

(GCF-2, GCF-3, GCF-3A, GCF-5, GCF-6, GCF-7, GCF-8, GCF-9, GCF-10, GCF-11, GCF-12, GCF-13, VCF-VDCF-1, VCF-VDCF-2)
 DATE: 13.11.2022 MAXIMUM MARKS: 100 TIMING: 2 Hours

BUSINESS MATHEMATICS, REASONING & STATISTICS

1. Ans. d

Explanation:

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

$$796870 = \frac{R}{0.1} [(1+0.1)^{10} - 1]$$

$$R = 50,000$$

2. Ans. a

Explanation:

$$\frac{A}{B} = \frac{2}{3}, \frac{B}{C} = \frac{1}{4}$$

$$A:B:C = 2:3:12$$

$$A's \text{ share} = Rs. 510 \times \frac{2}{17} = Rs. 60$$

3. Ans. d

Explanation:

$$\begin{aligned} \text{Present value} &= A(1+i)^{-n} = 10000 / (1+0.025)^4 \\ &= 10000 / (1.025)^4 \\ &= 10000 / (1.1038) \\ &= Rs. 9059.50 \end{aligned}$$

4. Ans. d

Explanation:

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

5. Ans. b

Explanation:

Let third proportional be T

$$x^2 - y^2, x - y, T$$

$$x^2 - y^2 : x - y :: x - y : T$$

$$(x - y)^2 = (x^2 - y^2) \times T$$

$$\frac{(x - y)^2}{x^2 - y^2} = T$$

$$\frac{x - y}{x + y} = T$$

6. Ans. c
Explanation:

$$x + \frac{1}{x} = \sqrt{2} \quad (\text{squaring both sides})$$

$$\left(x + \frac{1}{x}\right)^2 = (\sqrt{2})^2$$

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

$$x^2 + \frac{1}{x^2} = \boxed{0}$$
7. Ans. c
Explanation:
 The no. of arrangements = Total no. of arrangements – Two 'o's come together-

$$= \frac{6!}{2!} - 5! = 240$$
8. Ans. b
Explanation:

$$f \circ g(x) = f[g(x)]$$

$$= f\left[\frac{1}{1-x}\right]$$

$$= \frac{\frac{1}{1-x} - 1}{\frac{1}{1-x}}$$

$$= x$$
9. Ans. b
Explanation:

$$\alpha - \beta = \sqrt{(\alpha + \beta)^2 - 4\alpha\beta}$$

$$= \sqrt{(7)^2 - 4(-9)} = \sqrt{85}$$
10. Ans. b
Explanation:
 Given equation is $3x^2 + (5m-2)x + m = 0$
 Sum of the roots = $\frac{-(5m-2)}{3}$
 We know that if roots are reciprocal to each other then $\frac{c}{a} = 1$ of $ax^2 + bx + c = 0$
 So $\frac{m}{3} = 1 \Rightarrow m = 3$

So sum of the roots $\frac{-(5 \times 3 - 2)}{3} = \boxed{\frac{-13}{3}}$

11. Ans. b

Explanation:

By formula

$$n(A \cup B \cup C) = n(A) + n(B) + n(C) - n(A \cap B) - n(B \cap C) - n(A \cap C) + n(A \cap B \cap C)$$

$$92\% = 42\% + 51\% + 68\% - 30\% - 28\% - 36\% + n(A \cap B \cap C)$$

$$n(A \cap B \cap C) = 25\%$$

12. Ans. c

Explanation:

$$S_1 = 7$$

$$S_2 = 8 + 10 = 18$$

$$a_1 = 7$$

$$a_2 = S_2 - S_1 = 18 - 7 = 11 \quad d = 4$$

$$a_n = 7(n - 1) + 4$$

$$a_n = 7 + 4n - 4$$

$$a_n = 4n + 3$$

13. Ans. a

Explanation:

$$\left(\frac{x}{y} - 1 \right)$$

$$\left(\frac{x^2}{y^2} - 1 \right)$$

$$\Rightarrow \left(\frac{x - y}{y} \right) \times \frac{y^2}{x^2 - y^2}$$

$$\Rightarrow \frac{y}{x + y}$$

14. Ans. a

Explanation:

$$\frac{\log_b x}{\log_{2b} x}$$

$$\Rightarrow \frac{\log_x 2b}{\log_x b}$$

$$\Rightarrow \frac{\log_x 2 + \log_x b}{\log_x b}$$

$$\Rightarrow 1 + \frac{\log_x 2}{\log_x b}$$

$$\Rightarrow 1 + \log_b 2$$

15. Ans. c

Explanation:

$$\left(\frac{a^{-1}b^2}{a^2b^{-4}}\right)^7 \cdot \left(\frac{a^3b^{-5}}{a^{-2}b^3}\right)^{+5} \times a^{-4}b^{-2}$$

$$\Rightarrow \left(\frac{b^6}{a^3}\right)^7 \cdot \left(\frac{a^5}{b^8}\right)^5 \cdot a^{-4}b^{-2}$$

$$\Rightarrow \frac{(b)^{42}}{(a)^{21}} \cdot \frac{(a)^{25}}{(b)^{40}} \cdot a^{-4}b^{-2}$$

$$\Rightarrow (b)^{42-40-2} \cdot (a)^{25-21-4}$$

$$\Rightarrow (b)^0 \cdot (a)^0$$

$$\Rightarrow 1$$

16. Ans. c

Explanation:

$$\log_{.01}.00000001 = \log_{.01}(.01)^4 = 4$$

$$\log_{\sqrt{3}}81 = \log_{(\sqrt{3})}(\sqrt{3})^8 = 8$$

so ratio is 4 : 8

$$\boxed{1:2}$$

17. Ans. c

$$\text{Here } 5^{x+1} + 5^{2-x} = 125 + 1 = 126.$$

$$\text{or } 5^x \cdot 5 + 5^2 \cdot 5^{-x} = 126.$$

$$\text{Put } 5^x = y \text{ so that (1) becomes : } 5y + \frac{25}{y} = 126 \Rightarrow 5y^2 - 126y + 25 = 0$$

$$\text{or } 5y^2 - 125y - y + 25 = 0 \text{ or } 5y(y - 25) - 1(y - 25) = 0$$

$$(y - 25)(5y - 1) = 0 \Rightarrow y = 25, y = 1/5$$

$$\text{When } y = 25. \text{ Then } 5^x = 25 \Rightarrow 5^x = 5^2 \Rightarrow x = 2.$$

$$\text{When } y = 1/5, \text{ then } 5^x = 1/5 = 5^{-1} \Rightarrow x = -1.$$

Hence the solution set is $(-1, 2)$.

18. Ans. d

Explanation:

$$8x - 12x < 14 - 6$$

$$-4x < 8$$

$$x > -2 \quad (-2, \infty)$$

19. Ans. c

Explanation:

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

$$672 = P \left(1 + \frac{r}{100} \right)^2 \dots\dots (i)$$

$$714 = P \left(1 + \frac{r}{100} \right)^3 \dots\dots (ii)$$

equation (ii)

equation (i)

$$1.0625 = 1 + \frac{r}{100}$$

$$r = 6.25\%$$

20. Ans. c

Let the sum be Rs. x. Then,

$$C.L. = \left[X \times \left(1 + \frac{50}{3 \times 100} \right)^3 - X \right] = \left(\frac{343X}{216} - X \right) = \frac{127X}{216}.$$

$$\therefore \frac{127X}{216} = 1,270 \text{ or } X = \frac{1,270 \times 216}{127} = 2,160.$$

Thus, the sum is Rs. 2,160.

$$\therefore S.L. = Rs. \left(2,160 \times \frac{50}{3} \times 3 \times \frac{1}{100} \right) = Rs. 1,080.$$

21. Ans. c

Explanation:

$$\begin{aligned} \text{Present value of growing property} &= \frac{R}{i - g} \\ &= \frac{80}{0.07 - 0.05} = 4000 \end{aligned}$$

22. Ans. b

Explanation:

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

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

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

$$\text{then } {}_8C_6 = \boxed{28}$$

23. Ans. a

Explanation:

$$\text{Scrap Value} = P \left(1 - \frac{r}{100} \right)^n$$

$$21,870 = P (.9)^3$$

$$P = Rs. 30,000$$

24. Ans. b

Explanation:

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

$$400000 = \frac{R}{0.10} [(1 + 0.10)^{10} - 1]$$

$$R = \text{Rs. } 25098.16$$

25. Ans. b
Explanation:

$$\text{CAGR} = \left(\frac{280}{100} \right)^{\frac{1}{4}} - 1$$

$$= 29.35\%$$

26. Ans. c
Explanation:

Let the total Capital be Rs. X

$$\text{Then } \left(\frac{X}{3} \times \frac{7}{100} \times 1 \right) + \left(\frac{X}{4} \times \frac{8}{100} \times 1 \right) + \left(\frac{5X}{12} \times \frac{10}{100} \times 1 \right) = 561$$

$$X = 6600$$

27. Ans. b
Explanation:

$$SI = \frac{prt}{100}$$

$$\frac{3}{8} P = \frac{p \times r \times 25}{400}$$

$$r = 6\%$$

28. Ans. c
Explanation:

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

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

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

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

$$r = 25\%$$

29. Ans. a
Explanation :

$$A = P \left(1 + \frac{rt}{100} \right)$$

$$248 = Q \left(1 + \frac{16 \times 4.5}{300} \right)$$

$$Q = 200$$

30. Ans. b
Explanation :
 $SI = \frac{2000 \times 5 \times 6}{100} = 600$
31. Ans. a
Explanation:
 $4 \times 4 \times 3 \times 2 = 96$
 $5 \times 4 \times 3 \times 2 \times 1 = \frac{120}{216}$
32. Ans. c
Explanation :
 $(A-B) \cup c$
 $\{2, 6, 9\} \cup \{2, 6, 8\}$
 $= \{2, 6, 8, 9\}$
33. Ans. b
Explanation :
 $11C_x = 11C_{2x-4}$
 $x + 2x - 4 = 11$
 $x = 5$
 $7C_x = 7C_5 = 21$
34. Ans. a
Explanation :
Let cost of one chair and one table are x and y respectively, then
 $5x + 3y = 350 \dots\dots(i)$
 $3x + 5y = 370 \dots\dots(ii)$
on solving eqⁿ (i) and eqⁿ (ii)
 $x = 40, y = 50$
Cost of one table and two chairs is Rs. 130
35. Ans. a
Explanation :
 $y = \frac{1}{1-x}$ $[S_{\infty} = \frac{a}{1-r}]$
 $y - xy = 1$
 $y - 1 = xy$
 $x = \frac{y-1}{y}$
36. Ans. c
Explanation :
 $A(x) = M(x)$
 $\frac{c(x)}{x} = c'(x)$
 $150 - 5x + \frac{x^2}{6} = 150 - 10x + \frac{x^2}{2}$

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

$$x = 15$$

37. Ans. a
 Explanation:
 If $(b+c)$, $(c+a)$, $(a+b)$ are in A.p.
 Then $2(c+a) = b+c+a+b$
 $2b = a+c$

38. Ans. b
 Explanation :
 $ar^3 = 3$
 $a \times ar \times ar^2 \dots \dots \dots ar^6 = a^7 r^{21}$
 $= (ar^3)^7$
 $= 3^7$

39. Ans. a
 Explanation:
 $\text{gof}(3)$
 $= \text{gof}(x)$
 $= g[f(x)]$
 $= g[x^2]$
 $= x$
 $\text{gof}(3) = 3$

40. Ans. c
 Explanation:
 $2I = \int_a^b 1. dx$
 $2I = \int_2^3 1. dx$
 $2I = [x]_2^3$
 $2I = 1$
 $I = 1/2$

41. Ans. a
 Explanation :
 No. of diagonals $= n_{c_2} - n$
 $= {}^6C_2 - 6 = 9$

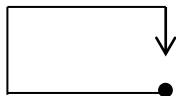
42. Ans. a
 Explanation :
 $3 \log y + 5 \log x = 8 \log(x+y)$
 $\frac{3}{y} \frac{dy}{dx} + \frac{5}{x} = \frac{8}{x+y} \left[1 + \frac{dy}{dx}\right]$

$$\frac{dy}{dx} \left[\frac{3}{y} = \frac{8}{x+y} \right] = \frac{8}{x+y} - \frac{5}{x}$$

$$\frac{dy}{dx} = \frac{y}{x}$$

43. Ans. a

Explanation:



South

44. Ans. a

Explanation:

$$\begin{array}{ccccccc} 10 & 100 & 200 & 310 & 430 & & \\ \underbrace{\hspace{1.5cm}} & \underbrace{\hspace{1.5cm}} & \underbrace{\hspace{1.5cm}} & \underbrace{\hspace{1.5cm}} & \underbrace{\hspace{1.5cm}} & & \\ 90 & 110 & 110 & 120 & 130 & & = 560 \end{array}$$

45. Ans. a

Explanation:

$$2^3-1, 3^3-1, 4^3-1, 5^3-1, 6^3-1, 7^3-1$$

342

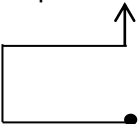
46. Ans. b

Explanation:

BOMBAY
AMJXVS

47. Ans. a

Explanation:



North

48. Ans. d

Explanation:

By Option d (FGD)

49. Ans. a

Explanation:

By Option a (A)

50. Ans. b

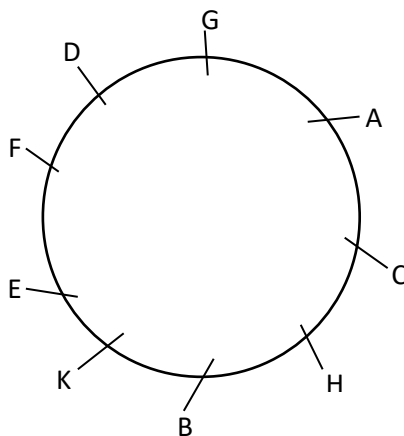
Explanation:

By Option b (H)

51. Ans. d

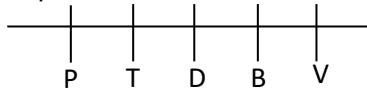
Explanation:

Teacher Trainer Professor are same kind
Student is different



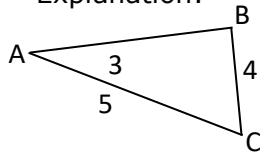
52. Ans. c

Explanation:



53. Ans. b

Explanation:



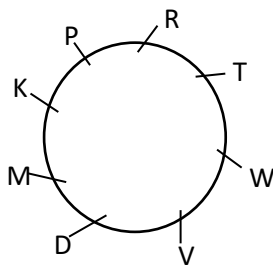
54. Ans. a

Explanation:

MALE
6217

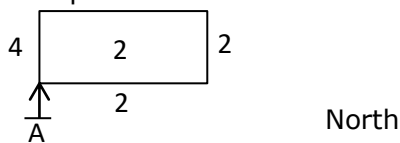
55. Ans. a

Explanation:



56. Ans. a

Explanation:



57. Ans. a

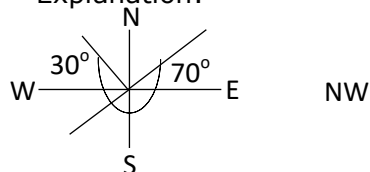
Explanation:

By Option $R \div M + N$

$$\begin{array}{c} \downarrow \\ R + \\ M - \\ N \end{array} \quad (a)$$

58. Ans. c

Explanation:



59. Ans. b
Explanation:
-

60. Ans. c
Explanation:
-

61. Ans. c
Explanation:
-

62. Ans. a
Explanation:
-

63. Ans. a
Explanation:
The colour of a flower is an example of An attribute.

64. 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.

65. Ans. b
Explanation:
Mutually exclusive classification is usually meant for a continuous variable

66. Ans. c
Explanation:
- | | | |
|-------|----|-------------|
| 0-10 | 15 | SO=19+16=35 |
| 10-20 | 23 | |

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

67. Ans. a

Explanation:

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

68. Ans. c

Explanation:

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

69. Ans. d

Explanation:

$$25000 = \frac{n_1 \times 27000 + n_2 \times 17000}{n_1 + n_2} \quad SO \quad n_1 = 80\% \quad n_2 = 20\%$$

70. Ans. b

Explanation:

$$\bar{x}_{com} = \frac{K\bar{x} + 10K\bar{y}}{11K} \quad \bar{x}_{com} = \frac{\bar{x} + 10\bar{y}}{11}$$

71. Ans. b

Explanation:

For ordering shoes of various sizes for resale, mode size will be more appropriate

72. Ans. a

Explanation:

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

73. Ans. a

Explanation:

52, 56, 68, 70, 75, 80, 82

Median = 70

X	X-M
52	18
56	14
68	2
70	0
75	5
80	10
82	12
	61

$$MD = \frac{61}{7} = 8.71428$$

$$MDCoefficient = \frac{8.71428}{70} \times 100$$

74. Ans. b

Explanation:

$$40 \times 100 = 4000 - 50 + 40 = \frac{3990}{100} = 39.90$$

$$\bar{x} = 39.90$$

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

$$5.1 = \sqrt{\frac{\sum x^2}{100} - 1600}$$

$$\sum x^2 = 162601 - 2500 + 1600 = 161701$$

$$\sigma = \sqrt{\frac{161701}{100} - 1592.01}$$

$$\sigma = 5$$

75. Ans. c

Explanation:

Given: Mode - Mean = 63

We know the empirical relationship between mean, Median & Mode i.e.

(Mode - Mean) = 3 (Median - Mean)

$$\text{Median} - \text{Mean} = \frac{63}{3} = 21$$

76. Ans. d

Explanation:

$$P_{01} = \sqrt{\frac{\sum P_1 Q_0}{\sum P_0 Q_0} \times \frac{\sum P_1 Q_1}{\sum P_0 Q_1}} \times 100 = 94.88$$

77. Ans. a

Explanation:

The most appropriate diagram to represent 5 year plan outlay of India in different economic sectors is Pie diagram

78. Ans. a

Explanation:

$$\sigma x = 3$$

$$y = 5 - 2x$$

$$\sigma y = \frac{2}{1} \times 3 = 6$$

$$v_y = 36$$

79. Ans. c
Explanation:
If the plotted points in a scatter diagram lie from upper left to lower right, then correlation is negative

80. Ans. b
Explanation:
If rank is in reverse order then spearman rank correlation coefficient is -1.

81. Ans. c
Explanation:

Commodity	R	W	RW
I	110	3	330
II	120	3	360
III	70	1	70
Total		7	760

$$\text{Weighted Price Index} = \frac{\sum RW}{\sum W} = \frac{760}{7} = 108.5$$

82. Ans. b
Explanation :

$$\begin{aligned} \frac{L}{P} &= \frac{\frac{\sum p_1 q_0}{\sum p_0 q_0}}{\frac{\sum p_1 q_1}{\sum p_0 q_1}} = \frac{\frac{20 + 5x}{15}}{\frac{10 + 2x}{7}} = \frac{28}{27} \\ &= \frac{140 + 35x}{150 + 30x} = \frac{28}{27} \\ x &= 4 \end{aligned}$$

83. Ans. a
Explanation:
By Option a (classification of units on the basis of time)

84. Ans. a
Explanation:

$$\begin{aligned} b_{vu} &= \frac{p}{q} \times b_{yx} \\ &= \frac{-3}{2} \times -1.2 = 1.8 \end{aligned}$$

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

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

86. Ans. c

Explanation:

$$\begin{array}{r} 97.5 \quad 19500 \\ 1 \quad \frac{19500}{97.5} \\ 115 \quad \frac{19500}{97.5} \times 115 \\ 23000 - 19500 = 3500 \end{array}$$

87. Ans. d

Explanation:

$$\begin{aligned} \text{By } x &= \frac{r \times \sigma_y}{\sigma_x} \\ \frac{0.6 \times 3}{2} \\ 0.9 \\ y - \bar{y} &= b_{yx} (x - \bar{x}) \\ y - 98 &= 0.9 (90 - 80) = y = 107 \end{aligned}$$

88. Ans. c

Explanation:

When the product of price index and the quantity index is equal to the corresponding value index then it is known as factor reversal test.

89. Ans. b

Explanation:

$$\begin{aligned} 1 - P(A \cup B) \\ 1 - \frac{3}{4} &= \frac{1}{4} \end{aligned}$$

90. Ans. b

Explanation:

$$\begin{aligned} A &= \frac{3}{7} \quad A^1 = \frac{4}{7} \\ B &= \frac{7}{12} \quad B^1 = \frac{5}{12} \\ 1 - A^1 B^1 \\ 1 - \frac{4}{7} \times \frac{5}{12} \\ 1 - \frac{5}{21} &= \frac{16}{21} \end{aligned}$$

91. Ans. b

Explanation:

Option from 12

6R 12B

$$\frac{12}{18} = \frac{6}{18}$$

92. Ans. d

Explanation:

2, 3

3, 2

4, 6

6, 4

2, 6

6, 2

6, 6

4, 3

3, 4

3, 6

6, 3

$$\frac{11}{36}$$

93. Ans. c

Explanation:

x	p	px
-20	3/20	--
-10	1/5	--
30	1/2	--
75	1/10	--
80	1/20	--

$$E(x) = EPX$$

94. Ans. b

Explanation:

$$V = E(x^2) - \mu^2$$

$$m = 30 - m^2$$

$$m^2 + m - 30 = 0$$

$$m = 5$$

95. Ans. c

Explanation:

For normal distribution First and third Quartile have same distance from median.

96. Ans. d

Explanation:

Binomial distribution tends to poisson distribution with two parameters n and p as
($n \rightarrow \infty, p \rightarrow 0, np \rightarrow \lambda$)

97. Ans. b

Explanation:

$$4SD = 6QD$$

$$4SD = 6 \times 6$$

$$SD = \frac{36}{4} = 9$$

98. Ans. d

Explanation:

$$100 - 3000$$

$$1 - \frac{3000}{100} \times 250$$

$$7500 - 3000 = 4500$$

99. Ans. c

Explanation:

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

$$150 = \sqrt{140 \times P}$$

$$P = 1607$$

100. Ans. c

Explanation:

Red or King

$$\frac{26}{30} = \frac{4}{2}$$

$$\frac{28}{52} = \frac{7}{13}$$

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