

(ALL CA FOUNDATION BATCHES)

DATE: 15.01.2021

MAXIMUM MARKS: 100

TIMING: 3 Hours

BUSINESS MATHEMATICS, REASONING & STATISTICS

1. Ans. b

Explanation:

$$\begin{aligned} & \log(a + \sqrt{a^2 + 1}) + \log(a + \sqrt{a^2 + 1})^{-1} \\ &= \log(a + \sqrt{a^2 + 1}) - \log(a + \sqrt{a^2 + 1}) \\ &= 0 \end{aligned}$$

2. Ans. c

Explanation:

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

$$a = 2, b = \frac{6}{5}$$

$$ab = \frac{12}{5}$$

3. Ans. c

4. Ans. a

Explanation:

$$\begin{aligned} \frac{dx}{dt} &= \frac{1}{t} \text{ and } \frac{dy}{dt} = -\frac{1}{t^2} \\ \Rightarrow \frac{dy}{dx} &= \frac{dy/dt}{dx/dt} = \frac{-\frac{1}{t^2}}{\frac{1}{t}} = -\frac{1}{t} \\ &= -y \end{aligned}$$

Differentiating w.r.t. x

$$\begin{aligned} \frac{d^2y}{dx^2} &= -\frac{dy}{dx} \\ \Rightarrow \frac{d^2y}{dx^2} + \frac{dy}{dx} &= 0 \end{aligned}$$

5. Ans. a

Explanation:

$$\text{No. of ways that can be formed by using the word 'BANANA'} = \frac{6!}{3!2!} = 60$$

$$\text{No. of ways in which two N comes together} = \frac{5!}{3!} = 20$$

$$\therefore \text{Required No. of ways} = 60 - 20 = 40$$

6. Ans. b
Explanation:
Standard Deviation (σ) = $\sqrt{\text{Variance}}$
= $\sqrt{100} = 10$
∴ Mode = 3 Median – 2 Mean
29 = (3 × 23) – 2 Mean
Mean = (69 – 29) / 2 = 20
∴ Coefficient of variation (CV) = $\frac{\sigma}{\bar{X}} \times 100$
∴ CV = $\frac{10}{20} \times 100 = 50\%$
7. Ans. c
8. Ans. b
Explanation:
By Option
9. Ans. d
Explanation:
$$P_{01} = \sqrt{\frac{\sum P_1 q_0}{\sum P_0 q_0} \times \frac{\sum P_1 q_1}{\sum P_0 q_1}} \times 100 = 94.88$$
10. Ans. d
11. Ans. b
12. Ans. c
13. Ans. a
14. Ans. a
15. Ans. a
16. Ans. a
17. Ans. d
18. Ans. a
19. Ans. a
20. Ans. d
21. Ans. b
22. Ans. b

- 23. Ans. b
- 24. Ans. c
- 25. Ans. a
- 26. Ans. c
- 27. Ans. a
- 28. Ans. b
- 29. Ans. c
- 30. Ans. c
- 31. Ans. c
- 32. Ans. a
- 33. Ans. c
- 34. Ans. d
- 35. Ans. a
- 36. Ans. a
- 37. Ans. c
- 38. Ans. d
- 39. Ans. b
- 40. Ans. c
- 41. Ans. c
- 42. Ans. d
- 43. Ans. b
- 44. Ans. a
- 45. Ans. a
- 46. Ans. b
- 47. Ans. b
- 48. Ans. c

49. Ans. a

50. Ans. d

Explanation:

The required no. of ways = $4! \times 3! = 144$

51. Ans. b

Explanation : If two variables are uncorrelated (i.e. $r = 0$) then regression lines are perpendicular.

52. Ans. b

Explanation : $r = \frac{\text{Cov}(x,y)}{SD_x \cdot SD_y}$

$$0.28 = \frac{7.6}{3 \times SD_y}$$

$$SD_y = 9.048$$

53. Ans. a

54. Ans. c

Explanation:

$$P_{2000, 2003} = \frac{P_{2003} \times 100}{P_{2000}}$$

$$= \frac{60 \times 100}{15} = 400\%$$

55. Ans. c

56. Ans. b

57. Ans. b

Explanation:

$$\frac{\sigma_x}{\sigma_y} = \sqrt{\frac{b_{xy}}{b_{yx}}}$$

$$= \sqrt{\frac{8}{15}}$$

$$= 0.73$$

58. Ans. b

59. Ans. b

Explanation:

$$f(x) = x^2 - 4x$$

$$F(x) = A^2 - 4A$$

$$= \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix} \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix} - 4 \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$$

$$= \begin{bmatrix} 7 & 18 \\ 6 & 19 \end{bmatrix} - \begin{bmatrix} 8 & 12 \\ 4 & 16 \end{bmatrix}$$

$$= \begin{bmatrix} -1 & 6 \\ 2 & 3 \end{bmatrix}$$

60. Ans. c

Explanation:

$$D = P \left(\frac{R}{100} \right)^2$$

$$768 = P \left(\frac{8}{100} \right)^2$$

$$P = 1,20,000$$

61. Ans. d

Explanation:

$$E = \left[\left(1 + \frac{r}{100} \right)^n - 1 \right] \times 100$$

$$= \left[\left(1 + \frac{6}{200} \right)^2 - 1 \right] \times 100 = 6.09\%$$

62. Ans. a

Explanation:

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

$$= 5,000 \left(1 + \frac{4}{100} \right) - 5,000$$

$$= 200$$

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

$$= 202$$

$$D = 202 - 200 = \text{Rs. } 2$$

63. Ans. b

Let the sum borrowed be x. Then,

$$\left(\frac{X \times 6 \times 2}{100} \right) + \left(\frac{x \times 9 \times 3}{100} \right) + \left(\frac{X \times 14 \times 4}{100} \right) = 11,400$$

$$\Leftrightarrow \left(\frac{3x}{25} + \frac{27x}{100} + \frac{14x}{25} \right) = 11,400 \Leftrightarrow \frac{95x}{100} = 11,400 \Leftrightarrow x = \left(\frac{11,400 \times 100}{95} \right) = 12,000$$

Hence Sum borrowed Rs. 12,000

64. Ans. c

65. Ans. b

66. Ans. a

67. Ans. b

68. Ans. b

Explanation:

$${}^{n+2}C_r = {}^{n+2}C_{10-r}$$

$$\text{or } n+2 = r+10-r$$

$$\text{or } n = 8$$

$$\text{then } {}^8C_6 = \boxed{28}$$

69. Ans. d

70. Ans. a

71. Ans. d

72. Ans. a

73. Ans. c

Explanation:

$$\begin{aligned}\text{The no. of ways} &= {}^4P_3 \times 4! \\ &= 24 \times 24 = 576\end{aligned}$$

74. Ans. c

75. Ans. b

76. Ans. a

77. Ans. d

78. Ans. c

79. Ans. c

80. Ans. c

81. Ans. d

82. Ans. b

83. Ans. d

Explanation:

$$E(x-\mu)^2 \text{ and } E[x-E(x)]^2 \text{ both are variance.}$$

84. Ans. c

Explanation:

$$P(A \cap B) = 1 - \frac{5}{6} = \frac{1}{6}$$

$$P(B) = 1 - \frac{2}{3} = \frac{1}{3}$$

$$P(A \cup B) = \frac{1}{2} + \frac{1}{3} - \frac{1}{6} = \frac{2}{3}$$

85. Ans. A

86. Ans. a

Explanation:

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

$$5,00,000 = \frac{R}{.08} [1 - (1+0.8)^{-3}]$$

$$R = \text{Rs. } 1,94,016.75$$

87. Ans. c

Explanation:

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

$$\frac{25}{16} P = P \left(1 + \frac{r}{100} \right)^2$$

$$\left(\frac{5}{4} \right)^2 = \left(1 + \frac{r}{100} \right)^2$$

$$\frac{5}{4} = 1 + \frac{r}{100}$$

$$r = 25\%$$

88. Ans. b

Explanation :

$$\frac{10000 \times 2 \times r}{100} + \frac{6000 \times 3 \times r}{100} = 1900$$

$$r = 5\%$$

89. Ans. b

90. Ans. a

91. Ans. a

92. Ans. c

93. Ans. a

94. Ans. a

95. Ans. d

96. Ans. b

Explanation:

$$\text{Coefficient of range} = \frac{L - S}{L + S}$$

Where $L \rightarrow$ for largest value

$S \rightarrow$ for smallest value

$$\text{Coefficient of range} = \frac{40 - 10}{40 + 10} = \frac{30}{50} = \frac{3}{5}$$

97. Ans. b

Explanation:

$$\begin{aligned}\text{G.M.} &= (2 \times 2^2 \times 2^3 \times 2^4 \times 2^5 \times 2^6)^{1/6} \\ &= 2^{7/2}\end{aligned}$$

98. Ans. c

99. Ans. b

Explanation:

Less than ogive & more than Ogive intersect at a point called MEDIAN or we can say second quartile.

100. Ans. a

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