**MITKARY SIR'S CAPS ACADEMY**
**CA Foundation - Test Series - Dec 2021**
Time :  2 hrs.  *SUBJECT :  BUSINESS MATHEMATICS, LOGICAL REASONING AND STATISTICS*    **Marks: 100**
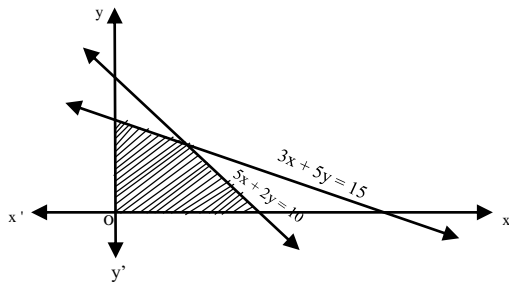
## INSTRUCTIONS

**General:**

*(i)   Marking: +1 for correct answer & -0.25 for incorrect.*
*(ii)  Mark only one correct answer out of four alternatives.*
*(iii) Use Pencil or Blue/Black Ball Point Pen only for writing particulars for any marking.*
*(iv)  Darken the circles in the space provided only.*
*(v)   Use of white fluid or any other material which damages the answer sheet, is not permitted.*

**1]**    Eight people are planning to share equally the cost of a rental car. If one person withdraws from the arrangement and the others share equally entire cost of the car, then the share of each of the remaining persons increased by :
    **(a)** 1/9    **(b)** 1/8    **(c)** 1/7    **(d)** 7/8

**2]**    In 40 litres mixture of glycerine and water, the ratio of glycerine and water is 3 : 1. The quantity of  water added in the mixture in order to make this ratio 2 : 1 is :
    **a)** 15 litres    **(b)** 10 litres    **(c)** 8 litres    **(d)** 5 litres

**3]**    Fourth proportional to $x$, $2x$, $(x + 1)$ is :
    **(a)** $x + 2$    **(b)** $(x + 2)$    **(c)** $(2x + 2)$    **(d)** $(2x - 2)$

**4]**    Value of $\left(a^{1/8} + a^{-1/8}\right)\left(a^{1/8} - a^{-1/8}\right)\left(a^{1/4} + a^{-1/4}\right)\left(a^{1/2} + a^{-1/2}\right)$ is :
    **(a)** $a + \dfrac{1}{a}$    **(b)** $a - \dfrac{1}{a}$    **(c)** $a^2 + \dfrac{1}{a^2}$    **(d)** $a^2 - \dfrac{1}{a^2}$

**5]**    If $2^x - 2^{x-1} = 4$ then the value of $x^x$  is :
    **(a)** 2    **(b)** 1    **(c)** 64    **(d)** 27

**6]**    If $\sqrt[3]{a} + \sqrt[3]{b} + \sqrt[3]{c} = 0$; then find the value of $\left[\dfrac{a+b+c}{3}\right]^3 =$
    **(a)** 9 abc    **(b)** $\dfrac{1}{9abc}$    **(c)** abc    **(d)** $\dfrac{1}{abc}$

**7]**    The  value of the expression : $a^{\log_a b.\log_b c.\log_c d.\log_d t}$
    **(a)** t    **(b)** abcdt    **(c)** ( a+b+c+d+t )    **(d)** None.

**8]**    If $\log_{10000} x = \dfrac{-1}{4}$, then $x$ is given by :
    **(a)** 1/100    **(b)** 1/10    **(c)** 1/20    **(d)** none of these.

**9]**   If $\log(2a - 3b) = \log a - \log b$ , then a = ?

(a) $\dfrac{3b^2}{2b-1}$          (b) $\dfrac{3b}{2b-1}$          (c) $\dfrac{b^2}{2b+1}$          (d) $\dfrac{3b^2}{2b+1}$

**10]**  In a school number of a students in each section is 36. If 12 new students are added, then the number of sections are increased by 4 and the number are students in each section becomes 30. The original number of section at first is

(a) 6          (b) 10          (c) 14          (d) 18

**11]**  A person on a tour has Rs. 9600 for his expenses. But the tour was extended for another 16 days, so he has to cut down his daily expenses by Rs. 20. The original duration of the tour had been.

(a) 48 days          (b) 64 days          (c) 80 days          (d) 96 days

**12]**  Find the positive value of k for which the equations :
$x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ will have real roots:

(a) 12          (b) 16          (c) 18          (d) 22

**13]**  If one roots of an equation is $\dfrac{2+\sqrt{5}}{}$ , then the quadradic equation is:

(a) $x^2 + 4x - 1 = 0$     (b) $x^2 - 4x - 1 = 0$     (c) $x^2 + 4x + 1 = 0$     (d) $x^2 - 4x + 1 = 0$

**14]**  If $\left(2 + \sqrt{3}\right)$ is root of quadradic equation $x^2 + px + q = 0$ then value of p and q.

(a) (4, -1)          (b) (4, 1)          (c) (-4, 1)          (d) (2, 3)

**15]**  The value of $\dfrac{1}{log_3 60} + \dfrac{1}{log_4 60} + \dfrac{1}{log_5 60} = $ _____.

(a) 0          (b) 1          (c) 5          (d) 60

**16]**  Solving equation $\left(x - \dfrac{1}{x}\right)^2 - 6\left(x + \dfrac{1}{x}\right) + 12 = 0$ we get roots as follows

(a) 0          (b) 1          (c) - 1          (d) None

**17]**  If $\left|x + \dfrac{1}{4}\right| > \dfrac{7}{4},$ then :

(a) $x < \dfrac{-3}{2}$ or $x > \dfrac{3}{2}$                    (b) $x < -2$ or $x > \dfrac{3}{2}$

(c) $-2 < x < \dfrac{3}{2}$                    (d) None

**18]** The shaded region represents :



**(a)** $3x+5y \le 15,\ 5x+2y \ge 10,\ x, y \ge 0.$        **(b)** $3x+5y \le 15,\ 5x+2y \le 10,\ x, y \ge 0.$

**(c)** $3x+5y \ge 15,\ 5x+2y \ge 10,\ x, y \ge 0.$        **(d)** None

**19]** The rate of simple: interest on a sum of money is 6% p.a. for first 3 years, 8% p.a. for next 5 years and 10% p.a. for the period beyond 8 years. If the simple interest accured by the sum for a period for 10 years is Rs. 1,560. The sum is:
**(a)** Rs. 1,500        **(b)** Rs. 2,000        **(c)** Rs. 3,000        **(d)** Rs. 5,000

**20]** A person borrows Rs. 5,000 for 2 years at 4% p.a. simple interest. He immediately lends to another person at $6\frac{1}{4}\%$ p.a for 2 years. Find his gain in the transactionper year:
**(a)** Rs. 112.50        **(b)** Rs. 125        **(c)** Rs. 225        **(d)** Rs. 167.50

**21]** Two equal sums of money were lent at simple interest at 11% p.a. for $3\frac{1}{2}$ years and $4\frac{1}{2}$ years respectively . If the difference in interests for two periods was 412.50, then each sum is:
**(a)** Rs. 3,250        **(b)** Rs. 3,500        **(c)** Rs. 3,750        **(d)** Rs. 4,350

**22]** The difference between the simple and compound interest on a certain sum for 3 years at 5% p.a. is Rs. 228.75. The compound interest on the sum of 2 years at 5% p.a. is :
**(a)** Rs. 3,175        **(b)** Rs. 3,075        **(c)** Rs. 3,275        **(d)** Rs. 2,975

**23]** How long will Rs. 12,000 take to amount Rs. 14,000 at 5% p.a. converted quaterly?
**(a)** 3 years        **(b)** 3.1 years        **(c)** 13.5 years        **(d)** 12.4 years

**24]** At what % rate of compound interest corresponding (C.I) will a sum of money became 16 times in four years, if interest is being calculated compounding annually :
**(a)** r = 100%        **(b)** r = 10%        **(c)** r = 200%        **(d)** r = 20%

**25]** A machine can be purchased for Rs. 50,000, Machine will contribute Rs. 12,000 per year for the next five years. Assume borrowing cost is 10% per annum. Determine whether machine should be purchased or not:
**(a)** Should be purchased        **(b)** Should not be purchased
**(c)** Can't say about purchase        **(d)** None of the above

**26]** How much amount is required to be invested every year so as to accumulate Rs. 3,00,000 at the end of 10 years, if interest is compunded annually at 10%?
[Give $(1.1)^{10} = 2.5937$]
**(a)** Rs. 18,823.65 **(b)** Rs. 18,828.65 **(c)** Rs. 18,832.65 **(d)** Rs. 18,882.65

**27]** Vipul purchases a car for Rs. 5,50,000. He gets a loan of Rs. 5,00,000 at 15% p.a. from a Bank and balance Rs. 50,000 he pays at the time of purchase. He has to pay the whole amount of loan in 12 equal monthly instalments with interest starting from the end of the first month. The money he has to pay at the end of every month is: [Given $(1.0125)^{12} = 1.16075452$]
**(a)** Rs. 45,130.43 **(b)** Rs. 45,230.43 **(c)** Rs. 45,330.43 **(d)** None of these

**28]** The number of triangles that can be formed by choosing the vertices from a set of 12 points, seven of which lie on the same straight line, is :
**(a)** 185 **(b)** 175 **(c)** 115 **(d)** 105

**29]** In how many ways can the letters of the word FAILURE be arranged so that the consonants may occupy only odd positions?
**(a)** 576 **(b)** 476 **(c)** 376 **(d)** 276

**30]** If $^{n}P_{r} = {}^{n}P_{r+1}$ and $^{n}C_{r} = {}^{n}C_{r-1}$ then find the value of 'n'
**(a)** 2 **(b)** 3 **(c)** 4 **(d)** 5

**31]** If $a^{1/x} = b^{1/y} = C^{1/z}$ and a, b, c are in G.P.; the x, y, z are in :
**(a)** A.P. **(b)** G.P. **(c)** Both (a) & (b) **(d)** None of these

**32]** A person pays Rs. 975 in monthly instalments, each instalment is less than former by Rs. 5. The amount of first instalment is Rs. 100. In what time will the entire amount be paid?
**(a)** 26 months **(b)** 15 months **(c)** Both (a) & (b) **(d)** 18 months

**33]** The first, second and seventh term of AP. are in G.P. and the common difference is 2, the 2$^{nd}$ term of A.P. is:
**(a)** 5/2 **(b)** 2 **(c)** 3/2 **(d)** ½

**34]** If $f : R \to R$ , f(x) = 2x + 7, then the inverse of f is :
**(a)** $f^{-1}(x) = (x-7)/2$ **(b)** $f^{-1}(x) = (x+7)/2$
**(c)** $f^{-1}(x) = (x-3)/2$ **(d)** None of these

**35]** If $f(x) = 2x + h$ then find $f(x + h) - 2 f(x)$
**(a)** $h-2x$ **(b)** $2x-h$ **(c)** $2x+h$ **(d)** none of these

**36]** There are 40 students, 30 of them passed in English, 25 of them passed in Maths and 15 of them passed in both. Assuming that every Student has passed at least in one subject. How many student's passed in English only but not in Maths.
**(a)** 15 **(b)** 20 **(c)** 10 **(d)** 25

**37]** If $y = 2x + \frac{4}{x}$ then $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx}$ - y yields

**(a)** 3 **(b)** 1 **(c)** 0 **(d)** 4

**38]** If $y = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \ldots\ldots + \frac{x^n}{n}\ldots\ldots\infty$ then $\frac{dy}{dx} - y$ is equal to:

(a) 1                 (b) -1              (c) 0               (d) None

**39]** The integral of $(e^{3x} + e^{-3x})/e^x$ is :

(a) $\frac{e^{2x}}{2} + \frac{e^{-4x}}{4}$                                 (b) $\frac{e^{2x}}{2} - \frac{e^{-4x}}{4} + C$

(c) $e^{2x} - e^{-4x} + C$                                 (d) None of these

**40]** $\int_1^2 \frac{2x}{1+x^2}$ dx :

(a) $log_e \frac{5}{2}$            (b) $log_e 5 - log_2 2 + 1$       (c) $log_e \frac{2}{5}$       (d) None of these

**41]** Find the missing number 1, 4, 27, 16, 125, 36, ?

(a) 45              (b) 64               (c) 225              (d) 343

**42]** Find the missing number 1, 8, 9, 64, 25, 216, ?

(a) 343             (b) 64               (c) 512              (d) 49

**43]** BKS, DJT, FIU, HHV? the next term is

(a) JJW            (b) JJG               (c) JGW             (d) None

**44]** A4B, C16D, E25F, G36H, I64J, K100L, wrong term is

(a) A4B             (b) E25F             (c) G36H            (d) 164J

**45]** If LOVE is coded as 5782 and JOCKEY is coded as 371429, what do figure 4295714 stands for?

(a) KEYLOCK       (b) KEYOLCK       (c) KEYLOK       (d) None

**46]** 18, 24, 21, 27, ?, 30, 27

(a) 33              (b) 30               (c) 24              (d) 21

**47]** Murli was facing East. He walked 6 km forward and then after turning to his right walked 4 km. Again he turned to his right and walked 3 km. After this he turned back. Which direction was he facing at that time?

(a) East            (b) West            (c) North           (d) South

**48]** Ram starts from his house and walks 3 km towards West, turns towards his right and walks 2 km, turns left and walks 3 km and finally turns left again and walks 2 km. in which direction is he from the starting point?

(a) North           (b) South           (c) East            (d) West

**49]**   Shyam started walking 3 km straight from his school. Then he turned right and walked 2 km. Again he turned right and walked 1 km to reach his house. If his house is sourth-east from his school, then in which direction did Ram start walking from the school?

   **(a)** East                  **(b)** West                  **(c)** South                  **(d)** North

**50]**   P, Q, R, S, T, U, V and W are sitting in a row facing North.

   (i)        P is fourth to the right of T

   (ii)       W is fourth to the left of S

   (iii)      R and U, which are not at the ends, are neighbours of Q and T respectively.

   (iv)       W is next to the left of P and P is the neighbor of Q, who are sitting at the extreme ends

   **(a)** T and V              **(b)** V and S              **(c)** Q and S              **(d)** T and S

**51]**    Eight persons P to W are sitting in front of one another in two rows. Each row has four persons. P is between U and V and facing North. Q, who is to the immediate left of M is facing W. R is between T and M and W is to the immediate right of V. In which of the following pairs, persons are sitting in front of each other?

   **(a)** MV                   **(b)** RV                   **(c)** TV                   **(d)** UR

**52]**   P is the father of T. T is the daughter of M. M is the daughter of K. Who is P to K?

   **(a)** Father               **(b)** father-in-law        **(c)** Brother              **(d)** Son-in-law

**53]**    Eight friends A, B, C, D, E, F, G and H are sitting in a circle facing the centre, not necessarily in the same order. D sits third to the left of A. E sits to the immediate right of A. B is third to left of D. G is second to the right of B. C is neighbour of B. C is third to left of H.

   Three of the following four are alike in a certain way based on the information given above and so form a group. Which does not belong to that group.

   **(a)** DC                   **(b)** AH                   **(c)** EF                   **(d)** CB

   **Direction (54- 57) :** Read the following information and answer the following Questions : C is D's brother. X is Q's grand daughter. Y is only nephew of C. D is P's grand daughter and mother of only son Y.

**54]**   How is D related to X?

   **(a)** Aunt                 **(b)** Niece               **(c)** Sister              **(d)** Great Grand Daughter

**55]**    How is X related to D?

   **(a)** Aunt                 **(b)** Niece               **(c)** Sister              **(d)** Great Grand Daughter

**56]**    How is D related to C ?

   **(a)** Aunt                 **(b)** Niece               **(c)** Sister              **(d)** Great Grand Daughter

**57]** How is X related to P?

(a) Aunt      (b) Niece      (c) Sister      (d) Great Grand Daughter

**58]** Mr. 'Ashok' meets Mr. 'Babu'. 'Babu' is the father of a son 'Dharmendra' and a daughter 'Chandrika'. 'Shalini' is the mother of 'Ashok'. 'Dharmendra' is married has one son. 'Shalini' is the dauther-in-law of 'Babu'. How is 'Ashok' related to 'Babu'.

(a) Son      (b) Nephew      (c) Uncle      (d) Grandson

**59]** 0.15, 0.3, _____, 1.2, 2.4, ……….

(a) 4.8      (b) .006      (c) 0.6      (d) 0.9

**60]** Snehal put his timepiece on the table in such a way that at 6 P.M. hour hand points to North. In which direction the minute hand will point at 9.15 P.M. ?

(a) South-East      (b) South      (c) North      (d) West

**61]** The _____ is satisfied when $P_{ab} \times P_{bc} \times P_{ca} = 1$

(a) Time reversal test                  (b) Factor reversal test

(c) Circular Test                       (d) none of these

**62]** The index number of prices at a place in 2008 is 355 with 2003 as base. This means

(a) There has been on the average a 255% increase in prices.

(b) There has been on the average a 355% increase in price.

(c) There has been on the average a 250% increase in price.

(d) None of these.

**63]** The number of tests of Adequacy.

(a) 2      (b) 3      (c) 4      (d) 5

**64]** If two events A and B are independent, the probability that both will occur is given by

(a) P(A) x P(B)                (b) P (A) + P (B)

(c) P(A) + P(B) – P(A∪B)      (d) P(A) + P(B) – P(A∩B)

**65]** If p : q is the odds in favor of an event, then the probability of that event is

(a) p/q      (b) $\frac{q}{p+q}$      (c) $\frac{p}{p+q}$      (d) none of these

**66]** If P (A) = 4/9 ; then the odd against the event 'A' is

(a) 4:9      (b) 4:5      (c) 5:4      (d) 4:14

**67]** If two letters are taken at random from the word HOME, what is the Probability that none of the letters would be vowels?

(a) 1/6      (b) ½      (c) 1/3      (d) 1/4

**68]** Equation of two lines of regression are $4x + 3y + 7 = 0$ and $3x + 4y + 8 = 0$, the mean of x and y are

(a) 5/7 and 6/7    (b) – 4/7 and – 11/7    (c) 2 and 4    (d) None of these

**69]** Correlation Co-efficient is _____ of the units of measurements

(a) Independent    (b) Dependent    (c) Both    (d) none of these

**70]** If for two variable $x$ and $y$, the covariance, variance of $x$ and variance of $y$ are 40, 16 and 256 respectively, what is the value of the correlation coefficient?

(a) 0.01    (b) 0.625    (c) 0.4    (d) 0.5

**71]** Statistics is concerned with

(a) Qualitative information    (b) Quantitative information

(c) (a) or (b)    (d) Both (a) and (b)

**72]** The standard deviation of 25, 32, 43, 53, 62, 59, 48, 31, 24, 33 is

(a) 13.23    (b) 12.33    (c) 11.33    (d) none of these

**73]** The quartile deviation of a normal distribution with mean 10 and standard deviation 4 is

(a) 0.675    (b) 67.50    (c) 2.70    (d) 3.20

**74]** If the range of x is 2, what would be the range of – 3x + 50 ?

(a) 2    (b) 6    (c) -6    (d) 44

**75]** If the quartile deviation of a normal curve is 4.05, then its mean deviation is

(a) 5.26    (b) 6.24    (c) 4.24    (d) 4.86

**76]** The mean of first 3 terms is 14 and the mean of next 2 terms is 18. The mean of 5 numbers is

(a) 14.5    (b) 15    (c) 14    (d) 15.6

**77]** The Standard deviation is independent of change of

(a) Origin    (b) Scale    (c) Both    (d) none

**78]** If two variables are uncorrelated then regression lines are

(a) Parallel    (b) Perpendicular    (c) Coincident    (d) Inclined at 45°

**79]** When 'p' = 0.5, the

(a) Asymmetrical    (b) Symmetrical    (c) Both of above    (d) None of above

**80]** In a normal distribution skewness is _____

(a) 0    (b) >3    (c) <3    (d) <1

**81]** If mean and standard deviation of a binomial distribution is 10 and 4 respectively; q will be _____

(a) 0.4    (b) 0.44    (c) 40    (d) 0.16

**82]** Which one is not a condition of Poisson model
   **(a)** the probability of having failures in a small time interval is constant
   **(b)** the probability of having success more than one in a small time interval is very small
   **(c)** the probability of having success in this time interval is independent of time 't' as well as earlier success
   **(d)** the probability of having success in a small interval (t, t + td) is Kt for a positive constant k.

**83]** In _____ distribution, mean = variance.
   **(a)** Normal          **(b)** Binomial          **(c)** Poisson          **(d)** None of these

**84]** For any two events A and B, P (B – A) is equal to :
   (a) P (A) – P (B)          (b) P (B) – P (A)          (c) P (A) – P (A ∩ B)          (d) P (B) – P (A ∩ B)

**85]** The mean of Binomial Distribution is 4 and the Standard Deviation $\sqrt{3}$ , what is the value of P.
   **(a)** $\dfrac{1}{3}$          **(b)** $\dfrac{1}{4}$          **(c)** $\dfrac{1}{5}$          **(d)** $\dfrac{3}{4}$

**86]** 'Stub' of a table is the _____ part of the table describing the _____.
   **(a)** Left, Columns          **(b)** Right, Columns          **(c)** Right, Rows          **(d)** Left, Rows

**87]** The pair of averages whose value can be determined graphically ?
   **(a)** Mean and Median                    **(b)** Mode and Mean
   **(c)** Mode and Median                    **(d)** None of these

**88]** Find the Expected value of the following distribution

| x | -20 | -10 | 30 | 75 | 80 |
|---|-----|-----|-----|-----|-----|
| P(x) | 3/20 | 1/5 | 1/2 | 1/10 | 1/20 |

   **(a)** 20.5          **(b)** 21.5          **(c)** 22.5          **(d)** 24.5

**89]** For any two numbers SD is always
   **(a)** Twice the range                    **(b)** Half of the range
   **(c)** Square of the range                **(d)** None of the above

**90]** A measure of dispersion is indicative of the reliability of
   **(a)** Average                           **(b)** Highest observation
   **(c)** Lowest observation                **(d)** Variability

**91]** "Root – Mean Square Deviation from Mean" is
   **(a)** Standard deviation                **(b)** Quartile deviation
   **(c)** Both (A) and (B)                  **(d)** None of these

**92]** The difference between the upper and lower limit of a class is called
   (a) Class Interval          **(b)** Mid Value          **(c)** Class Boundary          **(d)** Frequency

**93]** A man travels from Delhi to Agra at an average speed of 30km per hour and back at an are rage speed of 60 km per hour. What's the average Speed.
(a) 48 Km/hr          (b) 40 Km/hr          (c) 45 km/hr          (d) 35 km/hr

**94]** If the mean of frequency distribution is 100 and coefficient of variation is 45% then standard deviation is.
(a) 45          (b) 0.45          (c) 0.45          (d) 450

**95]** If the mean and SD of X are a and b respectively, then the S.D of $\frac{x-a}{b}$ is
(a) a/b          (b) – 1          (c) 1          (d) ab

**96]** Standard Error of Correlation coefficient
(a) $\frac{1-r^2}{\sqrt{N}}$          (b) $\frac{1+r^2}{\sqrt{N}}$          (c) $\frac{1+r^2}{N}$          (d) $\frac{1-r}{N}$

**97]** Probable Error can be obtained using Correlation coefficient as
(a) $0.6745 \times \frac{1-r^2}{\sqrt{N}}$          (b) $\frac{2}{3} \times \frac{1-r^2}{\sqrt{N}}$          (c) $\frac{1+r^2}{N}$          (d) $\frac{1-r^2}{r^2}$

**98]** What is exclusive Series
(a) In which both upper and lower limit are not included in class frequency
(b) In which lower limit is not included class frequency
(c) In which upper limit is not included in class frequency
(d) None of the above

**99]** If the arithmetic mean between two numbers is 64 and the Geometric Mean between them is 16. The Harmonic mean between them is _____
(a) 64          (b) 4          (c) 16          (d) 40

**100]** When the mean is 3.57 and mode is 2.13, then the value of median is _____
(a) 3.09          (b) 5.01          (c) 5.01          (d) none of these