

PAPER 3 : QUANTITATIVE APTITUDE

1. Ans. c
Explanation:
SI for 5 years = $1020 - 720$
 $= 300$
SI for years = $\frac{300}{5} \times 2$
 $= \text{Rs.}120$
Principal = $\text{Rs.}720 - \text{Rs.}120$
 $= \text{Rs.}600$
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:
 $\text{fog}(x) = f[g(x)]$
 $= f(x^2 + 7)$
 $\text{fog}(x) = 2(x^2 + 7) + 7$
 $\text{fog}(x) = 2x^2 + 21$
 $\Rightarrow 2x^2 + 21 = 25$
 $x^2 = 2$
 $x = \pm\sqrt{2}$
6. Ans. b
Explanation:
 $SI = \frac{prt}{100}$
 $\frac{3}{8}P = \frac{p \times r \times 25}{400}$
 $r = 6\%$

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7. Ans. c
 Explanation:
 $a + b + c = 0,$
 $a + b = -c,$
 $(a + b)^2 = c^2,$
 $a^2 + b^2 + 2ab = c^2$
 $a^2 + b^2 = c^2 - 2ab$
 $\frac{a^2 + b^2 + c^2}{c^2 - ab} = \frac{c^2 - 2ab + c^2}{c^2 - ab} = 2$
8. Ans. a
 Explanation:
 $\frac{\log_b x}{\log_{2b} x}$
 $\Rightarrow \frac{\log_x 2b}{\log_x b}$
 $\Rightarrow \frac{\log_x 2 + \log_x b}{\log_x b}$
 $\Rightarrow 1 + \frac{\log_x 2}{\log_x b}$
 $\Rightarrow 1 + \log_b 2$
9. Ans. a
 Explanation:
 $\log_2 \log_2 \log_3 x = 0$
 $\log_2 \log_3 x = 2^0 = 1$
 $\log_3 x = 2^1 = 2$
 $x = 3^2$
 $= \boxed{9}$
10. Ans. b
 Explanation:
 $a : b = \frac{2}{9} : \frac{1}{3} = 2 : 3, \quad b : c = \frac{2}{7} : \frac{5}{14} = 4 : 5$
 $c : d = \frac{3}{5} : \frac{7}{10} = 6 : 7$
 $\frac{a}{b} \times \frac{b}{c} \times \frac{c}{d} = \frac{2}{3} \times \frac{4}{5} \times \frac{6}{7} = \frac{16}{35} = 16 : 35$
11. 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 $ax^2 + bx + c = 0$

$$\text{So } \frac{m}{3} = 1 \Rightarrow m = 3$$

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

12. Ans. c

Explanation:

Let width of the rectangle is x , then length = $5 + 2x$

Given that Area of rectangle = 75

$$\text{Length} \times \text{width} = 75$$

$$(5 + 2x) \times x = 75$$

$$2x^2 + 5x - 75 = 0$$

$$(2x + 15)(x - 5) = 0$$

$$x = 5, \frac{-15}{2} \left[x \neq \frac{-15}{2} \right]$$

$$\text{Length} = 2x + 5$$

$$= 2(5) + 5 = 15 \text{ units}$$

13. Ans. b

Explanation:

Roots are -3, 1, 2 then

Factors are $x + 3$, $x - 1$, $x - 2$

and equation is $(x + 3)(x - 1)(x - 2) = 0$

$$x^3 - 7x + 6 = 0$$

14. Ans. b

Explanation:

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

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

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

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

15. Ans. a

Explanation:

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

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

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

16. Ans. d

Explanation:

$$(a, a), (b, b), (c, c) \in R$$

So R is a reflexive relation

$$\text{But } (a, b) \in R \text{ and } (b, a) \notin R$$

Thus, R is not a symmetric relation.

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Also, $(a, b), (b, c) \in R \Rightarrow (a, c) \notin R$
 Hence R is not a transitive relation

17. Ans. b

Explanation:

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

18. Ans. c

Explanation:

$$A = \{1, 2, 3\}$$

Subsets of A = Power set of A

$$\{\phi, \{1\}, \{2\}, \{3\}, \{1, 2\}, \{2, 3\}, \{1, 3\}, \{1, 2, 3\}\}$$

19. Ans. a

Explanation:

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

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

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

20. Ans. b

Explanation:

$$9, G, G_2, G_3, G_4, 288$$

$$l = ar^{n-1}$$

$$288 = 9r^5$$

$$r^5 = 2^5$$

$$r = 2$$

$$G_1 = ar = 9 \times 2 = 18$$

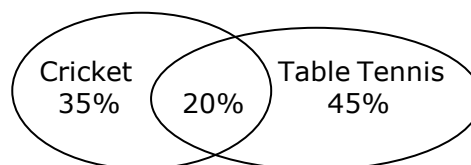
$$G_2 = ar^2 = 9 \times 4 = 36$$

$$G_3 = ar^3 = 9 \times 8 = 72$$

$$G_4 = ar^4 = 9 \times 16 = 144$$

21. Ans. b

Explanation:



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

22. Ans. d

Explanation:

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

23. 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 $x=3$

24. Ans. b

Explanation:

$$\begin{aligned} \alpha - \beta &= \sqrt{(\alpha + \beta)^2 - 4\alpha\beta} \\ &= \sqrt{(7)^2 - 4(-9)} = \sqrt{85} \end{aligned}$$

25. Ans. d

Explanation:

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

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

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

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

26. Ans. c

Explanation:

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

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

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

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

$$r = 25\%$$

27. Ans. c

Explanation:

Product of extreme terms = product of mean terms

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

$$x = 6$$

28. Ans. d

Explanation:

first part = x , second part = $2600 - x$

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

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

$$39x = 62,400$$

$$x = 1,600$$

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

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

29. Ans. b

Explanation:

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

30. Ans. b

Explanation:

$$\lim_{x \rightarrow 3} \frac{2x-6}{1-0} = 6 - 6 = 0$$

31. Ans. d

Explanation:

$$\lim_{n \rightarrow \infty} \frac{1}{1-n^2} (1+2+3+\dots+n)$$

$$\lim_{n \rightarrow \infty} \frac{1}{1-n^2} \frac{n(n+1)}{2}$$

$$\lim_{n \rightarrow \infty} \frac{n}{2(1-n)} \text{ (DL Hospital Rule)}$$

$$= -\frac{1}{2}$$

32. Ans. c

Explanation:

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Assume a, b, c which are in AP

a = 1, b = 2, c = 3 and put in given expression:-

$$\frac{1^3+4(2)^3+(3)^3}{2(1^2+3^2)} = \frac{60}{20} = 3$$

33. Ans. b

Explanation:

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

$$1852.20 = 1600 \left(1 + \frac{r}{100}\right)^3$$

$$\frac{9261}{8000} = \left(1 + \frac{r}{100}\right)^3$$

$$\left(\frac{21}{20}\right)^3 = \left(1 + \frac{r}{100}\right)^3$$

$$1 + \frac{r}{100} = \frac{21}{20}$$

$$r = 5\% \text{ p.a.}$$

34. Ans. c

Explanation:

$$26010 = P \left(1 + \frac{2}{100}\right)^2$$

$$P = 25000$$

35. Ans. c

Explanation:

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

$$63 = P \left(\frac{5}{100}\right)^2$$

$$P = 25,200$$

36. Ans. d

$$\text{P.V. of Perpetuity} = \frac{R}{i}$$

$$= \frac{25}{14} \times 1200$$

$$= ₹ 2142.8$$

37. Ans. d

Explanation:

None Statements are true.

38. Ans. d

Explanation:

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

39. Ans. b

Explanation:

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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

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

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

40. Ans. b

Explanation:

$$r_R = 1 - \frac{6 \sum d^2}{n(n^2-1)}$$

$$0.143 = 1 - \frac{6 \times 48}{7(48)} = 0.143$$

41. Ans. b

Explanation:

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

It means worker is in loss.

42. 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

43. Ans. c

Explanation:

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

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

44. Ans. b

Explanation :

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

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

$$x = 4$$

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45. Ans. b
 Explanation :
 Angle Corresponding to North America

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

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

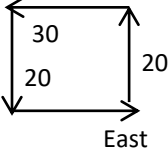
46. Ans. b
 Explanation:

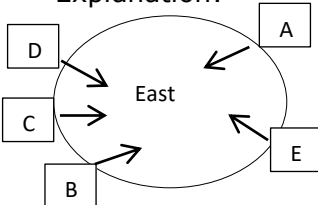
$$\frac{\sigma_x}{\sigma_y} = \sqrt{\frac{b_{xy}}{b_{yx}}}$$

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

$$= 0.73$$

47. Ans. b
 Explanation :
 The index 1970 on base 1960 will be $= \frac{150 \times 200}{100} = 300$

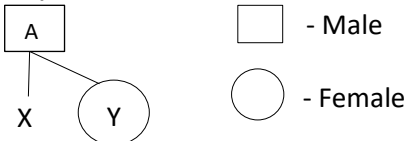
48. Ans. b
 Explanation:


49. Ans. d
 Explanation:


50. Ans. b
 Explanation:

$\frac{R}{M}$	$\frac{N}{Q}$	$\frac{P}{O}$
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51. Ans. a
 Explanation:
N R Q P M

52. Ans. d
 Explanation:


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53. 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 $\frac{6+1}{2} = 3.5th$ term

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

54. Ans. c

Explanation :

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

55. Ans. d

Explanation:

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

56. Ans. b

Explanation:

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

57. Ans. c

Explanation:

Standard Deviation is not affected by change in origin (+, -)

58. Ans. b

Explanation:

$$\begin{aligned} n &= 32, \sigma = 5, \Sigma x = 80 \\ \sigma &= \sqrt{\frac{\Sigma x^2}{n} - (\bar{x})^2} \\ (5)^2 &= \frac{\Sigma x^2}{32} - 6.25 \\ \Sigma x^2 &= 1000 \end{aligned}$$

59. Ans. b

Explanation :

Chain index for any year

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

60. Ans. b
 Explanation:

$$\text{Dorbish-Bowley's index number} = \frac{L+P}{2} = 145$$

$$L = 290 - P = 140$$

$$f = \sqrt{L \times P} = \sqrt{140 \times 150} = 144.91$$

61. Ans. b
 Explanation:
 Spatial classification is classification of units on the basis of geographical area.

62. 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	$\sum Px = 3.4$

$$\text{Expected value } E(x) = \sum Px = 3.4$$

63. Ans. c
 Explanation:
 $17 \times 14 = 765$
 $9 \times 51 = 459$
 $9 \times 36 = 324$
 Sum of 18 nos. = $459 + 324 = 783$
 17th no. = $783 - 765 = 18$

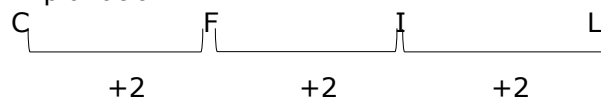
64. Ans. b
 Explanation:
 We know that if $u = \frac{x-a}{b}$ and $v = \frac{y-c}{d}$, then $r_{xy} = \frac{bd}{|b||d|} r_{uv}$

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

$$\text{Here } b = -1/5, d = 7/3$$

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

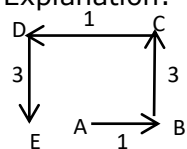
65. Ans. c
 Explanation:



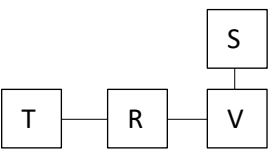
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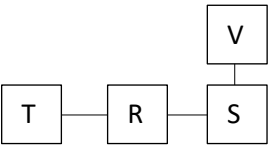
66. Ans. b
 Explanation:
 Red Colour Chalk → 2 ⑤ 6
 Green Colour Flower → ⑤ 8 9
 Red Colour Chalk → ② 5 6
 White Colour Chalk → ② 7 5
 White → 4

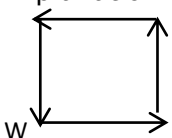
67. Ans. a
 Explanation:
 Tree grows a fruit. Tree is called sky.

68. Ans. c
 Explanation:


69. Ans. c
 Explanation:
 $5 \times 4 + 18 \div 3$
 $20 + 6 = 26$

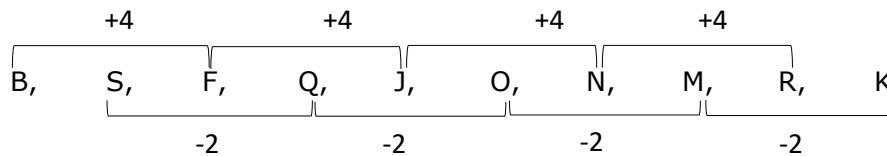
70. Ans. d
 Explanation:
 T Sis R Bro V Son S


71. Ans. b
 Explanation:
 T Sis R Son V Mother S


72. Ans. a
 Explanation:


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73. Ans. d
 Explanation:



74. Ans. a
 Explanation:
 The most appropriate diagram to represent 5 year plan outlay of India in different economic sectors is Pie diagram

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

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

77. Ans. c
 Explanation:
 $A = \frac{4}{5}$ $A' = \frac{1}{5}$
 $B = \frac{3}{4}$ $B' = \frac{1}{4}$
 $AB' + BA' = \frac{7}{20}$

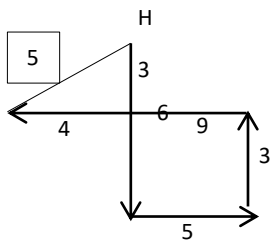
78. Ans. b
 Explanation:
 SM
 MT
 TW
 WT 53 Saturday = $\frac{2}{7}$

TF
 FS
 SS

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

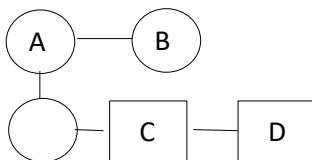
80. Ans. a
 Explanation:
 $np = 4$
 $npq = 3$
 $4q = 3$
 $q = \frac{3}{4}$ $p = \frac{1}{4}$ so n = 16
 $\text{mode} = (16 + 1) \frac{1}{4} = \frac{17}{4} = (4)$

81. Ans. c
 Explanation:

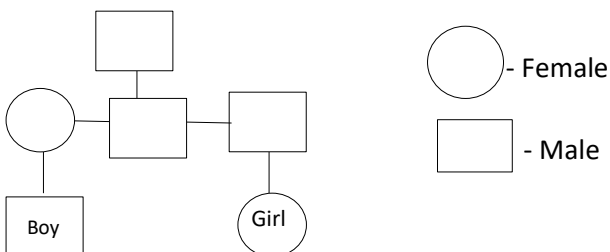


82. Ans. c
 Explanation:
 P D T B V

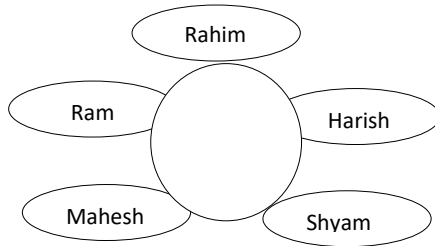
83. Ans. d
 Explanation:



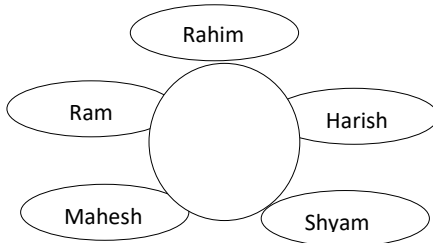
84. Ans. d
 Explanation:



85. Ans. d
 Explanation:



86. Ans. b
 Explanation:



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

88. Ans. b
 Explanation:

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

89. Ans. a
 Explanation:

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

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

91. Ans. c
 Explanation:
 $\mu = 0 \quad \sigma = 1$

92. 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 = $\sqrt{\sigma_1^2 + \sigma_2^2}$

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93. Ans. d
 Explanation:
 As the sample size increases, standard error Decreases proportionately.
94. Ans. d
 Explanation:
 Systematic sampling adds flexibility to the sampling process.
95. Ans. d
 Explanation:
 Sample in which the number of units is less than 30 is called a small sample
96. Ans. d
 Explanation:
 $P = .05$
 $n = 40$
 $m = 2$
 $P(X = 0, 1, 2)$
 $= e^{-2} \left[\frac{2^0}{|0|} + \frac{2^1}{|1|} + \frac{2^2}{|2|} \right]$
 $= 0.135 \times 5 = 0.675$
97. Ans. b
 Explanation:
 Circular test is called shifting the base.
98. Ans. b
 Explanation:
 $A = P(1+r)^n$
 $1 = P(1+.1)^2$
 $P = ₹ 0.83$
99. Ans. d
 Explanation:
 $A(n, i) = A \left[\frac{(1+i)^n - 1}{i} \right]$
 $200000 = A \left[\frac{(1+.1)^{10} - 1}{0.1} \right]$
100. Ans. a
 Explanation:
 Net present Value = $100000 - \left[\frac{60000}{(1+0.1)} + \frac{15000}{(1+0.1)^2} + \frac{25000}{(1+0.1)^3} \right]$
 $= 100000 - [54545.4 + 12,396.7 + 18,782.8]$
 $= 100000 - 85725$
 $= 14,275/-$

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