (c) 19
 - (d) 48
37. Identify the odd one out.
- (a) Teacher
 - (b) Trainer
 - (c) Professor
 - (d) Student
38. In a certain code 'AMNESTY' is written as 'NMAEYTS'. How will 'BRIGADE' written in that code?
- (a) IRBGEDA
 - (b) EDAGBRI
 - (c) ADEGBRI
 - (d) EDAGIRB
39. Prakash is moving toward East. He turn first left, then right, then left then right. Now in which direction he is moving?
- (a) North
 - (b) South
 - (c) East
 - (d) West
40. Five persons are sitting in a row. D is right to P and left to T. B is left to V and right to T. who are at the ends of the row?
- (a) D, T
 - (b) T, B
 - (c) P, V
 - (d) D, B
41. X is more richer than T. T is not as rich as D. S is not as rich as T or D. Who is the richest?
- (a) X
 - (b) T
 - (c) D
 - (d) S

Directions (Q. No. 42-44) : Each of the following questions contains two or three statements followed by two conclusions numbered I and II. You have to consider the two or three statements to be true, even if they are to be at variance at the commonly known facts. You have to decide which of the given conclusion definitely follows from the given statements.

42. Statements :
Some buses are trains.
Some trains are boats.
Conclusions :
I. Some trains are buses
II. Some boats are buses
(a) only I follows
(b) only II follows
(c) either I or II follows
(d) I and II follow
43. Statements :
All goats are flowers.
No flowers is branch.
Some branches are roots.
Conclusions:
I. Some roots are goats
II. No root is goat
(a) only I follows
(b) only II follows
(c) either I or II follows
(d) neither I or II follows
44. Statements:
All Tables are windows.
All Windows are rooms.
All rooms are buses.
Conclusions:
I. Some Buses are Tables.
II. Some rooms are tables.
(a) only I follows
(b) only II follows
(c) either I or II follows
(d) Both I and II follows
45. The colour of a flower is an example of
(a) An attribute
(b) A variable
(c) A discrete variable
(d) A Continuous variable

46. The following data relate to the marks of a group of students :

Marks	No. of Students
Below 10	15
Below 20	38
Below 30	65
Below 40	84
Below 50	100

- How many students got marks more than 30?
- (a) 65
(b) 50
(c) 35
(d) 43
47. Which of the following is correct?
- (a) AM = Assumed Mean + Arithmetic Mean of deviations of terms.
(b) GM = Assumed Mean + Arithmetic Mean of deviations of terms.
(c) Both
(d) None
48. The mean of set of observation is $\bar{x}$. If each observation is divided by α , $\alpha \neq 0$ and then is increased by 10, then the mean of the new set is
- (a) $\bar{x} / \alpha$
(b) $(\bar{x} + 10) / \alpha$
(c) $\frac{\bar{x}}{\alpha} + 10$
(d) $\alpha \bar{x} + 10$
49. _____ is the reciprocal of the AM of reciprocal of observations.
- (a) HM
(b) GM
(c) Both
(d) None
50. Which of the following relationship is true in a symmetrical distribution?
- (a) Median - $Q_1 = Q_3$ - Median
(b) Median - $Q_1 > Q_3$ - Median
(c) Median - $Q_1 < Q_3$ - Median
(d) Median - $Q_1 \neq Q_3$ - Median
51. The average of 2 number is 20 and their standard deviation 5. Find the two numbers?
- (a) 15, 25
(b) 30, 40
(c) 10, 15
(d) None of these
52. "Root-mean square deviation from Mean" is
- (a) Standard deviation
(b) Quartile deviation
(c) Both
(d) None

53. If events are mutually exclusive, then-
- (a) Their probabilities are less than one
 - (b) Their probabilities sum to one
 - (c) Both events cannot occur at the same time
 - (d) Both of them contain every possible outcome of an experiment.
54. If $P(A)=3/8$, $P(B)=1/3$ and $P(A \cap B)=1/4$ then $P(A \cup B)$ is equal to
- (a) $5/24$
 - (b) $3/24$
 - (c) $1/24$
 - (d) $11/24$
55. An experiment succeeds twice as often as it fails. What is the probability that in next five trials there will be three success.
- (a) $192/243$
 - (b) $19/243$
 - (c) $80/243$
 - (d) $50/243$
56. A man can kill a bird once in five shots. The probabilities that a bird is not killed is
- (a) $4/5$
 - (b) $1/5$
 - (c) $3/5$
 - (d) $2/5$
57. Binomial distribution is symmetrical is
- (a) $p > q$
 - (b) $p < q$
 - (c) $p = q = 0.50$
 - (d) None
58. In standard normal distribution
- (a) Mean = 1 SD = 0
 - (b) Mean = 1 SD = 1
 - (c) Mean = 0 SD = 1
 - (d) Mean = 0 SD = 0
59. Because of the symmetry of Normal distribution the median and the mode have the _____ value as that of the mean
- (a) Greater
 - (b) Smaller
 - (c) Same
 - (d) None
60. The symbol $\phi(a)$ indicates the area of the standard normal curve between
- (a) 0 to a
 - (b) a to ∞
 - (c) $-\infty$ To a
 - (d) $-\infty$ to ∞

61. Depression in business is:
(a) Secular trend
(b) Cyclical
(c) Seasonal
(d) Irregular
62. The multiplicative time series model is:
(a) $Y = T + S + C + I$
(b) $Y = T \times S \times C \times I$
(c) $Y = a + bX$
(d) $Y = a + bX + cX^2$
63. If $B = \begin{bmatrix} 1 & 1 \\ 8 & 3 \end{bmatrix}$
Evaluate $B^2 - 4B$.
(a) $\begin{bmatrix} 2 & -1 \\ 3 & -2 \end{bmatrix}$
(b) $\begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$
(c) $\begin{bmatrix} 5 & -0 \\ 0 & -1 \end{bmatrix}$
(d) $\begin{bmatrix} 5 & 0 \\ 0 & 5 \end{bmatrix}$
64. In an examination 40% students failed in Mathematics, 30% failed in English and 10% failed in both. The percentage of students who passed in both subject is -
(a) 20%
(b) 40%
(c) 60%
(d) 15%
65. Value of $\frac{2a^{1/2} \times a^{2/3} \times 6a^{-7/3}}{9a^{-5/3} \times a^{3/2}}$ if $a=4$
(a) $\frac{1}{3}$
(b) $\frac{1}{2}$
(c) $\frac{1}{4}$
(d) $\frac{1}{9}$

66. If ${}^n P_r = 2880$ and ${}^n C_r = 120$ then the value of r is :-
(a) -24
(b) 6
(c) 4
(d) 3
67. Choose the missing term out of the given alternatives.
PG, NJ, LM, JP ?
(a) RG
(b) GR
(c) HS
(d) SH
68. A and B are Sisters. C and D are Brothers. Daughter of A is Sister of C, then how B is related to D?
(a) Mother
(b) Grandmother
(c) Sister
(d) Aunty
69. A girl introduced a boy as the son of the daughter of the father of her paternal uncle. The boy is related to the girl as -
(a) Son
(b) Uncle
(c) Nephew
(d) Cousin
70. The data are known to be _____ if the data, as being already collected, are used by a different person or agency.
(a) Primary
(b) Secondary
(c) Specialized
(d) Subsidiary
71. 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
72. A man spends 75% of his income his income increase by 20% and his expenditure also increase by 10% then the percentage increase in his savings is:-
(a) 10%
(b) 20%
(c) 25%
(d) 50%

73. If you want to accumulate Rs. 50,000 by making equal payments at the end of each quarter for the next five years, what will be the size of these investments, if money is worth 6% per annum converted quarterly?
- (a) 3024.13
(b) 2103.13
(c) 2190.02
(d) 2162.29
74. If $F:R \rightarrow R$ 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
75. 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
76. 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
77. $\log(a + \sqrt{a^2 + 1}) + \log\left(\frac{1}{a + \sqrt{a^2 + 1}}\right)$ is equal to
- (a) 1
(b) 0
(c) 2
(d) $\frac{1}{2}$
78. Find the effective rate of interest of 9.9% p.a. calculated monthly:-
- (a) 9.9%
(b) 11.36%
(c) 9.36%
(d) 10.36%

79. What is the net present value of piece of property which would be valued at Rs. 2 Lakh at the end of 2 years? (annual rate of increase = 5%)
(a) Rs. 1.81 Lakh
(b) Rs. 2.01 Lakh
(c) Rs. 2.00 Lakh
(d) Rs. 1.91 Lakh
80. If $2^a = 3^b = 12^c$
then ab is equal to :-
(a) $a+b+c$
(b) $c(a+2b)$
(c) $c(2a+b)$
(d) None
81. The missing number in the series:- 7, 11, 13, 17, 19, 23, 25, 29, ?
(a) 30
(b) 31
(c) 32
(d) 33
82. Find the odd one out.
(a) C72X
(b) E110V
(c) G140T
(d) J180P
83. 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
84. In tabulation 'Caption' is
(a) the upper part of the table
(b) the lower part of the table
(c) the main part of the table
(d) the upper part of the table that describes the column and sub-column
85. Bar diagrams are _____ dimensional diagrams.
(a) multi
(b) two
(c) one
(d) three
86. If the relation between two variables x and y is $5x+2y=6$ and the mean deviation (M.D.) of x about its mean is 6 then the M.D. of y about its mean is
(a) 6
(b) 15
(c) 18
(d) none of these

87. The two lines of regression are $x+2y-15=0$ and $2x+3y-18=0$. The regression equation of Y on X is :
(a) $x+2y-15=0$
(b) $2x+3y-18=0$
(c) Both (a) and (b)
(d) None
88. The interval $(\mu-3\sigma, \mu+3\sigma)$ covers _____ area of a normal distribution.
(a) 90%
(b) 95%
(c) 99%
(d) 99.73%
89. The two lines of regression are $2x - 7y + 6 = 0$ and $7x - 2y + 1 = 0$. What is the correlation coefficient between x and y?
(a) $-2/7$
(b) $2/7$
(c) $4/49$
(d) None of these
90. Sum of deviation from mean for any set of observation is -
(a) Negative
(b) Positive
(c) Zero
(d) None of these
91. For two positive numbers SD is always -
(a) Half of range
(b) Double of range
(c) Zero
(d) None of these
92. A bag contains coins of Rs. 1, 50 paisa and 25 paisa in the ratio 4:5:6. If the total amount in the bag is Rs. 120, then the number of coins of 25 paisa, is :-
(a) 60
(b) 75
(c) 90
(d) 96
93. If set $A = \{1,2,3\}$, then what is the power set of A ?
(a) $\{ \{1\}, \{2\}, \{3\}, \{1,2\}, \{1,3\}, \{2,3\}, \{1,2,3\} \}$
(b) $\{ \phi, \{1\}, \{2\}, \{3\}, \{1,2\}, \{1,3\}, \{2,3\} \}$
(c) $\{ \phi, \{1\}, \{2\}, \{3\}, \{1,2\}, \{1,3\}, \{2,3\}, \{1,2,3\} \}$
(d) None
94. The number of arrangements of the letters of the word "SALOON" if the two O's do not come together is :-
(a) 360
(b) 720
(c) 240
(d) 120

95. If $\log_{10} 2 = x$ and $\log_{10} 4 = y$, then $\log_{10} 80$ is equal to:
- (a) $x - y + 1$
 - (b) $x + y + 1$
 - (c) $x - y - 1$
 - (d) $2x - y + 1$
96. Transpose of row matrix is
- (a) zero matrix
 - (b) diagonal matrix
 - (c) Column Matrix
 - (d) Row matrix
97. The value of $\frac{1}{\log_3 60} + \frac{1}{\log_4 60} + \frac{1}{\log_5 60}$ is :-
- (a) 0
 - (b) 1
 - (c) 5
 - (d) 60
98. The sides of a triangle are in the ratio $\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$. If the perimeter of the triangle is 52 cm, the length of the smallest side is :-
- (a) 9 cm
 - (b) 18 cm
 - (c) 24 cm
 - (d) 12 cm
99. A is a square matrix of order 3 and $|A| = 7$ then the value of $|\text{adj}A|$ is:-
- (a) 343
 - (b) 7
 - (c) 49
 - (d) 21
100. If $2^{x^2} = 3^{y^2} = 12^{z^2}$ then
- (a) $\frac{1}{x^2} + \frac{1}{y^2} = \frac{1}{z^2}$
 - (b) $\frac{1}{x^2} + \frac{2}{y^2} = \frac{1}{z^2}$
 - (c) $\frac{2}{x^2} + \frac{1}{y^2} = \frac{1}{z^2}$
 - (d) None

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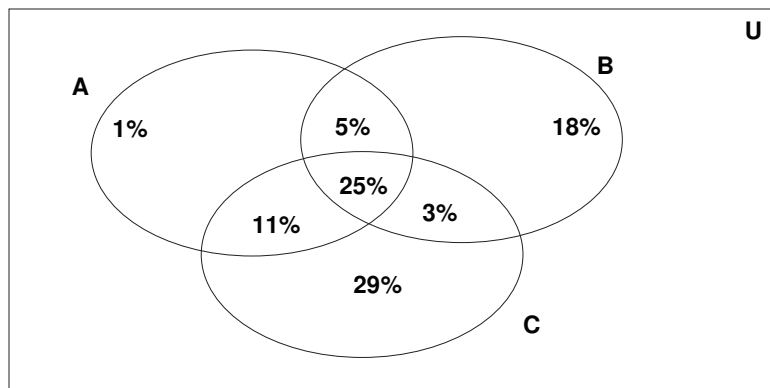
BUSINESS MATHEMATICS, REASONING & STATISTICS

1. Ans. c
 Explanation:

$$= \log(1+2+3) = \log 6$$

$$= \log(1 \times 2 \times 3)$$

$$= \log 1 + \log 2 + \log 3$$
2. Ans. b
 Explanation:
 Required no. of ways = $2 \times 4 \times 3 \times 2 \times 1 = 48$
3. Ans. d
 Explanation:
 By options putting the value $n = 9$
 ${}^9C_2 - 9 = 27$
4. Ans. d
 Explanation:
 $x^y = e^{x+y}$
 $y \log x = x + y$
 $y = \frac{x}{\log x - 1}$
 $\frac{dy}{dx} = \frac{\log x - 2}{(\log x - 1)^2}$
5. Ans. c
 Explanation:
 $\frac{A}{B} \times \frac{B}{C} \times \frac{C}{D} = \frac{2}{3} \times \frac{4}{5} \times \frac{5}{8}$
 $\frac{A}{D} = \frac{1}{3}$
6. Ans. b
 Explanation:
 By formula
 $n(A \cup B \cup C) = n(A) + n(B) + n(C) - n(A \cap B) - n(B \cap C) - n(A \cap C) + n(A \cap B \cap C)$
 $92\% = 42\% + 51\% + 68\% - 30\% - 28\% - 36\% + n(A \cap B \cap C)$
 $n(A \cap B \cap C) = 25\%$



The percentage of persons who read only one paper
 $= 1\% + 18\% + 29\% = 48\%$

7. Ans. b

Explanation:

$$S_{\infty} = \frac{a}{1-r} = \frac{\sqrt{3}}{1-\frac{1}{3}} = \frac{3\sqrt{3}}{2}$$

8. Ans. d

9. Ans. c

10. Ans. d

11. Ans. d

12. Ans. b

13. Ans. c

14. Ans. a

15. Ans. d

Explanation:

$$\text{Coefficient of variation} = \frac{\text{S.D.}}{\bar{x}} \times 100$$

$$50 = \frac{\text{S.D.}}{10} \times 100$$

$$\text{S.D.} = \frac{50 \times 10}{100} = 5$$

$$\therefore \text{Variance} = (\text{S.D.})^2 = 5^2 = 25$$

16. Ans. b

Explanation:

$$F = \sqrt{L \times P}$$

$$150^2 = 144 \times P$$

$$P = 156.25$$

17. Ans. a

18. Ans. a
Explanation:

$$b_{vu} = \frac{p}{q} \times b_{yx}$$

$$= \frac{-3}{2} \times -1.2 = 1.8$$

19. Ans. c

Explanation : Event A: Person aged 50 years will remain alive after 20 years

Event B: Person aged 60 years will remain alive after 20 years

$$\therefore P(A) = \frac{5}{9+5} = \frac{5}{14} \text{ and } P(B) = \frac{6}{8+6} = \frac{6}{14}$$

$$\therefore P(A \cup B) = \frac{5}{14} + \frac{6}{14} - \frac{5}{14} \times \frac{6}{14} = \frac{31}{49}$$

20. Ans. c

21. Ans. a

Explanation:

Laspeyre's Price Index is based on base year Quantity.

$$L = \frac{\sum P_1 Q_0}{\sum P_0 Q_0} \times 100$$

Since Formula is

Hence Q_0 is constant.

22. Ans. d

Explanation:

$$P_{01} = \sqrt{\frac{\sum P_1 q_0}{\sum P_0 q_0} \times \frac{\sum P_1 q_1}{\sum P_0 q_1}} \times 100 = 94.88$$

23. Ans. b

Explanation : Chain index for any year

$$= \frac{\text{Link relative (index) of current year} \times \text{Chain index of the previous year}}{100}$$

24. Ans. b

25. Ans. a

Explanation:

$$\text{Here } A = 2000, i = \frac{6}{100 \times 12} = 0.005, n = 24$$

Let Rs. P be the each payment.

$$\therefore \text{Amount : } A = P \left[\frac{(1+i)^n - 1}{i} \right] \Rightarrow 2000 = P \left[\frac{(1+0.005)^{24} - 1}{0.005} \right] = P \left[\frac{(1.005)^{24} - 1}{0.005} \right]$$

$$\Rightarrow P = \frac{2000 \times 0.005}{(1.005)^{24} - 1} \quad \text{or} \quad P = \frac{10}{1.1272 - 1} = \frac{10}{0.1272} = \text{Rs. } 78.61$$

26. Ans. c

Explanation:

37, 39, ... 119

$$l = a + (n-1)d$$

$$119 = 37 + (n-1)(2)$$

$$n = 42$$

$$S_n = \frac{n}{2}(a + l) = \frac{42}{2}(37 + 119) = 3276$$

27. Ans. d

Explanation :

The candidate can select 8 questions by selecting at last three from each part in the following ways:

(a) 3 questions from part A and 5 questions from part

$$B = {}^7C_3 \times {}^5C_5 = 35 \text{ ways}$$

(b) 4 questions from part A and part B each

$$B = {}^7C_4 \times {}^5C_4 = 175 \text{ ways}$$

(c) 5 questions from part A and questions from part

$$B = {}^7C_5 \times {}^5C_3 = 210 \text{ ways}$$

Hence, the total number of ways in which the candidate can select the question will be $= 35 + 175 + 210 = 420$ ways.

28. Ans. b

29. Ans. b

Explanation:

$$\text{Revised salary} = \frac{200}{110} \times 325 = 590.90$$

It means worker is in loss.

30. Ans. c

31. Ans. a

32. Ans. a

Explanation:

$$\frac{dy}{dx} = 6x^2 - 6x - 12$$

$$\frac{dy}{dx} \text{ at } x=0 = -12$$

33. Ans. a

Explanation:

$$\int (x^3 + 3^x) dx$$

$$e^{\log x} = x$$

$$\frac{1}{4}x^4 + \frac{3^x}{\log 3} + c$$

34. Ans. d

Explanation:

first part = x , second part = 2600-x

$$\frac{x \times 3 \times 5}{100} = \frac{(2600 - x) \times 6 \times 4}{100}$$

$$15x = 62,400 - 24x$$

$$39x = 62,400$$

$$x = 1,600$$

$$\text{Second part} = 2,600 - 1,600$$

$$= \text{Rs. } 1,000$$

35. Ans. c

Explanation:

Product of extreme terms = product of mean terms

$$(23 - x)(78 - x) = (30 - x)(57 - x)$$

$$x = 6$$

36. Ans. b

37. Ans. d

38. Ans. a

39. Ans. c

40. Ans. c

41. Ans. a

42. Ans. a

43. Ans. c

44. Ans. d

45. Ans. a

Explanation:

The colour of a flower is an example of An attribute

46. Ans. c

Explanation:

0-10	15	SO=19+16=35
10-20	23	

20-30	27	
30-40	19	
40-50	16	

47. Ans. a

Explanation:

$$\bar{x} = A + \frac{\sum dx}{n}$$

48. Ans. c

Explanation:

$$New\ Mean = \frac{\bar{x}}{\alpha} \quad New\ Mean = \frac{\bar{x}}{\alpha} + 10$$

49. Ans. a

Explanation:

HM is the reciprocal of the AM of reciprocal of observations.

$$H.M = \frac{n}{\frac{1}{a} + \frac{1}{b} + \frac{1}{c} + \frac{1}{n}}$$

50. Ans. a

Explanation:

$$Q2 - Q1 \Rightarrow Q3 - Q2$$

51. Ans. a

Explanation:

$$\frac{15+25}{2} = 20 \quad SD = \frac{range}{2} = \frac{10}{2} = 5$$

52. Ans. a

Explanation:

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

53. Ans. c

Explanation:

If events are mutually exclusive, then both events cannot occur at the same time.

54. Ans. d

Explanation:

$$P(A \cup B) = \frac{3}{8} + \frac{1}{3} - \frac{1}{4} = \frac{11}{24}$$

55. Ans. c
Explanation:
 $P=2$
 $P=2(1-P)$
 $P=2-2P$
 $3P=2$
 $P=2/3$
 $q=\frac{1}{3}$

$${}^5C_3\left(\frac{2}{3}\right)^3\left(\frac{1}{3}\right)^2$$

$$=\frac{80}{243}$$
56. Ans. a
Explanation:
 $A=\frac{1}{5}$ $A'=\frac{4}{5}$
57. Ans. c
Explanation:
 $\beta(n, \rho)$ is symmetrical when $\rho=0.5$ or $q=0.5$
58. Ans. c
Explanation:
 $\mu=0$ $\sigma=1$
59. Ans. c
Explanation:
 Because of the symmetry of Normal distribution the median and the mode have the same value as that of the mean
60. Ans. c
Explanation :
 The symbol $\phi(a)$ indicates the area of the standard normal curve between $-\infty$ To a
61. Ans. b
Explanation:
 Depression in business is cyclical
62. Ans. b
Explanation:
 The multiplicative time series model is $Y = T \times S \times C \times I$
63. Ans. d
Explanation:

$$\begin{aligned}
 B^2 &= \begin{bmatrix} 1 & 1 \\ 8 & 3 \end{bmatrix} \times \begin{bmatrix} 1 & 1 \\ 8 & 3 \end{bmatrix} \\
 &= \begin{bmatrix} 9 & 4 \\ 32 & 17 \end{bmatrix} \\
 B^2 - 4B &= \begin{bmatrix} 9 & 4 \\ 32 & 17 \end{bmatrix} - \begin{bmatrix} 4 & 4 \\ 32 & 12 \end{bmatrix} \\
 &= \begin{bmatrix} 5 & 0 \\ 0 & 5 \end{bmatrix}
 \end{aligned}$$

64. Ans. b

Explanation:

$$\begin{aligned}
 n(m \cup E) &= n(m) + n(E) - n(m \cap E) \\
 &= 40\% + 30\% - 10\% \\
 &= 60\%
 \end{aligned}$$

The percentage of students who passed in both subject = $100\% - 60\% = 40\%$.

65. Ans. a

Explanation:

$$\frac{4a^{\frac{1}{2} + \frac{2}{3} - \frac{7}{3}}}{3a^{\frac{-5}{3} + \frac{3}{2}}} = \frac{4}{3} a^{-1} = \frac{4}{3} \times \frac{1}{4} = \frac{1}{3}$$

66. Ans. c

Explanation:

$$\begin{aligned}
 {}^n P_r &= \frac{n!}{(n-r)!} \\
 2880 &= \frac{r!}{(r-r)!} \times 120 \\
 r! &= 24 \\
 r &= 4
 \end{aligned}$$

67. Ans. c

68. Ans. d

69. Ans. d

70. Ans. b

Explanation:

The data are known to be Secondary if the data, as being already collected, are used by a different person or agency.

71. Ans. a

Explanation:

$$\begin{aligned}
 &\log_5^{1024} \\
 &= \frac{\log^{1024}}{\log_5}
 \end{aligned}$$

$$= \frac{10 \log^2}{\log_5}$$

$$= \frac{10 \log^2}{\log_{10} - \log_2} = \frac{10 \times 0.3010}{1 - 0.3010}$$

72. Ans. d

Explanation:

Income	Expenses	Savings
100	75	25
120	82.5	37.5

$$\% \text{ increase in his savings} = \frac{37.5 - 25}{25} \times 100$$

$$= 50$$

73. Ans. d

Explanation:

$$A = \frac{P}{r} [(1+r)^n - 1]$$

$$\text{Here } r = \frac{6}{100 \times 4} = 0.015$$

$$n = 5 \times 4 = 20$$

$$\text{Now } 50,000 = \frac{P}{0.015} [1.015^{20} - 1]$$

$$= \frac{P}{0.015} 1.346 - 1$$

$$P = \frac{50,000 \times 0.15}{0.346}$$

$$P = \text{Rs. } 2162.2866$$

74. Ans. a

Explanation :

$$f(x) = (x-1)^3 + 2 \text{ (bijection function)}$$

$$\text{Let } (x-1)^3 + 2 = y$$

$$(x-1)^3 = y - 2$$

$$x = (y-2)^{1/3} + 1$$

$$\text{So } f^{-1} = (x-2)^{1/3} + 1$$

75. Ans. a

Explanation:

$$2x^2 + 5xy + 3y^2 = 1$$

$$4x + 5x \frac{dy}{dx} + 5y + 6y \frac{dy}{dx} = 0$$

$$\frac{dy}{dx} = \frac{-4x-5y}{5x+6y}$$

76. Ans. c

Explanation:

$$x^2 + x + 2 = 0$$

$$\alpha + \beta = -1, \alpha\beta = 2$$

$$(\alpha + \beta)^2 = \alpha^2 + \beta^2 + 2\alpha\beta$$

$$1 = \alpha^2 + \beta^2 + 4$$

$$\alpha^2 + \beta^2 = -3$$

$$\frac{\alpha}{\beta} + \frac{\beta}{\alpha} = \frac{\alpha^2 + \beta^2}{\alpha\beta} = \frac{-3}{2}$$

77. Ans. b

Explanation:

$$\log(a + \sqrt{a^2 + 1}) + \log(a + \sqrt{a^2 + 1})^{-1}$$

$$= \log(a + \sqrt{a^2 + 1}) - \log(a + \sqrt{a^2 + 1})$$

$$= 0$$

78. Ans. d

Explanation:

$$E = \left[\left(1 + \frac{9.9}{1200} \right)^{12} - 1 \right] \times 100$$

$$= 10.36\%$$

79. Ans. a

Explanation:

$$A = P \left(1 + \frac{r}{100} \right)^n$$

$$2,00,000 = P \left(1 + \frac{5}{100} \right)^2$$

$$P = \text{Rs. 1.81 Lakh}$$

80. Ans. b

Explanation:

$$2^a = 3^b = 12^c = k$$

$$2 \times 2 \times 3 = 12$$

$$k^{1/a} \times k^{1/a} \times k^{1/b} = k^{1/c}$$

$$\frac{2}{a} + \frac{1}{b} = \frac{1}{c}$$

$$\frac{2b + a}{ab} = \frac{1}{c}$$

$$ab = c(a + 2b)$$

81. Ans. b

82. Ans. d

83. Ans. d

84. Ans. d

Explanation:

In tabulation 'Caption' is the upper part of the table that describes the column and sub-column.

85. Ans. c

Explanation:

Bar diagrams are one dimensional diagrams.

86. Ans. b

Explanation:

$$5x + 2y = 6$$

$$2y = 6 - 5x$$

$$y = \frac{6}{2} - \frac{5x}{2}$$

$$|b| = \left| \frac{-5}{2} \right| = \frac{5}{2} \quad [\text{coefficient of } x]$$

mean deviation of $y = |b| \times \text{mean deviation of } x \text{ about mean.}$

$$= \frac{5}{2} \times 6 = 15$$

87. Ans. a

88. Ans. d

89. Ans. b

Explanation:

The two lines of regression are

$$2x - 7y + 6 = 0$$

....(1)

$$\text{and } 7x - 2y + 1 = 0$$

....(2)

If we take (1) as the regression equation of Y on X, then (2) is that of X on Y. We can write these as :

$$y = \frac{2}{7}x + \frac{6}{7} \text{ and } x = \frac{2}{7}y - \frac{1}{7}$$

respectively.

$$\therefore b_{yx} = \frac{2}{7} \text{ and } b_{xy} = \frac{2}{7}$$

$$\Rightarrow b_{yx}b_{xy} = \frac{2}{7} \times \frac{2}{7} = \frac{4}{49} < 1$$

So, our choice is valid.

$$\text{Now, } r^2 = b_{yx} b_{xy} = \frac{4}{49} \Rightarrow r = \frac{2}{7}$$

(Note that $b_{yx} > 0$), so $r > 0$

90. Ans. c

Explanation:

Sum of deviation from mean for any set of observation is Zero.

91. Ans. a

Explanation:

For two positive numbers SD is always Half of range.

92. Ans. c

Explanation:

1Rs. : 50P : 25P

4x, 5x, 6x

$$4x + \frac{250x}{100} + \frac{150x}{100} = 120$$

$$x = 15$$

The number of coins of 25 paisa = $6 \times 15 = 90$.

93. Ans. c

Explanation:

$A = 1, 2, 3$

Subsets of A = Power set of A

$\phi, 1, 2, 3, 1, 2, 2, 3, 1, 3, 1, 2, 3$

94. Ans. c

Explanation:

The no. of arrangements = Total no. of arrangements – Two 'o's come together-

$$= \frac{6!}{2!} - 5! = 240$$

95. Ans. b

Explanation:

$$\log_{10} 80 = \log_{10} (8 \times 10)$$

$$= \log_{10} (2 \times 4 \times 10)$$

$$= \log_{10} 2 + \log_{10} 4 + \log_{10} 10$$

$$= x + y + 1$$

96. Ans. c

Explanation:

Transpose of row matrix is Column Matrix.

97. Ans. b

Explanation:

$$= \log_{60} 3 + \log_{60} 4 + \log_{60} 5 \\ = \log_{60} 60 = 1$$

98. Ans. d

Explanation: Let the sides of a triangle are in $6x$, $4x$ and $3x$

$$\text{Then } 6x + 4x + 3x = 52$$

$$x = 4$$

$$\text{The length of the smallest side} = 3 \times 4 = 12 \text{ cm}$$

99. Ans. c

Explanation:

$$|\text{adj}A| = |A|^{n-1} \\ = 7^{3-1} = 7^2 = 49$$

100. Ans. c

Explanation :

$$2^{x^2} = 3^{y^2} = 12^{z^2} = K$$

$$12 = 2^2 \times 3$$

$$K^{1/z^2} = K^{2/x^2} \times K^{1/y^2}$$

$$\frac{2}{x^2} + \frac{1}{y^2} = \frac{1}{z^2}$$

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