

BUSINESS MATHEMATICS, REASONING & STATISTICS

1. Ans. c

Explanation:

$$\begin{aligned}
 f(x) &= {}^x C_2 \\
 &= \frac{x(x-1)}{2} \\
 &= \frac{x^2 - x}{2} \\
 f'(x) &= \frac{2x-1}{2} \\
 f'(3) &= \frac{2 \times 3 - 1}{2} = \frac{5}{2}
 \end{aligned}$$

2. Ans. a

Explanation:

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

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

$$C'(x) = 0$$

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

$$x = 2, 3$$

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

$$\text{Put } x = 3$$

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

$$\text{;fn } C''(x) > 0$$

$$\text{ykr } U;wure \text{ gksxh] tc } x=3$$

3. Ans. b

Explanation:

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

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

$$\begin{aligned}
 &= \frac{\frac{1}{1-x} - 1}{\frac{1}{1-x}} \\
 &= x
 \end{aligned}$$

4. Ans. d

Explanation:

IEcU/k R lefer rFkk laØked gksxk] ijUrq LorqY; ugha gksxk] D;ksafd (3,3)
 IEcU/k R ls IEcU/k ugha j[krkA

5. Ans. b

Explanation:

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

$$= \sqrt{(7)^2 - 4(-9)} = \sqrt{85}$$

6. Ans. c

Explanation:

By Option (c)

7. Ans. d

Explanation:

$$x^2 - (2 - \sqrt{3} + 2 + \sqrt{3})x + (2 - \sqrt{3})(2 + \sqrt{3}) = 0$$

$$x^2 - (2 - \sqrt{3} + 2 + \sqrt{3})x + (2 - \sqrt{3})(2 + \sqrt{3}) = 0$$

$$x^2 - 4x + 1 = 0$$

8. Ans. b

Explanation:

By Option (b)

9. Ans. a

Explanation:

	e'khu I	e'khu II	
xzSM A	2	3	≥ 14
xzSM B	1	4	≥ 12

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

$$x + 4y \geq 12$$

10. Ans. d

Explanation:

a, x, c A. P. esa gS] rks

$$2x = a + c$$

$$a + c = 50 \dots\dots (i)$$

a, y, c G.P. esa gS] rks

$$y^2 = ac$$

$$49 = ac \dots\dots (ii)$$

gy djus ij (i) rFkk (ii)

$$a = 1, c = 49$$

11. Ans. a

Explanation:

$$a = 5,00,000, d = 15,000$$

$$\begin{aligned}
 S_n &= \frac{n}{2} [2a + (n-1)d] \\
 &= \frac{10}{2} [2 \times 5,00,000 + (10-1) 15,000] \\
 &= \text{Rs. } 56,75,000
 \end{aligned}$$

12. Ans. d

Explanation:

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

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

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

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

13. Ans. c

Explanation:

$$? = L$$

14. Ans. b

Explanation:

$$\text{White} = 4$$

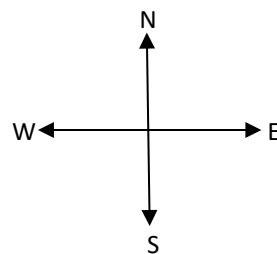
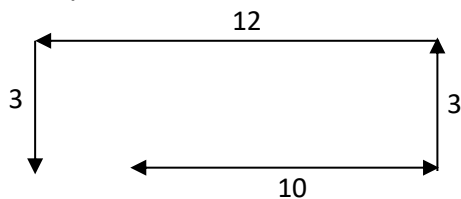
15. Ans. a

Explanation:

$$\text{Fruit} = \text{Sky}$$

16. Ans. c

Explanation:



17. Ans. c

Explanation:

$$12 \quad \text{ex. } U, V, M \text{ etc.}$$

18. Ans. c

Explanation:

$$26$$

19. Ans. b

Explanation:

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

20. Ans. a

Explanation:

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

$$r = 25\%$$

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

$$t = 16 \text{ years}$$

21. Ans. c

Explanation:

$$1Rs. : 50P : 25P$$

$$4x, 5x, 6x$$

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

$$x = 15$$

$$25 \text{ iSlS ds flDdksa dh la[;k} = 6 \times 15 = 90$$

22. Ans. c

Explanation:

$$A : B = 4 : 5] \times 7$$

$$B : C = 7 : 8] \times 5$$

$$A : B : C = 28 : 35 : 40$$

23. Ans. c

Explanation:

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

A ds mileqPp; = A ds ikWoj leqPp;

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

24. Ans. a

Explanation:

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

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

25. Ans. b

Explanation:

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

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

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

26. Ans. a

Explanation:

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

$$5,00,000 = \frac{R}{.08} [1 - (1 + 0.08)^{-3}]$$

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

27. Ans. c

Explanation:

$$bdkbZ \text{ vad ij la[;kvksa dk ;ksx}$$

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

$$= 108$$

28. Ans. b

Explanation:

$$l\text{ij js[kkvksa dh la[;k}$$

$$= {}^nC_2 - {}^xC_2 + 1$$

$$= {}^{15}C_2 - {}^6C_2 + 1 = 91$$

29. Ans. c

Explanation:

$$O;oLFkkvksa dh la[;k = dqy O;oLFkkvksa dh la[;k - nks 'o' lkFk esa jgs$$

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

30. Ans. d

Explanation:

$$rjhds = {}^6C_3 \times {}^5C_2 = 200$$

31. Ans. d

Explanation:

$$\text{fofHkUu 'kCnksa dh la[;k} = \frac{11!}{4!4!2!}$$

$$S = 4, P = 2, I = 4$$

32. Ans. c

Explanation:

By option (c)

33. Ans. b

Explanation:

in AP $a = -111$ and $d = 4$

$$\begin{aligned}
 T_n &= a + (n-1)d \\
 &= -111 + (n-1)4 \\
 &= -111 + 4n - 4 \\
 &= 4n - 115
 \end{aligned}$$

$$T_n > 0$$

$$4n - 115 > 0$$

$$n > 28\frac{3}{4}$$

$$\therefore \text{The least value of } n \text{ is } 29$$

34. Ans. b

Explanation:

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

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

$$288 = 9r^5$$

$$r^5 = 2^5$$

$$r = 2$$

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

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

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

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

35. Ans. b

Explanation:

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

36. Ans. d

Explanation:

By option (d)

37. Ans. a

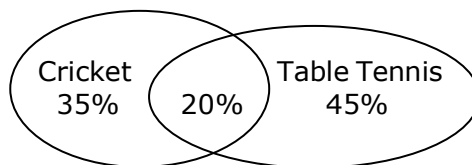
Explanation:

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

38. Ans. a
Explanation:

$$\begin{aligned}
 \text{rqyukRed okf" kZd o`f) nj} &= \left[\frac{\mathbf{v}(t_n)}{\mathbf{v}(t_o)} \right]^{\frac{1}{t_n - t_o}} - 1 \\
 &= \left(\frac{210}{100} \right)^{\frac{1}{4}} - 1 = 26.98\%
 \end{aligned}$$

39. Ans. b
Explanation:



$$\begin{aligned}
 \text{fØdsV [ksyus okys Nk=ksa dh la];k} &= 35\% + 20\% \\
 &= 55\% \text{ of } 120 \\
 &= 66
 \end{aligned}$$

40. Ans. b
Explanation:

$$\begin{aligned}
 f(x) &= \frac{1}{x-1} \\
 \text{;fn } x &= 1 \quad f(x) \text{ vifjHkkf"kr gksxk} \\
 A &= R - \{1\}
 \end{aligned}$$

41. Ans. d
Explanation:

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

42. Ans. c
Explanation:

$$\begin{aligned}
 & \int_1^2 (x^2 - 5x + 2) dx \\
 &= \left[\frac{x^3}{3} - \frac{5x^2}{2} + 2x \right]_1^2 = -\frac{19}{6}
 \end{aligned}$$

43. Ans. c

Explanation:

$$\begin{aligned}
 & \frac{d}{dx} (x^2 \log x) \\
 &= x^2 \cdot \frac{1}{x} + 2x \log x \\
 &= x (1 + 2 \log x)
 \end{aligned}$$

44. Ans. b

Explanation:

lgIEcU/k xq.kkad bZdkbZ ij Lora= jgrk gSA

45. Ans. b

Explanation:

rkieku o is; inkFkZ dh fcdzh esa /kukRed lgIEcU/k gksrk gSA

46. Ans. c

Explanation:

;fn $y = a + bx$ gks rks x rFkk y ds e/; 1 ;fn $b > 0$;k -1 ;fn $b < 0$ lgIEcU/k xq.kkar gksxkA

47. Ans. c

Explanation:

;fn fNrjs gq;s fp=ksa esa izkafdr fcUnq Åijh ck;sa ls fupys nk;sa fljs dh vksj xfreku gks rks _.kkRed lgIEcU/k gSA

48. Ans. a

Explanation:

lgfopj.k /kukRed] _.kkRed ;k 'kwU; vIR; gks ldrk gSA

49. Ans. d

Explanation:

voyksfdr rFkk vuqekfur ewY; ds varj dks izrhixeu leh{kk esa =qfV ;k vo'ks"k dgrs gSA

50. Ans. a

Explanation:

izrhixeu dh nksuksa js[kk;sa $(\bar{x}, \bar{y})$ izfrPNsn djrh gSA

51. Ans. a

Explanation:

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

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

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

$$b_{yx} = \frac{-5}{7}$$

$$b_{xy} = -\frac{2}{6} \quad -\frac{5}{7} = -\frac{\sqrt{\frac{10}{42}} \times \sqrt{15}}{\sigma_x} \quad \sigma_x = 2.646$$

52. Ans. b

Explanation:

$$b_{yx} = 0.80$$

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

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

$$b_{yx} = \frac{q}{p} \times b_{uv}$$

$$0.80 = \frac{\frac{-5}{-2}}{\frac{-1}{3}} \times b_{uv} \quad b_{uv} = 0.1066$$

53. Ans. b

Explanation:

$$b_{yx} = \frac{r \times \sigma_y}{\sigma_x}$$

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

$$\sigma_x = \sqrt{\frac{16}{3}}$$

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

54. Ans. a

Explanation:

$$b_{yx} = \frac{0.92 \times 6}{5} \quad b_{xy} = \frac{0.92 \times 5}{6}$$

$$byx + bxy = 1.871$$

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:

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

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

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

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:

ekud izlkekU; forj.k esa >qdko fcUnq – 1 & +1 gksrs gSA

60. Ans. c

Explanation:

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

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

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

61. Ans. b

Explanation:

SM

MT

TW

WT $53 \text{ 'kfuokj} = \frac{2}{7}$

TF

FS

SS

62. Ans. d

Explanation:

$$E(x - \mu)^2 \text{ rFkk } E[x - E(x)]^2 \text{ nksuksa gh fopj.k gSA}$$

63. Ans. b

Explanation:

$$\beta(n, p) ; \text{g forj.k f} \} \text{inh; forj.k gS] blesa vk;ke n rFkk p gksrs gSA}$$

64. Ans. d

Explanation:

$$np = 3$$

$$\sqrt{npq} = 1.5$$

$$3q = 2.25$$

$$q = \frac{2.25}{3} \quad q = 0.75, p = 0.75 \text{ so } n = 12$$

65. Ans. a

Explanation:

$$np = 4$$

$$npq = 3$$

$$4q = 3$$

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

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

66. Ans. a

Explanation:

$${}^{10}C_5 \left(\frac{1}{2}\right)^{10}$$

67. Ans. b

Explanation:

$$\text{Mean} = 6 \times \frac{1}{2} = 3$$

$$SD = \sqrt{6 \times \frac{1}{2} \times \frac{1}{2}} = 1.22$$

68. Ans. b

Explanation:

$$n p = \frac{10}{3}$$

$$2n_{c_2} p^2 q^{n-2} = n_{c_3} p^3 q^{n-3}$$

$$\frac{2 \times n!}{2! n-2!} q = \frac{n!}{3! n-3!} p$$

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

$$6q = n p - 2 p$$

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

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

$$18q = 10 - 6 p$$

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

$$12 p = 8$$

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

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

$$n = 5$$

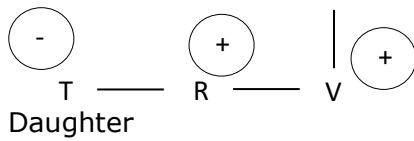
$$5_{c_0} \left(\frac{2}{3}\right)^0 \left(\frac{1}{3}\right)^5 + 5_{c_1} \left(\frac{2}{3}\right)^1 \left(\frac{1}{3}\right)^4 + 5_{c_2} \left(\frac{2}{3}\right)^2 \left(\frac{1}{3}\right)^3$$

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

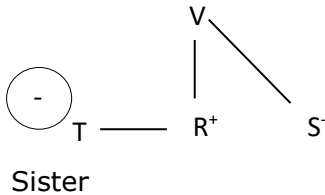
$$\frac{1 + 10 + 40}{3^5} = \frac{51}{3^5} = \frac{51}{243} = \frac{17}{81}$$

69. Ans. d

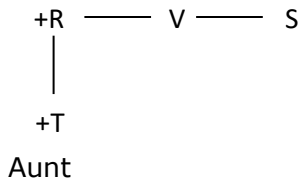
Explanation:



70. Ans. b
 Explanation:



71. Ans. a
 Explanation:



72. Ans. d
 Explanation:
 XC

73. Ans. d
 Explanation:
 Second from Right

74. Ans. c
 Explanation:
 XA

75. Ans. a
 Explanation:
 One

76. Ans. b
 Explanation:
 B

77. Ans. a
 Explanation:
 South

78. Ans. d
 Explanation:

R K

79. Ans. c

Explanation:

s vkdkj dk oØ ls de vkstkbo oØ gSA

80. Ans. d

Explanation:

lokZf/kd iz;qDr gksus okyk oØ ?kaVhuqek gSA

81. Ans. b

Explanation:

$$vk;dj dk dsUnzh; dks.k = \frac{240}{720} \times 360 = 120$$

$$/kudj dk dsUnzh; dks.k = \frac{180}{720} \times 360 = 90$$

82. Ans. a

Explanation:

Hkkjr ds vkfFkZd {ks= ls lacaf/kr mn~ns';ksa ds iapo"khZ; ;kstuk dks iznf'kZr djus esa ikbZ pkVZ izLrqfrdj.k dk mi;qDr ek;/e gSA

83. Ans. c

Explanation:

Ekk;/ vf/kd LFkkbZ dsUnzh; izd`fRr dk eki gSA

84. Ans. c

Explanation:

$$\sum \left(x - \bar{x} \right)^2 = U;wure$$

85. Ans. d

Explanation:

;fn leadks ds lewg esa dqN voyksdu ?kukRed rFkk dqN _.kkRed gks rks xq.kksRrj ek;/ vfu/kkZfjr gksxkA

86. Ans. a

Explanation:

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

$$G.M. = (6 \times 8 \times 12 \times 36)^{1/4} = 12$$

$$H.M. = \frac{4}{\frac{1}{6} + \frac{1}{8} + \frac{1}{12} + \frac{1}{36}} = 9.93$$

87. Ans. c

Explanation:

$$4x - 6y = 13$$

$$4 \times 16 - 6y = 13$$

$$64 - 13 = 6y$$

$$6y = 51$$

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

88. Ans. a

Explanation:

$$Q_1 = \frac{1(n+1)}{4}th$$

$$D_6 = \frac{6(n+1)}{10}th$$

$$P_{82} = \frac{82(n+1)}{100}th$$

$$= \frac{10+1}{4}th$$

$$\frac{6 \times 11}{10} = 6.6th$$

$$\frac{82 \times 11}{100}th$$

$$2.75 \text{ th item} = 62.75$$

$$6.6 \text{ th item} = 81.20$$

$$9.02 \text{ th item} = 120.20$$

89. Ans. b

Explanation:

$$ek/; - cgqyd = 3 (ek/; - ekf/kdk)$$

$$50 - x = 3 (50 - 40)$$

$$50 - x = 30$$

$$x = 20$$

90. Ans. d

Explanation:

$$\sum n^2 = \frac{n(n+1)(2n+1)}{6}$$

izFke 2n izkd`frd la[kvkksa dk ek/;

$$\frac{2n(2n+1)(4n+1)}{6 \times 2n}$$

$$= \frac{(2n+1)(4n+1)}{6}$$

91. Ans. a

Explanation:

$$\sigma x = 3$$

$$y = 5 - 2x$$

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

$$vy = 36$$

92. Ans. c

Explanation:

$$\sum dx^2 = 250 \quad n = 10$$

$$\bar{x} = 50$$

$$\sigma = \sqrt{\frac{250}{10}} = 5$$

$$C.V. = \frac{5}{50} \times 100 = 10$$

93. Ans. b

Explanation:

fn x esa ifjorZu gksus ij y esa ifjorZu uk gks rks nksukas pj x rFkk y vkil esa lglEcFfU/kr ugha dgykrs gSaA

94. Ans. c

Explanation:

$$\begin{aligned} D &= b^2 - 4ac \\ &= (-8)^2 - 4(3)(4) \\ &= 16 \end{aligned}$$

fn $D \geq 0$ rFkk ,d iw.kZ oxZ gS] rks ewy okLrfod] ifjes; vkSj vlekuA

95. Ans. c

Explanation:

$$\begin{aligned} \text{ckgjh enksa dk } xq.kuQy &= \text{vkUrfjd enksa dk } xq.kuQy \\ (23 - x)(78 - x) &= (30 - x)(57 - x) \\ x &= 6 \end{aligned}$$

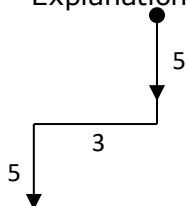
96. Ans. d

Explanation:

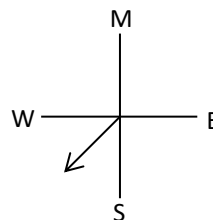
$$\text{rjhdkSa esa } vIQy \text{ gks ldrk } gS = 2^4 - 1$$

97. Ans. d

Explanation:



South-West



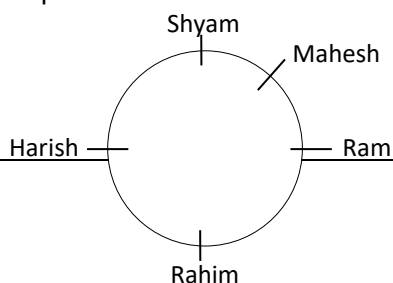
98. Ans. c

Explanation:

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

99. Ans. d

Explanation:



Shyam

100. Ans. b
Explanation:
Mahesh

— ** —