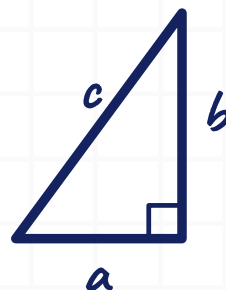
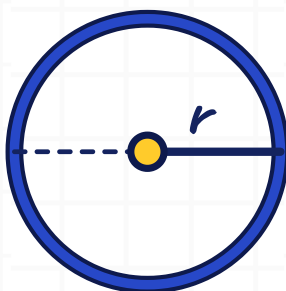


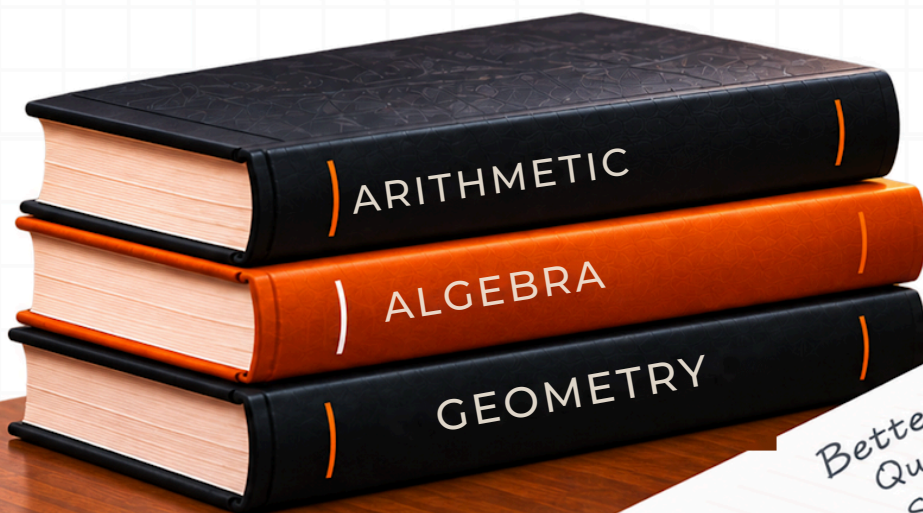
CAT PYQ

Algebra

$$a^2 + b^2 = c^2$$



$$D = S \times T$$



Better
Questions
Stronger
Concepts
Brighter Future

417 Questions

Quantitative Aptitude

Years: 1990-2025

General Instructions

- (i) This collection contains **417 Quantitative Aptitude questions** classified under **Algebra**, following the supplied CD PYQ sheet.
- (ii) **Coverage:** CAT 1990-2025. Questions are grouped by their source year and sitting, with continuous numbering from **1 to 417**.
- (iii) This collection has **350 multiple choice questions (MCQs)** and **67 Type In The Answer (TITA) questions**. Read every option before choosing the answer. Enter a response for questions marked "Type in the answer."
- (iv) All required shared passages and data sets for the selected questions are included. Blue range labels refer to the question numbers **in this collection**. Read the full passage, chart, table or conditions before answering.
- (v) Each question carries its original year or exam date, sitting where available, and source question number. References distinguish the two CAT 2003 sittings.
- (vi) Use this collection for practice. Follow the timing and marking scheme of the original sitting when attempting a timed exercise.
- (vii) Answer keys and solutions are not included. Passages and questions may continue onto the following page.

CAT 2025 Slot 1 - Questions 1-9

1. A value of c for which the minimum value of $f(x) = x^2 - 4cx + 8c$ is greater than the maximum value of $g(x) = -x^2 + 3cx - 2c$, is

30 Nov 2025, Slot 1, Q47

- | | |
|--------------------|-------------------|
| (A) 2 | (B) $\frac{1}{2}$ |
| (C) $-\frac{1}{2}$ | (D) -2 |

2. Let $3 \leq x \leq 6$ and $[x^2] = [x]^2$, where $[x]$ is the greatest integer not exceeding x . If set S represents all feasible values of x , then a possible subset of S is

30 Nov 2025, Slot 1, Q50

- | | |
|---|---|
| (A) $(3, \sqrt{10}) \cup [5, \sqrt{26}) \cup \{6\}$ | (B) $[3, \sqrt{10}] \cup [5, \sqrt{26}]$ |
| (C) $[3, \sqrt{10}] \cup [4, \sqrt{17}] \cup \{6\}$ | (D) $(4, \sqrt{18}) \cup [5, \sqrt{27}) \cup \{6\}$ |

3. Stocks A, B and C are priced at rupees 120, 90 and 150 per share, respectively. A trader holds a portfolio consisting of 10 shares of stock A, and 20 shares of stocks B and C put together. If the total value of her portfolio is rupees 3300, then the number of shares of stock B that she holds, is

30 Nov 2025, Slot 1, Q51

Type in the answer.

4. For any natural number k , let $a_k = 3^k$. The smallest natural number m for which $\{(a_1)^1 \times (a_2)^2 \times \dots \times (a_{20})^{20}\} < \{a_{21} \times a_{22} \times \dots \times a_{20+m}\}$, is

30 Nov 2025, Slot 1, Q52

- | | |
|--------|--------|
| (A) 58 | (B) 59 |
| (C) 56 | (D) 57 |

5. The number of distinct integers n for which $\log_{\frac{1}{4}}(n^2 - 7n + 11) > 0$, is

30 Nov 2025, Slot 1, Q53

- | | |
|-------|--------------|
| (A) 2 | (B) infinite |
| (C) 1 | (D) 0 |

6. The number of distinct pairs of integers (x, y) satisfying the inequalities $x > y \geq 3$ and $x + y < 14$ is

30 Nov 2025, Slot 1, Q54

Type in the answer.

7. In the set of consecutive odd numbers $\{1, 3, 5, \dots, 57\}$, there is a number k such that the sum of all the elements less than k is equal to the sum of all the elements greater than k . Then, k equals

30 Nov 2025, Slot 1, Q59

- | | |
|--------|--------|
| (A) 41 | (B) 39 |
| (C) 43 | (D) 37 |

8. If $a - 6b + 6c = 4$ and $6a + 3b - 3c = 50$, where a , b and c are real numbers, the value of $2a + 3b - 3c$ is

30 Nov 2025, Slot 1, Q62

(A) 20

(B) 14

(C) 18

(D) 15

9. The number of non-negative integer values of k for which the quadratic equation $x^2 - 5x + k = 0$ has only integer roots, is

30 Nov 2025, Slot 1, Q67

Type in the answer:

CAT 2025 Slot 2 - Questions 10-16

10. If $9^{x^2+2x-3} - 4(3^{x^2+2x-2}) + 27 = 0$ then the product of all possible values of x is

30 Nov 2025, Slot 2, Q47

- (A) 30 (B) 20
(C) 5 (D) 15

11. The set of all real values of x for which $(x^2 - |x + 9| + x) > 0$, is

30 Nov 2025, Slot 2, Q49

- (A) $(-\infty, -3) \cup (3, \infty)$ (B) $(-\infty, -9) \cup (3, \infty)$
(C) $(-9, -3) \cup (3, \infty)$ (D) $(-\infty, -9) \cup (9, \infty)$

12. The equations $3x^2 - 5x + p = 0$ and $2x^2 - 2x + q = 0$ have one common root. The sum of the other roots of this equations is

30 Nov 2025, Slot 2, Q53

- (A) $\frac{8}{3} - p + \frac{3}{2}q$ (B) $\frac{2}{3} - p + \frac{3}{2}q$
(C) $\frac{8}{3} + p + \frac{1}{3}q$ (D) $\frac{2}{3} - 2p + \frac{2}{3}q$

13. If $\log_{64} x^2 + \log_8 \sqrt{y} + 3 \log_{512} (\sqrt{y}z) = 4$, where x, y and z are positive real numbers, then the minimum possible value of $(x + y + z)$ is

30 Nov 2025, Slot 2, Q54

- (A) 48 (B) 36
(C) 24 (D) 96

14. Let $f(x) = \frac{x}{(2x-1)}$ and $g(x) = \frac{x}{(x-1)}$. Then the domain of the function $h(x) = f(g(x)) + g(f(x))$ is all real numbers except

30 Nov 2025, Slot 2, Q57

- (A) $-1, \frac{1}{2}$, and 1 (B) $\frac{1}{2}, 1$, and $\frac{3}{2}$
(C) $-\frac{1}{2}, \frac{1}{2}$, and 1 (D) $\frac{1}{2}$, and 1

15. If a, b, c and d are integers such that their sum is 46, then the minimum possible value of $(a-b)^2 + (a-c)^2 + (a-d)^2$ is

30 Nov 2025, Slot 2, Q62

Type in the answer.

16. Let a_n be the n^{th} term of a decreasing infinite geometric progression. If $a_1 + a_2 + a_3 = 52$ and $a_1a_2 + a_2a_3 + a_3a_1 = 624$, then the sum of this geometric progression is

(A) 57

(B) 54

(C) 60

(D) 63

CAT 2025 Slot 3 - Questions 17-24

17. In a school with 1500 students, each student chooses any one of the streams out of science, arts, and commerce, by paying a fee of Rs 1100, Rs 1000, and Rs 800, respectively. The total fee paid by all the students is Rs 15,50,000. If the number of science students is not more than the number of arts students, then the maximum possible number of science students in the school is

30 Nov 2025, Slot 3, Q49

Type in the answer.

18. In an arithmetic progression, if the sum of fourth, seventh and tenth terms is 99, and the sum of the first fourteen terms is 497, then the sum of first five terms is

30 Nov 2025, Slot 3, Q50

Type in the answer.

19. If $f(x) = (x^2 + 3x)(x^2 + 3x + 2)$ then the sum of all real roots of the equation $\sqrt{f(x) + 1} = 9701$, is

30 Nov 2025, Slot 3, Q55

- (A) -6 (B) 6
(C) 3 (D) -3

20. For real values of x , the range of the function $f(x) = \frac{2x - 3}{2x^2 + 4x - 6}$ is

30 Nov 2025, Slot 3, Q56

- (A) $\left(-\infty, \frac{1}{8}\right] \cup [1, \infty)$ (B) $\left(-\infty, \frac{1}{4}\right] \cup [1, \infty)$
(C) $\left(-\infty, \frac{1}{8}\right] \cup \left[\frac{1}{2}, \infty\right)$ (D) $\left(-\infty, \frac{1}{4}\right] \cup \left[\frac{1}{2}, \infty\right)$

21. If $\left(x^2 + \frac{1}{x^2}\right) = 25$ and $x > 0$, then the value of $\left(x^7 + \frac{1}{x^7}\right)$ is

30 Nov 2025, Slot 3, Q59

- (A) $44853\sqrt{3}$ (B) $44856\sqrt{3}$
(C) $44859\sqrt{3}$ (D) $44850\sqrt{3}$

22. The sum of all possible real values of x for which $\log_{x-3}(x^2 - 9) = \log_{x-3}(x + 1) + 2$, is

30 Nov 2025, Slot 3, Q61

- (A) -3 (B) $\sqrt{33}$
(C) 3 (D) $\frac{3 + \sqrt{33}}{2}$

23. If $12^{12x} \times 4^{24x+12} \times 5^{2y} = 8^{4z} \times 20^{12x} \times 243^{3x-6}$, where x , y and z are natural numbers, then $x + y + z$ equals

30 Nov 2025, Slot 3, Q64

Type in the answer.

24. Let p , q and r be three natural numbers such that their sum is 900, and r is a perfect square whose value lies between 150 and 500. If p is not less than $0.3q$ and not more than $0.7q$, then the sum of the maximum and minimum possible values of p is

30 Nov 2025, Slot 3, Q68

Type in the answer.

CAT 2024 Slot 1 - Questions 25-31

25. Let x, y , and z be real numbers satisfying $4(x^2 + y^2 + z^2) = a$, $4(x - y - z) = 3 + a$ The a equals

24 Nov 2024, Slot 1, Q48

- | | |
|-------|--------------------|
| (A) 3 | (B) $1\frac{1}{3}$ |
| (C) 4 | (D) 1 |

26. If the equations $x^2 + mx + 9 = 0$, $x^2 + nx + 17 = 0$ and $x^2 + (m + n)x + 35 = 0$ have a common negative root, then the value of $(2m + 3n)$ is

24 Nov 2024, Slot 1, Q49

Type in the answer.

27. Suppose $x_1, x_2, x_3, \dots, x_{100}$ are in arithmetic progression such that $x_5 = -4$ and $2x_6 + 2x_9 = x_{11} + x_{13}$, Then, x_{100} equals

24 Nov 2024, Slot 1, Q50

- | | |
|----------|----------|
| (A) -194 | (B) -196 |
| (C) 204 | (D) 206 |

28. The sum of all real values of k for which $\left(\frac{1}{8}\right)^k \times \left(\frac{1}{32768}\right)^{\frac{1}{3}} = \frac{1}{8} \times \left(\frac{1}{32768}\right)^{\frac{1}{k}}$, is

24 Nov 2024, Slot 1, Q53

- | | |
|--------------------|--------------------|
| (A) $\frac{2}{3}$ | (B) $\frac{4}{3}$ |
| (C) $-\frac{2}{3}$ | (D) $-\frac{4}{3}$ |

29. If x is a positive real number such that $4\log_{10} x + 4\log_{100} x + 8\log_{1000} x = 13$, then the greatest integer not exceeding x , is

24 Nov 2024, Slot 1, Q59

Type in the answer.

30. A shop wants to sell a certain quantity (in kg) of grains. It sells half the quantity and an additional 3 kg of these grains to the first customer. Then, it sells half of the remaining quantity and an additional 3 kg of these grains to the second customer. Finally, when the shop sells half of the remaining quantity and an additional 3 kg of these grains to the third customer, there are no grains left. The initial quantity, in kg, of grains is

24 Nov 2024, Slot 1, Q66

- | | |
|--------|--------|
| (A) 50 | (B) 36 |
| (C) 42 | (D) 18 |

31. If $(a + b\sqrt{n})$ is the positive square root of $(29 - 12\sqrt{5})$, where a and b are integers, and n is a natural number, then the maximum possible value of $(a + b + n)$ is

(A) 18

(B) 22

(C) 4

(D) 6

CAT 2024 Slot 2 - Questions 32-39

32. If a, b and c are positive real numbers such that $a > 10 \geq b \geq c$ and $\frac{\log_8(a+b)}{\log_2 c} + \frac{\log_{27}(a-b)}{\log_3 c} = \frac{2}{3}$, then the greatest possible integer value of a is

24 Nov 2024, Slot 2, Q50

Type in the answer.

33. A function f maps the set of natural numbers to whole numbers, such that $f(xy) = f(x)f(y) + f(x) + f(y)$ for all x, y and $f(p) = 1$ for every prime number p . Then, the value of $f(160000)$ is

24 Nov 2024, Slot 2, Q51

- | | |
|----------|----------|
| (A) 4095 | (B) 8191 |
| (C) 2047 | (D) 1023 |

34. The roots α, β of the equation $3x^2 + \lambda x - 1 = 0$, satisfy $\frac{1}{\alpha^2} + \frac{1}{\beta^2} = 15$. The value of $(\alpha^3 + \beta^3)^2$, is

24 Nov 2024, Slot 2, Q52

- | | |
|--------|-------|
| (A) 16 | (B) 4 |
| (C) 1 | (D) 9 |

35. All the values of x satisfying the inequality $\frac{1}{x+5} \leq \frac{1}{2x-3}$ are

24 Nov 2024, Slot 2, Q58

- | | |
|--|--|
| (A) $x < -5$ or $\frac{3}{2} < x \leq 8$ | (B) $-5 < x < \frac{3}{2}$ or $x > \frac{3}{2}$ |
| (C) $x < -5$ or $x > \frac{3}{2}$ | (D) $-5 < x < \frac{3}{2}$ or $\frac{3}{2} < x \leq 8$ |

36. If x and y are real numbers such that $4x^2 + 4y^2 - 4xy - 6y + 3 = 0$, then the value of $(4x + 5y)$ is

24 Nov 2024, Slot 2, Q63

Type in the answer.

37. If $(x + 6\sqrt{2})^{\frac{1}{2}} - (x - 6\sqrt{2})^{\frac{1}{2}} = 2\sqrt{2}$, then x equals

24 Nov 2024, Slot 2, Q64

Type in the answer.

38. If x and y satisfy the equations $|x| + x + y = 15$ and $x + |y| - y = 20$, then $(x - y)$ equals

24 Nov 2024, Slot 2, Q66

- | | |
|--------|--------|
| (A) 20 | (B) 15 |
| (C) 5 | (D) 10 |

39. The sum of the infinite series

$$\frac{1}{5} \left(\frac{1}{5} - \frac{1}{7} \right) + \left(\frac{1}{5} \right)^2 \left(\left(\frac{1}{5} \right)^2 - \left(\frac{1}{7} \right)^2 \right) + \left(\frac{1}{5} \right)^3 \left(\left(\frac{1}{5} \right)^3 - \left(\frac{1}{7} \right)^3 \right) + \dots \text{ is equal to}$$

24 Nov 2024, Slot 2, Q68

(A) $\frac{7}{816}$

(B) $\frac{5}{408}$

(C) $\frac{7}{408}$

(D) $\frac{5}{816}$

CAT 2024 Slot 3 - Questions 40-47

40. If $(a + b\sqrt{3})^2 = 52 + 30\sqrt{3}$, where a and b are natural numbers, then $a + b$ equals

24 Nov 2024, Slot 3, Q48

- (A) 7 (B) 8
(C) 9 (D) 10

41. Consider the sequence $t_1 = 1, t_2 = -1$ and $t_n = \left(\frac{n-3}{n-1}\right)t_{n-2}$ for $n \geq 3$. Then, the value of the sum $\frac{1}{t_2} + \frac{1}{t_4} + \frac{1}{t_6} + \dots + \frac{1}{t_{2022}} + \frac{1}{t_{2024}}$, is

24 Nov 2024, Slot 3, Q53

- (A) -1024144 (B) -1022121
(C) -1023132 (D) -1026169

42. The number of distinct real values of x , satisfying the equation $\max\{x, 2\} - \min\{x, 2\} = |x + 2| - |x - 2|$, is

24 Nov 2024, Slot 3, Q54

Type in the answer.

43. The sum of all distinct real values of x that satisfy the equation $10^x + \frac{4}{10^x} = \frac{81}{2}$, is

24 Nov 2024, Slot 3, Q56

- (A) $2 \log_{10} 2$ (B) $4 \log_{10} 2$
(C) $\log_{10} 2$ (D) $3 \log_{10} 2$

44. If $3^a = 4, 4^b = 5, 5^c = 6, 6^d = 7, 7^e = 8$ and $8^f = 9$, then the value of the product $abcdef$ is

24 Nov 2024, Slot 3, Q58

Type in the answer.

45. The number of distinct integer solutions (x, y) of the equation $|x + y| + |x - y| = 2$, is

24 Nov 2024, Slot 3, Q62

Type in the answer.

46. For any non-zero real number x , let $f(x) + 2f\left(\frac{1}{x}\right) = 3x$. Then, the sum of all possible values of x for which $f(x) = 3$, is

24 Nov 2024, Slot 3, Q63

- (A) 3 (B) -2
(C) -3 (D) 2

47. For some constant real numbers p, k and a , consider the following system of linear equations in x and y : $px - 4y = 2, 3x + ky = a$. A necessary condition for the system to have no solution for (x, y) , is

(A) $ap + 6 = 0$

(B) $2a + k \neq 0$

(C) $ap - 6 = 0$

(D) $kp + 12 \neq 0$

CAT 2023 Slot 1 - Questions 48-55

48. If x and y are positive real numbers such that $\log_x(x^2 + 12) = 4$ and $3 \log_y x = 1$, then $x + y$ equals
26 Nov 2023, Slot 1, Q46

- (A) 20 (B) 68
 (C) 10 (D) 11

49. If $\sqrt{5x+9} + \sqrt{5x-9} = 3(2 + \sqrt{2})$, then $\sqrt{10x+9}$ is equal to
26 Nov 2023, Slot 1, Q47

- (A) $3\sqrt{31}$ (B) $4\sqrt{5}$
 (C) $3\sqrt{7}$ (D) $2\sqrt{7}$

50. If x and y are real numbers such that $x^2 + (x - 2y - 1)^2 = -4y(x + y)$, then the value $x - 2y$ is
26 Nov 2023, Slot 1, Q48

- (A) 0 (B) 1
 (C) -1 (D) 2

51. The number of integer solutions of equation $2|x|(x^2 + 1) = 5x^2$ is
26 Nov 2023, Slot 1, Q49

Type in the answer.

52. The equation $x^3 + (2r + 1)x^2 + (4r - 1)x + 2 = 0$ has -2 as one of the roots. If the other two roots are real, then the minimum possible non-negative integer value of r is
26 Nov 2023, Slot 1, Q50

Type in the answer.

53. Let α and β be the two distinct roots of the equation $2x^2 - 6x + k = 0$, such that $(\alpha + \beta)$ and $\alpha\beta$ are the distinct roots of the equation $x^2 + px + p = 0$. Then, the value of $8(k - p)$ is
26 Nov 2023, Slot 1, Q51

Type in the answer.

54. For some positive and distinct real numbers x, y and z , if $\frac{1}{\sqrt{y} + \sqrt{z}}$ is the arithmetic mean of $\frac{1}{\sqrt{x} + \sqrt{z}}$ and $\frac{1}{\sqrt{x} + \sqrt{y}}$, then the relationship which will always hold true, is
26 Nov 2023, Slot 1, Q64

- (A) $\sqrt{x}, \sqrt{z}$ and $\sqrt{y}$ are in arithmetic progression (B) y, x and z are in arithmetic progression
 (C) x, y and z are in arithmetic progression (D) $\sqrt{x}, \sqrt{y}$ and $\sqrt{z}$ are in arithmetic progression

55. A lab experiment measures the number of organisms at 8 am every day. Starting with 2 organisms on the first day, the number of organisms on any day is equal to 3 more than twice the number on the previous day. If the number of organisms on the n th day exceeds one

million, then the lowest possible value of n is

26 Nov 2023, Slot 1, Q66

Type in the answer.

CAT 2023 Slot 2 - Questions 56-62

56. Any non-zero real numbers x, y such that $y \neq 3$ and $\frac{x}{y} < \frac{x+3}{y-3}$, Will satisfy the condition.

26 Nov 2023, Slot 2, Q46

- (A) $\frac{x}{y} < \frac{y}{x}$ (B) If $y < 0$, and $-x < y$
 (C) If $y > 10$, and $-x > y$ (D) If $x < 0$, and $-x < y$

57. The sum of all possible values of x satisfying the equation $2^{4x^2} - 2^{2x^2+x+16} + 2^{2x+30} = 0$, is

26 Nov 2023, Slot 2, Q48

- (A) 3 (B) $\frac{3}{2}$
 (C) $\frac{5}{2}$ (D) $\frac{1}{2}$

58. For some positive real number x , if $\log_{\sqrt{3}}(x) + \frac{\log_x(25)}{\log_x(0.008)} = \frac{16}{3}$, then the value of $\log_3(3x^2)$ is

26 Nov 2023, Slot 2, Q50

Type in the answer:

59. Let k be the largest integer such that the equation $(x-1)^2 + 2kx + 11 = 0$ has no real roots. If y is a positive real number, then the least possible value of $\frac{k}{4y} + 9y$ is

26 Nov 2023, Slot 2, Q51

Type in the answer:

60. Let both the series $a_1, a_2, a_3, \dots$ and $b_1, b_2, b_3, \dots$ be in arithmetic progression such that the common differences of both the series are prime numbers. If $a_5 = b_9$, $a_{19} = b_{19}$ and $b_2 = 0$, then a_{11} equals

26 Nov 2023, Slot 2, Q64

- (A) 86 (B) 79
 (C) 83 (D) 84

61. If $p^2 + q^2 - 29 = 2pq - 20 = 52 - 2pq$, then the difference between the maximum and minimum possible value of $(p^3 - q^3)$

26 Nov 2023, Slot 2, Q65

- (A) 243 (B) 486
 (C) 378 (D) 189

62. Let a_n and b_n be two sequences such that $a_n = 13 + 6(n-1)$ and $b_n = 15 + 7(n-1)$ for all natural numbers n . Then, the largest three digit integer that is common to both these sequences, is

26 Nov 2023, Slot 2, Q66

Type in the answer:

CAT 2023 Slot 3 - Questions 63-70

63. If x is a positive real number such that $x^8 + \left(\frac{1}{x}\right)^8 = 47$, then the value of $x^9 + \left(\frac{1}{x}\right)^9$ is

26 Nov 2023, Slot 3, Q45

- (A) $40\sqrt{5}$ (B) $30\sqrt{5}$
(C) $36\sqrt{5}$ (D) $34\sqrt{5}$

64. For some real numbers a and b , the system of equations $x + y = 4$ and $(a + 5)x + (b^2 - 15)y = 8b$ has infinitely many solutions for x and y . Then, the maximum possible value of ab is

26 Nov 2023, Slot 3, Q47

- (A) 33 (B) 25
(C) 15 (D) 55

65. For a real number x , if $\frac{1}{2}$, $\frac{\log_3(2^x - 9)}{\log_3 4}$, and $\frac{\log_5(2^x + \frac{17}{2})}{\log_5 4}$ are in an arithmetic progression, then the common difference is

26 Nov 2023, Slot 3, Q48

- (A) $\log_4 \left(\frac{3}{2}\right)$ (B) $\log_4 7$
(C) $\log_4 \left(\frac{23}{2}\right)$ (D) $\log_4 \left(\frac{7}{2}\right)$

66. Let n be any natural number such that $5^{n-1} < 3^{n+1}$. Then, the least integer value of m that satisfies $3^{n+1} < 2^{n+m}$ for each such n , is

26 Nov 2023, Slot 3, Q49

Type in the answer.

67. A quadratic equation $x^2 + bx + c = 0$ has two real roots. If the difference between the reciprocals of the roots is $\frac{1}{3}$, and the sum of the reciprocals of the squares of the roots is $\frac{5}{9}$, then the largest possible value of $(b + c)$ is

26 Nov 2023, Slot 3, Q51

Type in the answer.

68. The value of $1 + \left(1 + \frac{1}{3}\right)\frac{1}{4} + \left(1 + \frac{1}{3} + \frac{1}{9}\right)\frac{1}{16} + \left(1 + \frac{1}{3} + \frac{1}{9} + \frac{1}{27}\right)\frac{1}{64} + \dots$ is

26 Nov 2023, Slot 3, Q64

- (A) $\frac{15}{13}$ (B) $\frac{27}{12}$
(C) $\frac{15}{8}$ (D) $\frac{16}{11}$

69. Let $a_n = 46 + 8n$ and $b_n = 98 + 4n$ be two sequences for natural numbers $n \leq 100$. Then, the sum of all terms common to both the sequences is

(A) 14900

(B) 14798

(C) 15000

(D) 14602

70. Suppose $f(x, y)$ is a real-valued function such that $f(3x + 2y, 2x - 5y) = 19x$, for all real numbers x and y . The value of x for which $f(x, 2x) = 27$, is

26 Nov 2023, Slot 3, Q66

Type in the answer.

CAT 2022 Slot 1 - Questions 71-76

71. For any natural number n , suppose the sum of the first n terms of an arithmetic progression is $(n + 2n^2)$. If the n^{th} term of the progression is divisible by 9, then the smallest possible value of n is

27 Nov 2022, Slot 1, Q47

- (A) 9 (B) 4
(C) 7 (D) 8

72. Let $0 \leq a \leq x \leq 100$ and $f(x) = |x - a| + |x - 100| + |x - a - 50|$. Then the maximum value of $f(x)$ becomes 100 when a is equal to

27 Nov 2022, Slot 1, Q48

- (A) 25 (B) 100
(C) 50 (D) 0

73. Let a, b, c be non-zero real numbers such that $b^2 < 4ac$, and $f(x) = ax^2 + bx + c$. If the set S consists of all integers m such that $f(m) < 0$, then the set S must necessarily be

27 Nov 2022, Slot 1, Q53

- (A) the set of all positive integers
(B) the set of all integers
(C) either the empty set or the set of all integers
(D) the empty set

74. Let a and b be natural numbers. If $a^2 + ab + a = 14$ and $b^2 + ab + b = 28$, then $(2a + b)$ equals

27 Nov 2022, Slot 1, Q55

- (A) 8 (B) 7
(C) 10 (D) 9

75. The largest real value of a for which the equation $|x + a| + |x - 1| = 2$ has an infinite number of solutions for x is

27 Nov 2022, Slot 1, Q60

- (A) -1 (B) 0
(C) 1 (D) 2

76. For any real number x , let $[x]$ be the largest integer less than or equal to x . If $\sum_{n=1}^N \left[\frac{1}{5} + \frac{n}{25} \right] = 25$ then N is

27 Nov 2022, Slot 1, Q66

Type in the answer.

CAT 2022 Slot 2 - Questions 77-85

77. The number of integer solutions of the equation $(x^2 - 10)^{(x^2 - 3x - 10)} = 1$ is

27 Nov 2022, Slot 2, Q47

Type in the answer.

78. Let $f(x)$ be a quadratic polynomial in x such that $f(x) \geq 0$ for all real numbers x . If $f(2) = 0$ and $f(4) = 6$, then $f(-2)$ is equal to

27 Nov 2022, Slot 2, Q50

- (A) 12 (B) 24
(C) 6 (D) 36

79. Let r and c be real numbers. If r and $-r$ are roots of $5x^3 + cx^2 - 10x + 9 = 0$, then c equals

27 Nov 2022, Slot 2, Q51

- (A) $-\frac{9}{2}$ (B) $\frac{9}{2}$
(C) -4 (D) 4

80. Suppose for all integers x , there are two functions f and g such that $f(x) + f(x-1) - 1 = 0$ and $g(x) = x^2$. If $f(x^2 - x) = 5$, then the value of the sum $f(g(5)) + g(f(5))$ is

27 Nov 2022, Slot 2, Q53

Type in the answer.

81. In an examination, there were 75 questions. 3 marks were awarded for each correct answer, 1 mark was deducted for each wrong answer and 1 mark was awarded for each unattempted question. Rayan scored a total of 97 marks in the examination. If the number of unattempted questions was higher than the number of attempted questions, then the maximum number of correct answers that Rayan could have given in the examination is

27 Nov 2022, Slot 2, Q54

Type in the answer.

82. On day one, there are 100 particles in a laboratory experiment. On day n , where $n \geq 2$, one out of every n particles produces another particle. If the total number of particles in the laboratory experiment increases to 1000 on day m , then m equals

27 Nov 2022, Slot 2, Q57

- (A) 19 (B) 16
(C) 18 (D) 17

83. Consider the arithmetic progression 3, 7, 11, ... and let A_n denote the sum of the first n terms of this progression. Then the value of $\frac{1}{25} \sum_{n=1}^{25} A_n$ is

- (A) 455 (B) 442
(C) 415 (D) 404
-

84. The number of distinct integer values of n satisfying $\frac{4 - \log_2 n}{3 - \log_4 n} < 0$, is

27 Nov 2022, Slot 2, Q63

Type in the answer.

85. If a and b are non-negative real numbers such that $a + 2b = 6$, then the average of the maximum and minimum possible values of $(a + b)$ is

27 Nov 2022, Slot 2, Q64

- (A) 3 (B) 4
(C) 3.5 (D) 4.5
-

CAT 2022 Slot 3 - Questions 86-92

86. If $c = \frac{16x}{y} + \frac{49y}{x}$ for some non-zero real numbers x and y , then c cannot take the value

27 Nov 2022, Slot 3, Q45

- | | |
|---------|---------|
| (A) 60 | (B) -50 |
| (C) -70 | (D) -60 |

87. Suppose k is any integer such that the equation $2x^2 + kx + 5 = 0$ has no real roots and the equation $x^2 + (k - 5)x + 1 = 0$ has two distinct real roots for x . Then, the number of possible values of k is

27 Nov 2022, Slot 3, Q46

- | | |
|-------|--------|
| (A) 9 | (B) 7 |
| (C) 8 | (D) 13 |

88. If $(\sqrt{\frac{7}{5}})^{3x-y} = \frac{875}{2401}$ and $(\frac{4a}{b})^{6x-y} = (\frac{2a}{b})^{y-6x}$, for all non-zero real values of a and b , then the value of $x + y$ is

27 Nov 2022, Slot 3, Q47

Type in the answer.

89. If $(3 + 2\sqrt{2})$ is a root of the equation $ax^2 + bx + c = 0$ and $(4 + 2\sqrt{3})$ is a root of the equation $ay^2 + my + n = 0$ where a, b, c, m and n are integers, then the value of $(\frac{b}{m} + \frac{c-2b}{n})$ is

27 Nov 2022, Slot 3, Q50

- | | |
|-------|-------|
| (A) 0 | (B) 1 |
| (C) 3 | (D) 4 |

90. The average of all 3-digit terms in the arithmetic progression 38, 55, 72, ..., is

27 Nov 2022, Slot 3, Q57

Type in the answer.

91. Let r be a real number and $f(x) = \begin{cases} 2x - r & \text{if } x \geq r \\ r & \text{if } x < r \end{cases}$. Then, the equation $f(x) = f(f(x))$ holds for all real values of x where

27 Nov 2022, Slot 3, Q59

- | | |
|----------------|----------------|
| (A) $x > r$ | (B) $x \leq r$ |
| (C) $x \neq r$ | (D) $x \geq r$ |

92. The minimum possible value of $\frac{x^2 - 6x + 10}{3 - x}$, for $x < 3$, is

27 Nov 2022, Slot 3, Q62

(A) $-\frac{1}{2}$

(B) 2

(C) $\frac{1}{2}$

(D) -2

CAT 2021 Slot 1 - Questions 93-99

93. A basket of 2 apples, 4 oranges and 6 mangoes costs the same as a basket of 1 apple, 4 oranges and 8 mangoes, or a basket of 8 oranges and 7 mangoes. Then the number of mangoes in a basket of mangoes that has the same cost as the other baskets is

28 Nov 2021, Slot 1, Q53

- (A) 11 (B) 13
(C) 10 (D) 12

94. The number of integers n that satisfy the inequalities $|n - 60| < |n - 100| < |n - 20|$ is

28 Nov 2021, Slot 1, Q54

- (A) 21 (B) 19
(C) 18 (D) 20

95. $f(x) = \frac{x^2 + 2x - 15}{x^2 - 7x - 18}$ is negative if and only if

28 Nov 2021, Slot 1, Q59

- (A) $-5 < x < -2$ or $3 < x < 9$ (B) $x < -5$ or $-2 < x < 3$
(C) $-2 < x < 3$ or $x > 9$ (D) $x < -5$ or $3 < x < 9$

96. If $5 - \log_{10} \sqrt{1+x} + 4 \log_{10} \sqrt{1-x} = \log_{10} \frac{1}{\sqrt{1-x^2}}$, then $100x$ equals

28 Nov 2021, Slot 1, Q60

Type in the answer.

97. If $x_0 = 1$, $x_1 = 2$, and $x_{n+2} = \frac{1 + x_{n+1}}{x_n}$, $n = 0, 1, 2, 3, \dots$, then x_{2021} is equal to

28 Nov 2021, Slot 1, Q62

- (A) 4 (B) 1
(C) 3 (D) 2

98. The natural numbers are divided into groups as (1), (2, 3, 4), (5, 6, 7, 8, 9), ... and so on. Then, the sum of the numbers in the 15th group is equal to

28 Nov 2021, Slot 1, Q65

- (A) 6119 (B) 6090
(C) 4941 (D) 7471

99. If r is a constant such that $|x^2 - 4x - 13| = r$ has exactly three distinct real roots, then the value of r is

28 Nov 2021, Slot 1, Q66

- (A) 17 (B) 21
(C) 15 (D) 18

CAT 2021 Slot 2 - Questions 100-107

100. For all possible integers n satisfying $2.25 \leq 2 + 2^{n+2} \leq 202$, then the number of integer values of $3 + 3^{n+1}$ is:

28 Nov 2021, Slot 2, Q45

Type in the answer.

101. Three positive integers x , y and z are in arithmetic progression. If $y - x > 2$ and $xyz = 5(x + y + z)$, then $z - x$ equals

28 Nov 2021, Slot 2, Q46

- | | |
|--------|--------|
| (A) 8 | (B) 12 |
| (C) 14 | (D) 10 |

102. Suppose one of the roots of the equation $ax^2 - bx + c = 0$ is $2 + \sqrt{3}$, Where a, b and c are rational numbers and $a \neq 0$. If $b = c^3$ then $|a|$ equals.

28 Nov 2021, Slot 2, Q51

- | | |
|-------|-------|
| (A) 1 | (B) 2 |
| (C) 3 | (D) 4 |

103. If $\log_2[3 + \log_3\{4 + \log_4(x - 1)\}] - 2 = 0$ then $4x$ equals

28 Nov 2021, Slot 2, Q54

Type in the answer.

104. For all real values of x , the range of the function $f(x) = \frac{x^2 + 2x + 4}{2x^2 + 4x + 9}$ is:

28 Nov 2021, Slot 2, Q56

- | | |
|----------------------------------|----------------------------------|
| (A) $[\frac{4}{9}, \frac{8}{9}]$ | (B) $[\frac{3}{7}, \frac{8}{9})$ |
| (C) $(\frac{3}{7}, \frac{1}{2})$ | (D) $[\frac{3}{7}, \frac{1}{2})$ |

105. For a sequence of real numbers $x_1, x_2, \dots, x_n$, If $x_1 - x_2 + x_3 - \dots + (-1)^{n+1}x_n = n^2 + 2n$ for all natural numbers n , then the sum $x_{49} + x_{50}$ equals

28 Nov 2021, Slot 2, Q57

- | | |
|----------|--------|
| (A) 200 | (B) 2 |
| (C) -200 | (D) -2 |

106. For a real number x the condition $|3x - 20| + |3x - 40| = 20$ necessarily holds if

28 Nov 2021, Slot 2, Q58

- | | |
|-------------------|------------------|
| (A) $10 < x < 15$ | (B) $9 < x < 14$ |
| (C) $7 < x < 12$ | (D) $6 < x < 11$ |

107. Consider the pair of equations: $x^2 - xy - x = 22$ and $y^2 - xy + y = 34$. If $x > y$, then $x - y$ equals

28 Nov 2021, Slot 2, Q63

(A) 6

(B) 4

(C) 7

(D) 8

CAT 2021 Slot 3 - Questions 108-115

108. A shop owner bought a total of 64 shirts from a wholesale market that came in two sizes, small and large. The price of a small shirt was INR 50 less than that of a large shirt. She paid a total of INR 5000 for the large shirts, and a total of INR 1800 for the small shirts. Then, the price of a large shirt and a small shirt together, in INR, is

28 Nov 2021, Slot 3, Q45

- | | |
|---------|---------|
| (A) 175 | (B) 150 |
| (C) 200 | (D) 225 |

109. The number of distinct pairs of integers (m,n) , satisfying $|1 + mn| < |m + n| < 5$ is:

28 Nov 2021, Slot 3, Q48

Type in the answer.

110. For a real number a , if $\frac{\log_{15} a + \log_{32} a}{(\log_{15} a)(\log_{32} a)} = 4$ then a must lie in the range

28 Nov 2021, Slot 3, Q49

- | | |
|-----------------|-----------------|
| (A) $2 < a < 3$ | (B) $3 < a < 4$ |
| (C) $4 < a < 5$ | (D) $a > 5$ |

111. Consider a sequence of real numbers, $x_1, x_2, x_3, \dots$ such that $x_{n+1} = x_n + n - 1$ for all $n \geq 1$. If $x_1 = -1$ then x_{100} is equal to

28 Nov 2021, Slot 3, Q51

- | | |
|----------|----------|
| (A) 4849 | (B) 4949 |
| (C) 4950 | (D) 4850 |

112. One part of a hostel's monthly expenses is fixed, and the other part is proportional to the number of its boarders. The hostel collects ₹ 1600 per month from each boarder. When the number of boarders is 50, the profit of the hostel is ₹ 200 per boarder, and when the number of boarders is 75, the profit of the hostel is ₹ 250 per boarder. When the number of boarders is 80, the total profit of the hostel, in INR, will be

28 Nov 2021, Slot 3, Q53

- | | |
|-----------|-----------|
| (A) 20200 | (B) 20500 |
| (C) 20800 | (D) 20000 |

113. If $f(x) = x^2 - 7x$ and $g(x) = x + 3$, then the minimum value of $f(g(x)) - 3x$ is:

28 Nov 2021, Slot 3, Q61

- | | |
|---------|---------|
| (A) -20 | (B) -12 |
| (C) -15 | (D) -16 |

114. If n is a positive integer such that $(\sqrt[3]{10})(\sqrt[3]{10})^2 \dots (\sqrt[3]{10})^n > 999$, then the smallest value of n is

28 Nov 2021, Slot 3, Q63

Type in the answer.

115. If $3x + 2|y| + y = 7$ and $x + |x| + 3y = 1$ then $x + 2y$ is:

28 Nov 2021, Slot 3, Q66

(A) $-\frac{4}{3}$

(B) $\frac{8}{3}$

(C) 0

(D) 1

CAT 2020 Slot 1 - Questions 116-124

116. If Y is a negative number such that $2^{Y^2(\log_3 5)} = 5^{\log_2 3}$, then Y equals to:

29 Nov 2020, Slot 1, Q51

- (A) $\log_2\left(\frac{1}{5}\right)$ (B) $\log_2\left(\frac{1}{3}\right)$
 (C) $-\log_2\left(\frac{1}{5}\right)$ (D) $-\log_2\left(\frac{1}{3}\right)$

117. A gentleman decided to treat a few children in the following manner. He gives half of his total stock of toffees and one extra to the first child, and then the half of the remaining stock along with one extra to the second and continues giving away in this fashion. His total stock exhausts after he takes care of 5 children. How many toffees were there in his stock initially?

29 Nov 2020, Slot 1, Q52

Type in the answer.

118. The number of real-valued solutions of the equation $2^x + 2^{-x} = 2 - (x - 2)^2$ is:

29 Nov 2020, Slot 1, Q54

- (A) 1 (B) 2
 (C) infinite (D) 0

119. How many distinct positive integer-valued solutions exist to the equation $(x^2 - 7x + 11)^{(x^2 - 13x + 42)} = 1$?

29 Nov 2020, Slot 1, Q55

- (A) 8 (B) 4
 (C) 2 (D) 6

120. If $x = (4096)^{7+4\sqrt{3}}$, then which of the following equals to 64?

29 Nov 2020, Slot 1, Q64

- (A) $\frac{x^7}{x^{2\sqrt{3}}}$ (B) $\frac{x^{\frac{7}{2}}}{x^{\frac{4}{\sqrt{3}}}}$
 (C) $\frac{x^{\frac{7}{2}}}{x^{2\sqrt{3}}}$ (D) $\frac{x^7}{x^{4\sqrt{3}}}$

121. The number of distinct real roots of the equation $(x + \frac{1}{x})^2 - 3(x + \frac{1}{x}) + 2 = 0$ equals

29 Nov 2020, Slot 1, Q66

Type in the answer.

122. If $\log_4 5 = (\log_4 y)(\log_6 \sqrt{5})$, then y equals

29 Nov 2020, Slot 1, Q67

Type in the answer.

123. If $f(5 + x) = f(5 - x)$ for every real x , and $f(x) = 0$ has four distinct real roots, then the sum of these roots is

29 Nov 2020, Slot 1, Q75

- | | |
|--------|--------|
| (A) 0 | (B) 40 |
| (C) 10 | (D) 20 |
-

124. Let A , B and C be three positive integers such that the sum of A and the mean of B and C is 5. In addition, the sum of B and the mean of A and C is 7. Then the sum of A and B is

29 Nov 2020, Slot 1, Q76

- | | |
|-------|-------|
| (A) 5 | (B) 4 |
| (C) 6 | (D) 7 |
-

CAT 2020 Slot 2 - Questions 125-133

125. Let $f(x) = x^2 + ax + b$ and $g(x) = f(x + 1) - f(x - 1)$. If $f(x) \geq 0$ for all real x , and $g(20) = 72$. then the smallest possible value of b is

29 Nov 2020, Slot 2, Q53

- (A) 16 (B) 4
(C) 1 (D) 0

126. The value of $\log_a\left(\frac{a}{b}\right) + \log_b\left(\frac{b}{a}\right)$, for $1 < a \leq b$ cannot be equal to

29 Nov 2020, Slot 2, Q60

- (A) 0 (B) -1
(C) 1 (D) -0.5

127. The number of integers that satisfy the equality $(x^2 - 5x + 7)^{x+1} = 1$ is

29 Nov 2020, Slot 2, Q67

- (A) 3 (B) 2
(C) 4 (D) 5

128. Let the m -th and n -th terms of a geometric progression be $\frac{3}{4}$ and 12. respectively, where $m < n$. If the common ratio of the progression is an integer r , then the smallest possible value of $r + n - m$ is

29 Nov 2020, Slot 2, Q70

- (A) 6 (B) 2
(C) -4 (D) -2

129. If x and y are non-negative integers such that $x + 9 = z$, $y + 1 = z$ and $x + y < z + 5$, then the maximum possible value of $2x + y$ equals

29 Nov 2020, Slot 2, Q72

Type in the answer.

130. Aron bought some pencils and sharpeners. Spending the same amount of money as Aron, Aditya bought twice as many pencils and 10 less sharpeners. If the cost of one sharpener is ₹ 2 more than the cost of a pencil, then the minimum possible number of pencils bought by Aron and Aditya together is

29 Nov 2020, Slot 2, Q73

- (A) 33 (B) 27
(C) 30 (D) 36

131. For real x , the maximum possible value of $\frac{x}{\sqrt{1+x^4}}$ is

29 Nov 2020, Slot 2, Q74

- (A) $\frac{1}{2}$ (B) 1
(C) $\frac{1}{\sqrt{3}}$ (D) $\frac{1}{\sqrt{2}}$
-

132. In how many ways can a pair of integers (x, a) be chosen such that $x^2 - 2 \mid x + |a - 2| = 0$?

29 Nov 2020, Slot 2, Q75

- (A) 6 (B) 5
(C) 4 (D) 7
-

133. if x and y are positive real numbers satisfying $x + y = 102$, then the minimum possible value of $2601\left(1 + \frac{1}{x}\right)\left(1 + \frac{1}{y}\right)$ is

29 Nov 2020, Slot 2, Q76

Type in the answer.

CAT 2020 Slot 3 - Questions 134-141

134. Let m and n be positive integers, If $x^2 + mx + 2n = 0$ and $x^2 + 2nx + m = 0$ have real roots, then the smallest possible value of $m + n$ is

29 Nov 2020, Slot 3, Q53

- | | |
|-------|-------|
| (A) 7 | (B) 6 |
| (C) 8 | (D) 5 |

135. If $x_1 = -1$ and $x_m = x_{m+1} + (m + 1)$ for every positive integer m , then X_{100} equals

29 Nov 2020, Slot 3, Q55

- | | |
|-----------|-----------|
| (A) -5050 | (B) -5151 |
| (C) -5051 | (D) -5150 |

136. If $\log_a 30 = A$, $\log_a \left(\frac{5}{3}\right) = -B$ and $\log_2 a = \frac{1}{3}$, then $\log_3 a$ equals

29 Nov 2020, Slot 3, Q56

- | | |
|-------------------------|-------------------------|
| (A) $\frac{2}{A+B-3}$ | (B) $\frac{2}{A+B} - 3$ |
| (C) $\frac{A+B}{2} - 3$ | (D) $\frac{A+B-3}{2}$ |

137. Let m and n be natural numbers such that n is even and $0.2 < \frac{m}{20}, \frac{n}{m}, \frac{n}{11} < 0.5$. Then $m - 2n$ equals

29 Nov 2020, Slot 3, Q59

- | | |
|-------|-------|
| (A) 3 | (B) 1 |
| (C) 2 | (D) 4 |

138. If a, b, c are non-zero and $14^a = 36^b = 84^c$, then $6b\left(\frac{1}{c} - \frac{1}{a}\right)$ is equal to

29 Nov 2020, Slot 3, Q62

Type in the answer.

139. Let k be a constant. The equations $kx + y = 3$ and $4x + ky = 4$ have a unique solution if and only if

29 Nov 2020, Slot 3, Q68

- | | |
|------------------|---------------|
| (A) $ k \neq 2$ | (B) $ k = 2$ |
| (C) $k \neq 2$ | (D) $k = 2$ |

140. If $f(x+y) = f(x)f(y)$ and $f(5) = 4$, then $f(10) - f(-10)$ is equal to

29 Nov 2020, Slot 3, Q74

- | | |
|-------------|-------|
| (A) 14.0625 | (B) 0 |
| (C) 15.9375 | (D) 3 |

141. $\frac{2 \times 4 \times 8 \times 16}{(\log_2 4)^2 (\log_4 8)^3 (\log_8 16)^4}$ equals

29 Nov 2020, Slot 3, Q75

Type in the answer.

CAT 2019 Slot 1 - Questions 142-153

142. If $a_1, a_2, \dots$ are in A.P, then, $\frac{1}{\sqrt{a_1} + \sqrt{a_2}} + \frac{1}{\sqrt{a_2} + \sqrt{a_3}} + \dots + \frac{1}{\sqrt{a_n} + \sqrt{a_{n+1}}}$ is equal to

24 Nov 2019, Slot 1, Q68

(A) $\frac{n}{\sqrt{a_1} + \sqrt{a_{n+1}}}$

(B) $\frac{n-1}{\sqrt{a_1} + \sqrt{a_{n-1}}}$

(C) $\frac{n-1}{\sqrt{a_1} + \sqrt{a_n}}$

(D) $\frac{n}{\sqrt{a_1} - \sqrt{a_{n+1}}}$

143. If $(5.55)^x = (0.555)^y = 1000$, then the value of $\frac{1}{x} - \frac{1}{y}$ is

24 Nov 2019, Slot 1, Q70

(A) $\frac{1}{3}$

(B) 3

(C) 1

(D) $\frac{2}{3}$

144. The product of the distinct roots of $|x^2 - x - 6| = x + 2$ is

24 Nov 2019, Slot 1, Q73

(A) -16

(B) -4

(C) -24

(D) -8

145. If the population of a town is p in the beginning of any year then it becomes $3 + 2p$ in the beginning of the next year. If the population in the beginning of 2019 is 1000, then the population in the beginning of 2034 will be

24 Nov 2019, Slot 1, Q75

(A) $(1003)^{15} + 6$

(B) $(997)^{15} - 3$

(C) $(997)2^{14} + 3$

(D) $(1003)2^{15} - 3$

146. Consider a function f satisfying $f(x + y) = f(x)f(y)$ where x, y are positive integers, and $f(1) = 2$. If $f(a + 1) + f(a + 2) + \dots + f(a + n) = 16(2^n - 1)$ then a is equal to

24 Nov 2019, Slot 1, Q76

Type in the answer.

147. For any positive integer n , let $f(n) = n(n + 1)$ if n is even, and $f(n) = n + 3$ if n is odd. If m is a positive integer such that $8f(m + 1) - f(m) = 2$, then m equals

24 Nov 2019, Slot 1, Q78

Type in the answer.

148. The product of two positive numbers is 616. If the ratio of the difference of their cubes to the cube of their difference is 157:3, then the sum of the two numbers is

24 Nov 2019, Slot 1, Q79

(A) 58

(B) 85

(C) 50

(D) 95

149. If $a_1 + a_2 + a_3 + \dots + a_n = 3(2^{n+1} - 2)$, for every $n \geq 1$, then a_{11} equals

24 Nov 2019, Slot 1, Q84

Type in the answer.

150. The number of the real roots of the equation $2 \cos(x(x+1)) = 2^x + 2^{-x}$ is

24 Nov 2019, Slot 1, Q85

- | | |
|--------------|-------|
| (A) 2 | (B) 1 |
| (C) infinite | (D) 0 |
-

151. If m and n are integers such that $(\sqrt{2})^{19} 3^4 4^2 9^m 8^n = 3^n 16^m (\sqrt[4]{64})$ then m is

24 Nov 2019, Slot 1, Q92

- | | |
|---------|---------|
| (A) -20 | (B) -24 |
| (C) -12 | (D) -16 |
-

152. Let x and y be positive real numbers such that $\log_5(x+y) + \log_5(x-y) = 3$, and $\log_2 y - \log_2 x = 1 - \log_2 3$. Then xy equals

24 Nov 2019, Slot 1, Q95

- | | |
|---------|---------|
| (A) 150 | (B) 25 |
| (C) 100 | (D) 250 |
-

153. The number of solutions to the equation $|x| (6x^2 + 1) = 5x^2$ is

24 Nov 2019, Slot 1, Q99

Type in the answer.

CAT 2019 Slot 2 - Questions 154-163

154. Let $a_1, a_2, \dots$ be integers such that $a_1 - a_2 + a_3 - a_4 + \dots + (-1)^{n-1}a_n = n$, for all $n \geq 1$. Then $a_{51} + a_{52} + \dots + a_{1023}$ equals

24 Nov 2019, Slot 2, Q72

- (A) 0 (B) 1
(C) 10 (D) -1

155. Let A be a real number. Then the roots of the equation $x^2 - 4x - \log_2 A = 0$ are real and distinct if and only if

24 Nov 2019, Slot 2, Q74

- (A) $A > \frac{1}{16}$ (B) $A < \frac{1}{16}$
(C) $A < \frac{1}{8}$ (D) $A > \frac{1}{8}$

156. The quadratic equation $x^2 + bx + c = 0$ has two roots $4a$ and $3a$, where a is an integer. Which of the following is a possible value of $b^2 + c$?

24 Nov 2019, Slot 2, Q75

- (A) 3721 (B) 361
(C) 427 (D) 549

157. If x is a real number, then $\sqrt{\log_e \frac{4x - x^2}{3}}$ is a real number if and only if

24 Nov 2019, Slot 2, Q78

- (A) $1 \leq x \leq 3$ (B) $1 \leq x \leq 2$
(C) $-1 \leq x \leq 3$ (D) $-3 \leq x \leq 3$

158. If $5^x - 3^y = 13438$ and $5^{x-1} + 3^{y+1} = 9686$, then $x + y$ equals

24 Nov 2019, Slot 2, Q79

Type in the answer.

159. The real root of the equation $2^{6x} + 2^{3x+2} - 21 = 0$ is

24 Nov 2019, Slot 2, Q83

- (A) $\log_2 9$ (B) $\frac{\log_2 3}{3}$
(C) $\log_2 27$ (D) $\frac{\log_2 7}{3}$

160. In 2010, a library contained a total of 11500 books in two categories - fiction and nonfiction. In 2015, the library contained a total of 12760 books in these two categories. During this period, there was 10% increase in the fiction category while there was 12% increase in the non-fiction category. How many fiction books were in the library in 2015?

- (A) 6160 (B) 6600
(C) 6000 (D) 5500
-

161. If $(2n + 1) + (2n + 3) + (2n + 5) + \dots + (2n + 47) = 5280$, then what is the value of $1 + 2 + 3 + \dots + n$?

24 Nov 2019, Slot 2, Q89

Type in the answer.

162. The number of common terms in the two sequences: 15, 19, 23, 27, . . . , 415 and 14, 19, 24, 29, . . . , 464 is

24 Nov 2019, Slot 2, Q92

- (A) 21 (B) 20
(C) 18 (D) 19
-

163. Let f be a function such that $f(mn) = f(m)f(n)$ for every positive integers m and n . If $f(1)$, $f(2)$ and $f(3)$ are positive integers, $f(1) < f(2)$, and $f(24) = 54$, then $f(18)$ equals

24 Nov 2019, Slot 2, Q98

Type in the answer.

CAT 2018 Slot 1 - Questions 164-174

164. If x is a positive quantity such that $2^x = 3^{\log_5 2}$, then x is equal to

25 Nov 2018, Slot 1, Q67

- (A) $\log_5 8$ (B) $1 + \log_3 \left(\frac{5}{3}\right)$
 (C) $\log_5 9$ (D) $1 + \log_5 \left(\frac{3}{5}\right)$

165. Let $f(x) = \min(2x^2, 52 - 5x)$ where x is any positive real number. Then the maximum possible value of $f(x)$ is

25 Nov 2018, Slot 1, Q73

Type in the answer.

166. While multiplying three real numbers, Ashok took one of the numbers as 73 instead of 37. As a result, the product went up by 720. Then the minimum possible value of the sum of squares of the other two numbers is

25 Nov 2018, Slot 1, Q74

Type in the answer.

167. Given an equilateral triangle T_1 with side 24 cm, a second triangle T_2 is formed by joining the midpoints of the sides of T_1 . Then a third triangle T_3 is formed by joining the midpoints of the sides of T_2 . If this process of forming triangles is continued, the sum of the areas, in sq cm, of infinitely many such triangles $T_1, T_2, T_3, \dots$ will be

25 Nov 2018, Slot 1, Q77

- (A) $188\sqrt{3}$ (B) $248\sqrt{3}$
 (C) $164\sqrt{3}$ (D) $192\sqrt{3}$

168. If $\log_{12} 81 = p$, then $3^{\left(\frac{4-p}{4+p}\right)}$ is equal to

25 Nov 2018, Slot 1, Q78

- (A) $\log_4 16$ (B) $\log_6 16$
 (C) $\log_2 8$ (D) $\log_6 8$

169. If $f(x+2) = f(x) + f(x+1)$ for all positive integers x , and $f(11) = 91, f(15) = 617$, then $f(10)$ equals

25 Nov 2018, Slot 1, Q87

Type in the answer.

170. If $U^2 + (U - 2V - 1)^2 = -4V(U + V)$, then what is the value of $U + 3V$?

25 Nov 2018, Slot 1, Q91

- (A) 0 (B) $\frac{1}{2}$
 (C) $-\frac{1}{4}$ (D) $\frac{1}{4}$

171. Let x, y, z be three positive real numbers in a geometric progression such that $x < y < z$. If $5x, 16y$, and $12z$ are in an arithmetic progression then the common ratio of the geometric progression is

25 Nov 2018, Slot 1, Q94

- (A) $\frac{3}{6}$ (B) $\frac{1}{6}$
(C) $\frac{5}{2}$ (D) $\frac{3}{2}$
-

172. Given that $x^{2018}y^{2017} = \frac{1}{2}$, and $x^{2016}y^{2019} = 8$, then value of $x^2 + y^3$ is

25 Nov 2018, Slot 1, Q95

- (A) $\frac{31}{4}$ (B) $\frac{35}{4}$
(C) $\frac{37}{4}$ (D) $\frac{33}{4}$
-

173. If $\log_2(5 + \log_3 a) = 3$ and $\log_5(4a + 12 + \log_2 b) = 3$, then $a + b$ is equal to

25 Nov 2018, Slot 1, Q97

- (A) 59 (B) 40
(C) 32 (D) 67
-

174. The number of integers x such that $0.25 \leq 2^x \leq 200$ and $2^x + 2$ is perfectly divisible by either 3 or 4, is

25 Nov 2018, Slot 1, Q99

Type in the answer.

CAT 2018 Slot 2 - Questions 175-186

175. Let $f(x) = \max(5x, 52 - 2x^2)$, where x is any positive real number. Then the minimum possible value of $f(x)$

25 Nov 2018, Slot 2, Q68

Type in the answer.

176. The smallest integer n such that $n^3 - 11n^2 + 32n - 28 > 0$ is

25 Nov 2018, Slot 2, Q70

Type in the answer.

177. The scores of Amal and Bimal in an examination are in the ratio 11 : 14. After an appeal, their scores increase by the same amount and their new scores are in the ratio 47 : 56. The ratio of Bimal's new score to that of his original score is

25 Nov 2018, Slot 2, Q71

- | | |
|-----------|-----------|
| (A) 4 : 3 | (B) 8 : 5 |
| (C) 5 : 4 | (D) 3 : 2 |

178. Let $a_1, a_2, \dots, a_{52}$ be positive integers such that $a_1 < a_2 < \dots < a_{52}$. Suppose, their arithmetic mean is one less than arithmetic mean of $a_2, a_3, \dots, a_{52}$. If $a_{52} = 100$, then the largest possible value of a_1 is

25 Nov 2018, Slot 2, Q78

- | | |
|--------|--------|
| (A) 48 | (B) 20 |
| (C) 23 | (D) 45 |

179. The value of the sum $7 \times 11 + 11 \times 15 + 15 \times 19 + \dots + 95 \times 99$ is

25 Nov 2018, Slot 2, Q79

Type in the answer.

180. If N and x are positive integers such that $N^N = 2^{160}$ and $N^2 + 2^N$ is an integral multiple of 2^x , then the largest possible x is

25 Nov 2018, Slot 2, Q80

Type in the answer.

181. If the sum of squares of two numbers is 97, then which one of the following cannot be their product?

25 Nov 2018, Slot 2, Q84

- | | |
|---------|--------|
| (A) -32 | (B) 16 |
| (C) 48 | (D) 64 |

182. The smallest integer n for which $4^n > 17^{19}$ holds, is closest to

25 Nov 2018, Slot 2, Q90

- (A) 37 (B) 35
(C) 33 (D) 39

183. If a and b are integers such that $2x^2 - ax + 2 > 0$ and $x^2 - bx + 8 \geq 0$ for all real numbers x , then the largest possible value of $2a - 6b$ is

25 Nov 2018, Slot 2, Q92

Type in the answer.

184. $\frac{1}{\log_2 100} - \frac{1}{\log_4 100} + \frac{1}{\log_5 100} - \frac{1}{\log_{10} 100} + \frac{1}{\log_{20} 100} - \frac{1}{\log_{25} 100} + \frac{1}{\log_{50} 100} = ?$

25 Nov 2018, Slot 2, Q93

- (A) $\frac{1}{2}$ (B) 10
(C) 0 (D) -4

185. If $p^3 = q^4 = r^5 = s^6$, then the value of $\log_s(pqr)$ is equal to

25 Nov 2018, Slot 2, Q94

- (A) $\frac{47}{10}$ (B) $\frac{24}{5}$
(C) $\frac{16}{5}$ (D) 1

186. Let $t_1, t_2, \dots$ be real numbers such that $t_1 + t_2 + \dots + t_n = 2n^2 + 9n + 13$, for every positive integer $n \geq 2$. If $t_k = 103$, then k equals

25 Nov 2018, Slot 2, Q100

Type in the answer.

CAT 2017 Slot 1 - Questions 187-196

187. If a and b are integers of opposite signs such that $(a + 3)^2 : b^2 = 9 : 1$ and $(a - 1)^2 : (b - 1)^2 = 4 : 1$, then the ratio $a^2 : b^2$ is

26 Nov 2017, Slot 1, Q79

- (A) 9:4 (B) 81:4
(C) 1:4 (D) 25:4

188. Suppose, $\log_3 x = \log_{12} y = a$, where x, y are positive numbers. If G is the geometric mean of x and y , and $\log_6 G$ is equal to

26 Nov 2017, Slot 1, Q87

- (A) $\sqrt{a}$ (B) $2a$
(C) $a/2$ (D) a

189. If $x + 1 = x^2$ and $x > 0$, then $2x^4$ is

26 Nov 2017, Slot 1, Q88

- (A) $6 + 4\sqrt{5}$ (B) $3 + 3\sqrt{5}$
(C) $5 + 3\sqrt{5}$ (D) $7 + 3\sqrt{5}$

190. The value of $\log_{0.008} \sqrt{5} + \log_{\sqrt{3}} 81 - 7$ is equal to

26 Nov 2017, Slot 1, Q89

- (A) $1/3$ (B) $2/3$
(C) $5/6$ (D) $7/6$

191. If $9^{2x-1} - 81^{x-1} = 1944$, then x is

26 Nov 2017, Slot 1, Q90

- (A) 3 (B) $9/4$
(C) $4/9$ (D) $1/3$

192. For how many integers n , will the inequality $(n - 5)(n - 10) - 3(n - 2) \leq 0$ be satisfied?

26 Nov 2017, Slot 1, Q92

Type in the answer.

193. If $f_1(x) = x^2 + 11x + n$ and $f_2(x) = x$, then the largest positive integer n for which the equation $f_1(x) = f_2(x)$ has two distinct real roots is

26 Nov 2017, Slot 1, Q93

Type in the answer.

194. If the square of the 7th term of an arithmetic progression with positive common difference equals the product of the 3rd and 17th terms, then the ratio of the first term to the common difference is

- (A) 2:3 (B) 3:2
(C) 3:4 (D) 4:3
-

195. $f(x) = \frac{5x+2}{3x-5}$ and $g(x) = x^2 - 2x - 1$, then the value of $g(f(f(3)))$ is

26 Nov 2017, Slot 1, Q99

- (A) 2 (B) $\frac{1}{3}$
(C) 6 (D) $\frac{2}{3}$
-

196. Let $a_1, a_2, \dots, a_{3n}$ be an arithmetic progression with $a_1 = 3$ and $a_2 = 7$. If $a_1 + a_2 + \dots + a_{3n} = 1830$, then what is the smallest positive integer m such that $m(a_1 + a_2 + \dots + a_n) > 1830$?

26 Nov 2017, Slot 1, Q100

- (A) 8 (B) 9
(C) 10 (D) 11
-

CAT 2017 Slot 2 - Questions 197-206

197. If x is a real number such that $\log_3 5 = \log_5(2 + x)$, then which of the following is true?

26 Nov 2017, Slot 2, Q88

- (A) $0 < x < 3$ (B) $23 < x < 30$
(C) $x > 30$ (D) $3 < x < 23$

198. Let $f(x) = x^2$ and $g(x) = 2^x$, for all real x . Then the value of $f[f(g(x)) + g(f(x))]$ at $x = 1$ is

26 Nov 2017, Slot 2, Q89

- (A) 16 (B) 18
(C) 36 (D) 40

199. The minimum possible value of the sum of the squares of the roots of the equation $x^2 + (a + 3)x - (a + 5) = 0$ is

26 Nov 2017, Slot 2, Q90

- (A) 1 (B) 2
(C) 3 (D) 4

200. If $9^{x-\frac{1}{2}} - 2^{2x-2} = 4^x - 3^{2x-3}$, then x is

26 Nov 2017, Slot 2, Q91

- (A) $3/2$ (B) $2/5$
(C) $3/4$ (D) $4/9$

201. If $\log(2^a \times 3^b \times 5^c)$ is the arithmetic mean of $\log(2^2 \times 3^3 \times 5)$, $\log(2^6 \times 3 \times 5^7)$, and $\log(2 \times 3^2 \times 5^4)$, then a equals

26 Nov 2017, Slot 2, Q92

Type in the answer.

202. Let a_1, a_2, a_3, a_4, a_5 be a sequence of five consecutive odd numbers. Consider a new sequence of five consecutive even numbers ending with $2a_3$. If the sum of the numbers in the new sequence is 450, then a_5 is

26 Nov 2017, Slot 2, Q93

Type in the answer.

203. If $f(ab) = f(a)f(b)$ for all positive integers a and b , then the largest possible value of $f(1)$ is

26 Nov 2017, Slot 2, Q97

Type in the answer.

204. Let $f(x) = 2x - 5$ and $g(x) = 7 - 2x$. Then $|f(x) + g(x)| = |f(x)| + |g(x)|$ if and only if

26 Nov 2017, Slot 2, Q98

- (A) $\frac{5}{2} < x < \frac{7}{2}$ (B) $x \leq \frac{5}{2}$ or $x \geq \frac{7}{2}$
(C) $x < \frac{5}{2}$ or $x \geq \frac{7}{2}$ (D) $\frac{5}{2} \leq x \leq \frac{7}{2}$
-

205. An infinite geometric progression $a_1, a_2, \dots$ has the property that $a_n = 3(a_{n+1} + a_{n+2} + \dots)$ for every $n \geq 1$. If the sum $a_1 + a_2 + a_3 + \dots = 32$, then a_5 is

26 Nov 2017, Slot 2, Q99

- (A) $1/32$ (B) $2/32$
(C) $3/32$ (D) $4/32$
-

206. If $a_1 = \frac{1}{2 \times 5}$, $a_2 = \frac{1}{5 \times 8}$, $a_3 = \frac{1}{8 \times 11}$, ..., then $a_1 + a_2 + a_3 + \dots + a_{100}$ is

26 Nov 2017, Slot 2, Q100

- (A) $\frac{25}{151}$ (B) $\frac{1}{2}$
(C) $\frac{1}{4}$ (D) $\frac{111}{55}$
-

CAT 2008 - Questions 207-213

207. If the roots of the equation $x^3 - ax^2 + bx - c = 0$ are three consecutive integers, then what is the smallest possible value of b ?

16 Nov 2008, Q3

- | | |
|---------------------------|----------|
| (A) $\frac{-1}{\sqrt{3}}$ | (B) -1 |
| (C) 0 | (D) 1 |
| (E) $\frac{1}{\sqrt{3}}$ | |

208. A shop stores x kg of rice. The first customer buys half this amount plus half a kg of rice. The second customer buys half the remaining amount plus half a kg of rice. Then the third customer also buys half the remaining amount plus half a kg of rice. Thereafter, no rice is left in the shop. Which of the following best describes the value of x ?

16 Nov 2008, Q4

- | | |
|-------------------------|-------------------------|
| (A) $2 \leq x \leq 6$ | (B) $5 \leq x \leq 8$ |
| (C) $9 \leq x \leq 12$ | (D) $11 \leq x \leq 14$ |
| (E) $13 \leq x \leq 18$ | |

209. Let $f(x) = ax^2 + bx + c$, where a , b and c are certain constants and $a \neq 0$? It is known that $f(5) = -3f(2)$. and that 3 is a root of $f(x) = 0$. What is the other root of $f(x) = 0$?

16 Nov 2008, Q5

- | | |
|--------------------------|----------|
| (A) -7 | (B) -4 |
| (C) 2 | (D) 6 |
| (E) cannot be determined | |

210. Let $f(x) = ax^2 + bx + c$, where a , b and c are certain constants and $a \neq 0$? It is known that $f(5) = -3f(2)$. and that 3 is a root of $f(x) = 0$. What is the value of $a + b + c$?

16 Nov 2008, Q6

- | | |
|--------------------------|----------|
| (A) 9 | (B) 14 |
| (C) 13 | (D) 37 |
| (E) cannot be determined | |

211. The number of common terms in the two sequences 17, 21, 25,..., 417 and 16, 21, 26,..., 466 is

16 Nov 2008, Q7

- | | |
|----------|----------|
| (A) 78 | (B) 19 |
| (C) 20 | (D) 77 |
| (E) 22 | |

212. Let $f(x) \neq 0$ for any 'x' be a function satisfying $f(x)f(y) = f(xy)$ for all real x, y . If $f(2) = 4$, then what is the value of $f(\frac{1}{2})$?

- (A) 0
(B) $\frac{1}{4}$
(C) $\frac{1}{2}$
(D) 1
(E) cannot be determined
-

213. Find the sum $\sqrt{1 + \frac{1}{1^2} + \frac{1}{2^2}} + \sqrt{1 + \frac{1}{2^2} + \frac{1}{3^2}} + \dots + \sqrt{1 + \frac{1}{2007^2} + \frac{1}{2008^2}}$

16 Nov 2008, Q24

- (A) $2008 - \frac{1}{2008}$
(B) $2007 - \frac{1}{2007}$
(C) $2007 - \frac{1}{2008}$
(D) $2008 - \frac{1}{2007}$
(E) $2008 - \frac{1}{2009}$
-

CAT 2007 - Questions 214-221

214. A function $f(x)$ satisfies $f(1) = 3600$, and $f(1) + f(2) + \dots + f(n) = n^2 f(n)$, for all positive integers $n > 1$. What is the value of $f(9)$?

18 Nov 2007, Q3

- (A) 80 (B) 240
(C) 200 (D) 100
(E) 120

215. A confused bank teller transposed the rupees and paise when he cashed a cheque for Shailaja, giving her rupees instead of paise and paise instead of rupees. After buying a toffee for 50 paise, Shailaja noticed that she was left with exactly three times as much as the amount on the cheque. Which of the following is a valid statement about the cheque amount?

18 Nov 2007, Q5

- (A) Over Rupees 13 but less than Rupees 14 (B) Over Rupees 7 but less than Rupees 8
(C) Over Rupees 22 but less than Rupees 23 (D) Over Rupees 18 but less than Rupees 19
(E) Over Rupees 4 but less than Rupees 5

Questions 216 to 217

Directions for the following two questions:

Mr. David manufactures and sells a single product at a fixed price in a niche market. The selling price of each unit is Rs. 30. On the other hand, the cost, in rupees, of producing x units is $240 + bx + cx^2$, where b and c are some constants. Mr. David noticed that doubling the daily production from 20 to 40 units increases the daily production cost by 66.67%. However, an increase in daily production from 40 to 60 units results in an increase of only 50% in the daily production cost. Assume that demand is unlimited and that Mr. David can sell as much as he can produce. His objective is to maximize the profit.

216. How many units should Mr. David produce daily?

18 Nov 2007, Q19

- (A) 130 (B) 100
(C) 70 (D) 150
(E) Cannot be determined

217. What is the maximum daily profit, in rupees, that Mr. David can realize from his business?

18 Nov 2007, Q20

- (A) 620 (B) 920
(C) 840 (D) 760
(E) Cannot be determined

218. The price of Darjeeling tea (in rupees per kilogram) is $100 + 0.10n$, on the n th day of 2007 ($n=1, 2, \dots, 100$), and then remains constant. On the other hand, the price of Ooty tea (in rupees per kilogram) is $89 + 0.15n$, on the n th day of 2007 ($n = 1, 2, \dots, 365$). On which date in 2007 will the

prices of these two varieties of tea be equal?

18 Nov 2007, Q21

- (A) May 21
(C) May 20
(E) June 30
- (B) April 11
(D) April 10

219. A quadratic function $f(x)$ attains a maximum of 3 at $x = 1$. The value of the function at $x = 0$ is 1. What is the value of $f(x)$ at $x = 10$?

18 Nov 2007, Q23

- (A) -119
(C) -110
(E) -105
- (B) -159
(D) -180

Questions 220 to 221

Directions for the following two questions:

Let $a_1 = p$ and $b_1 = q$, where p and q are positive quantities.

Define $a_n = pb_{n-1}$, $b_n = qa_{n-1}$, for even $n > 1$. and $a_n = pa_{n-1}$, $b_n = qb_{n-1}$, for odd $n > 1$.

220. Which of the following best describes $a_n + b_n$ for even n ?

18 Nov 2007, Q24

- (A) $q(pq)^{(n/2)-1}(p+q)^{n/2}$
(C) $qp^{n/2}(p+q)$
(E) $q^{n/2}(p+q)^{n/2}$
- (B) $q(pq)^{(n/2)-1}(p+q)$
(D) $q^{n/2}(p+q)$

221. If $p = 1/3$ and $q = 2/3$, then what is the smallest odd n such that $a_n + b_n < 0.01$?

18 Nov 2007, Q25

- (A) 7
(C) 11
(E) 15
- (B) 13
(D) 9

222. If $x = -0.5$, then which of the following has the smallest value?

19 Nov 2006, Q52

- (A) $2^{1/x}$ (B) $1/x$
(C) $1/x^2$ (D) 2^x
(E) $1/\sqrt{-x}$

223. Consider a sequence where the n^{th} term, $t_n = n/(n+2)$, $n = 1, 2, \dots$. The value of $t_3 * t_4 * t_5 * \dots * t_{53}$ equals.

19 Nov 2006, Q53

- (A) $2/495$ (B) $2/477$
(C) $12/55$ (D) $1/1485$
(E) $1/2970$

224. Which among $2^{1/2}$, $3^{1/3}$, $4^{1/4}$, $6^{1/6}$, and $12^{1/12}$ is the largest?

19 Nov 2006, Q54

- (A) $2^{1/2}$ (B) $3^{1/3}$
(C) $4^{1/4}$ (D) $6^{1/6}$
(E) $12^{1/12}$

225. A group of 630 children is arranged in rows for a group photograph session. Each row contains three fewer children than the row in front of it. What number of rows is not possible?

19 Nov 2006, Q60

- (A) 3 (B) 4
(C) 5 (D) 6
(E) 7

226. What values of x satisfy $x^{2/3} + x^{1/3} - 2 \leq 0$?

19 Nov 2006, Q63

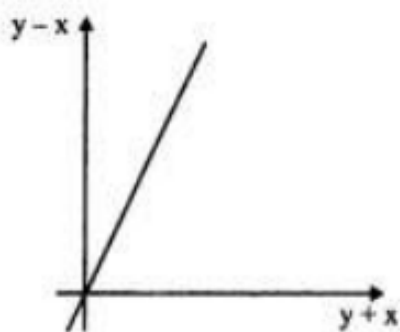
- (A) $-8 \leq x \leq 1$ (B) $-1 \leq x \leq 8$
(C) $1 \leq x \leq 8$ (D) $1 \leq x \leq 18$
(E) $-8 \leq x \leq 8$

227. Consider the set $S = \{1, 2, 3, \dots, 1000\}$. How many arithmetic progressions can be formed from the elements of S that start with 1 and end with 1000 and have at least 3 elements?

19 Nov 2006, Q64

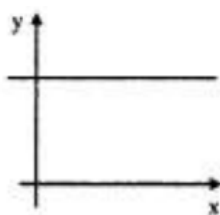
- (A) 3 (B) 4
(C) 6 (D) 7
(E) 8

228. The graph of $y - x$ (on the y axis) against $y + x$ (on the x axis) is as shown below. (All graphs in this question are drawn to scale and the same scale has been used on each axis.)

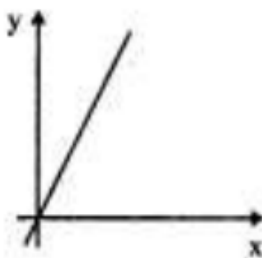


Which of the following shows the graph of y against x ?

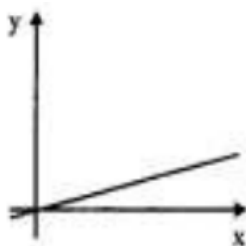
19 Nov 2006, Q65



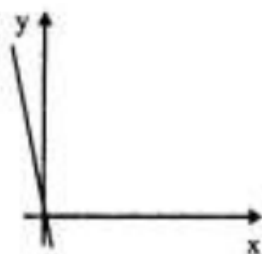
(A)



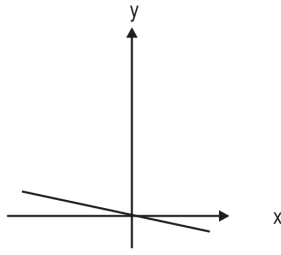
(B)



(C)



(D)



(E)

229. The number of solutions of the equation $2x + y = 40$ where both x and y are positive integers and $x \leq y$ is:

19 Nov 2006, Q67

- (A) 7 (B) 13
(C) 14 (D) 18
(E) 20

230. If $\log_y x = (a * \log_z y) = (b * \log_x z) = ab$, then which of the following pairs of values for (a, b) is not possible?

19 Nov 2006, Q70

- (A) $(-2, 1/2)$ (B) $(1, 1)$
(C) $(0.4, 2.5)$ (D) $(\pi, 1/\pi)$
(E) $(2, 2)$

231. What are the values of x and y that satisfy both the equations? $2^{0.7x} * 3^{-1.25y} = 8\sqrt{6}/27$
 $4^{0.3x} * 9^{0.2y} = 8 * 81^{1/5}$

19 Nov 2006, Q71

- (A) $x = 2, y = 5$ (B) $x = 2.5, y = 6$
(C) $x = 3, y = 5$ (D) $x = 3, y = 4$
(E) $x = 5, y = 2$

232. Let $f(x) = \max(2x + 1, 3 - 4x)$, where x is a real number. Then the minimum possible value of $f(x)$ is:

19 Nov 2006, Q72

- (A) $1/3$ (B) $1/2$
(C) $2/3$ (D) $4/3$
(E) $5/3$

CAT 2005 - Questions 233-239

233. If $R = (30^{65} - 29^{65}) / (30^{64} + 29^{64})$, then

20 Nov 2005, Q8

- (A) $0 < R \leq 0.1$ (B) $0.1 < R \leq 0.5$
 (C) $0.5 < R \leq 1.0$ (D) $R > 1.0$

234. If $a_1 = 1$ and $a_{n+1} - 3a_n + 2 = 4n$ for every positive integer n , then a_{100} equals

20 Nov 2005, Q14

- (A) $3^{99} - 200$ (B) $3^{99} + 200$
 (C) $3^{100} - 200$ (D) $3^{100} + 200$

235. If $x \geq y$ and $y > 1$, then the value of the expression $\log_x(x/y) + \log_y(y/x)$ can never be

20 Nov 2005, Q18

- (A) -1 (B) -0.5
 (C) 0 (D) 1

236. Let $x = \sqrt{4 + \sqrt{4 - \sqrt{4 + \sqrt{4 - \dots}}}}$ to infinity. Then x equals

20 Nov 2005, Q26

- (A) 3 (B) $(\sqrt{13} - 1)/2$
 (C) $(\sqrt{13} + 1)/2$ (D) $\sqrt{13}$

237. Let $g(x)$ be a function such that $g(x+1) + g(x-1) = g(x)$ for every real x . Then for what value of p is the relation $g(x+p) = g(x)$ necessarily true for every real x ?

20 Nov 2005, Q27

- (A) 5 (B) 3
 (C) 2 (D) 6

238. A telecom service provider engages male and female operators for answering 1000 calls per day. A male operator can handle 40 calls per day whereas a female operator can handle 50 calls per day. The male and the female operators get a fixed wage of Rs. 250 and Rs. 300 per day respectively. In addition, a male operator gets Rs. 15 per call he answers and a female operator gets Rs. 10 per call she answers. To minimize the total cost, how many male operators should the service provider employ assuming he has to employ more than 7 of the 12 female operators available for the job?

20 Nov 2005, Q28

- (A) 15 (B) 14
 (C) 12 (D) 10

239. A rectangular floor is fully covered with square tiles of identical size. The tiles on the edges are white and the tiles in the interior are red. The number of white tiles is the same as the number of red tiles. A possible value of the

number of tiles along one edge of the floor is

20 Nov 2005, Q30

(A) 10

(B) 12

(C) 14

(D) 16

CAT 2004 - Questions 240-250

240. If the sum of the first 11 terms of an arithmetic progression equals that of the first 19 terms, then what is the sum of the first 30 terms?

21 Nov 2004, Q41

- (A) 0 (B) -1
(C) 1 (D) Not unique

241. On January 1, 2004 two new societies S1 and S2 are formed, each n numbers. On the first day of each subsequent month, S1 adds b members while S2 multiplies its current numbers by a constant factor r. Both the societies have the same number of members on July 2, 2004. If $b = 10.5n$, what is the value of r?

21 Nov 2004, Q43

- (A) 2.0 (B) 1.9
(C) 1.8 (D) 1.7

242. If $f(x) = x^3 - 4x + p$, and $f(0)$ and $f(1)$ are of opposite signs, then which of the following is necessarily true [CAT 2004]

21 Nov 2004, Q44

- (A) $-1 < p < 2$ (B) $0 < p < 3$
(C) $-2 < p < 1$ (D) $-3 < p < 0$

243. If $\frac{a}{b+c} = \frac{b}{a+c} = \frac{c}{b+a} = r$, then r cannot take any value except

21 Nov 2004, Q47

- (A) $1/2$ (B) -1
(C) $1/2$ or -1 (D) $-1/2$ or -1

244. Let $y = \frac{1}{2 + \frac{1}{3 + \frac{1}{2 + \frac{1}{3 + \dots}}}}$. Then y equals?

21 Nov 2004, Q48

- (A) $\frac{\sqrt{11} + 3}{2}$ (B) $\frac{\sqrt{11} - 3}{2}$
(C) $\frac{\sqrt{15} + 3}{2}$ (D) $\frac{\sqrt{15} - 3}{2}$

245. Let $f(x) = ax^2 - b|x|$, where a and b are constants. Then at $x = 0$, $f(x)$ is

21 Nov 2004, Q56

- (A) maximized whenever $a > 0, b > 0$ (B) maximized whenever $a > 0, b < 0$
(C) minimized whenever $a > 0, b > 0$ (D) minimized whenever $a > 0, b < 0$

246. Each family in a locality has at most two adults, and no family has fewer than 3 children. Considering all the families together, there are more adults than boys, more boys than girls, and more

girls than families. Then the minimum possible number of families in the locality is

21 Nov 2004, Q57

- (A) 4 (B) 5
(C) 2 (D) 3

247. Consider the sequence of numbers $a_1, a_2, a_3, \dots$ to infinity where $a_1 = 81.33$ and $a_2 = -19$ and $a_j = a_{j-1} - a_{j-2}$ for $j \geq 3$. What is the sum of the first 6002 terms of this sequence?

21 Nov 2004, Q60

- (A) -100.33 (B) -30.00
(C) 62.33 (D) 119.33

248. Let $u = (\log_2 x)^2 - 6\log_2 x + 12$ where x is a real number. Then the equation $x^u = 256$, has

21 Nov 2004, Q62

- (A) no solution for x (B) exactly one solution for x
(C) exactly two distinct solutions for x (D) exactly three distinct solutions for x

Questions 249 to 250

Directions for the following two questions:

Answer the questions on the basis of the information given below.

$$f_1(x) = x \text{ if } 0 \leq x \leq 1 \quad f_1(x) = 1 \text{ if } x > 1 \quad f_1(x) = 0 \text{ otherwise}$$

$$f_2(x) = f_1(-x) \text{ for all } x$$

$$f_3(x) = -f_2(x) \text{ for all } x$$

$$f_4(x) = f_3(-x) \text{ for all } x$$

249. How many of the following products are necessarily zero for every x :

$$f_1(x)f_2(x), f_2(x)f_3(x), f_2(x)f_4(x)$$

21 Nov 2004, Q63

- (A) 0 (B) 1
(C) 2 (D) 3

250. Which of the following is necessarily true?

21 Nov 2004, Q64

- (A) $f_4(x) = f_1(x)$ for all x (B) $f_1(x) = -f_3(-x)$ for all x
(C) $f_2(-x) = f_4(x)$ for all x (D) $f_1(x) + f_3(x) = 0$ for all x

CAT 2003 Re-test (15 Feb 2004) - Questions 251-267

251. If both a and b belong to the set $\{1, 2, 3, 4\}$, then the number of equations of the form $ax^2 + bx + 1 = 0$ having real roots is

15 Feb 2004, CAT 2003 Re-test, Q64

- | | |
|--------|--------|
| (A) 10 | (B) 7 |
| (C) 6 | (D) 12 |

252. If $\log_{10} x - \log_{10} \sqrt{x} = 2 \log_x 10$, then the possible value of x is given by

15 Feb 2004, CAT 2003 Re-test, Q65

- | | |
|----------------------|---------------------|
| (A) 10 | (B) $\frac{1}{100}$ |
| (C) $\frac{1}{1000}$ | (D) None of these |

253. If $\frac{1}{3} \log_3 M + 3 \log_3 N = 1 + \log_{0.008} 5$, then

15 Feb 2004, CAT 2003 Re-test, Q70

- | | |
|-------------------------|-------------------------|
| (A) $M^9 = \frac{9}{N}$ | (B) $N^9 = \frac{9}{M}$ |
| (C) $M^3 = \frac{3}{N}$ | (D) $N^9 = \frac{3}{M}$ |

254. If x and y are integers, then the equation $5x + 19y = 64$ has

15 Feb 2004, CAT 2003 Re-test, Q74

- | | |
|---|--|
| (A) no solution for $x < 300$ and $y < 0$ | (B) no solution for $x > 250$ and $y > -100$ |
| (C) a solution for $250 < x < 300$ | (D) a solution for $-59 < y < -56$ |

255. What is the sum of ' n ' terms in the series $\log m + \log \left(\frac{m^2}{n} \right) + \log \left(\frac{m^3}{n^2} \right) + \log \left(\frac{m^4}{n^3} \right) + \dots$?

15 Feb 2004, CAT 2003 Re-test, Q75

- | | |
|---|---|
| (A) $\log \left[\frac{n^{(n-1)}}{m^{(n+1)}} \right]^{\frac{n}{2}}$ | (B) $\log \left[\frac{m^m}{n^n} \right]^{\frac{n}{2}}$ |
| (C) $\log \left[\frac{m^{(1-n)}}{n^{(1-m)}} \right]^{\frac{n}{2}}$ | (D) $\log \left[\frac{m^{(n+1)}}{n^{(n-1)}} \right]^{\frac{n}{2}}$ |

256. Let S_1 be a square of side a . Another square S_2 is formed by joining the mid-points of the sides of S_1 . The same process is applied to S_2 to form yet another square S_3 , and so on. If $A_1, A_2, A_3, \dots$ be the areas and $P_1, P_2, P_3, \dots$ be the perimeters of $S_1, S_2, S_3, \dots$, respectively, then the ratio $\frac{P_1 + P_2 + P_3 + \dots}{A_1 + A_2 + A_3 + \dots}$ equals

15 Feb 2004, CAT 2003 Re-test, Q76

- | | |
|---------------------------------|----------------------------------|
| (A) $\frac{2(1 + \sqrt{2})}{a}$ | (B) $\frac{2(2 - \sqrt{2})}{a}$ |
| (C) $\frac{2(2 + \sqrt{2})}{a}$ | (D) $\frac{2(1 + 2\sqrt{2})}{a}$ |

257. If three positive real numbers x , y and z satisfy $y - x = z - y$ and $xyz = 4$, then what is the minimum possible value of y ?

15 Feb 2004, CAT 2003 Re-test, Q77

- (A) $2^{1/3}$ (B) $2^{2/3}$
(C) $2^{1/4}$ (D) $2^{3/4}$
-

258. The infinite sum $1 + \frac{4}{7} + \frac{9}{7^2} + \frac{16}{7^3} + \frac{25}{7^4} + \dots$ equals

15 Feb 2004, CAT 2003 Re-test, Q79

- (A) $\frac{27}{14}$ (B) $\frac{21}{13}$
(C) $\frac{49}{27}$ (D) $\frac{256}{147}$
-

259. The number of roots common between the two equations $x^3 + 3x^2 + 4x + 5 = 0$ and $x^3 + 2x^2 + 7x + 3 = 0$ is

15 Feb 2004, CAT 2003 Re-test, Q82

- (A) 0 (B) 1
(C) 2 (D) 3
-

260. A real number x satisfying $1 - \frac{1}{n} < x \leq 3 + \frac{1}{n}$, for every positive integer n , is best described by

15 Feb 2004, CAT 2003 Re-test, Q83

- (A) $1 < x < 4$ (B) $1 < x \leq 3$
(C) $0 < x \leq 4$ (D) $1 \leq x \leq 3$
-

261. If n is such that $36 \leq n \leq 72$, then $x = \frac{n^2 + 2\sqrt{n}(n+4) + 16}{n + 4\sqrt{n} + 4}$ satisfies

15 Feb 2004, CAT 2003 Re-test, Q84

- (A) $20 < x < 54$ (B) $23 < x < 58$
(C) $25 < x < 64$ (D) $28 < x < 60$
-

262. If $13x + 1 < 2z$ and $z + 3 = 5y^2$, then

15 Feb 2004, CAT 2003 Re-test, Q85

- (A) x is necessarily less than y (B) x is necessarily greater than y
(C) x is necessarily equal to y (D) None of the above is necessarily true
-

263. If $|b| \geq 1$ and $x = -|a|b$, then which one of the following is necessarily true?

15 Feb 2004, CAT 2003 Re-test, Q87

- (A) $a - xb < 0$ (B) $a - xb \geq 0$
(C) $a - xb > 0$ (D) $a - xb \leq 0$
-

264. In a coastal village, every year floods destroy exactly half of the huts. After the flood water recedes, twice the number of huts destroyed are rebuilt. The floods occurred consecutively in the last three years

— 2001, 2002 and 2003. If floods are expected again in 2004, the number of huts expected to be destroyed is

15 Feb 2004, CAT 2003 Re-test, Q93

- (A) less than the number of huts existing at the beginning of 2001
- (B) less than the total number of huts destroyed by floods in 2001 and 2003
- (C) less than the total number of huts destroyed by floods in 2002 and 2003
- (D) more than the total number of huts built in 2001 and 2002

Questions 265 to 267

Directions for Questions 265 to 267: Answer the questions on the basis of the tables given below.

Two binary operations $\oplus$ and $*$ are defined over the set $\{a, e, f, g, h\}$ as per the following tables:

$\oplus$	a	e	f	g	h
a	a	e	f	g	h
e	e	f	g	h	a
f	f	g	h	a	e
g	g	h	a	e	f
h	h	a	e	f	g

$*$	a	e	f	g	h
a	a	a	a	a	a
e	a	e	f	g	h
f	a	f	h	e	g
g	a	g	e	h	f
h	a	h	g	f	e

Thus, according to the first table $f \oplus g = a$, while according to the second table $g * h = f$, and so on. Also, let $f^2 = f * f$, $g^3 = g * g * g$, and so on.

265. What is the smallest positive integer n such that $g^n = e$?

15 Feb 2004, CAT 2003 Re-test, Q94

- (A) 4
- (B) 5
- (C) 2
- (D) 3

266. Upon simplification, $f \oplus [f * \{f \oplus (f * f)\}]$ equals

15 Feb 2004, CAT 2003 Re-test, Q95

- (A) e
- (B) f
- (C) g
- (D) h

267. Upon simplification, $\{a^{10} * (f^{10} \oplus g^9)\} \oplus e^8$ equals

15 Feb 2004, CAT 2003 Re-test, Q96

- (A) e
- (B) f
- (C) g
- (D) h

268. The number of non-negative real roots of $2^x - x - 1 = 0$ equals

23 Nov 2003, CAT 2003 Original sitting, Q105

- (A) 0 (B) 1
(C) 2 (D) 3

269. When the curves $y = \log_{10}x$ and $y = x^{-1}$ are drawn in the x-y plane, how many times do they intersect for values $x \geq 1$?

23 Nov 2003, CAT 2003 Original sitting, Q106

- (A) Never (B) Once
(C) Twice (D) More than twice

270. Which one of the following conditions must p, q and r satisfy so that the following system of linear simultaneous equations has at least one solution, such that $p + q + r \neq 0$?
 $x + 2y - 3z = p$
 $2x + 6y - 11z = q$
 $x - 2y + 7z = r$

23 Nov 2003, CAT 2003 Original sitting, Q108

- (A) $5p - 2q - r = 0$ (B) $5p + 2q + r = 0$
(C) $5p + 2q - r = 0$ (D) $5p - 2q + r = 0$

271. A leather factory produces two kinds of bags, standard and deluxe. The profit margin is Rs. 20 on a standard bag and Rs. 30 on a deluxe bag. Every bag must be processed on machine A and on Machine B. The processing times per bag on the two machines are as follows:

	Time Required (Hours/bag)	
	Machine A	Machine B
Standard Bag	4	6
Deluxe Bag	5	10

The total time available on machine A is 700 hours and on machine B is 1250 hours. Among the following production plans, which one meets the machine availability constraints and maximizes the profit?

23 Nov 2003, CAT 2003 Original sitting, Q109

- (A) Standard 75 bags, Deluxe 80 bags (B) Standard 100 bags, Deluxe 60 bags
(C) Standard 50 bags, Deluxe 100 bags (D) Standard 60 bags, Deluxe 90 bags

272. The sum of 3rd and 15th elements of an arithmetic progression is equal to the sum of 6th, 11th and 13th elements of the same progression. Then which element of the series should necessarily be equal to zero?

23 Nov 2003, CAT 2003 Original sitting, Q110

- (A) 1st (B) 9th
(C) 12th (D) None of the above

273. A test has 50 questions. A student scores 1 mark for a correct answer, $-1/3$ for a wrong answer, and $-1/6$ for not attempting a question. If the net score of a student is 32, the number of questions answered wrongly by that student cannot be less than

- (A) 6 (B) 12
(C) 3 (D) 9

274. Let $g(x) = \max(5 - x, x + 2)$. The smallest possible value of $g(x)$ is

23 Nov 2003, CAT 2003 Original sitting, Q116

- (A) 4.0 (B) 4.5
(C) 1.5 (D) None of the above

275. The function $f(x) = |x - 2| + |2.5 - x| + |3.6 - x|$, where x is a real number, attains a minimum at

23 Nov 2003, CAT 2003 Original sitting, Q117

- (A) $x = 2.3$ (B) $x = 2.5$
(C) $x = 2.7$ (D) None of the above

276. The 288th term of the series $a, b, b, c, c, c, d, d, d, d, e, e, e, e, f, f, f, f, f, \dots$ is

23 Nov 2003, CAT 2003 Original sitting, Q128

- (A) u (B) v
(C) w (D) x

277. Let p and q be the roots of the quadratic equation $x^2 - (\alpha - 2)x - \alpha - 1 = 0$. What is the minimum possible value of $p^2 + q^2$?

23 Nov 2003, CAT 2003 Original sitting, Q129

- (A) 0 (B) 3
(C) 4 (D) 5

278. Let a, b, c, d be four integers such that $a + b + c + d = 4m + 1$ where m is a positive integer. Given m , which one of the following is necessarily true?

23 Nov 2003, CAT 2003 Original sitting, Q131

- (A) The minimum possible value of $a^2 + b^2 + c^2 + d^2$ is $4m^2 - 2m + 1$
(B) The minimum possible value of $a^2 + b^2 + c^2 + d^2$ is $4m^2 + 2m + 1$
(C) The maximum possible value of $a^2 + b^2 + c^2 + d^2$ is $4m^2 - 2m + 1$
(D) The maximum possible value of $a^2 + b^2 + c^2 + d^2$ is $4m^2 + 2m + 1$

279. There are 8436 steel balls, each with a radius of 1 centimeter, stacked in a pile, with 1 ball on top, 3 balls in the second layer, 6 in the third layer, 10 in the fourth, and so on. The number of horizontal layers in the pile is

23 Nov 2003, CAT 2003 Original sitting, Q138

- (A) 34 (B) 38
(C) 36 (D) 32

280. If the product of n positive real numbers is unity, then their sum is necessarily

23 Nov 2003, CAT 2003 Original sitting, Q139

- (A) a multiple of n (B) equal to $n + 1/n$
(C) never less than n (D) a positive integer
-

281. If $\log_3 2, \log_3(2^x - 5), \log_3(2^x - 7/2)$ are in arithmetic progression, then the value of x is equal to

23 Nov 2003, CAT 2003 Original sitting, Q140

- (A) 5 (B) 4
(C) 2 (D) 3
-

282. Given that $-1 \leq v \leq 1, -2 \leq u \leq -0.5$ and $-2 \leq z \leq -0.5$ and $w = vz/u$, then which of the following is necessarily true?

23 Nov 2003, CAT 2003 Original sitting, Q143

- (A) $-0.5 \leq w \leq 2$ (B) $-4 \leq w \leq 4$
(C) $-4 \leq w \leq 2$ (D) $-2 \leq w \leq -0.5$
-

283. Consider the following two curves in the x - y plane: $y = x^3 + x^2 + 5$ $y = x^2 + x + 5$ Which of following statements is true for $-2 \leq x \leq 2$?

23 Nov 2003, CAT 2003 Original sitting, Q145

- (A) The two curves intersect once. (B) The two curves intersect twice.
(C) The two curves do not intersect (D) The two curves intersect thrice.
-

284. In a certain examination paper, there are n questions. For $j = 1, 2 \dots n$, there are 2^{n-j} students who answered j or more questions wrongly. If the total number of wrong answers is 4095, then the value of n is

23 Nov 2003, CAT 2003 Original sitting, Q146

- (A) 12 (B) 11
(C) 10 (D) 9
-

285. If x, y, z are distinct positive real numbers the $(x^2(y+z) + y^2(x+z) + z^2(x+y))/xyz$ would always be

23 Nov 2003, CAT 2003 Original sitting, Q147

- (A) Less than 6 (B) greater than 8
(C) greater than 6 (D) Less than 8
-

286. If $f(x) = \log \frac{(1+x)}{(1-x)}$, then $f(x) + f(y)$ is

CAT 2002, Q54

- (A) $f(x+y)$ (B) $f \frac{(x+y)}{(1+xy)}$
 (C) $(x+y)f \frac{1}{(1+xy)}$ (D) $\frac{f(x)+f(y)}{(1+xy)}$

287. The n th element of a series is represented as $X_n = (-1)^n X_{n-1}$. If $X_0 = x$ and $x > 0$, then which of the following is always true?

CAT 2002, Q63

- (A) X_n is positive if n is even (B) X_n is positive if n is odd
 (C) X_n is negative if n is even (D) None of these

288. If x , y and z are real numbers such that $x + y + z = 5$ and $xy + yz + zx = 3$, what is the largest value that x can have?

CAT 2002, Q64

- (A) $5/3$ (B) $\sqrt{19}$
 (C) $13/3$ (D) None of these

289. The owner of a local jewellery store hired three watchmen to guard his diamonds, but a thief still got in and stole some diamonds. On the way out, the thief met each watchman, one at a time. To each he gave $1/2$ of the diamonds he had then, and 2 more besides. He escaped with one diamond. How many did he steal originally?

CAT 2002, Q66

- (A) 40 (B) 36
 (C) 25 (D) None of these

290. Mayank, Mirza, Little and Jaspal bought a motorbike for \$60. Mayank paid one-half of the sum of the amounts paid by the other boys. Mirza paid one-third of the sum of the amounts paid by the other boys. Little paid one-fourth of the sum of the amounts paid by the other boys. How much did Jaspal have to pay?

CAT 2002, Q67

- (A) \$15 (B) \$13
 (C) \$17 (D) None of these

291. A rich merchant had collected many gold coins. He did not want anybody to know about him. One day, his wife asked, "How many gold coins do we have?" After a brief pause, he replied, "Well! If I divide the coins into two unequal numbers, then 48 times the difference between the two numbers equals the difference between the squares of the two numbers." The wife looked puzzled. Can you help the merchant's wife by finding out how many gold coins the merchant has?

- (A) 96 (B) 53
(C) 43 (D) None of these

292. Shyam visited Ram during his brief vacation. In the mornings they both would go for yoga. In the evenings they would play tennis. To have more fun, they indulge only in one activity per day, i.e. either they went for yoga or played tennis each day. There were days when they were lazy and stayed home all day long. There were 24 mornings when they did nothing, 14 evenings when they stayed at home, and a total of 22 days when they did yoga or played tennis. For how many days Shyam stayed with Ram?

CAT 2002, Q69

- (A) 32 (B) 24
(C) 30 (D) None of these

293. Let S denotes the infinite sum $2 + 5x + 9x^2 + 14x^3 + 20x^4 + \dots$, where $|x| < 1$ and the coefficient of x^{n-1} is $n(n+3)/2$, ($n = 1, 2, \dots$). Then S equals:

CAT 2002, Q70

- (A) $(2-x)/(1-x)^3$ (B) $(2-x)/(1+x)^3$
(C) $(2+x)/(1-x)^3$ (D) $(2+x)/(1+x)^3$

294. If $x^2 + 5y^2 + z^2 = 2y(2x + z)$, then which of the following statements is(are) necessarily true? A. $x = 2y$ B. $x = 2z$ C. $2x = z$

CAT 2002, Q71

- (A) Only A (B) B and C
(C) A and B (D) None of these

295. A car rental agency has the following terms. If a car is rented for 5 hr or less, then, the charge is Rs. 60 per hour or Rs. 12 per kilometre whichever is more. On the other hand, if the car is rented for more than 5 hr, the charge is Rs. 50 per hour or Rs. 7.50 per kilometre whichever is more. Akil rented a car from this agency, drove it for 30 km and ended up paying Rs. 300. For how many hours did he rent the car?

CAT 2002, Q73

- (A) 4 hr (B) 5 hr
(C) 6 hr (D) None of these

296. A child was asked to add first few natural numbers (i.e. $1 + 2 + 3 + \dots$) so long his patience permitted. As he stopped, he gave the sum as 575. When the teacher declared the result wrong, the child discovered he had missed one number in the sequence during addition. The number he missed was

CAT 2002, Q74

- (A) less than 10 (B) 10
(C) 15 (D) more than 15

297. Suppose for any real number x , $[x]$ denotes the greatest integer less than or equal to x . Let $L(x, y) = [x] + [y] + [x + y]$ and $R(x, y) = [2x] + [2y]$. Then it is impossible to find

any two positive real numbers x and y for which

CAT 2002, Q75

- (A) $L(x, y) = R(x, y)$ (B) $L(x, y) \neq R(x, y)$
(C) $L(x, y) < R(x, y)$ (D) $L(x, y) > R(x, y)$
-

298. The number of real roots of the equation $A^2/x + B^2/(x-1) = 1$, where A and B are real numbers not equal to zero simultaneously, is

CAT 2002, Q78

- (A) 3 (B) 1
(C) 2 (D) Cannot be determined
-

299. A piece of string is 40 cm long. It is cut into three pieces. The longest piece is three times as long as the middle-sized and the shortest piece is 23 cm shorter than the longest piece. Find the length of the shortest piece.

CAT 2002, Q88

- (A) 27 (B) 5
(C) 4 (D) 9
-

300. If $pqr = 1$, the value of the expression $1/(1+p+q^{-1}) + 1/(1+q+r^{-1}) + 1/(1+r+p^{-1})$

CAT 2002, Q94

- (A) $p+q+r$ (B) $1/(p+q+r)$
(C) 1 (D) $p^{-1} + q^{-1} + r^{-1}$
-

301. Davji Shop sells samosas in boxes of different sizes. The samosas are priced at Rs. 2 per samosa up to 200 samosas. For every additional 20 samosas, the price of the whole lot goes down by 10 paise per samosa. What should be the maximum size of the box that would maximise the revenue?

CAT 2002, Q96

- (A) 240 (B) 300
(C) 400 (D) None of these
-

CAT 2001 - Questions 302-315

302. If $x > 5$ and $y < -1$, then which of the following statements is true?

CAT 2001, Q4

- (A) $(x + 4y) > 1$
(B) $x > -4y$
(C) $-4x < 5y$
(D) None of these

303. Two men X and Y started working for a certain company at similar jobs on January 1, 1950. X asked for an initial monthly salary of Rs. 300 with an annual increment of Rs. 30. Y asked for an initial monthly salary of Rs. 200 with a rise of Rs. 15 every 6 months. Assume that the arrangements remained unaltered till December 31, 1959. Salary is paid on the last day of the month. What is the total amount paid to them as salary during the period?

CAT 2001, Q11

- (A) Rs. 93,300
(B) Rs. 93,200
(C) Rs. 93,100
(D) None of these

304. Anita had to do a multiplication. In stead of taking 35 as one of the multipliers, she took 53. As a result, the product went up by 540. What is the new product?

CAT 2001, Q12

- (A) 1050
(B) 540
(C) 1440
(D) 1590

305. x and y are real numbers satisfying the conditions $2 < x < 3$ and $-8 < y < -7$. Which of the following expressions will have the least value?

CAT 2001, Q14

- (A) x^2y
(B) xy^2
(C) $5xy$
(D) None of these

306. m is the smallest positive integer such that for any integer $n \geq m$, the quantity $n^3 - 7n^2 + 11n - 5$ is positive. What is the value of m ?

CAT 2001, Q15

- (A) 4
(B) 5
(C) 8
(D) None of these

307. Every 10 years the Indian Government counts all the people living in the country. Suppose that the director of the census has reported the following data on two neighbouring villages Chota Hazri and Mota Hazri. Chota Hazri has 4,522 fewer males than Mota Hazri. Mota Hazri has 4,020 more females than males. Chota Hazri has twice as many females as males. Chota Hazri has 2,910 fewer females than Mota Hazri. What is the total number of males in Chota Hazri?

CAT 2001, Q21

- (A) 11,264
(B) 14,174
(C) 5,632
(D) 10,154

308. All the page numbers from a book are added, beginning at page 1. However, one page number was added twice by mistake. The sum obtained was 1000. Which page number was added twice?

CAT 2001, Q24

- (A) 44 (B) 45
(C) 10 (D) 12
-

309. At a certain fast food restaurant, Brian can buy 3 burgers, 7 shakes, and one order of fries for Rs. 120 exactly. At the same place it would cost Rs. 164.5 for 4 burgers, 10 shakes, and one order of fries. How much would it cost for an ordinary meal of one burger, one shake, and one order of fries?

CAT 2001, Q26

- (A) Rs. 31 (B) Rs. 41
(C) Rs. 21 (D) Cannot be determined
-

310. If a, b, c and d are four positive real numbers such that $abcd = 1$, what is the minimum value of $(1 + a)(1 + b)(1 + c)(1 + d)$?

CAT 2001, Q27

- (A) 4 (B) 1
(C) 16 (D) 18
-

311. For a Fibonacci sequence, from the third term onwards, each term in the sequence is the sum of the previous two terms in that sequence. If the difference in squares of 7th and 6th terms of this sequence is 517, what is the 10th term of this sequence? It is known that all the terms of the Fibonacci sequence are natural numbers

CAT 2001, Q30

- (A) 147 (B) 76
(C) 123 (D) Cannot be determined
-

312. Let x and y be two positive numbers such that $x + y = 1$. Then the minimum value of $(x + \frac{1}{x})^2 + (y + \frac{1}{y})^2$ is

CAT 2001, Q37

- (A) 12 (B) 20
(C) 12.5 (D) 13.3
-

313. In some code, letters a, b, c, d and e represent numbers 2, 4, 5, 6 and 10. We just do not know which letter represents which number. Consider the following relationships: I. $a + c = e$, II. $b - d = d$ and III. $e + a = b$ Which of the following statements is true?

CAT 2001, Q44

- (A) $b = 4, d = 2$ (B) $a = 4, e = 6$
(C) $b = 6, e = 2$ (D) $a = 4, c = 6$
-

314. Ujagar and Keshab attempted to solve a quadratic equation. Ujagar made a mistake in writing down the constant term. He ended up with the roots (4, 3). Keshab made a mistake in writing down the coefficient of x . He got the roots as (3, 2). What will be the exact roots of the original quadratic equation?

(A) (6, 1)

(B) (-3, -4)

(C) (4, 3)

(D) (-4, -3)

315. A change-making machine contains one-rupee, two-rupee and five-rupee coins. The total number of coins is 300. The amount is Rs. 960. If the numbers of one-rupee coins and two-rupee coins are interchanged, the value comes down by Rs. 40. The total number of five-rupee coins is

(A) 100

(B) 140

(C) 60

(D) 150

CAT 2000 - Questions 316-331

316.

x	1	2	3	4	5	6
y	4	8	14	22	32	44

In the above table, for suitably chosen constants a, b and c, which one of the following best describes the relation between y and x?

CAT 2000, Q57

- (A) $y = a + bx$ (B) $y = a + bx + cx^2$
 (C) $y = e^{a+bx}$ (D) None of the above

317. If $a_1 = 1$ and $a_{n+1} = 2a_n + 5$, $n=1,2,\dots$, then a_{100} is equal to:

CAT 2000, Q58

- (A) $(5 * 2^{99} - 6)$ (B) $(5 * 2^{99} + 6)$
 (C) $(6 * 2^{99} + 5)$ (D) $(6 * 2^{99} - 5)$

318. What is the value of the following expression? $\frac{1}{(2^2 - 1)} + \frac{1}{(4^2 - 1)} + \frac{1}{(6^2 - 1)} + \dots + \frac{1}{(20^2 - 1)}$

CAT 2000, Q59

- (A) 9/19 (B) 10/19
 (C) 10/21 (D) 11/21

319. If $x > 2$ and $y > -1$, then which of the following statements is necessarily true?

CAT 2000, Q62

- (A) $xy > -2$ (B) $-x < 2y$
 (C) $xy < -2$ (D) $-x > 2y$

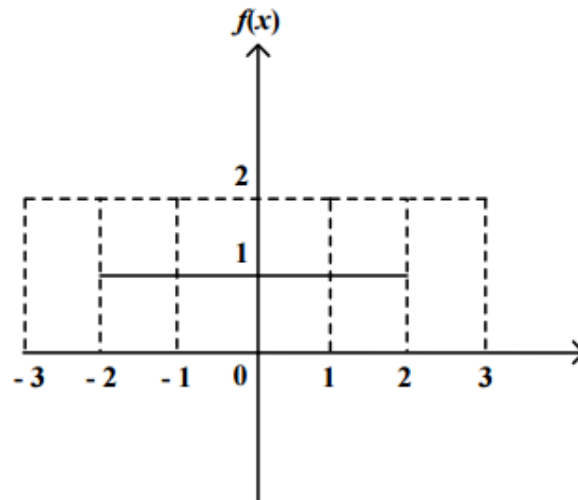
Questions 320 to 322

Directions for the next 3 questions:

Given below are three graphs made up of straight-line segments shown as thick lines. In each case choose the answer as:

- a) if $f(x) = 3f(-x)$
 b) if $f(x) = -f(-x)$
 c) if $f(x) = f(-x)$
 d) if $3f(x) = 6f(-x)$, for $x \geq 0$

320.



CAT 2000, Q82

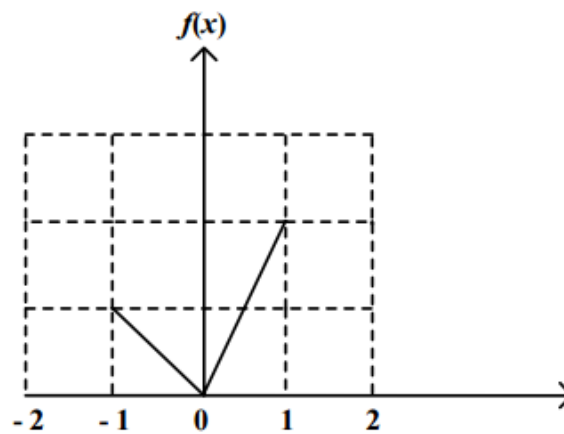
(A) if $f(x) = 3f(-x)$

(B) if $f(x) = -f(-x)$

(C) if $f(x) = f(-x)$

(D) if $3f(x) = 6f(-x)$, for $x \geq 0$

321.



CAT 2000, Q83

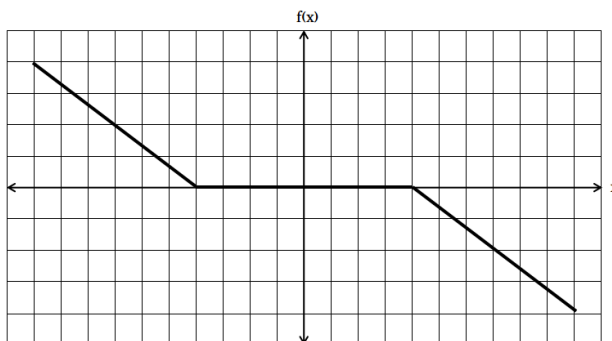
(A) if $f(x) = 3f(-x)$

(B) if $f(x) = -f(-x)$

(C) if $f(x) = f(-x)$

(D) if $3f(x) = 6f(-x)$, for $x \geq 0$

322.



CAT 2000, Q84

(A) if $f(x) = 3f(-x)$

(B) if $f(x) = -f(-x)$

(C) if $f(x) = f(-x)$

(D) if $3f(x) = 6f(-x)$, for $x \geq 0$

Questions 323 to 324

Directions for the next 2 questions:

For a real number x , let

$f(x) = 1/(1+x)$, if x is non-negative

$f(x) = 1+x$, if x is negative

$f^n(x) = f(f^{n-1}(x))$, $n = 2, 3, \dots$

323. What is the value of the product, $f(2)f^2(2)f^3(2)f^4(2)f^5(2)$?

CAT 2000, Q87

(A) $1/3$

(B) 3

(C) $1/18$

(D) None of these

324. r is an integer ≥ 2 . Then, what is the value of $f^{r-1}(-r) + f^r(-r) + f^{r+1}(-r)$?

CAT 2000, Q88

(A) -1

(B) 0

(C) 1

(D) None of these

325. If $x^2 + y^2 = 0.1$ and $|x-y| = 0.2$, then $|x| + |y|$ is equal to:

CAT 2000, Q95

(A) 0.3

(B) 0.4

(C) 0.2

(D) 0.6

326. If the equation $x^3 - ax^2 + bx - a = 0$ has three real roots, then it must be the case that,

CAT 2000, Q100

(A) $b=1$

(B) $b \neq 1$

(C) $a=1$

(D) $a \neq 1$

327. A shipping clerk has five boxes of different but unknown weights each weighing less than 100 kgs. The clerk weighs the boxes in pairs. The weights obtained are 110, 112, 113, 114, 115, 116, 117, 118, 120 and 121 kgs. What is the weight, in kgs, of the heaviest box?

CAT 2000, Q103

- (A) 60 (B) 62
(C) 64 (D) cannot be determined
-

328. The set of all positive integers is the union of two disjoint subsets: $\{f(1), f(2), \dots, f(n), \dots\}$ and $\{g(1), g(2), \dots, g(n), \dots\}$, where $f(1) < f(2) < \dots < f(n) < \dots$, and $g(1) < g(2) < \dots < g(n) < \dots$, and $g(n) = f(f(n)) + 1$ for all $n \geq 1$. What is the value of $g(1)$?

CAT 2000, Q105

- (A) Zero (B) Two
(C) One (D) Cannot be determined
-

329. For all non-negative integers x and y , $f(x, y)$ is defined as below: $f(0, y) = y + 1$, $f(x + 1, 0) = f(x, 1)$, $f(x + 1, y + 1) = f(x, f(x + 1, y))$. Then, what is the value of $f(1, 2)$?

CAT 2000, Q107

- (A) Two (B) Four
(C) Three (D) Cannot be determined
-

330. Two full tanks, one shaped like a cylinder and the other like a cone, contain jet fuel. The cylindrical tank holds 500 litres more than the conical tank. After 200 litres of fuel has been pumped out from each tank the cylindrical tank contains twice the amount of fuel in the conical tank. How many litres of fuel did the cylindrical tank have when it was full?

CAT 2000, Q109

- (A) 700 (B) 1000
(C) 1100 (D) 1200
-

331. A farmer has decided to build a wire fence along one straight side of this property. For this, he planned to place several fence-posts at six metre intervals, with posts fixed at both ends of the side. After he bought the posts and wire, he found that the number of posts he had bought was five less than required. However, he discovered that the number of posts he had bought would be just sufficient if he spaced them eight metres apart. What is the length of the side of his property and how many posts did he buy?

CAT 2000, Q110

- (A) 100 metres, 15 (B) 100 metres, 16
(C) 120 metres, 15 (D) 120 metres, 16
-

CAT 1999 - Questions 332-334

332. The number of positive integer valued pairs (x, y) , satisfying $4x - 17y = 1$ and $x < 1000$ is:

CAT 1999, Q56

- (A) 59
(B) 57
(C) 55
(D) 58
-

333. Total expenses of a boarding house are partly fixed and partly varying linearly with the number of boarders. The average expense per boarder is Rs. 700 when there are 25 boarders and Rs. 600 when there are 50 boarders. What is the average expense per boarder when there are 100 boarders?

CAT 1999, Q62

- (A) 550
(B) 580
(C) 540
(D) 560
-

334. If $|r - 6| = 11$ and $|2q - 12| = 8$, what is the minimum possible value of q/r ?

CAT 1999, Q64

- (A) $-2/5$
(B) $2/17$
(C) $10/17$
(D) None of these
-

CAT 1998 - Questions 335-341

335. One bacterium splits into eight bacteria of the next generation. But due to environmental condition only 50% survives and remaining 50% dies. If the seventh generation number is 4,096 million, what is the number in first generation?

CAT 1998, Q55

- (A) 1 million (B) 2 million
(C) 4 million (D) 8 million

Questions 336 to 338

Answer the questions based on the following information. The following operations are defined for real numbers.

$a \# b = a + b$, if a and b both are positive else $a \# b = 1$

$a \nabla b = (a \times b)^{a+b}$ if $a \times b$ is positive else $a \nabla b = 1$.

336. $\frac{(2\#1)}{(1\nabla2)} =$

CAT 1998, Q57

- (A) $\frac{1}{8}$ (B) 1
(C) $\frac{3}{8}$ (D) 3

337. $\frac{((1\#1)\#2) - (10^{1.3} \nabla \log_{10} 0.1)}{1\nabla2}$

CAT 1998, Q58

- (A) $\frac{3}{8}$ (B) $\frac{4 \cdot \log_{10} 0.1}{8}$
(C) $\frac{(4 + 10^{13})}{8}$ (D) None of these

338. $\left(\frac{(X\# - Y)}{(-X\nabla Y)} \right) = \frac{3}{8}$, then which of the following must be true?

CAT 1998, Q59

- (A) $X = 2, Y = 1$ (B) $X > 0, Y < 0$
(C) X, Y both positive (D) X, Y both negative

339. A yearly payment to the servant is Rs. 90 plus one turban. The servant leaves the job after 9 months and receives Rs. 65 and a turban. Then find the price of the turban.

CAT 1998, Q70

- (A) Rs. 10 (B) Rs. 15
(C) Rs. 7.50 (D) Cannot be determined

340. You can collect as many rubies and emeralds as you can. Each ruby is worth Rs. 4 crore and each emerald is worth Rs. 5 crore. Each ruby weighs 0.3 kg. And each emerald weighs 0.4 kg. Your bag can

carry at the most 12 kg. What should you collect to get the maximum wealth?

CAT 1998, Q82

- (A) 20 rubies and 15 emeralds
(B) 40 rubies
(C) 28 rubies and 9 emeralds
(D) None of these
-

341. My son adores chocolates. He likes biscuits. But he hates apples. I told him that he can buy as many chocolates he wishes. But then he must have biscuits twice the number of chocolates and should have apples more than biscuits and chocolates together. Each chocolate cost Re 1. The cost of apple is twice the chocolate and four biscuits are worth one apple. Then which of the following can be the amount that I spent on that evening on my son if number of chocolates, biscuits and apples brought were all integers?

CAT 1998, Q84

- (A) Rs. 34
(B) Rs. 33
(C) Rs. 8
(D) None of these
-

CAT 1997 - Questions 342-351

342. If $\log_2 \log_7 (x^2 - x + 37) = 1$, then what could be the value of 'x'?

CAT 1997, Q109

- (A) 3 (B) 5
(C) 4 (D) None of these

343. A student instead of finding the value of $\frac{7}{8}$ of a number, found the value of $\frac{7}{18}$ of the number. If his answer differed from the actual one by 770, find the number.

CAT 1997, Q115

- (A) 1584 (B) 2520
(C) 1728 (D) 1656

344. If the roots x_1 and x_2 are the roots of the quadratic equation $x^2 - 2x + c = 0$ also satisfy the equation $7x_2 - 4x_1 = 47$, then which of the following is true?

CAT 1997, Q118

- (A) $c = -15$ (B) $x_1 = -5$ and $x_2 = 3$
(C) $x_1 = 4.5$ and $x_2 = -2.5$ (D) None of these

345. Which of the following is true?

CAT 1997, Q121

- (A) $7^{(3^2)} = (7^3)^2$ (B) $7^{(3^2)} > (7^3)^2$
(C) $7^{(3^2)} < (7^3)^2$ (D) None of these

346. A man earns $x\%$ on the first Rs. 2,000 and $y\%$ on the rest of his income. If he earns Rs. 700 from income of Rs. 4,000 and Rs. 900 from Rs. 5,000 of income, find $x\%$.

CAT 1997, Q125

- (A) 20% (B) 15%
(C) 25% (D) None of these

347. P, Q and R are three consecutive odd numbers in ascending order. If the value of three times P is 3 less than two times R, find the value of R.

CAT 1997, Q127

- (A) 5 (B) 7
(C) 9 (D) 11

Questions 348 to 350

For these questions the following functions have been defined.

$$la(x, y, z) = \min(x + y, y + z)$$

$$le(x, y, z) = \max(x - y, y - z)$$

$$ma(x, y, z) = \frac{1}{2}(le(x, y, z) + la(x, y, z))$$

348. Given that $x > y > z > 0$. Which of the following is necessarily true?

CAT 1997, Q128

- (A) $la(x, y, z) < le(x, y, z)$ (B) $ma(x, y, z) < la(x, y, z)$
(C) $ma(x, y, z) < le(x, y, z)$ (D) None of these
-

349. What is the value of $ma(10, 4, le(la(10, 5, 3), 5, 3))$?

CAT 1997, Q129

- (A) 7 (B) 6.5
(C) 8 (D) 7.5
-

350. For $x=15$, $y=10$ and $z=9$, find the value of $le(x, \min(y, x-z), le(9, 8, ma(x, y, z)))$.

CAT 1997, Q130

- (A) 5 (B) 12
(C) 9 (D) 4
-

351. A, B and C are defined as follows. $A = (2.000004) \div ((2.000004)^2 + 4.000008)$; $B = (3.000003) \div ((3.000003)^2 + 9.000009)$; $C = (4.000002) \div ((4.000002)^2 + 8.000004)$ Which of the following is true about the values of the above three expressions?

CAT 1997, Q133

- (A) All of them lie between 0.18 and 0.2 (B) A is twice of C
(C) C is the smallest (D) B is the smallest
-

CAT 1996 - Questions 352-363

352. Which of the following values of x do not satisfy the inequality $(x^2 - 3x + 2 > 0)$ at all?

CAT 1996, Q107

- (A) $1 \leq x \leq 2$ (B) $-1 \geq x \geq -2$
 (C) $0 \leq x \leq 2$ (D) $0 \geq x \geq -2$

Questions 353 to 354

Answer the questions based on the following information. A , S , M and D are functions of x and y , and they are defined as follows.

$$A(x, y) = x + y$$

$$S(x, y) = x - y$$

$$M(x, y) = xy$$

$$D(x, y) = \frac{x}{y}, y \neq 0$$

353. What is the value of $M(M(A(M(x, y), S(y, x)), x), A(y, x))$ for $x = 2, y = 3$?

CAT 1996, Q115

- (A) 60 (B) 140
 (C) 25 (D) 70

354. What is the value of $S[M(D(A(a, b), 2), D(A(a, b), 2)), M(D(S(a, b), 2), D(S(a, b), 2))]$?

CAT 1996, Q116

- (A) $a^2 + b^2$ (B) ab
 (C) $a^2 - b^2$ (D) $\frac{a}{b}$

355. Once I had been to the post office to buy five-rupee, two-rupee and one-rupee stamps. I paid the clerk Rs. 20, and since he had no change, he gave me three more one-rupee stamps. If the number of stamps of each type that I had ordered initially was more than one, what was the total number of stamps that I had when I left the post office?

CAT 1996, Q122

- (A) 10 (B) 9
 (C) 12 (D) 8

356. Given the quadratic equation $x^2 - (A - 3)x - (A - 2)$, for what value of A will the sum of the squares of the roots be zero?

CAT 1996, Q128

- (A) -2 (B) 3
 (C) 6 (D) None of these

357. I bought 5 pens, 7 pencils and 4 erasers. Rajan bought 6 pens, 8 erasers and 14 pencils for an amount which was half more what I had paid. What per cent of the

total amount paid by me was paid for the pens?

CAT 1996, Q130

- (A) 37.5% (B) 62.5%
(C) 50% (D) None of these

358. Out of two-thirds of the total number of basketball matches, a team has won 17 matches and lost 3 of them. What is the maximum number of matches that the team can lose and still win more than three-fourths of the total number of matches, if it is true that no match can end in a tie?

CAT 1996, Q135

- (A) 4 (B) 6
(C) 5 (D) 3

Questions 359 to 363

Answer the questions based on the following information. A series S_1 of five positive integers is such that the third term is half the first term and the fifth term is 20 more than the first term. In series S_2 , the n th term is defined as the difference between the $(n+1)$ th term and the n th term of series S_1 , S_2 is an arithmetic progression with a common difference of 30.

359. First term of S_1 is

CAT 1996, Q141

- (A) 80 (B) 90
(C) 100 (D) 120

360. Fourth term of S_2

CAT 1996, Q142

- (A) 50 (B) 60
(C) 70 (D) None of these

361. What is the difference between fourth terms of S_1 and S_2 ?

CAT 1996, Q143

- (A) 10 (B) 20
(C) 30 (D) 40

362. What is the average value of the terms of series S_1 ?

CAT 1996, Q144

- (A) 60 (B) 70
(C) 80 (D) Average is not an integer

363. What is the sum of series S_2 ?

CAT 1996, Q145

- (A) 10 (B) 20
(C) 30 (D) 40

CAT 1995 - Questions 364-371

364. The value of $(55^3 + 45^3) / (55^2 - 55 \times 45 + 45^2)$ is

CAT 1995, Q60

- (A) 100 (B) 105
(C) 125 (D) 75

365. One root of $x^2 + kx - 8 = 0$ is the square of the other. Then the value of k is

CAT 1995, Q77

- (A) 2 (B) 8
(C) -8 (D) -2

366. What is the value of m which satisfies $3m^2 - 21m + 30 < 0$?

CAT 1995, Q84

- (A) $m < 2$ or $m > 5$ (B) $m > 2$
(C) $2 < m < 5$ (D) Both (a) and (c)

367. Largest value of $\min(2 + x^2, 6 - 3x)$, when $x > 0$, is

CAT 1995, Q86

- (A) 1 (B) 2
(C) 3 (D) 4

368. Answer the questions based on the following information. $\text{le}(x, y)$ = Least of (x, y) ; $\text{mo}(x) = |x|$; $\text{me}(x, y)$ = Maximum of (x, y) .

Find the value of $\text{me}(a + \text{mo}(\text{le}(a, b)), \text{mo}(a + \text{me}(\text{mo}(a), \text{mo}(b))))$, at $a = -2$ and $b = -3$.

CAT 1995, Q88

- (A) 1 (B) 0
(C) 5 (D) 3

369. Which of the following must always be correct for $a, b > 0$?

CAT 1995, Q89

- (A) $\text{mo}(\text{le}(a, b)) \geq \text{me}(\text{mo}(a), \text{mo}(b))$ (B) $\text{mo}(\text{le}(a, b)) > \text{me}(\text{mo}(a), \text{mo}(b))$
(C) $\text{mo}(\text{le}(a, b)) < \text{le}(\text{mo}(a), \text{mo}(b))$ (D) $\text{mo}(\text{le}(a, b)) = \text{le}(\text{mo}(a), \text{mo}(b))$

370. For what values of ' a ' is $\text{me}(a^2 - 3a, a - 3) < 0$?

CAT 1995, Q90

- (A) $a > 3$ (B) $0 < a < 3$
(C) $a < 0$ (D) $a = 3$

371. For what values of 'a' is $le(a^2 - 3a, a - 3) < 0$?

CAT 1995, Q91

(A) $a > 3$

(B) $0 < a < 3$

(C) $a < 0$

(D) Both (b) and (c)

CAT 1994 - Questions 372-382

372. If $\log_7 \log_5 (\sqrt{x+5} + \sqrt{x}) = 0$, find the value of x .

CAT 1994, Q55

- (A) 1
(B) 0
(C) 2
(D) None of these

373. If $a + b + c = 0$, where $a \neq b \neq c$, then $a^2/(2a^2 + bc) + b^2/(2b^2 + ac) + c^2/(2c^2 + ab)$ is equal to

CAT 1994, Q60

- (A) zero
(B) 1
(C) -1
(D) abc

374. If one root of $x^2 + px + 12 = 0$ is 4, while the equation $x^2 + px + q = 0$ has equal roots, then the value of q is

CAT 1994, Q62

- (A) $49/4$
(B) $4/49$
(C) 4
(D) $1/4$

Questions 375 to 376

Are based on the following information: If $md(x) = |x|$, $mn(x, y) = \text{minimum of } x \text{ and } y$ and $Ma(a, b, c, \dots) = \text{maximum of } a, b, c, \dots$ (Note: this information is shared by Questions 375 to 376.)

375. Value of $Ma[md(a), mn(md(b), a), mn(ab, md(ac))]$ where $a = -2, b = -3, c = 4$ is

CAT 1994, Q63

- (A) 2
(B) 6
(C) 8
(D) -2

376. Given that $a > b$ then the relation $Ma[md(a), mn(a, b)] = mn[a, md(Ma(a, b))]$ does not hold if

CAT 1994, Q64

- (A) $a < 0, b < 0$
(B) $a > 0, b > 0$
(C) $a > 0, b < 0, |a| < |b|$
(D) $a > 0, b < 0, |a| > |b|$

377. Fourth term of an arithmetic progression is 8. What is the sum of the first 7 terms of the arithmetic progression?

CAT 1994, Q67

- (A) 7
(B) 64
(C) 56
(D) Cannot be determined

378. $\log_6 (216\sqrt{6})$ is

CAT 1994, Q77

- (A) 3
(B) $3/2$
(C) $7/2$
(D) None of these

Questions 379 to 382

Are based on the following information: If $f(x) = 2x + 3$ and $g(x) = (x-3)/2$. (Note: this information is shared by Questions 379 to 382.)

379. Then $f \circ g(x) =$

CAT 1994, Q87

- (A) 1
(B) $g \circ f(x)$
(C) $(15x+9)/(16x-5)$
(D) $1/x$

380. For what value of x ; $f(x) = g(x-3)$

CAT 1994, Q88

- (A) -3
(B) $1/4$
(C) -4
(D) None of these.

381. What is the value of $(g \circ f \circ f \circ g \circ g \circ f)(x)(f \circ g \circ f \circ g)(x)$

CAT 1994, Q89

- (A) x
(B) x^2
(C) $(5x+3)/(4x-1)$
(D) $(x+3)(5x+3)/[(4x-5)(4x-1)]$

382. What is the value of $f \circ (f \circ g) \circ (g \circ f)(x)$

CAT 1994, Q90

- (A) x
(B) x^2
(C) $2x+3$
(D) $(x+3)/(4x-5)$

CAT 1993 - Questions 383-393

383. Choose the appropriate answer choice.

58. Two oranges three bananas and four apples cost Rs. 15. Three oranges, two bananas and one apple cost Rs. 10. I bought 3 oranges, 3 bananas and 3 apples. How much did I pay?

CAT 1993, Q58

- | | |
|------------|--------------------------|
| (A) Rs. 10 | (B) Rs. 8 |
| (C) Rs 15 | (D) Cannot be determined |

384. John bought five mangoes and ten oranges together for forty rupees. Subsequently, he returned one mango and got two oranges in exchange. The price of an orange would be

CAT 1993, Q71

- | | |
|-------|-------|
| (A) 1 | (B) 2 |
| (C) 3 | (D) 4 |

385. Let $u(n+1) = 2u(n) + 1$ ($n = 0, 1, 2, \dots$) and $u(0) = 0$. Then $u(10)$ nearest to

CAT 1993, Q73

- | | |
|----------|----------|
| (A) 1023 | (B) 2047 |
| (C) 4095 | (D) 8195 |

Questions 386 to 387

Use the following information: A function $f(x)$ is said to be even if $f(-x) = f(x)$, and odd if $f(-x) = -f(x)$. Thus, for example, the function given by $f(x) = x^2$ is even, while the function given by $f(x) = x^3$ is odd. Using this definition, answer the following questions.

386. The function given by $f(x) = |x|^3$ is

CAT 1993, Q74

- | | |
|-------------|----------|
| (A) even | (B) odd |
| (C) neither | (D) both |

387. The sum of two odd functions

CAT 1993, Q75

- | | |
|---|---------------------------------|
| (A) is always an even function | (B) is always an odd function |
| (C) is sometimes odd and sometimes even | (D) may be neither odd nor even |

388. Let $x < 0.50$, $0 < y < 1$, $z > 1$. Given a set of numbers, the middle number, when they are arranged in ascending order, is called the median. So the median of the numbers x , y , and z would be

CAT 1993, Q81

- | | |
|--------------------|---------------------|
| (A) less than one | (B) between 0 and 1 |
| (C) greater than 1 | (D) cannot say |

389. The maximum possible value of $y = \min(1/2 - 3x^{2/4}, 5x^{2/4})$ for the range $0 < x < 1$ is

CAT 1993, Q82

- (A) $1/3$ (B) $1/2$
(C) $5/27$ (D) $5/16$
-

390. Use the following information: The following functions have been defined for three numbers A, B and C: $@(A,B)$ = average of A and B; $*(A,B)$ = product of A and B; $/(A,B)$ = A divided by B. Answer these questions with the above data.

86. If $A = 2$ and $B = 4$, the value of $@/(*(A,B),B),A$ would be

CAT 1993, Q86

- (A) 2 (B) 4
(C) 6 (D) 16
-

391. The sum of A and B is given by

CAT 1993, Q87

- (A) $*(@(A,B),2)$ (B) $/(@(A,B),2)$
(C) $@(* (A,B),2)$ (D) $@/(A,B),2$
-

392. The sum of A, B, and C is given by

CAT 1993, Q88

- (A) $*(@(*(@ (B,A),2),C),3)$ (B) $/(@(*(@ (B,A),3),C),2)$
(C) $/(*(@(* (B,A),2),C),3)$ (D) None of these
-

393. Let $x < 0$, $0 < y < 1$, $z > 1$. Which of the following may be false?

CAT 1993, Q90

- (A) $(x^2 - z^2)$ has to be positive. (B) yz can be less than one.
(C) xy can never be zero. (D) $(y^2 - z^2)$ is always negative.
-

394. A function can sometimes reflect on itself, i.e. if $y = f(x)$, then $x = f(y)$. Both of them retain the same structure and form. Which of the following functions has this property?

CAT 1991, Q61

- (A) $y = \frac{2x+3}{3x+4}$ (B) $y = \frac{2x+3}{3x-2}$
(C) $y = \frac{3x+4}{4x-5}$ (D) None of the above

395. What is the value of k for which the following system of equations has no solution: $2x-8y = 3$ and $kx+4y = 10$

CAT 1991, Q62

- (A) -2 (B) 1
(C) -1 (D) 2

396. Iqbal dealt some cards to Mushtaq and himself from a full pack of playing cards and laid the rest aside. Iqbal then said to Mushtaq. "If you give me a certain number of your cards, I will have four times as many cards as you will have. If I give you the same number of cards, I will have thrice as many cards as you will have". Of the given choices, which could represent the number of cards with Iqbal?

CAT 1991, Q65

- (A) 9 (B) 31
(C) 12 (D) 35

397. Three times the first of three consecutive odd integers is 3 more than twice the third. What is the third integer?

CAT 1991, Q67

- (A) 15 (B) 9
(C) 11 (D) 5

398. The number of integers n satisfying $-n+2 \geq 0$ and $2n \geq 4$ is

CAT 1991, Q71

- (A) 0 (B) 1
(C) 2 (D) 3

399. The sum of two integers is 10 and the sum of their reciprocals is $5/12$. Then the larger of these integers is

CAT 1991, Q72

- (A) 2 (B) 4
(C) 6 (D) 8

400. If $y = f(x)$ and $f(x) = \frac{(1-x)}{(1+x)}$, which of the following is true?

CAT 1991, Q74

- (A) $f(2x) = f(x) - 1$ (B) $x = f(2y) - 1$
(C) $f(1/x) = f(x)$ (D) $x = f(y)$
-

401. Let $Y = \text{minimum of } \{(x+2), (3-x)\}$. What is the maximum value of Y for $0 \leq x \leq 1$?

CAT 1991, Q79

- (A) 1.0 (B) 1.5
(C) 3.1 (D) 2.5
-

402. In Sivakasi, each boy's quota of match sticks to fill into boxes is not more than 200 per session. If he reduces the number of sticks per box by 25, he can fill 3 more boxes with the total number of sticks assigned to him. Which of the following is the possible number of sticks assigned to each boy?

CAT 1991, Q91

- (A) 200 (B) 150
(C) 125 (D) 175
-

CAT 1990 - Questions 403-417

403. What is the sum of the following series: $\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \dots + \frac{1}{100 \times 101}$?

CAT 1990, Q14

- | | |
|-----------------------|-----------------------|
| (A) $\frac{99}{100}$ | (B) $\frac{1}{100}$ |
| (C) $\frac{100}{101}$ | (D) $\frac{101}{102}$ |

404. The value of $\frac{1}{1-x} + \frac{1}{1+x} + \frac{2}{1+x^2} + \frac{4}{1+x^4}$

CAT 1990, Q15

- | | |
|-----------------------|------------------------|
| (A) $\frac{8}{1-x^8}$ | (B) $\frac{4x}{1+x^2}$ |
| (C) $\frac{4}{1-x^6}$ | (D) $\frac{4}{1+x^4}$ |

405. Let a, b be any positive integers and $x = 0$ or 1 , then

CAT 1990, Q16

- | | |
|---------------------------------|--|
| (A) $a^x b^{1-x} = xa + (1-x)b$ | (B) $a^x b^{1-x} = (1-x)a + xb$ |
| (C) $a^x b^{(1-x)} = a(1-x)bx$ | (D) None of the above is necessarily true. |

406. From any two numbers x and y , we define $x * y = x + 0.5y - xy$. Suppose that both x and y are greater than 0.5 . Then $x * x < y * y$ if

CAT 1990, Q20

- | | |
|-----------------|-----------------|
| (A) $1 > x > y$ | (B) $x > 1 > y$ |
| (C) $1 > y > x$ | (D) $y > 1 > x$ |

407. Consider a function $f(k)$ defined for positive integers $k = 1, 2, \dots$; the function satisfies the condition $f(1) + f(2) + \dots = \frac{p}{p-1}$. Where p is fraction i.e. $0 < p < 1$. Then $f(k)$ is given by

CAT 1990, Q21

- | | |
|-----------------------|--------------------|
| (A) $(-p)(p)^{(k-1)}$ | (B) $p(1-p)^{k-1}$ |
| (C) $(p(1-p))^{k-1}$ | (D) None of these |

408. The value of $\frac{(1-d^3)}{(1-d)}$ is

CAT 1990, Q24

- | | |
|----------------------------|-----------------------|
| (A) > 1 if $d > -1$ | (B) > 3 if $d > 1$ |
| (C) > 2 if $0 < d < 0.5$ | (D) < 2 if $d < -2$ |

Questions 409 to 411

A dealer deals only in colour TVs and VCRs. He wants to spend up to Rs.12 lakhs to buy 100 pieces. He can purchase a colour TV at Rs.10,000 and a VCR at Rs.15,000. He can sell a colour TV at Rs.12,000 and a VCR at Rs.17,500. His objective is to maximize profits. Assume that

he can sell all the items that he stocks.

409. For the maximum profit, the number of colour TVs and VCRs that he should respectively stock are

CAT 1990, Q26

- (A) 80, 20 (B) 20, 80
(C) 60, 40 (D) None of these

410. If the dealer would have managed to get an additional space to stock 20 more items, then for maximizing profit, the ratio of number of VCRs and number of TVs that he should stock is

CAT 1990, Q27

- (A) 7 : 3 (B) 0
(C) 1 : 2 (D) None of these

411. The maximum profit, in rupees lakh, the dealer can earn from his original stock if he can sell a colour TV at Rs. 12200 and VCR at Rs.18300 is

CAT 1990, Q28

- (A) 2.64 (B) 2.49
(C) 2.72 (D) 2.87

412. The roots of the equation $ax^2 + 3x + 6 = 0$ will be reciprocal to each other if the value of a is

CAT 1990, Q35

- (A) 3 (B) 4
(C) 5 (D) 6

413. N the set of natural numbers is partitioned into subsets $S_1 = (1)$, $S_2 = (2, 3)$, $S_3 = (4, 5, 6)$, $S_4 = (7, 8, 9, 10)$ and so on. The sum of the elements of the subset S_{50} is

CAT 1990, Q39

- (A) 61250 (B) 65525
(C) 42455 (D) 62525

414. A square is drawn by joining the midpoints of the sides of a given square. A third square is drawn inside the second square in the same way and this process is continued indefinitely. If a side of the first square is 8 cm, the sum of the areas of all the squares such formed (in sq.cm.) is

CAT 1990, Q40

- (A) 128 (B) 120
(C) 96 (D) None of these

415. If $xy + yz + zx = 0$, then $(x + y + z)^2$ equals

CAT 1990, Q47

- (A) $(x + y)^2 + xz$ (B) $(x + z)^2 + xy$
(C) $x^2 + y^2 + z^2$ (D) $2(xy + yz + xz)$

416. I brought 30 books on Mathematics, Physics, and Chemistry, priced at Rs.17, Rs.19, and Rs.23 per book respectively, for distribution among poor students of Standard X of a school. The physics books were more in number than the Mathematics books but less than the Chemistry books, the difference being more than one. The total cost amounted to Rs.620. How many books on Mathematics, Physics, and Chemistry could have been bought respectively?

CAT 1990, Q49

(A) 5, 8, 17

(B) 5, 12, 13

(C) 5, 10, 15

(D) 5, 6, 19

417. The last time Rahul bought Diwali cards, he found that the four types of cards that he liked were priced Rs.2.00, Rs.3.50, Rs.4.50 and Rs.5.00 each. As Rahul wanted 30 cards, he took five each of two kinds and ten each of the other two, putting down the exact number of 10 rupees notes on the counter payment. How many notes did Rahul give?

CAT 1990, Q50

(A) 8

(B) 9

(C) 10

(D) 11

- End of PYQ Collection -
