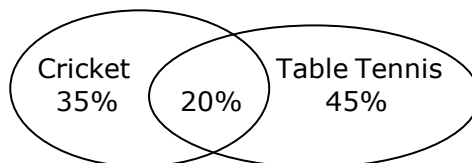


PAPER 3 : QUANTITATIVE APTITUDE

1. Ans. d
 Explanation:
 By options putting the value $n = 9$
 $9c_2 - 9 = 27$
2. Ans. c
 Explanation:
 $\text{fog}(x) = f[g(x)]$
 $= f(x^2+7)$
 $\text{fog}(x) = 2(x^2+7) + 7$
 $\text{fog}(x) = 2x^2+21$
 $\Rightarrow 2x^2+21=25$
 $x^2 = 2$
 $x = \pm\sqrt{2}$
3. Ans. c
 Explanation:
 $A = \{1, 2, 3\}$
 Subsets of A = Power set of A
 $\{\phi, \{1\}, \{2\}, \{3\}, \{1, 2\}, \{2, 3\}, \{1, 3\}, \{1, 2, 3\}\}$
4. Ans. b
 Explanation:
 $9, G, G_2, G_3, G_4, 288$
 $l = ar^{n-1}$
 $288 = 9r^5$
 $r^5 = 2^5$
 $r = 2$
 $G_1 = ar = 9 \times 2 = 18$
 $G_2 = ar^2 = 9 \times 4 = 36$
 $G_3 = ar^3 = 9 \times 8 = 72$
 $G_4 = ar^4 = 9 \times 16 = 144$

5. Ans. b
 Explanation:



$$\begin{aligned}
 \text{No. of students can play cricket} &= 35\% + 20\% \\
 &= 55\% \text{ of } 120 \\
 &= 66
 \end{aligned}$$

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6. Ans. d

Explanation:

$$\begin{aligned}\int \frac{dx}{x + \sqrt{x^2 - 1}} &= \int \frac{x - \sqrt{x^2 - 1}}{(x + \sqrt{x^2 - 1})(x - \sqrt{x^2 - 1})} dx \\ &= \int (x - \sqrt{x^2 - 1}) dx \\ &= \frac{x^2}{2} - \frac{x}{2} \sqrt{x^2 - 1} + \frac{1}{2} \log (x + \sqrt{x^2 - 1}) + C\end{aligned}$$

7. Ans. b

Explanation:

Sum of male and female employees Can not be more than ten so option (b) shows right inequality.

8. Ans. a

Explanation:

$${}^4C_3 \times {}^2C_1 \times {}^{10}C_7 = 960$$

9. Ans. b

Explanation:

$$\text{Sum} = \frac{100 \times SI}{R \times T} = \frac{100 \times x}{x \times x} = \text{Rs. } \frac{100}{x}$$

10. Ans. c

Explanation:

Only Reflexive aRa

$$\{(2,2), (3,3), (4,4), (5,5), (6,6)\}$$

11. Ans. a

Explanation:

$$\begin{aligned}\log \frac{8^4}{25^4} - \log \frac{16^3}{125^3} - \log 5 \\ = \log \left[\frac{8^4}{25^4} \times \frac{125^3}{16^3} \times \frac{1}{5} \right] \\ = \log 1 = 0\end{aligned}$$

12. Ans. a

Explanation:

Let the original prices of two houses be Rs.16x and Rs.23x respectively

$$\text{Then, } \frac{16x + 10\% \text{ of } 16x}{23x + 477} = \frac{11}{20}$$

On solving, x = 53

Hence, the original prices of two houses are Rs.16 x 53 and Rs.23 x 53 i.e., Rs.848 and Rs.1219

13. Ans. b

Explanation:

$$SI = 2600 \times \frac{20}{300} \times T = Rs. \frac{520}{3} \times T$$

which is an exact number of rupees when $T = 3$ years.

14. Ans. b

Explanation:

$$x^2 y^2 + 3xy + y = 0$$

Differentiating respect to y we see:-

$$2x \frac{dx}{dy} \times y^2 + x^2 (2y) + 3 \left[x \cdot 1 + y \cdot \frac{dx}{dy} \right] + 1 = 0$$

$$2xy^2 \frac{dx}{dy} + 2x^2 y + 3x + 3y \frac{dx}{dy} + 1 = 0$$

$$\frac{dx}{dy} = - \frac{2x^2 y + 3x + 1}{2xy^2 + 3y}$$

15. Ans. b

Explanation:

$$\begin{aligned} \text{Mean proportion} &= \sqrt{x^2 y^2 \times x^4 y^6} \\ &= x^3 y^4 \end{aligned}$$

$$\text{Fourth proportion} = \frac{x^3 y \times x^6 y^3}{xy^2} = x^8 y^2$$

$$\text{Third proportion} = \frac{(x^3 y)^2}{xy^2} = x^5$$

16. Ans. c

Explanation:

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

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

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

$$32P = P \left(1 + \frac{r}{100} \right)^n$$

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

$$\left(1 + \frac{r}{100} \right)^{20} = \left(1 + \frac{r}{100} \right)^n$$

$n = 20$ years

17. Ans. d

Explanation:

Number of permutations of n distinct objects when a particular object is always included in any arrangement is $r \cdot {}^{n-1}P_{r-1}$

18. Ans. b

Explanation:

Let A's share = Rs. x , B's share = Rs.(8840- x)

$$\therefore x \left(1 + \frac{10}{100}\right)^8 = (8840 - x) \left(1 + \frac{10}{100}\right)^{10}$$

$$x = \frac{121}{100} (8840 - x)$$

$$x = \frac{121 \times 8840}{221} = 4840$$

Hence, two parts are Rs.4840 and Rs.4000

19. Ans. a

Explanation:

$$\frac{a+b}{2} = 5 \quad \therefore a+b=10$$

$$\sqrt{ab} = 4 \quad \therefore ab=16$$

$$a-b = \sqrt{(a+b)^2 - 4ab}$$

$$= \sqrt{100 - 4(16)} = 6_s$$

20. Ans. a

Explanation:

The present value of an Annuity immediate is the same as Annuity regular for $(n-1)$ year plus the initial receipt in the beginning of the period.

21. Ans. c

Explanation:

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

$$5,00,000 = \frac{A}{0.14} [1 - (1+0.14)^{-5}]$$

$$A = 1,45,645.2$$

Payment after 5 equal annual instalments

$$= 5 \times 1,45,645.2 = 7,28,209$$

Total interest charged in the instalment plan

$$= 7,28,209 - 5,00,000$$

$$= 2,28,209$$

22. Ans. c

Explanation:

$$\lim_{x \rightarrow 5} 2x = 10$$

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23. Ans. c

Explanation:

$$A = 8000 \left(1 + \frac{15}{100} \right)^2 \left(1 + \frac{\frac{4}{12} \times 15}{100} \right)$$

$$CI = 11109 - 8000 = \text{Rs. } 3109$$

24. Ans. a

Explanation:

$$x^3 + x^2 - x - 1 = 0$$

$$x^2(x+1) - 1(x+1) = 0$$

$$(x+1)(x^2-1) = 0$$

$$x = -1, 1, -1$$

25. Ans. c

Explanation:

Use Hit & Trial Method.

26. Ans. b

Explanation:

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

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

$$P = \text{Rs. } 1470.06$$

27. Ans. d

Explanation:

$$\text{Required number of numbers} = 5 \times 4 \times 1 = 20$$

28. Ans. d

Explanation:

$$x = \sqrt{1+x}$$

$$x^2 = 1+x$$

$$x^2 - x - 1 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \text{ from quadratic equation}$$

$$x = \frac{+1 \pm \sqrt{5}}{2}$$

$$x = \frac{+1 + \sqrt{5}}{2} \text{ only this solution is possible}$$

29. 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

30. Ans. c

Explanation:

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

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

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

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

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

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

31. Ans. d

Explanation:

$$SI \text{ for 2 years} = 5,680 - 5,200 = 480$$

$$SI \text{ for 5 years} = \frac{480}{2} \times 5 = 1,200$$

$$P = 5,200 - 1,200 = \text{Rs. } 4,000$$

$$\text{Rate} = \frac{100 \times 1,200}{4,000 \times 5} = 6\%$$

32. Ans. b

Explanation:

$$T_5 = a + 4d = 14 \dots\dots\dots (i)$$

$$T_{12} = a + 11d = 35 \dots\dots\dots (ii)$$

On solving equation (i) and (ii)

$$a = 2$$

33. Ans. a

Explanation:

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

34. 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.

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

Mittal Commerce Classes

35. Ans. a

Explanation:

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

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

$$P = \text{Rs. } 30,000$$

36. Ans. a

Explanation :

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

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

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

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

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

37. Ans. a

Explanation:

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

Let Rs. P be the each payment.

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

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

38. Ans. d

Explanation:

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

$$= \left[\left(1 + \frac{10}{400} \right)^4 - 1 \right] \times 100$$

$$= 10.38\%$$

39. Ans. a

Explanation:

$$A(n, i) = A \left[\frac{(1+i)^n - 1}{i} \right]$$

$$5,00,000 = A \left[\frac{(1 + .04)^{25} - 1}{.04} \right]$$

$$A = 12006$$

40. Ans. b

Explanation:

$$\begin{aligned} \text{P.V.} &= \frac{5,000}{12} \times 1,200 \\ &= 5,00,000 \end{aligned}$$

41. Ans. d

Explanation:

+2	+4	+6	+8	
6 F	8 G	12 I	18 L	26 P
	+1	+2	+3	+4

42. Ans. b

Explanation:

First 5 and last five observations are same in magnitude but opposite in sign. So

For given observation $\sum_{i=1}^{10} x_i = 0$ and

$$\sum_{i=1}^{10} x_i^2 = 2 \sum_{i=1}^5 x^2 = 2 \times 80 = 160$$

$$\begin{aligned} \sigma &= \sqrt{\frac{\sum x^2}{n} - \left(\frac{\sum x}{n} \right)^2} \\ &= \sqrt{\frac{160}{10} - \left(\frac{0}{10} \right)^2} \\ &= 4 \end{aligned}$$

43. Ans. b

Explanation:

$$\begin{aligned} r_R &= 1 - \frac{6 \sum d^2}{n(n^2-1)} \\ 0.143 &= 1 - \frac{6 \times 48}{7(48)} = 0.143 \end{aligned}$$

44. Ans. b

Explanation:

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

It means worker is in loss.

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45. Ans. c

Explanation :

$$b_{yx} = 0.5, b_{xy} = B, r = 0.1$$

$$r = \sqrt{b_{xy} \times b_{yx}}$$

$$0.1 = \sqrt{0.5 \times B}$$

$$0.5B = 0.01$$

$$B = \frac{0.01}{0.5} = 0.02$$

Five competitors in a contest are ranked by two judges in the order 1, 2, 3, 4, 5 and 5,4,3,2,1 respectively.

(a) -0.5

46. Ans. c

Explanation:

Regression coefficients are independent of the change of origin but not of scale.

and $b_{yx} > 1$ then $b_{xy} < 1$

47. Ans. b

Explanation :

$$\frac{L}{P} = \frac{\frac{\sum p_1 q_0}{\sum p_0 q_0}}{\frac{\sum p_1 q_1}{\sum p_0 q_1}} = \frac{\frac{20 + 5x}{15}}{\frac{10 + 2x}{7}} = \frac{28}{27}$$

$$= \frac{140 + 35x}{150 + 30x} = \frac{28}{27}$$

$$x = 4$$

48. Ans. b

Explanation :

Angle Corresponding to North America

$$= \frac{11.7}{82} \times 66$$

$$= 9.4 \text{ km}^2$$

49. Ans. b

Explanation:

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

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

$$= 0.73$$

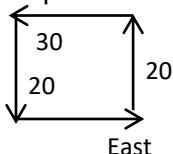
50. Ans. b

Explanation :

$$\text{The index 1970 on base 1960 will be} = \frac{150 \times 200}{100} = 300$$

51. Ans. b

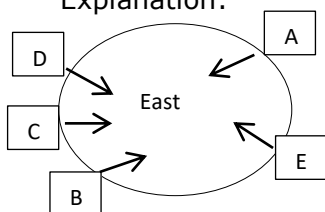
Explanation:



Mittal Commerce Classes

52. Ans. d

Explanation:



53. Ans. b

Explanation:

$$\frac{R}{M} \quad \frac{N}{Q} \quad \frac{P}{O}$$

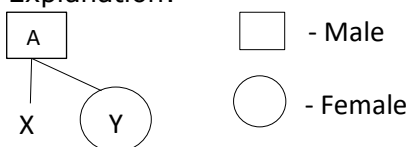
54. Ans. a

Explanation:

$$\frac{N}{M} \quad \frac{R}{Q} \quad \frac{O}{P} \quad \frac{P}{M}$$

55. Ans. d

Explanation:



56. Ans. c

Explanation:

Arrange the observations in ascending order: $\frac{x}{7}, \frac{x}{6}, \frac{x}{5}, \frac{x}{3}, \frac{x}{2}, x$

Median = size of $\frac{6+1}{2} = 3.5^{th}$ term

$$\text{Median} = \frac{\text{size of 3rd term} + \text{size of 4th term}}{2} \Rightarrow 24 = \frac{\frac{x}{5} + \frac{x}{3}}{2} \Rightarrow x = 90$$

57. Ans. c

Explanation :

$$\begin{aligned} \text{Average speed} &= \frac{2ab}{a+b} \\ 150 &= \frac{2 \times 120 \times b}{120+b} \\ b &= 200 \text{ km/h} \end{aligned}$$

58. Ans. d

Explanation:

$$\begin{aligned} \text{G.M.} &= (4 \times 20 \times 36)^{\frac{1}{3}} \\ &= (4\sqrt[3]{45}) \end{aligned}$$

59. Ans. b

Explanation:

Quartile deviation does not depend on extreme values. So quartile deviation can be calculated for open end classes.

Mittal Commerce Classes

60. Ans. c
 Explanation:
 Standard Deviation is not affected by change in origin (+, -)
61. Ans. c
 Explanation:
 $\mu = np = 7$
 $\sigma^2 = npq = 6$
 $7q = 6$
 $q = 6/7$
 $p = 1/7$
62. Ans. b
 Explanation :
 Chain index for any year

$$= \frac{\text{Link relative (index) of current year} \times \text{Chain index of the previous year}}{100}$$
63. Ans. b
 Explanation:
 Dornish-Bowley's index number = $\frac{L+P}{2} = 145$
 $L = 290 - P = 140$
 $f = \sqrt{L \times P} = \sqrt{140 \times 150} = 144.91$
64. Ans. b
 Explanation:
 Spatial classification is classification of units on the basis of geographical area.
65. Ans. d
 Explanation:
 $\therefore \sum P = 1 \Rightarrow 3k + 5k + 2k + 4k + 3k + 3k = 1 \Rightarrow 20k = 1 \Rightarrow k = 0.05$
- | | | | | | | | |
|----|------|------|-----|-----|------|------|-----------------|
| X | 1 | 2 | 3 | 4 | 5 | 6 | |
| P | 0.15 | 0.25 | 0.1 | 0.2 | 0.15 | 0.15 | $\sum P = 1$ |
| PX | 0.15 | 0.5 | 0.3 | 0.8 | 0.75 | 0.9 | $\sum PX = 3.4$ |
- Expected value $E(x) = \sum Px = 3.4$
66. Ans. c
 Explanation:
 $17 \times 14 = 765$
 $9 \times 51 = 459$
 $9 \times 36 = 324$
 Sum of 18 nos. = $459 + 324 = 783$
 17th no. = $783 - 765 = 18$
67. Ans. b
 Explanation:

We know that if $u = \frac{x-a}{b}$ and $v = \frac{y-c}{d}$, then $r_{xy} = \frac{bd}{|b||d|} r_{uv}$

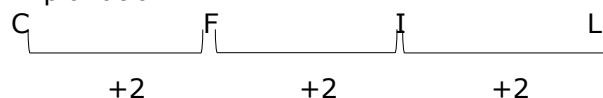
$$u = -5x + 6 = \frac{x - 6/5}{(-1/5)}, v = \frac{(y - 20/3)}{(7/3)}$$

Here $b = -1/5$, $d = 7/3$

Since $b = -1/5$ and $d = 7/3$ are of opposite sign, so $r_{uv} = -r_{xy} = -0.58$.

68. Ans. c

Explanation:



69. Ans. b

Explanation:

Red	Colour	Chalk →	2 ⑤ 6
Green	Colour	Flower →	⑤ 8 9
Red	Colour	Chalk →	② 5 6
White	Colour	Chalk →	② 7 5

White → 4

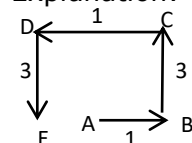
70. Ans. a

Explanation:

Tree grows a fruit. Tree is called sky.

71. Ans. c

Explanation:



72. Ans. c

Explanation:

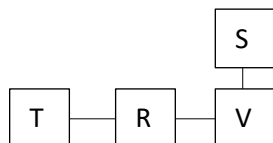
$$5 \times 4 + 18 \div 3$$

$$20 + 6 = 26$$

73. Ans. d

Explanation:

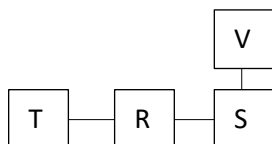
T Sis R Bro V Son S



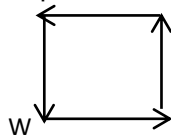
74. Ans. b

Explanation:

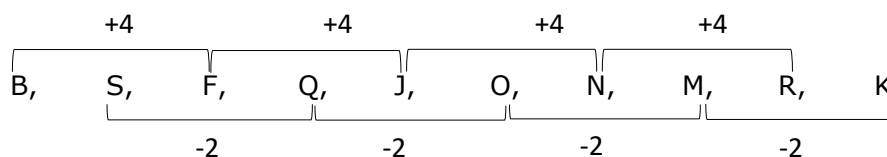
T Sis R Son V Mother S



75. Ans. a
 Explanation:



76. Ans. d
 Explanation:



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:
 $\sigma x = 3$
 $y = 5 - 2x$
 $\sigma y = \frac{2}{1} \times 3 = 6$
 $\sigma y = 36$

79. Ans. c
 Explanation:
 $P(A \cap B) = 1 - \frac{5}{6} = \frac{1}{6}$
 $P(B) = 1 - \frac{2}{3} = \frac{1}{3}$
 $P(A \cup B) = \frac{1}{2} + \frac{1}{3} - \frac{1}{6} = \frac{2}{3}$

80. Ans. c
 Explanation:
 $A = \frac{4}{5}$ $A' = \frac{1}{5}$
 $B = \frac{3}{4}$ $B' = \frac{1}{4}$

Mittal Commerce Classes

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

81. Ans. b

Explanation:

SM

MT

TW

WT 53 Saturday = $\frac{2}{7}$

TF

FS

SS

82. Ans. b

Explanation:

$\beta(n, p)$ it is Biparametric and Parameters are n and p

83. Ans. a

Explanation:

$$np = 4$$

$$npq = 3$$

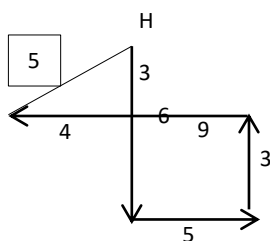
$$4q = 3$$

$$q = \frac{3}{4} \quad p = \frac{1}{4} \quad \text{so } n = 16$$

$$\text{mod } e = (16 + 1) \frac{1}{4} = \frac{17}{4} = (4)$$

84. Ans. c

Explanation:



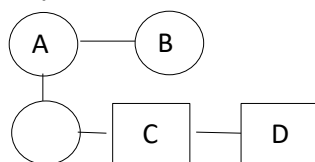
85. Ans. c

Explanation:

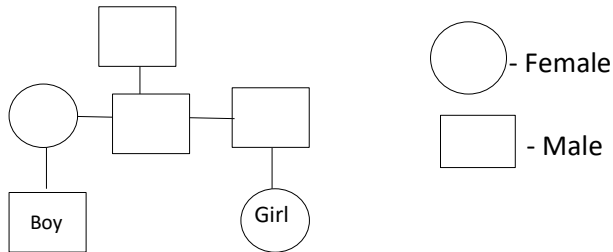
P D T B V

86. Ans. d

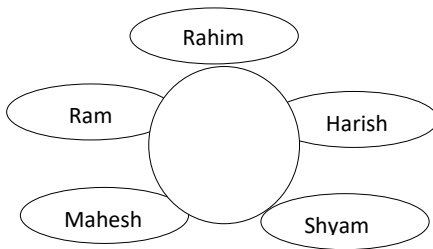
Explanation:



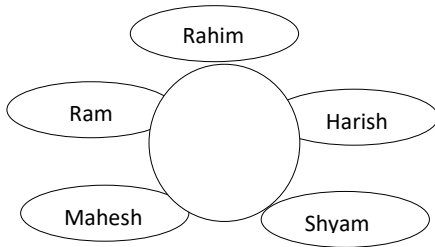
87. Ans. d
Explanation:



88. Ans. d
Explanation:



89. Ans. b
Explanation:



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

91. Ans. b
Explanation:
- $$\bar{x}_{com} = \frac{K\bar{x} + 10K\bar{y}}{11K} \quad \bar{x}_{com} = \frac{\bar{x} + 10\bar{y}}{11}$$

92. Ans. a
Explanation:
- $$\frac{15 + 25}{2} = 20 \quad SD = \frac{range}{2} = \frac{10}{2} = 5$$

93. Ans. c
Explanation:
If events are mutually exclusive, then both events cannot occur at the same time.

94. Ans. c
 Explanation:
 $\mu=0 \quad \sigma=1$
95. Ans. d
 Explanation:
 If X & Y are two independent normal variates with means μ_1 & μ_2 and standard deviations σ_1 & σ_2 respectively, then X + Y follows Means = $\mu_1 + \mu_2$, S.D = $\sqrt{\sigma_1^2 + \sigma_2^2}$
96. Ans. d
 Explanation:
 As the sample size increases, standard error Decreases proportionately.
97. Ans. d
 Explanation:
 Systematic sampling adds flexibility to the sampling process.
98. Ans. d
 Explanation:
 Sample in which the number of units is less than 30 is called a small sample
99. Ans. d
 Explanation:
 $P = .05$
 $n = 40$
 $m = 2$
- $$P(X = 0, 1, 2)$$
- $$= e^{-2} \left[\frac{2^0}{|0|} + \frac{2^1}{|1|} + \frac{2^2}{|2|} \right]$$
- $$= 0.135 \times 5 = 0.675$$
100. Ans. b
 Explanation:
 Circular test is called shifting the base.

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