(GCF-9, 11, 12, 13, 14, 15, VCF-VDCF-SCF-3, VTW-1+Fnd, VDTW-1+Fnd, GTW-1+Fnd, STW-1+Fnd, JCC 12th+Foundation)

DATE: 09.05.2022 **MAXIMUM MARKS: 100** **TIMING: 2 Hours**

BUSINESS MATHEMATICS, REASONING & STATISTICS

1. Ans. d
Explanation:
Different words can be formed $= \frac{11!}{4!4!2!}$
S = 4, P = 2, I = 4

2. Ans. c
Explanation:
By option (c)

3. Ans. b
Explanation:
It is an AP with a=-111 and d=4
T_n = a + (n-1) d
= -111 + (n-1) 4
= - 111 + 4n – 4
= 4n-115
Tn > 0
4n – 115 > 0
n > $28\frac{3}{4}$
∵ The smallest integer greater than $28\frac{3}{4}$ *is* 29.

4. Ans. b
Explanation:
$9, G, G_2, G_3, G_4, 288$
$l = ar^{n-1}$
$288 = 9\,r^5$
$r^5 = 2^5$
$r = 2$
$G_1 = ar = 9 \times 2 = 18$
$G_2 = ar^2 = 9 \times 4 = 36$
$G_3 = ar^3 = 9 \times 8 = 72$
$G_4 = ar^4 = 9 \times 16 = 144$

5. Ans. b
Explanation:

$$\log_{10} 80 = \log_{10}(8 \times 10)$$
$$= \log_{10}(2 \times 4 \times 10)$$
$$= \log_{10} 2 + \log_{10} 4 + \log_{10} 10$$
$$= x + y + 1$$

6. Ans. d
Explanation:
By option (d)

7. Ans. a
Explanation:

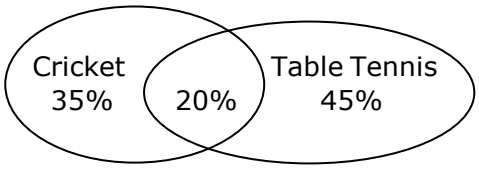
$$\frac{2^{n+3} - 10 \times 2^{n+1}}{2^{n+1} \times 6}$$
$$= \frac{2^n \times 2^3 - 10 \times 2^n \times 2}{2^{n+1} \times 2 \times 6}$$
$$= \frac{8 - 20}{12} = \frac{-12}{12} = -1$$

8. Ans. a

Explanation:

$$\text{Compound annual growth rate} = \left[\frac{v(t_n)}{v(t_o)}\right]^{\frac{1}{t_n - t_o}} - 1$$
$$= \left(\frac{210}{100}\right)^{\frac{1}{4}} - 1 = 26.98\%$$

9. Ans. b
Explanation:



No. of students can play cricket $= 35\% + 20\%$
$= 55\% \ of \ 120$
$= 66$

10. Ans. b
Explanation:

$$f(x) = \frac{1}{x - 1}$$
if $x = 1$ $f(x)$ *will be undefined*
$$A = R - \{1\}$$

11. Ans. d
Explanation:

$$\int \frac{dx}{x+\sqrt{x^2-1}} = \int \frac{x-\sqrt{x^2-1}\quad dx}{(x+\sqrt{x^2-1})\,(x-\sqrt{x^2-1})}$$

$$= \int (x-\sqrt{x^2-1})\,dx$$

$$= \frac{x^2}{2} - \frac{x}{2}\sqrt{x^2-1} + \frac{1}{2}\log\,(x+\sqrt{x^2-1}) + C$$

12. Ans. c
Explanation:

$$\int_1^2 (x^2 - 5x + 2)\,dx$$

$$= \left[\frac{x^3}{3} - \frac{5x^2}{2} + 2x\right]_1^2 = -\frac{19}{6}$$

13. Ans. c
Explanation:

$$\frac{d}{dx}(x^2 \log x)$$

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

$$= x\,(1 + 2\log x)$$

14. Ans. b
Explanation:
Correlation coefficient is Independent of the units of measurement

15. Ans. b
Explanation:
The correlation between sale of cold drinks and day temperature is positive

16. Ans. c
Explanation:
If y = a + bx, then what is the coefficient of correlation between x and y -1

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

18. Ans. a
Explanation:
Co-variance may be positive, negative or zero true

19. Ans. d
Explanation:
The difference between the observed value and the estimated value in regression analysis is known as error or residue

20. Ans. a
Explanation:

The two lines of regression meet at $(\bar{x}, \bar{y})$

21. Ans. c
Explanation:

$$f(x) = {}^{x}c_2$$

$$= \frac{x\,(x-1)}{2}$$

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

$$f'(x) = \frac{2x-1}{2}$$

$$f'(3) = \frac{2\times 3-1}{2} = \frac{5}{2}$$

22. Ans. a
Explanation:

$$C(x) = 2x^3 - 15x^2 + 36x + 15$$

$$C'(x) = 6x^2 - 30x + 36$$

$$C'(x) = 0$$

$$x^2 - 5x + 6 = 0$$

$$x = 2, 3$$

$$C''(x) = 12x - 30$$

$$Put\ x = 3$$

$$C''(x) = 36$$

$$if\ C''(x) > 0$$

The cost will be minimum when x=3

23. Ans. b
Explanation:

$$\boldsymbol{fog}\ (\boldsymbol{x}) = \boldsymbol{f}\ [\boldsymbol{g}(\boldsymbol{x})]$$

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

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

24. Ans. d
Explanation:
Relation R is Symmetric and Transitive but not Reflexive because (3,3) does not belong to R.

25. Ans. b
Explanation:
$$\propto -\beta = \sqrt{(\propto+\beta)^2 - 4\propto\beta}$$
$$= \sqrt{(7)^2 - 4(-9)} \quad = \quad \sqrt{85}$$

26. Ans. c
Explanation:
By Option (c)

27. Ans. d
Explanation:
$$x^2 - (sum\ of\ \ roots)\,x + \ product\ of\ \ roots = 0$$
$$\boldsymbol{x}^2 - (2-\sqrt{3}+2+\sqrt{3})\ \boldsymbol{x} + (2-\sqrt{3})\ (2+\sqrt{3}) = 0$$
$$x^2 - 4x + 1 = 0$$

28. Ans. b
Explanation:
By Option (b)

29. Ans. a
Explanation:

	Machine I	Machine II	
Grade A	2	3	≥ 14
Grade B	1	4	≥ 12

$$2x+3y \geq 14$$
$$x+4y \geq 12$$

30. Ans. d
Explanation:
a, x, c are in A. P. Then,
2 x = a + c
a + c = 50 ……. (i)
a, y, c are in G.P. Then,
y^2 = ac
49 = ac……(ii)
On solving equation (i) and (ii)
a =1, c = 49

31. Ans. a
Explanation:
a = 5,00,000 , d = 15,000

$$S_n = \frac{n}{2}\,[2a + (n-1)\,d]$$

$$= \frac{10}{2}\,[2 \times 5{,}00{,}000 + (10-1)\,15{,}000]$$

= Rs. 56,75,000

32. Ans. d
Explanation:

$$A^{\frac{1}{2}} \times A^{\frac{1}{4}} \times A^{\frac{1}{8}} \ldots\ldots\ldots\ldots\ldots\infty$$

$$= A^{\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\ldots\ldots\ldots\ldots\ldots\infty}$$

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

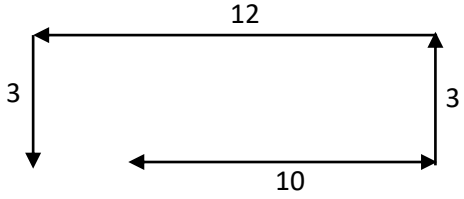
$$= A^{\frac{\frac{1}{2}}{1-1/2}} = A$$

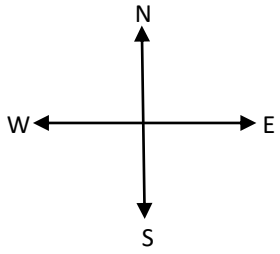
33. Ans. c
Explanation:
? = L

34. Ans. b
Explanation:
White = 4

35. Ans. a
Explanation:
Fruit = Sky

36. Ans. c
Explanation:





37. Ans. c
Explanation:
12 ex. U, V, M etc.

38. Ans. c
Explanation:
26

39. Ans. b
Explanation:

$$CI = 60000\left(1+\frac{6}{100}\right)\left(1+\frac{8}{100}\right)\left(1+\frac{10}{100}\right) - 60{,}000 = Rs.\,15{,}556.80$$

40. Ans. a
Explanation:

$$3P = P\left(1+\frac{r\times 8}{100}\right)$$

$$r = 25\%$$

$$5P = P\left(1+\frac{25\times t}{100}\right)$$

$$t = 16\,years$$

41. Ans. c
Explanation:
$1\,Rs.\ :\ 50P\ :\ 25P$
$4x,\ 5x,\ 6x$

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

$$x = 15$$

The number of coins of 25 paisa = 6 x 15 = 90

42. Ans. c
Explanation:
$A : B = 4 : 5\ ]\times 7$
$B : C = 7 : 8\ ]\times 5$
$A : B : C = 28 : 35 : 40$

43. Ans. c
Explanation:
$A = \{1, 2, 3\}$
Subsets of A = Power set of A
$\{\phi, \{1\}, \{2\}, \{3\}, \{1,2\}, \{2, 3\}, \{1, 3\}, \{1,2,3\}\}$

44. Ans. a
Explanation:

$$\frac{1}{1+\frac{a^x}{a^y}} + \frac{1}{1+\frac{a^y}{a^x}}$$

$$= \frac{a^y}{a^y+a^x} + \frac{a^x}{a^x+a^y} = \frac{a^x+a^y}{a^x+a^y} = 1$$

45. Ans. b
Explanation:

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

$$2000 = P\left(1+\frac{8}{100}\right)^{4}$$

P = Rs. 1470.06

46. Ans. a
Explanation:

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

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

R = Rs. 1,94,016.75

47. Ans. c
Explanation:
The sum of digit in unit place

$$=(3+4+5+6)\times 3!$$

= 108

48. Ans. b
Explanation:
The number of straight lines

$$= {}^{n}c_2 - {}^{x}c_2 + 1$$

$$= {}^{15}c_2 - {}^{6}c_2 + 1 = 91$$

49. Ans. c
Explanation:
The no. of arrangements = Total no. of arrangements – Two 'o's come together-

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

50. Ans. d
Explanation:
Number of ways $= {}^{6}c_3 \times {}^{5}c_2 = 200$

51. Ans. a
Explanation:

$$5x+7y-22=0$$

$$6x+2y-22=0$$

$$r=\sqrt{\frac{10}{42}}$$

$$byx=\frac{-5}{7}$$

$bxy = -\frac{2}{6}$ $-\frac{5}{7} = -\frac{\sqrt{\frac{10}{42}} \times \sqrt{15}}{\sigma x}$ $\sigma x = 2.64\ \ 6$

52. Ans. b
Explanation:

$byx = 0.80$

$p = \frac{1}{-3}$

$q = \frac{5}{-2}$

$byx = \frac{q}{p} x buv$

$0.80 = \frac{\frac{-5}{2}}{\frac{-1}{3}} \times buv$ $buv = 0.1066$

53. Ans. b
Explanation:

$byx = \frac{r \times \sigma y}{\sigma x}$

$-\frac{3}{4} = -\frac{\sqrt{\frac{3}{2}} \times 2}{\sigma x}$

$\sigma x = \sqrt{\frac{16}{3}}$

$Vx = \frac{16}{3}$

54. Ans. a
Explanation:

$byx = \frac{0.92 \times 6}{5}$ $bxy = \frac{0.92 \times 5}{6}$

$byx + bxy = 1.871$

55. Ans. b
Explanation:

$p.E = \frac{0.6745 \times 1 - r^2}{\sqrt{n}}$

$0.2 = \frac{0.6745 \times (1 - r^2)}{3}$

r = 0.332

56. Ans. c
Explanation:

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

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

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

57. Ans. a
Explanation:
$(3,4)(4,3)\ (2,6)\ (6,2)$

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

58. Ans. d
Explanation:

$$\frac{5c_3}{12c_3} \times \frac{7c_3}{12c_3} = \frac{7}{968}$$

$$\frac{5c_3}{12c_3} \times \frac{7c_3}{12c_3} = \frac{5}{264}$$

59. Ans. c
Explanation:
Standard normal distribution have inflexion points – 1 & +1.

60. Ans. c
Explanation:

$$A = \frac{4}{5} \qquad A' = \frac{1}{5}$$

$$B = \frac{3}{4} \qquad B' = \frac{1}{4}$$

$$AB' + BA' = \frac{7}{20}$$

61. Ans. b
Explanation:

Income Tax Central angle = $\frac{240}{720} \times 360 = 120$

Wealth Tax angle = $\frac{180}{720} \times 360 = 90$

62. Ans. a
Explanation:

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

63. Ans. c
Explanation:
The most stable measure of central tendency is mean

64. Ans. c
Explanation:

$$\sum\left(x-\bar{x}\right)^2 = Minimum$$

65. Ans. d
Explanation:
GM cannot be determined is data set have positive and negative observations

66. Ans. a
Explanation:

$$A.M.=\frac{6+8+12+36}{4}=15.5$$

$$G.M.=(6\times8\times12\times36)^{1/4}=12$$

67. Ans. c
Explanation:

$$4x-6y=13$$

$$4\times16-6y=13$$

$$64-13=6y$$

$$6y=51$$

$$y_m=\frac{51}{6}=8.5$$

68. Ans. a
Explanation:

$$Q_1=\frac{1\,(n+1)}{4}th \qquad D_6=\frac{6\,(n+1)}{10}th \qquad P_{82}=\frac{82\,(n+1)}{100}th$$

$$=\frac{10+1}{4}th \qquad \frac{6\,X\,11}{10}=6.6th \qquad \frac{82\times11}{100}th$$

2.75 th item = 62.75 6.6 th item = 81.20 9.02 th item = 120.20

69. Ans. b
Explanation:
Mean – Mode = 3 (Mean – Median)
50 – x = 3 (50 – 40)
50 – x = 30

X = 20

70. Ans. d
Explanation:
$\sum n^2 = \frac{n(n+1)\ (2n+1)}{6}$
A.M. of first 2n natural number
$\frac{2n\ (2n+1)\ (4n+1)}{6\times 2n}$
$= \frac{(2n+1)\ (4n+1)}{6}$

71. Ans. a
Explanation:
$\sigma x = 3$
$y = 5 - 2x$
$\sigma\ y = \frac{2}{1}\times 3 = 6$
$vy = 36$

72. Ans. c
Explanation:
$\sum dx^2 = 250 \qquad n = 10$
$\bar{x} = 50$
$\sigma = \sqrt{\frac{250}{10}} = 5$
$C.V. = \frac{5}{50}\times 100 = 10$

73. Ans. b
Explanation:
If the values of y are not affected by changes in the values of x, the variables are said to be Uncorrelated

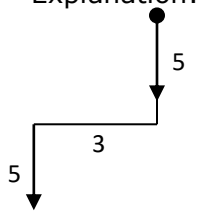
74. Ans. c
Explanation:
D = b^2-4ac
= $(-8)^2$–4(3)(4)
= 16
If D $\geq$ 0 and a perfect square then roots are real, rational and unequal.

75. Ans. c
Explanation:
Product of extreme terms = product of mean terms
(23 – x) (78 - x) = (30 - x) (57 - x)

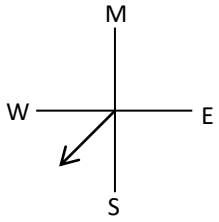
x = 6

76. Ans. d
Explanation:
No. of different ways can be failed $=2^4-1$

77. Ans. d
Explanation:

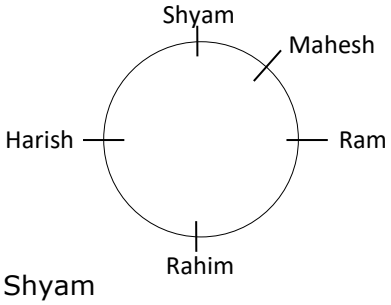


South-West



78. Ans. c
Explanation:
For dividing 12 into two whole nos. the sum of ratio must be a factor of 12. So they cannot be 3:2.

79. Ans. d
Explanation:



Shyam

80. Ans. b
Explanation:
Mahesh

81. Ans. b
Explanation:
SM
MT
TW
WT 53 Saturday= $\frac{2}{7}$
TF
FS
SS

82. Ans. d
Explanation:
$E(x-\mu)^2$ *and* $E[x-E(x)]^2$ *both are known as* variance

83. Ans. b
Explanation:
$\beta(n, p)$ it is Biparametric and Parameters are n and p

84. Ans. d
Explanation:
$np = 3$
$\sqrt{npq} = 1.5$
$3q = 2.25$
$q = \frac{2.25}{3}$ $q = 0.75,\ p = 0.75$ so n = 12

85. Ans. a
Explanation:
$np = 4$
$npq = 3$
$4q = 3$
$q = \frac{3}{4}$ $p = \frac{1}{4}$ so n = 16
$\text{mod}\, e = (16+1)\frac{1}{4} = \frac{17}{4} = (4)$

86. Ans. a
Explanation:
${}^{10}c_5\left(\frac{1}{2}\right)^{10}$

87. Ans. b
Explanation:
Mean = $6 \times \frac{1}{2} = 3$
$SD = \sqrt{6 \times \frac{1}{2} \times \frac{1}{2}} = 1.22$

88. Ans. b
Explanation:
$np = \frac{10}{3}$
$2\, n_{c_2}\, p^2 q^{n-2} = n_{c_3}\, p^3 q^{n-3}$
$\frac{2 \times n!}{2!\, n-21}\, q = \frac{n!}{3!\, n-3!}\, p$

$$\frac{q}{n-2} = \frac{p}{6}$$

$$6q = np - 2p$$

$$6q = \frac{10}{3} - 2p$$

$$6q = \frac{10-6p}{3}$$

$$18q = 10 - 6p$$

$$18 - 18p = 10 - 6p$$

$$12p = 8$$

$$p = \frac{2}{3} \quad q = \frac{1}{3}$$

$$n \times \frac{2}{3} = \frac{10}{3}$$

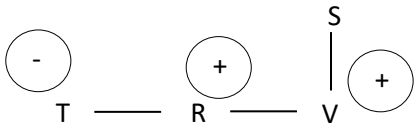
$$n = 5$$

$$5_{c_0}\left(\frac{2}{3}\right)^0\left(\frac{1}{3}\right)^5 + 5_{c_1}\left(\frac{2}{3}\right)^1\left(\frac{1}{3}\right)^4 + 5_{c_2}\left(\frac{2}{3}\right)^2\left(\frac{1}{3}\right)^3$$

$$\frac{1}{3^5} + 5 \times \frac{2}{3^5} + \frac{10 \times 4}{3^5}$$

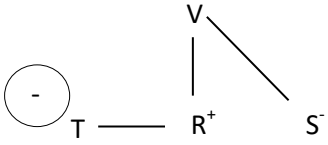
$$\frac{1+10+40}{3^5} = \frac{51}{3^5} = \frac{51}{243} = \frac{17}{81}$$

89. Ans. d
Explanation:



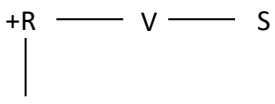
Daughter

90. Ans. b
Explanation:



Sister

91. Ans. a
Explanation:



+T

Aunt

92. Ans. d
Explanation:
XC

93. Ans. d
Explanation:
Second from Right

94. Ans. c
Explanation:
XA

95. Ans. a
Explanation:
One

96. Ans. b
Explanation:
B

97. Ans. a
Explanation:
South

98. Ans. d
Explanation:
R K

99. Ans. c
Explanation:
"The less than Ogive" is a S–shaped curve

100. Ans. d
Explanation:
Most of the commonly used frequency curves are Bell-shaped

__**__