MITTAL COMMERCE CLASSES **CA FOUNDATION– MOCK TEST**

BATCH: GCF-1 to GCF-7, SCF-1 to SCF3, VCF-1 to 3 TIMING: 3 Hours
Test Booklet No.– 110011   DATE: 04.10.2018   MAXIMUM MARKS: 100

PAPER: BUSINESS MATHEMATICS, REASONING & STATISTICS

1. Ans. a
    Explanation:
    From (i) equation, $bx + ay = 2ab$
    From (ii) equation, $ax - by = a^2 - b^2$
    Multiply eq^n (i) by a and eq^n (ii) by b, we get
    $$abx + a^2y = 2a^2b \qquad \ldots(iii)$$
    and $abx - b^2y = a^2b - b^3 \qquad \ldots(iv)$
    Subtracting (iii) and (iv), $b^2y + a^2y = b^3 + a^2b$
    $$\Rightarrow y(b^2 + a^2) = b(b^2 + a^2)$$
    $$\Rightarrow y = b$$
    Putting y = b in the equation (i)
    $$bx + a(b) = 2ab$$
    $$\Rightarrow bx = ab \Rightarrow x = a$$

2   Ans. c
    Explanation:
    $$\log_8 m + \log_8 2 = \frac{2}{3}$$
    $$\log_8(2m) = \frac{2}{3}$$
    $$(8)^{\frac{2}{3}} = 2m$$
    $$(2^3)^{\frac{2}{3}} = 2m$$
    $$(2)^2 = 2m$$
    $$4 = 2m$$
    $$2 = m$$

3   Ans: c
    Explanation:
    Let width of the rectangle is x, then length = 5+2x
    Given that   Area of rectangle = 75
                  Length x width = 75
                  $(5 + 2x) \times x = 75$
                  $2x^2 + 5x - 75 = 0$
                  $(2x + 15)(x - 5) = 0$
                  $x = 5, \frac{-15}{2} \left[x \neq \frac{-15}{2} \right]$
    Length $= 2x + 5$
          $= 2(5) + 5 = 15$ units

4   Ans. b
     Explanation:
     Given equation is $3x^2 + (5m-2)x + m = 0$

     Sum of the roots = $\dfrac{-(5m-2)}{3}$

     We know that if roots are reciprocal to each other then $\dfrac{c}{a} = 1$ of $ax^2 + bx + c = 0$

     So $\dfrac{m}{3} = 1 \Rightarrow m = 3$

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

5   Ans. d
     Explanation:
     $$\dfrac{\log_9 11}{\log_5 13} - \dfrac{\log_3 11}{\log_{\sqrt{5}} 13}$$

     $$\Rightarrow \dfrac{\log_{(3)^2} 11}{\log_{(\sqrt{5})^2} 13} - \dfrac{\log_3 11}{\log_{\sqrt{5}} 13}$$

     $$\Rightarrow \dfrac{\frac{1}{2}.\log_3 11}{\frac{1}{2}.\log_{\sqrt{5}} 13} - \dfrac{\log_3 11}{\log_{\sqrt{5}} 13}$$

     $$\Rightarrow \dfrac{\log_3 11}{\log_{\sqrt{5}} 13} - \dfrac{\log_3 11}{\log_{\sqrt{5}} 13}$$

     $$\Rightarrow 0$$

     $\boxed{\text{Note } \log_{a^n} m = \dfrac{1}{n}\log_a m}$

6   Ans. (b)
     Explanation:
     $+ \leq$ then shaded region towards the origin.

7   Ans. d
     Explanation:
     Let α and β are roots of equation
     $\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta$
     $\quad\quad\quad = (-2)^2 - 2(-143)$
     $\quad\quad\quad = 290$

8   Ans. (c)

Explanation :

$$\frac{25x}{100} + \frac{10 \times 2x}{100} + \frac{5 \times 3x}{100} = 30$$

: $x = 50$

then the number of 5 p coins = 3 x 50 = 150

9   Ans.   C

Explanation:

    =   log(1+2+3) = log6
    =   log(1X2X3)
    =   log1+log2+log3

10   Ans. a

Explanation:

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

A:B:C=2:3:12

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

11   Ans. c

Explanation:

SI for 5 years = 1020 – 720
              = 300

SI for years   = $\frac{300}{5}$ x 2
              = Rs.120

Principal   = Rs.720 – Rs.120
              = Rs.600

12   Ans. c

Explanation:

$$\frac{\sqrt{x+1}+\sqrt{x-1}}{\sqrt{x+1}-\sqrt{x-1}} = 2$$

Using componendo&dividendo

$$\frac{\sqrt{x+1}}{\sqrt{x-1}} = 3$$

$$\frac{x+1}{x-1} = 9$$

$$x = \frac{5}{4}$$

13   Ans. b

Explanation:

Milk = 5x, water = x

$$\frac{5x}{x+5} = \frac{5}{2}$$

10x = 5x+25

x= 5

The quantity of milk in the original mixture = 5 × 5 = 25 litres

14　Ans. a

Explanation:

$$a+b = 6x$$
$$b+c = 7x$$
$$\underline{c+a = 8x}$$
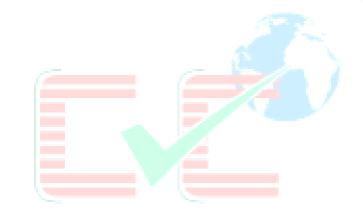$$2(a + b + c) = 21x$$
$$2(14) = 21x$$
$$\frac{4}{3} = x$$

$$\therefore a+b = 6 \times \frac{4}{3}$$

$$a+b = 8$$

Given a + b + c = 14

8 + c = 14

c = 14 – 8

c = 6

15　Ans. b

Explanation:

$$\sqrt{a.\sqrt{.b.\sqrt{c.\sqrt{d}}}} = \sqrt{a.\sqrt{b.\sqrt{c.d^{1/2}}}} = \sqrt{a\sqrt{b.c^{\frac{1}{2}}d^{\frac{1}{4}}}} = \sqrt{a.b^{\frac{1}{2}}.c^{\frac{1}{4}}d^{\frac{1}{8}}}$$

$$= a^{\frac{1}{2}}.b^{\frac{1}{4}}.c^{\frac{1}{8}}.d^{\frac{1}{16}}$$

16　Ans:　b

Explanation:

Let the share of each nephew be Rs. x

Then , share of each daughter = Rs. 4x; share of each son = Rs. 5x,

So,

$$5 \text{ x } 5x + 4 \text{ x } 4x + 2 \text{ x } x = 8600$$
$$43x = 8600$$
$$x = 200$$

Share of each daughter 　　= Rs. (4 x 200)

　　　　　　　　　　　　　　= Rs. 800

17   Ans. a
      Explanation:
      Let number is x

      Then $x + \dfrac{1}{x} = \dfrac{10}{3}$

      $3x^2 - 10x + 3 = 0$

      and roots are $3, \dfrac{1}{3}$

      and square of the numbers are $9, \dfrac{1}{9}$

18   Ans. d
      Explanation:

$$\frac{x+y+z}{\dfrac{1}{xy} + \dfrac{1}{yz} + \dfrac{1}{zx}} = \frac{x+y+z}{\left(\dfrac{z+x+y}{xyz}\right)} = \frac{x+y+z}{1} \times \frac{xyz}{(x+y+z)} = xyz$$

19   Ans. b
      Explanation:
      Let third proportial be T

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

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

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

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

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

20   Ans. c
      Explanation:

      $x + \dfrac{1}{x} = \sqrt{2}$ (squaring both sides)

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

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

      $x^2 + \dfrac{1}{x^2} = \boxed{0}$

21   Ans. b
      Explanation:
      Required no. of ways = 2×4×3×2×1=48

22   Ans. d
      Explanation:
      Present value $= A(1+i)^{-n} = 10000 / (1+0.025)^4$

$$= 10000 / (1.025)^4$$
$$= 10000 / (1.1038)$$
$$= Rs.9059.50$$

23   Ans. a
      Explanation:
      For the lines $2x + 3y = 4$ and $4x + 6y = 7$

$\frac{2}{4} = \frac{3}{6} \neq \frac{4}{7}$

So, the given system of equation have no solution because, both lines are parallel to each other.

24   Ans. b
      Explanation:
      LHL = 3
      RHL = 5–P
      LHL = RHL
      3 = 5–P
      P = 2

  25 Ans. a
      Explanation:

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

      Let Rs. P be the each payment.

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

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

26   Ans. d
      Explanation:
      By options putting the value n = 9
      $9c_2 - 9 = 27$

27   Ans. c
      Explanation:
      37, 39, ... 119
      l = a + (n–1)d
      119 = 37 + (n–1)(2)

n = 42

$$S_n = \frac{n}{2}(a+l) = \frac{42}{2}(37+119) = 3276$$

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

29   Ans. d
       Explanation :
       The candidate can select 8 questions by selecting at last three from each part in the
       following ways:
       (a)   3 questions from part A and 5 questions from part
              B= $^7C_3$x $^5C_5$ = 35 ways
       (b)   4 questions from part A and part B each
              B= $^7C_4$x $^5C_4$ = 175 ways
       (c)   5 questions from part A and questions from part
              B= $^7C_5$x $^5C_3$ = 210 ways

       Hence, the total number of ways in which the candidate can select the question will
       be=35+175+210=420 ways.

30   Ans. d
       Explanation:
       $x^y = e^{x+y}$

       $y \log x = x + y$

       $y = \dfrac{x}{\log x - 1}$

       $\dfrac{dy}{dx} = \dfrac{\log x - 2}{(\log x - 1)^2}$

31   Ans. b
       Explanation:
       $SI = \dfrac{prt}{100}$

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

       r = 6%

32   Ans. d
       Explanation:
       The required no. of ways = 4!×3! = 144

33   Ans. b
       Explanation:
       x = 8^{17}

$x = 2^{51}$

$\log x = 51 \log^2$

$\log x = 51 \times 0.3010 = 15.381$

Number of terms in $8^{17} = 15 + 1 = 16$

34   Ans. c

Explanation:

fog (x) = f[g(x)]

= f(x²+7)

fog(x) = 2 (x²+7) + 7

fog(x) = 2x²+21

$\Rightarrow 2x^2 + 21 = 25$

x² = 2

$x = \pm\sqrt{2}$

35   Ans. b

Explanation:

f(x) = 2x²+3x−5

f'(x) = 4x+3

f'(0) = 3

f' (−1) = −1

f'(0)+3f'(−1)=3+3(−1)=3−3=0

36   Ans: (c)

Explanation:

$(P + Q)x\frac{20}{100} = (P - Q) x\frac{50}{100}$

$$2P + 2Q = 5P - 5Q$$
$$7Q = 3P$$
$$P : Q = 7 : 3$$

37   Ans. c

Explanation:

Let x years be the present age of the man and sum of the present ages of the two sons be y years.

By the condition   x = 3y   ....(i)

and   x + 5 = 2 (y + 5 + 5)   ....(ii)

From (i) & (ii)   3y + 5 = 2 (y + 10)

or3y + 5 = 2y + 20

or3y - 2y = 20 - 5

or y = 15

$\therefore$ x = 3 x y = 3 x 15 = 45

Hence the present age of the main is 45 years.

38   Ans. c

Explanation:

Total line can be made by 10_{C_2}

and 7_{C_2} lines could not be drawn because points are collinear

So Remaining $\Rightarrow 10_{C_2} - 7_{C_2} + 1$

$\Rightarrow 25$

39   Ans. b
       Explanation:
       Orders are 2x8; 8x2; 4x4; 1x16; 16x1.

40   Ans. b
       Explanation:
       $$\begin{bmatrix} x+xy & 2x+y^2 & 3x+yz \\ 2+3x & 4+3y & 6+3z \end{bmatrix}$$

41   Ans. b
       Explanation:

       Given $n_1 = k$, $n_2 = k$
       $\bar{x}_1 = 16 \ \bar{x}_2 = 10$
       Combined mean
       $$\bar{x} = \frac{n_1\bar{x}_1 + n_2\bar{x}_2}{n_1 + n_2}$$

       $= \dfrac{k \times 16 + k \times 10}{k + k} = \dfrac{16k + 20k}{3k} = \dfrac{36k}{3k}$

       $= 12$

42   Ans. a
       Explanation : Sum of marks of 300 students = 300 x 40 = 12000
       after replacing wrong and missing observations sum of marks =
       12000-60+66+14-41+60 = 12039
       Correct mean = 12039/300 = 40.13

43   Ans. b
       Explanation:
       First 5 and last five observations are same in magnitude but opposite in sign. So

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

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

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

       $$= \sqrt{\frac{160}{10} - \left(\frac{0}{10}\right)^2}$$

       $= 4$

44   Ans. d

Explanation:

Coefficient of variation = $\dfrac{\text{S.D.}}{\overline{x}} \times 100$

$50 = \dfrac{\text{S.D.}}{10} \times 100$

$\text{S.D.} = \dfrac{50 \times 10}{100} = 5$

Variance = $(\text{S.D.})^2 = 5^2 = 25$

45   Ans. b
Explanation:

Coefficient of range = $\dfrac{L-S}{L+S}$

Where $L \rightarrow$ for largest value

$S \rightarrow$ for smallest value

Coefficient of range = $\dfrac{40-10}{40+10} = \dfrac{30}{50} = \dfrac{3}{5}$

46   Ans. a
Explanation:
Arrange the data in ascending order:
$x/5, x/3, x/2, x$
M = Simple Average of two middle terms

$M = \dfrac{\dfrac{x}{2} + \dfrac{x}{3}}{2} = 10$

$\dfrac{x}{2} + \dfrac{x}{3} = 20$

$\dfrac{5x}{6} = 20$

x = 24

47   Ans. d
Explanation: $\sum x = 50 \times 80 = 4000$
After replacing correct observations $\sum x = 4000 - 28 - 69 + 82 + 96 = 4081$
Revised $\overline{x} = \dfrac{4081}{50} = 81.62$

48   Ans. b
Explanation:
G.M. $= (2 \times 2^2 \times 2^3 \times 2^4 \times 2^5 \times 2^6)^{1/6}$
$= 2^{7/2}$

49   Ans.   d
Explanation:

$$\text{H.M.} = \frac{n}{1+3+5...2n-1} = \frac{1}{n}$$

50   Ans. c
Explanation: $b_{yx} = -5/2$

51   Ans. b
Explanation:

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

52   Ans. b
Explanation:
$F = \sqrt{L \times P}$
$150^2 = 144 \times P$
$P = 156.25$

53   Ans. b
Explanation:

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

It means worker is in loss.

54   Ans. c
Explanation:
Spearman's rank correlation coefficient is used for qualitative data

55   Ans. d
Explanation : Regression coefficient are independent of change of origin but not scale
(As per Fundamental Principle)

56   Ans. c
Explanation :

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

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

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

$0.5B = 0.01$

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

Five competitors in a contest are ranked by two judges in the order 1, 2, 3, 4, 5 and 5,4,3,2,1 respe
(a)   -0.5

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

58   Ans. a
       Explanation:
       Purchasing power of money is is inversely proportional to the price index.

59   Ans. c
       Explanation:

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

Weighted Price Index $= \dfrac{\Sigma RW}{\Sigma W} = \dfrac{760}{7} = 108.5$

60   Ans. c
       Explanation:
$$r^2 = b_{yx} \times b_{xy}$$
$$r = \pm\sqrt{b_{yx} \times b_{xy}}$$

61   Ans. c
       Explanation:
       Regression coefficients are independent of the change of origin but not of scale.
       and $b_{yx} > 1$ then $b_{xy} < 1$

62   Ans. a
       Explanation:

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

$$0.75 = \sqrt{\frac{5}{4} \times b_{xy}}$$

$$\frac{0.5625 \times 4}{5} = b_{xy}$$

$$b_{xy} = 0.45$$

63   Ans. b
       Explanation :

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

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

$$x = 4$$

64   Ans. c
Explanation:
two or more related time series are expressed in different units, we usemultiple axis chart

65   Ans. b
Explanation :
Angle Corresponding to North America

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

$= 9.4 \ km^2$

66   Ans. c
Explanation:
Hidden trend, if any, in the data can be noticed inDiagrammatic representation.

67   Ans. b
Explanation : $\bar{x} = 1500, \ SD = 400$

             After 1st year
             Mean = 1500 + 20% of 1500=1800
             SD = 400 + 20% of 400 = 480

             After 2nd year
             Mean = 1800 + 100 = 1900
             SD = 480 (no change)

68   Ans. b
Explanation:

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

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

$$= 0.73$$

69   Ans. a
Explanation:
Chronological classification is also known as time series data.

70   Ans. b
Explanation:
We Know Q.D = $\frac{2}{3} S.D$

Q.D.<S.D

71   Ans. c
Explanation : Average age of 10 students = 20 yrs
               The sum of age of 10 students = 20 x 10 = 200 yrs

If two boys are increased
The total no of students = 10+2=12
And average increased by 4 yrs
Then new average = 20 + 4 = 24
The sum of age of 12 student = 24 x 12 = 288
The sum of age of two boys = 288 – 200 = 88
Average age of two boys = $\frac{88}{2}$ = 44

72   Ans. c
Explanation:
Given: Mode - Mean = 63
We know the empirical relationship between mean, Median & Mode i.e.
(Mode - Mean) = 3 (Median - Mean)
Median - Mean = $\frac{63}{3}$ = 21

73   Ans. a
Explanation:
If age increases premium of insurance increases.

74   Ans. a
Explanation:

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

$$= \frac{-3}{2} \times -1.2 = 1.8$$

75
Ans. c

Explanation : Event A: Person aged 50 years will remain alive after 20 years

Event B: Person aged 60 years will remain alive after 20 years

$$\therefore P(A) = \frac{5}{9+5} = \frac{5}{14} \text{ and } P(B) = \frac{6}{8+6} = \frac{6}{14}$$

$$\therefore P(A \cup B) = \frac{5}{14} + \frac{6}{14} - \frac{5}{14} \times \frac{6}{14} = \frac{31}{49}$$

76   Ans.   c
Explanation:
$-\infty$ to ∞ area = 1.

77   Ans. c
Explanation:

$$np - npq = \frac{5}{9}$$

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

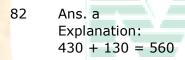Distribution is $\left(\frac{2}{3} + \frac{1}{3}\right)^5$

78   Ans. b

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

79   Ans. b

Explanation: Less than ogive& more than Ogive intersect at a point called MEDIAN or we can say second quartile.

80   Ans.   a
Explanation:

Largest angle $= \frac{32}{90} \times 360 = 128^0$

Smallest angle $= \frac{17}{90} \times 360 = 68^0$

Difference $= 60^0$

81   Ans. a
Explanation:
$54 + 16 = 70$

82   Ans. a
Explanation:
$430 + 130 = 560$

83   Ans. a
Explanation:
$285 + 60 = 345.$

84   Ans. a
Explanation:
$7^3 - 1 = 342$

85   Ans. b
Explanation:
$25 + 41 = 66$

86   Ans. a

87   Ans. b

88   Ans. b

89   Ans. a

90   Ans. a

91   Ans. a

92   Ans. a

93   Ans. c

94   Ans. d

95   Ans. d

96   Ans. d

97   Ans. a

98   Ans. d

99   Ans. a

100   Ans. b

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