CA Foundation July 2021 - Past Year Questions

Ratio & Proportion

1. If A : B = 5 : 3, B : C = 6 : 7 and C : D = 14 : 9 then the value of A : B : C : D
   (a) 20 : 14 : 12 : 9
   (b) 20 : 9 : 12 : 14
   (c) 20 : 9 : 14 : 12
   (d) 20 : 12 : 14 : 9

2. The salaries of A, B and C are of ratio 2 : 3 : 5. If the increments of 15%, 10% and 20% are done to their respective salaries, then find the new ratio of the salaries.
   (a) 23 : 33 : 60
   (b) 33 : 23 : 60
   (c) 23 : 60 : 33
   (d) 33 : 60 : 23

3. A vessel contained a solution of acid and water in which water was 64%. Four liters of the solution were taken out of the vessel and the same quantity of water was added. If the resulting solution contains 30% acid, the quantity (in litres) of the solution, in the beginning in the vessel, was
   (a) 24
   (b) 36
   (c) 32
   (d) 27

Indices

4. If xy + yz + zx = - 1, then the value of $\left(\dfrac{x+y}{1+xy} + \dfrac{y+z}{1+yz} + \dfrac{x+z}{1+xz} \right)$ is

   (a) xyz
   (b) $-\dfrac{1}{yz}$
   (c) $\dfrac{1}{xyz}$
   (d) $\dfrac{1}{x+y+z}$

Logarithm

5. If $\log_4 x + \log_{16} x + \log_{64} x + \log_{256} x = 25/6$ then the value of x is
   (a) 64
   (b) 4
   (c) 16
   (d) 2

Equations

6. The cost of 2 oranges and 3 apples is ₹ 28. If the cost of an apple is doubled then the cost of 3 oranges and 5 apples is ₹ 75. The original cost of 7 oranges and 4 apples (in ₹) is
   (a) 59
   (b) 47
   (c) 71
   (d) 63

7. Find the value of k, if 2 is a root of the following cubic equation: $x^3 - (k + 1)x + k = 0$
   (a) 2
   (b) 6
   (c) 1
   (d) 4

8. If α and β are the roots of the equation $2x^2 + 5x + k = 0$, and $4(\alpha^2 + \beta^2 + \alpha\beta) = 23$, then which of the following is true?
   (a) $k^2 + 3k - 2 = 0$
   (b) $k^2 - 2k + 3 = 0$
   (c) $k^2 - 2k - 3 = 0$
   (d) $k^2 - 3k + 2 = 0$

9. The sum of square of any real positive quantity and its reciprocal is never less
   (a) 1
   (b) 2
   (c) 3
   (d) 4

Permutations & Combinations

10. If $^nP_6 = 20\ ^nP_4$ then the value of n is given by
   (a) 5   (b) 3   (c) 9   (d) 8

11. How many numbers of seven-digit numbers, which can be formed from the digits 3, 4, 5, 6, 7, 8, 9 with no digits being repeated are not divisible by 5?
   (a) 4320   (b) 4690   (c) 3900   (d) 3890

12. A person can go from place A to B by 11 different modes of transport but is allowed to return back to A by any mode other than the one earlier. The number of different ways, the entire journey can be completed is
   (a) 110   (b) 10^{10} (c) 9^5 (d) 10^9

13. The number of ways 5 boys and 5 girls can be seated at a round table, such that no two boys are adjacent is
   (a) 2550   (b) 2880   (c) 625   (d) 2476

Sequences & Series

14. The number of terms of the series: 5 + 7 + 9 + …… must be taken so that the sum will be 480 is
   (a) 20   (b) 10   (c) 15   (d) 25

15. If the sum of 'n' terms of an A.P. is $2n^2$, the fifth term is
   (a) 20   (b) 50   (c) 18   (d) 25

16. The sum of three numbers in a geometric progression is 28. When 7,2 and 1 are subtracted from first, second and the third numbers respectively, then the resulting numbers are in arithmetic progression. What is the sum of squares of the original three numbers?
   (a) 510   (b) 456   (c) 400   (d) 336

Sets, Relations & Functions

17. Let U be the universal set, A and B are the subsets of U. If n(U) = 650, n(A) = 310, n(A∩B) = 95 and n(B) = 190, then n($\overline{A}$∩$\overline{B}$) is equal to ($\overline{A}$ and $\overline{B}$ are the complement of A and B, respectively
   (a) 400   (b) 200   (c) 300   (d) 245

18. The range of the function f defined by $f(x) = \sqrt{16 - x^2}$ is
   (a) [-4, 0]   (b) [-4, 4]   (c) [0, 4]   (d) (-4, 4)

19. Let A = R - {3} and B = R - {1}. Let f : A→B defined by $f(x) = \dfrac{x-2}{x-3}$, then what is the value of $f^{-1}\left(\dfrac{1}{2}\right) = ?$
   (a) 2/3   (b) 3/4   (c) 1   (d) - 1

20. If $f(x) = x^2 - 1$ and g(x) = |2x + 3|, then fog(3) - gof(-3) =
   (a) 71   (b) 61   (c) 41   (d) 51

▶ **Akash Agrawal**
#TheMathsTutor

Differential Calculus

21. In a market there are 30 shops to allocate to people. If they allocate x shop then their monthly expenses in rupees is given by, $p(x) = 8x^2 - 400x + 1000$ then the number of shops should they allocate to minimize the expenses.
(a) 0   (b) 35   (c) 25   (d) 10

22. The cost function $C(x) = 125 + 500x - x^2 + x^3/3$, $0 \le x \le 100$ and the demand function for the items is given by, $p(x) = 1500 - x$, then the marginal profit when 18 items are sold is
(a) 751   (b) 571   (c) 676   (d) 875

23. If $f(x) = 3e^{x^4}$ then $f'(x) - 4x^3 f(x) + \left(\frac{1}{3}\right) f(0) - f'(0) =$

(a) 0   (b) e^{x^2} (c) 1   (d) -1

Integral Calculus

24. The value of $\int_{-2}^{2} f(x)dx$, where $f(x) = 1 + x$, $x \le 0$; $f(x) = 1 - 2x$, $x \ge 0$ is

(a) 20   (b) -2 (c) -4 (d) 0

Time Value of Money

25. A sum of ₹ 7500 amounts to ₹ 9075 at 10% p.a., interest being compounded yearly in a certain time. The simple interest (in ₹) on the same sum for the same time and the same rate is
(a) ₹ 1000   (b) ₹ 1250   (c) ₹ 1800   (d) ₹ 1500

26. A loan of ₹ 1,02,000 is to be paid back in two equal annual instalments. If the rate of interest is 4% p.a., compounded annually, then the total interest charged (in ₹) under this instalment plan is
(a) ₹ 6,160   (b) ₹ 8,120   (c) ₹ 5,980   (d) ₹ 7,560

27. If the desired future value after 5 years with 18% interest rate is ₹ 1,50,000, then the present value (in ₹) is (Given that $(1.18)^5 = 2.2877$)
(a) ₹ 63,712   (b) ₹ 65,568   (c) ₹ 53,712   (d) ₹ 41,712

28. What is the compound interest (in ₹) on a sum of ₹ 12,600 for 1½ years at 20% per annum if the interest is compounded half yearly?
(a) ₹ 4,271   (b) ₹ 4,171   (c) ₹ 4,711   (d) ₹ 4,117

29. A sum of ₹ x amounts to ₹ 27,900 in 3 years and to ₹ 41,850 in 6 years at a certain rate percent per annum, when the interest is compounded yearly. The value of x is
(a) ₹ 16,080   (b) ₹ 18,600   (c) ₹ 18,060   (d) ₹ 16,800

30. If a person bought a house by paying ₹ 45,00,000 down payment and ₹ 80,000 at the end of each year till the perpetuity, assuming the rate of interest as 16%, the present value of house (in ₹) is given as
(a) ₹ 47,00,000   (b) ₹ 45,00,000   (c) ₹ 57,80,000   (d) ₹ 50,00,000

31. Let the operating profit of a manufacturer for five years is given as:

Year	1	2	3	4	5	6
Operating Profit (in lakh ₹)	90	100	106.4	107.14	120.24	157.35

Then the operating profit of Compound Annual Growth Rate (CAGR) for year 6 with respect to year 2 is given at
(a) 9%   (b) 12%   (c) 11%   (d) 13%

32. If discount rate is 14% per annum, then how much a company has to pay to receiver ₹ 280 growing at 9% annually forever.
(a) ₹ 5,600   (b) ₹ 1,400   (c) ₹ 2,800   (d) ₹ 4,200

33. The effective rate of return for 24% per annum convertible monthly is given as
(a) 24%   (b) 26.82%   (c) 18%   (d) 24.24%

34. If the cost of capital be 12% per annum, then the net present value (in nearest ₹) from the given cash flow is given as

Year	0	1	2	3
Operating Profit (in '000 ₹)	(100)	60	40	50

(a) ₹ 31,048   (b) ₹ 34,185   (c) ₹ 51,048   (d) ₹ 24,187   (e) ₹ 21,048

35. A certain sum amounts to ₹ 15748 in 3 years at simple interest at r% p.a. The same sum amounts to ₹ 16,510 at (r + 2) % p.a. simple interest in the same time. What is the value of r?
(a) 10%   (b) 8%   (c) 12%   (d) 6%

36. What is the difference (in ₹) between the simple interest and the compound interest on a sum of ₹ 8000 for $2\frac{2}{5}$ years at the rate of 10% p.a. when the interest is compounded yearly
(a) ₹ 135.75   (b) ₹ 129.50   (c) ₹ 151.75   (d) ₹ 147.20

37. The future value of annuity of ₹ 2000 for 5 years at 5% compounded annually is given (in nearest ₹) as
(a) ₹ 51,051   (b) ₹ 21,021   (c) ₹ 15,624   (d) ₹ 61,254   (e) ₹ 11,051

38. If the nominal rate of growth is 17% and inflation is 9% for the five years. Let P be the Gross Domestic Product (GDP) amount at the present year then the projected real GDP after 6 years is
(a) 1.587 P   (b) 1.921 P   (c) 1.403 P   (d) 2.51 P

39. Matrices
40. Linear Inequalities (question out of scope of syllabus)

Logical Reasoning

Number Series, Coding Decoding and Odd man out series

41. Find the missing term in the series: 1, 1, 8, 4, 27, __, 64, 16

    (a) 27   (b) 11   (c) 9   (d) 125

42. The wrong term in the series: 225, 196, 169, 144, 121, 100, 77, 64 is

    (a) 121   (b) 77   (c) 100   (d) 169

43. If DELHI is coded as EFMIJ then JAIPUR is coded as

    (a) JQVSBK   (b) QVSKBJ   (c) BJQVSK   (d) KBJQVS

44. If FRAME is coded as 0618011305 then ARISE is coded as

    (a) 0118091905   (b) 0119091805   (c) 0118190905   (d) 0118091805

45. If CLOCK is coded as 34235 and TIME as 8679, then MOTEL is coded as

    (a) 27894   (b) 72964   (c) 72894   (d) 77684

Direction Sense Test

46. A and B start moving towards each other from two places 200m apart. After walking 60m, B turns left and goes 20m then turn right and goes 40m. He then turns right again and comes back to the road on which he had started walking. If A and B walk with same speed, what is the distance between them now?

    (a) 80m   (b) 70m   (c) 40m   (d) 60m

47. There are four towns P, Q, R, and T. Q is to the South-West of P, R is to the east of Q and South-East of P, and T is to the North of R in line with Q and P. In which direction of P is T located?

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

48. Five friends A, B, C, D and E are staying in the same locality. B's house is to the east of A's house and to the north of C's house. C's house is to the west of D's house. D's house is in which direction with respect to A's house?

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

49. One morning after sunrise, Vikram and Shailesh were standing on a lawn with their back towards each other. Vikram's shadow fell exactly towards left hand side. Which direction was Shailesh facing?

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

Seating Arrangements

50. Five friends A, B, C, D and E are sitting on a bench. A is sitting next to B; C is sitting next to D, D is not sitting with E; E is at the left end of bench. C is on second position from the right; A is on the right side of B and of E. A and C are sitting together. A is sitting between?

    (a) C & D   (b) D & E   (c) B & C   (d) B & D

51. Five girls are sitting on a bench to be photographed. Seema is to the left of Rani and to the right of Bindu. Mary is to the right of Rani. Reeta is between Rani and Mary. Who is sitting immediate right to Reeta?

(a) Seema   (b) Rani   (c) Bindu   (d) Mary

52. Six friends P, Q, R, S, T and U are sitting around the hexagonal table each at one corner and are facing the centre of the table. P is second to the left of U. Q is neighbour of R and S. T is second to the left of S. Who is sitting opposite to S?

(a) R   (b) P   (c) Q   (d) T

53. A, B, C, D, E, F and G are sitting in a row facing North:

i) F is to the immediate right of E

ii) E is 4th to the right of G.

iii) C is the neighbour of B and D.

iv) Person who is third to the left of D is at one of the ends.

Who are to the right of D?

(a) E and F only   (b) G, B and C   (c) E, F and A   (d) G and B only

Blood Relations

54. Pointing towards 'A', 'B' said: "Your mother is the younger sister of my mother." 'A' is related to 'B' as:

(a) Uncle   (b) Cousin   (c) Nephew   (d) Father

55. Shyam's mother said to Shyam "My mother has a son whose son in Ram." Shyam is related to Ram as:

(a) Uncle   (b) Cousin   (c) Nephew   (d) Grandfather

56. Amit said "This girl is the wife of the grandson my mother." How is Amit related to the girl?

(a) Father-in-law   (b) Grandson   (c) Father   (d) Son

57. A is the son of C; C and Q are sisters; Z is the mother of Q and P is the son of Z. Which of the following statement is true?

(a) A and P are cousins   (b) C and P are sisters

(c) P is the maternal uncle of A   (d) A is the maternal uncle of P

58. Syllogism

59. Syllogism

60. Syllogism

Statistics

Statistical Description of Data

61. There were 200 employees in an office in which 150 were married. Total male employees were 160 out of which 120 were married. What was the number of female unmarried employees?

(a) 30   (b) 40   (c) 50   (d) 10

▶ Akash Agrawal

#TheMathsTutor

62. Data collected on religion from the census reports are
    (a) Primary data   (b) Unclassified data
    (c) Sample data   (d) Secondary data

63. Which of the following diagram is the most appropriate to represents various heads in total cost?
    (a) Pie Chart   (b) Bar Graph   (c) Multiple line chart   (d) Scatter plot

64. In a graphical representation of data, the largest numerical value is 25 the smallest numerical value is 5. If classes desired are 4 then which class interval is
    (a) 45   (b) 5   (c) 20   (d) 7.5

65. In graphical representation of data, ideographs are also called as
    (a) Picto-graphs   (b) Asymmetry graphs   (c) Symmetry graphs   (d) Pictograms

66. _____ means separating items according to similar characteristics grouping them into various classes.
    (a) Classification   (b) Editing   (c) Separation   (d) Tabulation

67. Frequency density of a class interval is the ratio of
    (a) Class frequency to the total frequency
    (b) Class length to class frequency
    (c) Class frequency to the cumulative frequency
    (d) Frequency of that class interval to the corresponding class length

68. A graph that uses vertical bars to represent data is called a
    (a) Line graph   (b) Scatter plot   (c) Vertical graphs   (d) Bar graph

Measures of Central Tendency

69. Expenditures of a Company (in Million Rupees) per item in various Years

Year	Item of expenditure				
	Salary	Fuel and Transport	Bonus	Interest on loans	Taxes
1998	288	98	3.00	23.4	83
1999	342	112	2.52	32.5	108
2000	324	101	3.84	41.6	74
2001	336	133	3.68	36.4	88
2002	420	142	3.96	49.4	98

What is the average amount of interest per year which the company had to pay during this period?
    (a) 33.66   (b) 36.66   (c) 31.66   (d) 39.66

70. There are n numbers. When 50 is subtracted from each of these number the sum of the numbers no obtained is − 10. When 46 is subtracted from each of the original n numbers, then the sum of numbers, so obtained is 70. What is the mean of the original n numbers?
    (a) 56.8   (b) 25.7   (c) 49.5   (d) 53.8

71. The mean of 'n' observation is 'X'. If K is added to each observation, then the new mean is
    (a) X   (b) X.K   (c) X – K   (d) X + K

72. If y = 3 + 1.9 x, and mode of x is 15, then the mode of y is
    (a) 15.9   (b) 27.8   (c) 35.7   (d) 31.5

Measures of Dispersion

73. The mean deviation of the numbers 3, 10, 6, 11, 14, 17, 9, 8, 12 about the mean is
    (a) 8.7   (b) 4.2   (c) 3.1   (d) 9.8

74. The standard deviation of 1 to 9 natural numbers is
    (a) 6.65   (b) 2.58   (c) 6.75   (d) 5.62

75. The probable value of mean deviation when $Q_3 = 40$ and $Q_1 = 15$ is
    (a) 15   (b) 18.75   (c) 17.50   (d) 0

76. If the numbers are 5, 1, 8, 7, 2 then the coefficient of variation is
    (a) 56.13%   (b) 59.13%   (c) 48.13%   (d) 44.13%

77. If every observation is increased by 7 then
    (a) Standard Deviation increases by 7
    (b) Mean deviation increases by 7
    (c) Not affected at all
    (d) Quartile Deviation increases by 7

78. If a school has 14 teachers, their heights (in cm) are: 172, 173, 164, 178, 168, 169, 173, 172, 173, 164, 178, 168, 169, 173 then average deviation of this data is
    (a) 2.43   (b) 3.93   (c) 3.43   (d) 2.92

79. If the relationship between x and y is given by 2x + 3y = 10 and the range of y is 10, then what is the range of x?
    (a) 10   (b) 18   (c) 8   (d) 15

Probability

80. If there are 16 phones, 10 of them are Android and 6 of them are of Apple, then the probability of 4 randomly selected phones to include 2 Android and 2 Apple phone is
    (a) 0.47   (b) 0.51   (c) 0.37   (d) 0.27

81. If there are 48 marbles marked with numbers 1 to 48, then the probability of selecting a marble having the number divisible by 4 is
    (a) 1/2   (b) 2/3   (c) 1/3   (d) 1/4

82. If in a class, 60% of the students study Mathematics and Science and 90% of the students study Science, then the probability of a student studying Mathematics given that she is already studying Science is
    (a) 1/2   (b) 2/3   (c) 1   (d) ½

▶ **Akash Agrawal**
#TheMathsTutor

83. A bag contains 7 Blue and 5 Green balls. One ball is drawn at random. The probability of getting a blue ball is
(a) 5/12   (b) 12/35   (c) 7/12   (d) 0

84. The probability that a football team losing a match at Kolkata is 3/5 and winning a match at Bengaluru is 6/7, the probability of the team winning at least one match is
(a) 3/35   (b) 18/35   (c) 32/35   (d) 17/35

85. The value of K for the probability density function of a variate X is equal to

X	0	1	2	3	4	5	6
P(X)	5K	3K	4K	6K	7K	9K	11K

(a) 1/39   (b) 1/40   (c) 1/49   (d) 1/45

Theoretical Distributions

86. A biased coin is such that the probability of getting a head is thrice the probability of getting a tail. If the coin is tossed 4 times, what is the probability of getting a head all the times?
(a) 2/5   (b) 81/218   (c) 81/256   (d) 81/64

87. In normal distribution, Mean, Median and Mode are
(a) Zero   (b) Not Equal   (c) Equal   (d) None of these

88. If X is a Poisson variate such that P (X = 1) = 0.7, P(X = 2) = 0.3, then P(X = 0) =
(a) $e^{\frac{6}{7}}$ (b) $e^{-\frac{6}{7}}$ (c) $e^{-\frac{2}{3}}$ (d) $e^{-\frac{1}{3}}$

89. If X is a binomial variate with p = 1/3, for the experiment of 90 trials, then the standard deviation is equal to
(a) $-\sqrt{5}$ (b) $\sqrt{5}$ (c) $2\sqrt{5}$ (d) $\sqrt{15}$

90. For a certain type of mobiles, the length of time between charges of the battery is normally distributed with a mean of 50 hours and a standard deviation of 15 hours. A person owns one of these mobiles and wants to know the probability that the length of time will be between 50 and 70 hours is (Given $\phi(1.33) = 0.9082$, $\phi(0) = 0.5$)
(a) -0.4082 (b) 0.5   (c) 0.4082   (d) -0.5

Correlation

91. If the sum of the product of the deviation of X and Y from their means is zero, the correlation coefficient between X and Y is
(a) Zero   (b) Positive   (c) Negative   (d) 10

Regression

92. If the slope of the regression line is calculated to be 5.5 and the intercept 15 then the value of Y when X is 6 is
(a) 88   (b) 48   (c) 18   (d) 78

▶ **Akash Agrawal**
#TheMathsTutor

93. If Y = 9X and X = 0.01Y. then r is equal to
   (a) – 0.1   (b) 0.1   (c) 0.3   (d) – 0.3

94. The straight - line graph of the linear equation Y = a + b X, slope is horizontal if
   (a) b = 1   (b) b ≠ 0   (c) b = 0   (d) a = b ≠ 0

95. If b_{yx} = -1.6 and b_{xy} = -0.4, then r_{xy} will be
   (a) 0.4   (b) – 0.8   (c) 0.64   (d) 0.8

Index Numbers

96. The consumer price Index goes up from 120 to 180 when salary goes up from 240 to 540, what is the increase in real terms?
   (a) 80   (b) 150   (c) 120   (d) 240

97. The weighted aggregative price index numbers for 2001 with 2000 as the base year using Paasche's Index Number is

Commodity	Price (in ₹)		Quantities	
	2000	2001	2000	2001
A	10	12	20	22
B	8	8	16	18
C	5	6	10	11
D	4	4	7	8

   (a) 112.32   (b) 112.38   (c) 112.26   (d) 112.20

98. The weighted aggregative price index numbers for 2001 with 2000 as the base year using Marshal - Edgeworth Index Number is

Commodity	Price (in ₹)		Quantities	
	2000	2001	2000	2001
A	10	12	20	22
B	8	8	16	18
C	5	6	10	11
D	4	4	7	8

   (a) 112.26   (b) 112.20   (c) 112.32   (d) 112.38

99. Weighted aggregative price index numbers for 2001 with 2000 as the base year using Fisher's Index Number is

Commodity	Price (in ₹)		Quantities	
	2000	2001	2000	2001
A	10	12	20	22
B	8	8	16	18
C	5	6	10	11
D	4	4	7	8

   (a) 112.32   (b) 112.20   (c) 112.38   (d) 112.26

100. Time Series

▶ **Akash Agrawal**
#TheMathsTutor