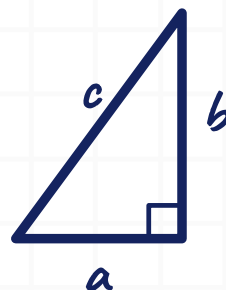
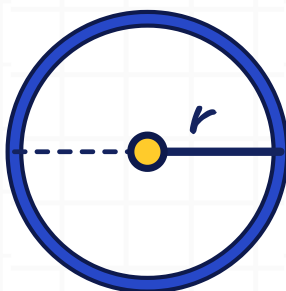


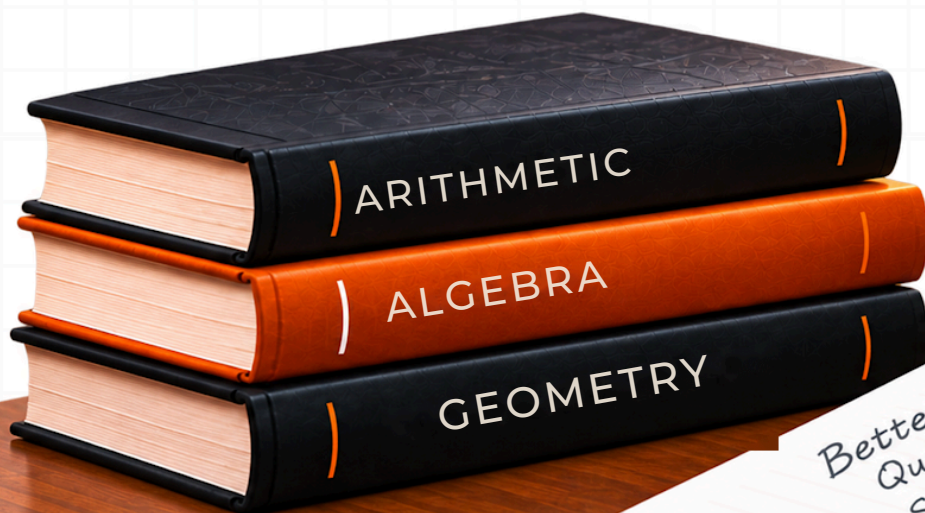
CAT PYQ

Number System

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



$$D = S \times T$$



Better
Questions
Stronger
Concepts
Brighter Future

159 Questions

Quantitative Aptitude

Years: 1990-2025

General Instructions

- (i) This collection contains **159 Quantitative Aptitude** questions classified under **Number System**, 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 159**.
- (iii) This collection has **133 multiple choice questions (MCQs)** and **26 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 1-1

1. In a 3-digit number N , the digits are non-zero and distinct such that none of the digits is a perfect square, and only one of the digits is a prime number. Then, the number of factors of the minimum possible value of N is

30 Nov 2025, Slot 1, Q49

Type in the answer.

CAT 2025 Slot 2 - Questions 2-5

2. If m and n are integers such that $(m + 2n)(2m + n) = 27$, then the maximum possible value of $2m - 3n$ is

30 Nov 2025, Slot 2, Q51

Type in the answer.

3. The sum of digits of the number $(625)^{65} \times (128)^{36}$ is

30 Nov 2025, Slot 2, Q52

Type in the answer.

4. Suppose a, b, c are three distinct natural numbers, such that $3ac = 8(a + b)$. Then, the smallest possible value of $3a + 2b + c$ is

30 Nov 2025, Slot 2, Q56

Type in the answer.

5. The number of divisors of $(2^6 \times 3^5 \times 5^3 \times 7^2)$, which are of the form $(3r + 1)$, where r is a non-negative integer, is

30 Nov 2025, Slot 2, Q60

(A) 36

(B) 56

(C) 24

(D) 42

CAT 2025 Slot 3 - Questions 6-7

6. For a 4-digit number (greater than 1000), sum of the digits in the thousands, hundreds, and tens places is 15. Sum of the digits in the hundreds, tens, and units places is 16. Also, the digit in the tens place is 6 more than the digit in the units place. The difference between the largest and smallest possible value of the number is

30 Nov 2025, Slot 3, Q52

- | | |
|---------|----------|
| (A) 811 | (B) 3289 |
| (C) 735 | (D) 4078 |
-

7. The sum of all the digits of the number $(10^{50} + 10^{25} - 123)$, is

30 Nov 2025, Slot 3, Q57

- | | |
|---------|---------|
| (A) 212 | (B) 221 |
| (C) 324 | (D) 255 |
-

8. When 10^{100} is divided by 7, the remainder is

24 Nov 2024, Slot 1, Q52

- (A) 3 (B) 4
(C) 1 (D) 6

9. For any natural number n let a_n be the largest integer not exceeding $\sqrt{n}$. Then the value of $a_1 + a_2 + \dots + a_{50}$ is

24 Nov 2024, Slot 1, Q54

Type in the answer.

10. The sum of all four-digit numbers that can be formed with the distinct non-zero digits a, b, c , and d , with each digit appearing exactly once in every number, is $153310 + n$, where n is a single digit natural number. Then, the value of $(a + b + c + d + n)$ is

24 Nov 2024, Slot 1, Q56

Type in the answer.

CAT 2024 Slot 2 - Questions 11-12

11. If m and n are natural numbers such that $n > 1$, and $m^n = 2^{25} \times 3^{40}$, then $m - n$ equals

24 Nov 2024, Slot 2, Q61

(A) 209932

(B) 209937

(C) 209942

(D) 209947

12. When 3^{333} is divided by 11, the remainder is

24 Nov 2024, Slot 2, Q62

(A) 5

(B) 10

(C) 1

(D) 6

CAT 2024 Slot 3 - Questions 13-14

13. If 10^{68} is divided by 13, the remainder is

24 Nov 2024, Slot 3, Q50

(A) 5

(B) 8

(C) 9

(D) 4

14. The number of all positive integers up to 500 with non-repeating digits is

24 Nov 2024, Slot 3, Q67

Type in the answer.

CAT 2023 Slot 1 - Questions 15-15

15. Let n be the least positive integer such that 168 is a factor of 1134^n . If m is the least positive integer such that 1134^n is a factor of 168^m , then $m + n$ equals

26 Nov 2023, Slot 1, Q45

- | | |
|--------|--------|
| (A) 9 | (B) 15 |
| (C) 12 | (D) 24 |
-

CAT 2023 Slot 2 - Questions 16-18

16. Let a , b , m and n be natural numbers such that $a > 1$ and $b > 1$. If $a^m b^n = 144^{145}$, then the largest possible value of $n - m$ is

26 Nov 2023, Slot 2, Q45

- (A) 580 (B) 290
(C) 289 (D) 579
-

17. For any natural numbers m , n , and k , such that k divides both $m + 2n$ and $3m + 4n$, k must be a common divisor of

26 Nov 2023, Slot 2, Q47

- (A) m and n (B) $2m$ and $3n$
(C) m and $2n$ (D) $2m$ and n
-

18. The number of positive integers less than 50, having exactly two distinct factors other than 1 and itself, is

26 Nov 2023, Slot 2, Q49

Type in the answer.

CAT 2023 Slot 3 - Questions 19-20

19. Let n and m be two positive integers such that there are exactly 41 integers greater than 8^m and less than 8^n , which can be expressed as powers of 2. Then, the smallest possible value of $n + m$ is

26 Nov 2023, Slot 3, Q46

- (A) 42 (B) 44
(C) 14 (D) 16
-

20. The sum of the first two natural numbers, each having 15 factors (including 1 and the number itself), is

26 Nov 2023, Slot 3, Q50

Type in the answer.

CAT 2022 Slot 1 - Questions 21-22

21. Let A be the largest positive integer that divides all the numbers of the form $3^k + 4^k + 5^k$, and B be the largest positive integer that divides all the numbers of the form $4^k + 3(4^k) + 4^{k+2}$, where k is any positive integer. Then (A + B) equals

27 Nov 2022, Slot 1, Q52

Type in the answer.

22. For natural numbers x, y, and z, if $xy + yz = 19$ and $yz + xz = 51$, then the minimum possible value of xyz is

27 Nov 2022, Slot 1, Q63

Type in the answer.

CAT 2022 Slot 2 - Questions 23-23

23. For some natural number n , assume that $(15,000)!$ is divisible by $(n!)!$. The largest possible value of n is

27 Nov 2022, Slot 2, Q59

(A) 4

(B) 7

(C) 6

(D) 5

CAT 2022 Slot 3 - Questions 24-25

24. A school has less than 5000 students and if the students are divided equally into teams of either 9 or 10 or 12 or 25 each, exactly 4 are always left out. However, if they are divided into teams of 11 each, no one is left out. The maximum number of teams of 12 each that can be formed out of the students in the school is

27 Nov 2022, Slot 3, Q61

Type in the answer.

25. A donation box can receive only cheques of ₹100, ₹250, and ₹500. On one good day, the donation box was found to contain exactly 100 cheques amounting to a total sum of ₹15250. Then, the maximum possible number of cheques of ₹500 that the donation box may have contained, is

27 Nov 2022, Slot 3, Q63

Type in the answer.

CAT 2021 Slot 1 - Questions 26-26

26. How many three-digit numbers are greater than 100 and increase by 198 when the three digits are arranged in the reverse order?

28 Nov 2021, Slot 1, Q55

Type in the answer.

CAT 2021 Slot 2 - Questions 27-27

27. For a 4-digit number, the sum of its digits in the thousands, hundreds and tens places is 14, the sum of its digits in the hundreds, tens and units places is 15, and the tens place digit is 4 more than the units place digit. Then the highest possible 4-digit number satisfying the above conditions is

28 Nov 2021, Slot 2, Q47

Type in the answer.

CAT 2020 Slot 1 - Questions 28-31

28. How many 3-digit numbers are there, for which the product of their digits is more than 2 but less than 7?

29 Nov 2020, Slot 1, Q53

Type in the answer.

29. Among 100 students, x_1 have birthdays in January, x_2 have birthdays in February, and so on. If $x_0 = \max(x_1, x_2, \dots, x_{12})$, then the smallest possible value of x_0 is

29 Nov 2020, Slot 1, Q60

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

30. The mean of all 4-digit even natural numbers of the form 'aabb', where $a > 0$, is

29 Nov 2020, Slot 1, Q70

- | | |
|----------|----------|
| (A) 4466 | (B) 5050 |
| (C) 4864 | (D) 5544 |

31. If a , b and c are positive integers such that $ab = 432$, $bc = 96$ and $c < 9$, then the smallest possible value of $a + b + c$ is

29 Nov 2020, Slot 1, Q72

- | | |
|--------|--------|
| (A) 49 | (B) 56 |
| (C) 59 | (D) 46 |

CAT 2020 Slot 2 - Questions 32-33

32. How many 4-digit numbers, each greater than 1000 and each having all four digits distinct, are there with 7 coming before 3?

29 Nov 2020, Slot 2, Q57

Type in the answer.

33. The number of pairs of integers (x, y) satisfying $x \geq y \geq -20$ and $2x + 5y = 99$

29 Nov 2020, Slot 2, Q68

Type in the answer.

CAT 2020 Slot 3 - Questions 34-37

34. How many integers in the set $\{100, 101, 102, \dots, 999\}$ have at least one digit repeated?

29 Nov 2020, Slot 3, Q60

Type in the answer.

35. Let N , x and y be positive integers such that $N = x + y$, $2 < x < 10$ and $14 < y < 23$. If $N > 25$, then how many distinct values are possible for N ?

29 Nov 2020, Slot 3, Q67

Type in the answer.

36. How many of the integers $1, 2, \dots, 120$, are divisible by none of 2, 5 and 7?

29 Nov 2020, Slot 3, Q69

- | | |
|--------|--------|
| (A) 42 | (B) 41 |
| (C) 40 | (D) 43 |
-

37. How many pairs (a, b) of positive integers are there such that $a \leq b$ and $ab = 4^{2017}$?

29 Nov 2020, Slot 3, Q70

- | | |
|----------|----------|
| (A) 2018 | (B) 2019 |
| (C) 2017 | (D) 2020 |
-

CAT 2019 Slot 2 - Questions 38-41

38. What is the largest positive integer n such that $\frac{n^2 + 7n + 12}{n^2 - n - 12}$ is also a positive integer?

24 Nov 2019, Slot 2, Q69

- (A) 6 (B) 16
(C) 8 (D) 12
-

39. How many pairs (m, n) of positive integers satisfy the equation $m^2 + 105 = n^2$?

24 Nov 2019, Slot 2, Q70

Type in the answer.

40. How many factors of $2^4 \times 3^5 \times 10^4$ are perfect squares which are greater than 1?

24 Nov 2019, Slot 2, Q84

Type in the answer.

41. In a six-digit number, the sixth, that is, the rightmost, digit is the sum of the first three digits, the fifth digit is the sum of first two digits, the third digit is equal to the first digit, the second digit is twice the first digit and the fourth digit is the sum of fifth and sixth digits. Then, the largest possible value of the fourth digit is

24 Nov 2019, Slot 2, Q85

Type in the answer.

CAT 2018 Slot 2 - Questions 42-43

42. How many two-digit numbers, with a non-zero digit in the units place, are there which are more than thrice the number formed by interchanging the positions of its digits?

25 Nov 2018, Slot 2, Q72

Type in the answer.

43. If $A = \{6^{2n} - 35n - 1\}$, where $n = 1, 2, 3, \dots$ and $B = \{35(n-1)\}$, where $n = 1, 2, 3, \dots$ then which of the following is true?

25 Nov 2018, Slot 2, Q89

- (A) Every member of A is in B and at least one member of B is not in A
 - (B) Neither every member of A is in B nor every member of B is in A
 - (C) Every member of B is in A.
 - (D) At least one member of A is not in B
-

CAT 2017 Slot 1 - Questions 44-44

44. If a, b, c , and d are integers such that $a + b + c + d = 30$ then the minimum possible value of $(a - b)^2 + (a - c)^2 + (a - d)^2$ is

26 Nov 2017, Slot 1, Q94

Type in the answer.

CAT 2017 Slot 2 - Questions 45-46

45. If the product of three consecutive positive integers is 15600 then the sum of the squares of these integers is

26 Nov 2017, Slot 2, Q87

- (A) 1777 (B) 1785
(C) 1875 (D) 1877

46. How many different pairs(a,b) of positive integers are there such that $a \geq b$ and $\frac{1}{a} + \frac{1}{b} = \frac{1}{9}$?

26 Nov 2017, Slot 2, Q94

Type in the answer.

CAT 2008 - Questions 47-50

47. The integers 1, 2, ..., 40 are written on a blackboard. The following operation is then repeated 39 times: In each repetition, any two numbers, say a and b , currently on the blackboard are erased and a new number $a + b - 1$ is written. What will be the number left on the board at the end?

16 Nov 2008, Q1

- (A) 820 (B) 821
(C) 781 (D) 819
(E) 780

48. What are the last two digits of 7^{2008} ?

16 Nov 2008, Q2

- (A) 21 (B) 61
(C) 01 (D) 41
(E) 81

49. Suppose, the seed of any positive integer n is defined as follows: $\text{seed}(n) = n$, if $n < 10$ $\text{seed}(n) = \text{seed}(s(n))$, otherwise, where $s(n)$ indicates the sum of digits of n . For example, $\text{seed}(7) = 7$, $\text{seed}(248) = \text{seed}(2 + 4 + 8) = \text{seed}(14) = \text{seed}(1 + 4) = \text{seed}(5) = 5$ etc. How many positive integers n , such that $n < 500$, will have $\text{seed}(n) = 9$?

16 Nov 2008, Q12

- (A) 39 (B) 72
(C) 81 (D) 108
(E) 55

50. Three consecutive positive integers are raised to the first, second and third powers respectively and then added. The sum so obtained is perfect square whose square root equals the total of the three original integers. Which of the following best describes the minimum, say m , of these three integers?

16 Nov 2008, Q23

- (A) $1 \leq m \leq 3$ (B) $4 \leq m \leq 6$
(C) $7 \leq m \leq 9$ (D) $10 \leq m \leq 12$
(E) $13 \leq m \leq 15$

CAT 2007 - Questions 51-52

51. How many pairs of positive integers m, n satisfy $1/m + 4/n = 1/12$, where n is an odd integer less than 60?

18 Nov 2007, Q6

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

52. Consider four digit numbers for which the first two digits are equal and the last two digits are also equal. How many such numbers are perfect squares?

18 Nov 2007, Q18

- | | |
|-------|-------|
| (A) 3 | (B) 2 |
| (C) 4 | (D) 0 |
| (E) 1 | |
-

CAT 2006 - Questions 53-55

53. The sum of four consecutive two-digit odd numbers, when divided by 10, becomes a perfect square. Which of the following can possibly be one of these four numbers?

19 Nov 2006, Q66

- | | |
|--------|--------|
| (A) 21 | (B) 25 |
| (C) 41 | (D) 67 |
| (E) 73 | |

54. The number of employees in Obelix Menhir Co. is a prime number and is less than 300. The ratio of the number of employees who are graduates and above, to that of employees who are not, can possibly be:

19 Nov 2006, Q68

- | | |
|-------------|------------|
| (A) 101:88 | (B) 87:100 |
| (C) 110:111 | (D) 85:98 |
| (E) 97:84 | |

55. When you reverse the digits of the number 13, the number increases by 18. How many other two-digit numbers increase by 18 when their digits are reversed?

19 Nov 2006, Q73

- | | |
|--------|-------|
| (A) 5 | (B) 6 |
| (C) 7 | (D) 8 |
| (E) 10 | |

CAT 2005 - Questions 56-61

56. If $x = (16^3 + 17^3 + 18^3 + 19^3)$, then x divided by 70 leaves a remainder of

20 Nov 2005, Q1

- (A) 0 (B) 1
(C) 69 (D) 35

57. Let $n! = 1 * 2 * 3 * \dots * n$ for integer $n \geq 1$. If $p = 1! + (2 * 2!) + (3 * 3!) + \dots + (10 * 10!)$, then $p + 2$ when divided by 11! leaves a remainder of

20 Nov 2005, Q11

- (A) 10 (B) 0
(C) 7 (D) 1

58. The digits of a three-digit number A are written in the reverse order to form another three-digit number B. If $B > A$ and $B - A$ is perfectly divisible by 7, then which of the following is necessarily true?

20 Nov 2005, Q13

- (A) $100 < A < 299$ (B) $106 < A < 305$
(C) $112 < A < 311$ (D) $118 < A < 317$

59. The rightmost non-zero digit of the number 30^{2720} is

20 Nov 2005, Q16

- (A) 1 (B) 3
(C) 7 (D) 9

60. For a positive integer n , let P_n denote the product of the digits of n , and S_n denote the sum of the digits of n . The number of integers between 10 and 1000 for which $P_n + S_n = n$ is

20 Nov 2005, Q19

- (A) 81 (B) 16
(C) 18 (D) 9

61. Let S be a set of positive integers such that every element n of S satisfies the conditions A. $1000 \leq n \leq 1200$ B. every digit in n is odd Then how many elements of S are divisible by 3?

20 Nov 2005, Q25

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

CAT 2004 - Questions 62-64

62. Suppose n is an integer such that the sum of digits on n is 2, and $10^{10} < n < 10^{11}$. The number of different values of n is

21 Nov 2004, Q45

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

63. The total number of integers pairs (x, y) satisfying the equation $x + y = xy$ is

21 Nov 2004, Q58

- | | |
|-------|-----------------------|
| (A) 0 | (B) 1 |
| (C) 2 | (D) None of the above |
-

64. The remainder, when $(15^{23} + 23^{23})$ is divided by 19, is

21 Nov 2004, Q72

- | | |
|-------|--------|
| (A) 4 | (B) 15 |
| (C) 0 | (D) 18 |
-

Questions 65 to 67

Directions for Questions 65 to 67: Answer the questions on the basis of the information given below.

The seven basic symbols in a certain numeral system and their respective values are as follows:

I = 1, V = 5, X = 10, L = 50, C = 100, D = 500 and M = 1000

In general, the symbols in the numeral system are read from left to right, starting with the symbol representing the largest value; the same symbol cannot occur continuously more than three times; the value of the numeral is the sum of the values of the symbols. For example, XXVII = $10 + 10 + 5 + 1 + 1 = 27$. An exception to the left-to-right reading occurs when a symbol is followed immediately by a symbol of greater value; then the smaller value is subtracted from the larger. For example, XLVI = $(50 - 10) + 5 + 1 = 46$.

65. The value of the numeral MDCCLXXXVII is

15 Feb 2004, CAT 2003 Re-test, Q51

- | | |
|----------|----------|
| (A) 1687 | (B) 1787 |
| (C) 1887 | (D) 1987 |

66. The value of the numeral MCMXCIX is

15 Feb 2004, CAT 2003 Re-test, Q52

- | | |
|----------|----------|
| (A) 1999 | (B) 1899 |
| (C) 1989 | (D) 1889 |

67. Which of the following represent the numeral for 1995? I. MCMLXXV II. MCMXCV III. MVD IV. MVM

15 Feb 2004, CAT 2003 Re-test, Q53

- | | |
|--------------------|---------------------|
| (A) Only I and II | (B) Only III and IV |
| (C) Only II and IV | (D) Only IV |

68. What is the sum of all two-digit numbers that give a remainder of 3 when they are divided by 7?

15 Feb 2004, CAT 2003 Re-test, Q66

- | | |
|---------|---------|
| (A) 666 | (B) 676 |
| (C) 683 | (D) 777 |

69. Using only 2, 5, 10, 25, and 50 paise coins, what will be the minimum number of coins required to pay exactly 78 paise, 69 paise and Rs. 1.01 to three different persons?

15 Feb 2004, CAT 2003 Re-test, Q71

- | | |
|--------|--------|
| (A) 19 | (B) 20 |
| (C) 17 | (D) 18 |

70. What is the remainder when 4^{96} is divided by 6?

15 Feb 2004, CAT 2003 Re-test, Q73

- (A) 0 (B) 2
(C) 3 (D) 4
-

71. Consider the sets $T_n = \{n, n + 1, n + 2, n + 3, n + 4\}$, where $n = 1, 2, 3, \dots, 96$. How many of these sets contain 6 or any integral multiple thereof (i.e. any one of the numbers 6, 12, 18, ...)?

15 Feb 2004, CAT 2003 Re-test, Q80

- (A) 80 (B) 81
(C) 82 (D) 83
-

72. Let $n (>1)$ be a composite integer such that $\sqrt{n}$ is not an integer. Consider the following statements:
A: n has a perfect integer-valued divisor which is greater than 1 and less than $\sqrt{n}$
B: n has a perfect integer-valued divisor which is greater than $\sqrt{n}$ but less than n

15 Feb 2004, CAT 2003 Re-test, Q86

- (A) Both A and B are false (B) A is true but B is false
(C) A is false but B is true (D) Both A and B are true
-

73. If a , $a + 2$ and $a + 4$ are prime numbers, then the number of possible solutions for a is

15 Feb 2004, CAT 2003 Re-test, Q91

- (A) one (B) two
(C) three (D) more than three
-

74. Let a , b , c , d and e be integers such that $a = 6b = 12c$, and $2b = 9d = 12e$. Then which of the following pairs contains a number that is not an integer?

15 Feb 2004, CAT 2003 Re-test, Q92

- (A) $\left(\frac{a}{27}, \frac{b}{e}\right)$ (B) $\left(\frac{a}{36}, \frac{c}{e}\right)$
(C) $\left(\frac{a}{12}, \frac{bd}{18}\right)$ (D) $\left(\frac{a}{6}, \frac{c}{d}\right)$
-

75. Let x and y be positive integers such that x is prime and y is composite. Then,

15 Feb 2004, CAT 2003 Re-test, Q99

- (A) $y - x$ cannot be an even integer (B) xy cannot be an even integer
(C) $\frac{(x + y)}{x}$ cannot be an even integer (D) None of these
-

CAT 2003 Original sitting (23 Nov 2003) - Questions 76-79

76. How many even integers n , where $100 \leq n \leq 200$, are divisible neither by seven nor by nine?

23 Nov 2003, CAT 2003 Original sitting, Q118

- (A) 40 (B) 37
(C) 39 (D) 38
-

77. A positive whole number M less than 100 is represented in base 2 notation, base 3 notation, and base 5 notation. It is found that in all three cases the last digit is 1, while in exactly two out of the three cases the leading digit is 1. Then M equals

23 Nov 2003, CAT 2003 Original sitting, Q119

- (A) 31 (B) 63
(C) 75 (D) 91
-

78. The number of positive integers n in the range $12 \leq n \leq 40$ such that the product $(n-1)(n-2)\dots 3 \cdot 2 \cdot 1$ is not divisible by n is

23 Nov 2003, CAT 2003 Original sitting, Q149

- (A) 5 (B) 7
(C) 13 (D) 14
-

79. Let T be the set of integers $\{3, 11, 19, 27, \dots, 451, 459, 467\}$ and S be a subset of T such that the sum of no two elements of S is 470. The maximum possible number of elements in S is

23 Nov 2003, CAT 2003 Original sitting, Q150

- (A) 32 (B) 28
(C) 29 (D) 30
-

CAT 2002 - Questions 80-88

80. Two boys are playing on a ground. Both the boys are less than 10 years old. Age of the younger boy is equal to the cube root of the product of the age of the two boys. If we place the digit representing the age of the younger boy to the left of the digit representing the age of the elder boy, we get the age of father of the younger boy. Similarly, if we place the digit representing the age of the elder boy to the left of the digit representing the age of the younger boy and divide the figure by 2, we get the age of mother of the younger boy. The mother of the younger boy is younger to his father by 3 years. Then, what is the age of the younger boy?

CAT 2002, Q5

- (A) 3 (B) 4
(C) 2 (D) None of these

81. Number S is obtained by squaring the sum of digits of a two-digit number D. If difference between S and D is 27, then the two-digit number D is

CAT 2002, Q62

- (A) 24 (B) 54
(C) 34 (D) 45

82. When 2^{256} is divided by 17, the remainder would be

CAT 2002, Q77

- (A) 1 (B) 16
(C) 14 (D) None of these

83. At a bookstore, 'MODERN BOOK STORE' is flashed using neon lights. The words are individually flashed at the intervals of 2.5 s, 4.25 s and 5.125 s respectively, and each word is put off after a second. The least time after which the full name of the bookstore can be read again for a full second is

CAT 2002, Q79

- (A) 49.5 s (B) 72.5 s
(C) 1744.5 s (D) 855 s

84. Three pieces of cakes of weights 4.5 lb, 6.75 lb and 7.2 lb respectively are to be divided into parts of equal weight. Further, each part must be as heavy as possible. If one such part is served to each guest, then what is the maximum number of guests that could be entertained?

CAT 2002, Q80

- (A) 54 (B) 72
(C) 20 (D) None of these

85. After the division of a number successively by 3, 4 and 7, the remainders obtained are 2, 1 and 4 respectively. What will be the remainder if 84 divides the same number?

CAT 2002, Q81

- (A) 80 (B) 75
(C) 41 (D) 53

86. If u, v, w and m are natural numbers such that $u^m + v^m = w^m$, then which one of the following is true?

CAT 2002, Q91

- (A) $m \geq \min(u, v, w)$ (B) $m \geq \max(u, v, w)$
(C) $m < \min(u, v, w)$ (D) None of these
-

87. $7^{6n} - 6^{6n}$, where n is an integer > 0 , is divisible by

CAT 2002, Q93

- (A) 13 (B) 127
(C) 559 (D) All of these
-

88. How many numbers greater than 0 and less than a million can be formed with the digits 0, 7 and 8?

CAT 2002, Q100

- (A) 486 (B) 1,084
(C) 728 (D) None of these
-

CAT 2001 - Questions 89-96

89. Let x , y and z be distinct integers. x and y are odd and positive, and z is even and positive. Which one of the following statements cannot be true?

CAT 2001, Q3

- (A) $y(x - z)^2$ is even
(B) $y^2(x - z)$ is odd
(C) $y(x - z)$ is odd
(D) $z(x - y)^2$ is even

90. A red light flashes three times per minute and a green light flashes five times in 2 min at regular intervals. If both lights start flashing at the same time, how many times do they flash together in each hour?

CAT 2001, Q5

- (A) 30
(B) 24
(C) 20
(D) 60

91. Of 128 boxes of oranges, each box contains at least 120 and at most 144 oranges. X is the maximum number of boxes containing the same number of oranges. What is the minimum value of X ?

CAT 2001, Q6

- (A) 5
(B) 103
(C) 6
(D) Cannot be determined

92. In a four-digit number, the sum of the first 2 digits is equal to that of the last 2 digits. The sum of the first and last digits is equal to the third digit. Finally, the sum of the second and fourth digits is twice the sum of the other 2 digits. What is the third digit of the number?

CAT 2001, Q10

- (A) 5
(B) 8
(C) 1
(D) 4

93. If 09/12/2001(DD/MM/YYYY) happens to be Sunday, then 09/12/1971 would have been a

CAT 2001, Q18

- (A) Wednesday
(B) Tuesday
(C) Saturday
(D) Thursday

94. In a number system the product of 44_{10} and 11_{10} is 3414. The number 3111 of this system, when converted to the decimal number system, becomes

CAT 2001, Q19

- (A) 406
(B) 1086
(C) 213
(D) 691

95. Let b be a positive integer and $a = b^2 - b$. If $b \geq 4$, then $a^2 - 2a$ is divisible by

CAT 2001, Q42

- (A) 15
(B) 20
(C) 24
(D) All of these
-

96. Ashish is given Rs. 158 in one-rupee denominations. He has been asked to allocate them into a number of bags such that any amount required between Re 1 and Rs. 158 can be given by handing out a certain number of bags without opening them. What is the minimum number of bags required?

CAT 2001, Q43

- (A) 11
(B) 12
(C) 13
(D) None of these
-

CAT 2000 - Questions 97-105

97. Let D be recurring decimal of the form, $D = 0.a_1a_2a_1a_2a_1a_2\dots$, where digits a_1 and a_2 lie between 0 and 9. Further, at most one of them is zero. Then which of the following numbers necessarily produces an integer, when multiplied by D ?

CAT 2000, Q56

- | | |
|---------|---------|
| (A) 18 | (B) 108 |
| (C) 198 | (D) 288 |

98. Let S be the set of integers x such that: 1) $100 \leq x \leq 200$ 2) x is odd 3) x is divisible by 3 but not by 7. How many elements does S contain?

CAT 2000, Q64

- | | |
|--------|--------|
| (A) 16 | (B) 12 |
| (C) 11 | (D) 13 |

99. Let x , y and z be distinct integers, that are odd and positive. Which one of the following statements cannot be true?

CAT 2000, Q65

- | | |
|------------------------------------|--|
| (A) xyz^2 is odd | (B) $(x - y)^2z$ is even |
| (C) $(x + y - z)^2(x + y)$ is even | (D) $(x - y)(y + z)(x + y - z)$ is odd |

100. Let S be the set of prime numbers greater than or equal to 2 and less than 100. Multiply all the elements of S . With how many consecutive zeroes will the product end?

CAT 2000, Q66

- | | |
|-------|--------|
| (A) 1 | (B) 4 |
| (C) 5 | (D) 10 |

101. Let $N = 1421 * 1423 * 1425$. What is the remainder when N is divided by 12?

CAT 2000, Q68

- | | |
|-------|-------|
| (A) 0 | (B) 9 |
| (C) 3 | (D) 6 |

102. The integers 34041 and 32506 when divided by a three-digit integer n leave the same remainder. What is n ?

CAT 2000, Q69

- | | |
|---------|---------|
| (A) 289 | (B) 367 |
| (C) 453 | (D) 307 |

103. Each of the numbers $x_1, x_2, \dots, x_n$ ($n > 4$), is equal to 1 or -1. Suppose, $x_1x_2x_3x_4 + x_2x_3x_4x_5 + x_3x_4x_5x_6 + \dots + x_{n-3}x_{n-2}x_{n-1}x_nx_1 + x_{n-1}x_nx_1x_2 + x_nx_1x_2x_3 = 0$, then:

CAT 2000, Q70

- | | |
|-----------------|----------------|
| (A) n is even | (B) n is odd |
|-----------------|----------------|

(C) n is an odd multiple of 3

(D) n is prime

104. Let $N = 55^3 + 17^3 - 72^3$. N is divisible by:

CAT 2000, Q94

(A) both 7 and 13

(B) both 3 and 13

(C) both 17 and 7

(D) both 3 and 17

105. Convert the number 1982 from base 10 to base 12. The result is:

CAT 2000, Q108

(A) 1182

(B) 1912

(C) 1192

(D) 1292

CAT 1999 - Questions 106-110

106. Let a, b, c be distinct digits. Consider a two digit number ' ab ' and a three digit number ' ccb ', both defined under the usual decimal number system. If $((ab)^2 = ccb)$ and $ccb > 300$ then the value of b is

CAT 1999, Q57

- | | |
|-------|-------|
| (A) 1 | (B) 0 |
| (C) 5 | (D) 6 |

107. The remainder when 7^{84} is divided by 342 is :

CAT 1999, Q58

- | | |
|--------|---------|
| (A) 0 | (B) 1 |
| (C) 49 | (D) 341 |

108. If $n = 1 + x$, where x is the product of four consecutive positive integers, then which of the following is/are true? A. n is odd B. n is prime C. n is a perfect square

CAT 1999, Q65

- | | |
|------------------|-------------------|
| (A) A and C only | (B) A and B only |
| (C) A only | (D) None of these |

109. For two positive integers a and b define the function $h(a,b)$ as the greatest common factor (G.C.F) of a, b . Let A be a set of n positive integers. $G(A)$, the GCF of the elements of set A is computed by repeatedly using the function h . The minimum number of times h is required to be used to compute G is:

CAT 1999, Q67

- | | |
|-------------|-------------------|
| (A) $1/2 n$ | (B) $(n - 1)$ |
| (C) n | (D) None of these |

110. If $n^2 = 123456787654321$, what is n ?

CAT 1999, Q70

- | | |
|--------------|-------------|
| (A) 12344321 | (B) 1235789 |
| (C) 11111111 | (D) 1111111 |

CAT 1998 - Questions 111-120

111. n^3 is odd. Which of the following statement(s) is/are true? I. n is odd. II. n^2 is odd. III. n^2 is even.

CAT 1998, Q52

- (A) I only
(B) II only
(C) I and II
(D) I and III

112. $(BE)^2 = MPB$, where B, E, M and P are distinct integers. Then $M =$

CAT 1998, Q60

- (A) 2
(B) 3
(C) 9
(D) None of these

113. Five-digit numbers are formed using only 0, 1, 2, 3, 4 exactly once. What is the difference between the maximum and minimum number that can be formed?

CAT 1998, Q61

- (A) 19800
(B) 41976
(C) 32976
(D) None of these

114. Three wheels can complete 60, 36 and 24 revolutions per minute. There is a red spot on each wheel that touches the ground at time zero. After how much time, all these spots will simultaneously touch the ground again?

CAT 1998, Q72

- (A) $\frac{5}{2}$ s
(B) $\frac{5}{3}$ s
(C) 5 s
(D) 7.5 s

115. A certain number, when divided by 899, leaves a remainder 63. Find the remainder when the same number is divided by 29.

CAT 1998, Q73

- (A) 5
(B) 4
(C) 1
(D) Cannot be determined

116. A is the set of positive integers such that when divided by 2, 3, 4, 5, 6 leaves the remainders 1, 2, 3, 4, 5 respectively. How many integers between 0 and 100 belong to set A?

CAT 1998, Q74

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

117. Number of students who have opted for subjects A, B and C are 60, 84 and 108 respectively. The examination is to be conducted for these students such that only the students of the same subject are allowed in one room. Also the number of students in each room must be same. What is the minimum number of rooms that

should be arranged to meet all these conditions?

CAT 1998, Q80

- | | |
|--------|--------|
| (A) 28 | (B) 60 |
| (C) 12 | (D) 21 |
-

118. How many five-digit numbers can be formed using the digits 2, 3, 8, 7, 5 exactly once such that the number is divisible by 125?

CAT 1998, Q81

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

119. What is the digit in the unit's place of 2^{51} ?

CAT 1998, Q92

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

120. A number is formed by writing first 54 natural numbers next to each other as 12345678910111213 ... Find the remainder when this number is divided by 8.

CAT 1998, Q94

- | | |
|-------|-------|
| (A) 1 | (B) 7 |
| (C) 2 | (D) 0 |
-

CAT 1997 - Questions 121-124

121. If n is an integer, how many values of n will give an integral value of $\frac{(16n^2 + 7n + 6)}{n}$?

CAT 1997, Q111

- (A) 2 (B) 3
(C) 4 (D) None of these

122. P and Q are two positive integers such that $PQ = 64$. Which of the following cannot be the value of $P + Q$?

CAT 1997, Q116

- (A) 20 (B) 65
(C) 16 (D) 35

123. If m and n are integers divisible by 5, which of the following is not necessarily true?

CAT 1997, Q120

- (A) $m - n$ is divisible by 5 (B) $m^2 - n^2$ is divisible by 25
(C) $m + n$ is divisible by 10 (D) None of these

124. ABC is a three-digit number in which $A > 0$. The value of ABC is equal to the sum of the factorials of its three digits. What is the value of B ?

CAT 1997, Q131

- (A) 9 (B) 7
(C) 4 (D) 2

CAT 1996 - Questions 125-127

125. If a number 774958A96B is to be divisible by 8 and 9, the respective values of A and B will be

CAT 1996, Q106

- | | |
|-------------|-------------------|
| (A) 7 and 8 | (B) 8 and 0 |
| (C) 5 and 8 | (D) None of these |
-

126. If n is any odd number greater than 1, then $n(n^2 - 1)$ is

CAT 1996, Q118

- | | |
|----------------------------|----------------------------|
| (A) divisible by 96 always | (B) divisible by 48 always |
| (C) divisible by 24 always | (D) None of these |
-

127. Find the value of $\frac{1}{1 + \frac{1}{3 - \frac{1}{2 + \frac{1}{3 - \frac{1}{2}}}}} + \frac{3}{3 - \frac{4}{3 + \frac{1}{2 - \frac{1}{2}}}}$

CAT 1996, Q127

- | | |
|---------------------|---------------------|
| (A) $\frac{13}{7}$ | (B) $\frac{15}{7}$ |
| (C) $\frac{11}{21}$ | (D) $\frac{17}{28}$ |
-

CAT 1995 - Questions 128-135

128. $5^6 - 1$ is divisible by

CAT 1995, Q52

- (A) 13 (B) 31
(C) 5 (D) None of these

129. 72 hens cost Rs. __96.7__. Then what does each hen cost, where two digits in place of '___' are not visible or are written in illegible hand?

CAT 1995, Q58

- (A) Rs. 3.23 (B) Rs. 5.11
(C) Rs. 5.51 (D) Rs. 7.22

130. For the product $n(n + 1)(2n + 1)$, $n \in \mathbb{N}$, which one of the following is not necessarily true?

CAT 1995, Q62

- (A) It is even
(B) Divisible by 3
(C) Divisible by the sum of the squares of the first n natural numbers
(D) Never divisible by 237

131. The remainder obtained when a prime number greater than 6 is divided by 6 is

CAT 1995, Q63

- (A) 1 or 3 (B) 1 or 5
(C) 3 or 5 (D) 4 or 5

132. Three consecutive positive even numbers are such that thrice the first number exceeds double the third by 2. Then the third number is

CAT 1995, Q70

- (A) 10 (B) 14
(C) 16 (D) 12

133. If a 4-digit number is formed with digits 1, 2, 3 and 5, what is the probability that the number is divisible by 25, if repetition of digits is not allowed?

CAT 1995, Q72

- (A) $1/12$ (B) $1/4$
(C) $1/6$ (D) None of these

134. Two positive integers differ by 4 and the sum of their reciprocals is $\frac{10}{21}$. Then one of the numbers is

CAT 1995, Q82

- | | |
|-------|--------|
| (A) 3 | (B) 1 |
| (C) 5 | (D) 21 |
-

135. Three bells chime at an interval of 18 min, 24 min and 32 min. At a certain time they begin to chime together. What length of time will elapse before they chime together again?

CAT 1995, Q83

- | | |
|---------------------|---------------------|
| (A) 2 hr and 24 min | (B) 4 hr and 48 min |
| (C) 1 hr and 36 min | (D) 5 hr |
-

CAT 1994 - Questions 136-137

136. What is the smallest number which when increased by 5 is completely divisible by 8, 11 and 24?

CAT 1994, Q70

- | | |
|---------|-------------------|
| (A) 264 | (B) 259 |
| (C) 269 | (D) None of these |
-

137. Which is the least number that must be subtracted from 1856, so that the remainder when divided by 7, 12, and 16 is 4.

CAT 1994, Q79

- | | |
|---------|----------|
| (A) 137 | (B) 1361 |
| (C) 140 | (D) 172 |
-

CAT 1993 - Questions 138-144

138. Suppose one wishes to find distinct positive integers x, y such that $(x + y)/xy$ is also a positive integer. Identify the correct alternative.

CAT 1993, Q61

- (A) This is never possible.
- (B) This is possible and the pair (x,y) satisfying the stated condition is unique.
- (C) This is possible and there exist more than one but a finite number of ways of choosing the pair (x,y) .
- (D) This is possible and the pair (x,y) can be chosen in infinite ways.

139. Given odd positive integers x, y and z which of the following is not necessarily true?

CAT 1993, Q62

- (A) $x^2 y^2 z^2$ is odd
- (B) $3(x^2 + y^3)z^2$ is even
- (C) $5x + y + z^4$ is odd
- (D) $z^2 (x^4 + y^4)/2$ is even

140. The number of positive integers not greater than 100, which are not divisible by 2, 3 or 5 is

CAT 1993, Q72

- (A) 26
- (B) 18
- (C) 31
- (D) None

141. A five digit number is formed using digits 1, 3, 5, 7 and 9 without repeating any one of them. What is the sum of all such possible numbers?

CAT 1993, Q76

- (A) 6666600
- (B) 6666660
- (C) 6666666
- (D) None

142. The smallest number which when divided by 4, 6 or 7 leaves a remainder of 2, is

CAT 1993, Q95

- (A) 44
- (B) 62
- (C) 80
- (D) 86

143. The product of all integers from 1 to 100 will have the following numbers of zeros at the end.

CAT 1993, Q98

- (A) 20
- (B) 24
- (C) 19
- (D) 22

144. Let x, y and z be distinct positive integers satisfying $x < y < z$ and $x + y + z = k$. What is the smallest value of K that does not determine x, y, z uniquely?

CAT 1993, Q99

- (A) 9
- (B) 6
- (C) 7
- (D) 8

CAT 1991 - Questions 145-155

145. $2^{73} - 2^{72} - 2^{71}$ is the same as

CAT 1991, Q70

- (A) 2^{69} (B) 2^{70}
(C) 2^{71} (D) 2^{72}

146. x , y and z are three positive integers such that $x > y > z$. Which of the following is closest to the product xyz ?

CAT 1991, Q82

- (A) $(x-1)yz$ (B) $x(y-1)z$
(C) $xy(z-1)$ (D) $x(y+1)z$

147. What is the greatest power of 5 which can divide $80!$ exactly?

CAT 1991, Q83

- (A) 16 (B) 20
(C) 19 (D) None of these

148. A third standard teacher gave a simple multiplication exercise to the kids. But one kid reversed the digits of both the numbers and carried out the multiplication and found that the product was exactly the same as the one expected by the teacher. Only one of the following pairs of numbers will fit in the description of the exercise. Which one is that?

CAT 1991, Q84

- (A) 14, 22 (B) 13, 62
(C) 19, 33 (D) 42, 28

149. Find the minimum integral value of n such that the division $\frac{55n}{124}$ leaves no remainder.

CAT 1991, Q85

- (A) 124 (B) 123
(C) 31 (D) 62

150. Let k be a positive integer such that $k+4$ is divisible by 7. Then the smallest positive integer n , greater than 2, such that $k+2n$ is divisible by 7 equals

CAT 1991, Q86

- (A) 9 (B) 7
(C) 5 (D) 3

151. A calculator has two memory buttons, A and B. Value 1 is initially stored in both memory locations. The following sequence of steps is carried out five times: add 1 to B multiply A to B store the result in A. What is the value

stored in memory location A after this procedure?

CAT 1991, Q87

- (A) 120 (B) 450
(C) 720 (D) 250
-

152. If x is a positive integer such that $2x + 12$ is perfectly divisible by x , then the number of possible values of x is

CAT 1991, Q94

- (A) 2 (B) 5
(C) 6 (D) 12
-

153. A positive integer is said to be a prime number if it is not divisible by any positive integer other than itself and 1. Let p be a prime number greater than 5. Then $(p^2 - 1)$ is

CAT 1991, Q97

- (A) never divisible by 6
(B) always divisible by 6, and may or may not be divisible by 12.
(C) always divisible by 12, and may or may not be divisible by 24.
(D) always divisible by 24.
-

154. To decide whether a number of n digits is divisible by 7, we can define a process by which its magnitude is reduced as follows: ($i_1, i_2, i_3, \dots$ are the digits of the number, starting from the most significant digit). $i_1 i_2 \dots i_n \Rightarrow i_1 \cdot 3^{n-1} + i_2 \cdot 3^{n-2} + \dots + i_n \cdot 3^0$. e.g. $259 \Rightarrow 2 \cdot 3^2 + 5 \cdot 3^1 + 9 \cdot 3^0 = 18 + 15 + 9 = 42$
Ultimately the resulting number will be seven after repeating the above process a certain number of times. After how many such stages, does the number 203 reduce to 7?

CAT 1991, Q98

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

155. If $8 + 12 = 2$, $7 + 14 = 3$ then $10 + 18 = ?$

CAT 1991, Q99

- (A) 10 (B) 4
(C) 6 (D) 18
-

CAT 1990 - Questions 156-159

156. There were 'x' pigeons and 'y' mynahs in a cage. One fine morning, 'p' birds escaped to freedom. The bird-keeper, knowing only that $p = 7$, was able to figure out without looking into the cage that at least one pigeon had escaped. Which of the following does not represent a possible (x,y) pair?

CAT 1990, Q11

- | | |
|------------|------------|
| (A) (10,8) | (B) (7,2) |
| (C) (25,6) | (D) (12,4) |

157. The remainder when 2^{60} is divided by 5 equals

CAT 1990, Q12

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

158. Mr X enters a positive integer $Y(>1)$ in an electronic calculator and then goes on pressing the square root key repeatedly. Then

CAT 1990, Q13

- (A) The display does not stabilize
- (B) The display becomes closer to 0
- (C) The display becomes closer to 1
- (D) May not be true and the answer depends on the choice of Y

159. If n is any positive integer, then $n^3 - n$ is divisible

CAT 1990, Q23

- | | |
|------------------|-----------------|
| (A) Always by 12 | (B) Never by 12 |
| (C) Always by 6 | (D) Never by 6 |

- End of PYQ Collection -