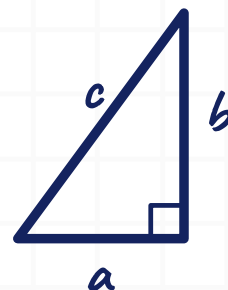
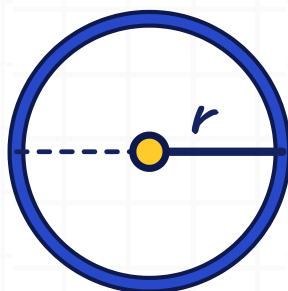


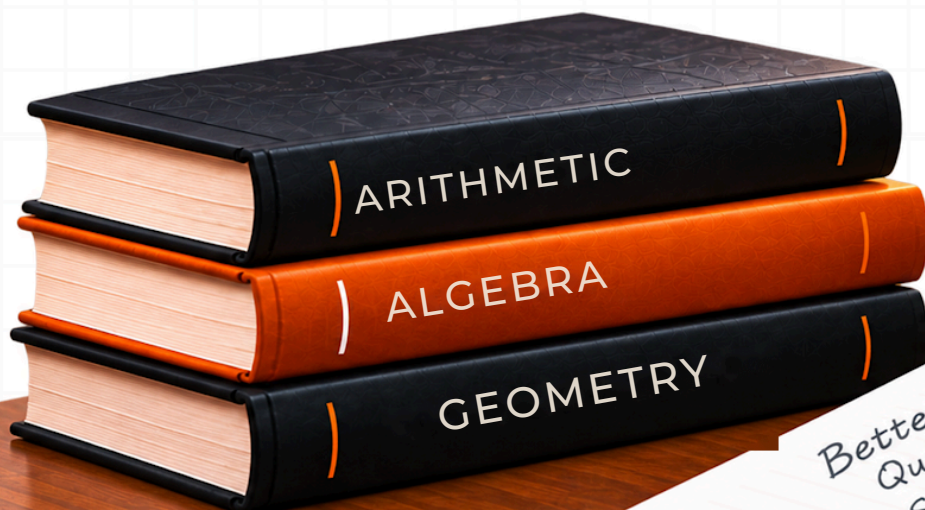
CAT PYQ

Quadratic Equations

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



$$D = S \times T$$



Better
Questions
Stronger
Concepts
Brighter Future

Quadratic Equations CAT PYQ



Common Admission Test - Indian Institutes of Management

55 Questions

Quantitative Aptitude

Years: 1990-2025

General Instructions

- (i) This collection contains **55 Quantitative Aptitude questions** classified under **Quadratic Equations**, 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 55**.
- (iii) This collection has **43 multiple choice questions (MCQs)** and **12 Type In The Answer (TITA) questions**. Read every option before choosing the answer. Enter a response for questions marked "Type in the answer."
- (iv) Original mathematical expressions, question wording and option order are retained. Use the diagrams and data provided with each question.
- (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 1-2

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. 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 3-4

3. 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
-

4. 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) $\frac{2}{3} - 2p + \frac{2}{3}q$
-

CAT 2025 Slot 3 - Questions 5-5

5. 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

CAT 2024 Slot 1 - Questions 6-6

6. 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.

CAT 2024 Slot 2 - Questions 7-8

7. 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

8. 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.

CAT 2023 Slot 1 - Questions 9-12

9. 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

10. 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.

11. 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.

12. 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.

CAT 2023 Slot 2 - Questions 13-14

13. 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.

14. 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

CAT 2023 Slot 3 - Questions 15-15

15. 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.

CAT 2022 Slot 1 - Questions 16-16

16. 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
-

CAT 2022 Slot 2 - Questions 17-18

17. 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.

18. 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

CAT 2022 Slot 3 - Questions 19-20

19. 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
-

20. 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
-

CAT 2021 Slot 1 - Questions 21-21

21. 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 22-23

22. 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 |
-

23. 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 2020 Slot 1 - Questions 24-25

24. 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

25. 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.

CAT 2020 Slot 2 - Questions 26-28

26. 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 |
-

27. 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 |
-

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

29 Nov 2020, Slot 2, Q75

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

CAT 2020 Slot 3 - Questions 29-29

29. 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 |
-

CAT 2019 Slot 1 - Questions 30-31

30. 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

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

24 Nov 2019, Slot 1, Q99

Type in the answer.

32. 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) $A > \frac{1}{16}$
(C) $A < \frac{1}{8}$

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

33. 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
(C) 427

(B) 361
(D) 549

CAT 2018 Slot 1 - Questions 34-34

34. 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) $\frac{1}{4}$

CAT 2018 Slot 2 - Questions 35-35

35. 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

CAT 2017 Slot 1 - Questions 36-38

36. 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
-

37. 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) $7 + 3\sqrt{5}$
-

38. 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.

39. 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 |
-

CAT 2008 - Questions 40-41

40. 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

41. 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

CAT 2007 - Questions 42-42

42. 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 | (B) -159 |
| (C) -110 | (D) -180 |
| (E) -105 | |
-

CAT 2005 - Questions 43-43

43. 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 |
-

44. 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

45. 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

CAT 2002 - Questions 46-48

46. 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
-

47. 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
-

48. 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
-

49. Ujakar and Keshab attempted to solve a quadratic equation. Ujakar 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?

CAT 2001, Q45

(A) (6, 1)

(B) (-3, -4)

(C) (4, 3)

(D) (-4, -3)

CAT 1997 - Questions 50-50

50. 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

CAT 1996 - Questions 51-51

51. 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

CAT 1995 - Questions 52-52

52. 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

CAT 1994 - Questions 53-53

53. 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) $1/4$

CAT 1991 - Questions 54-54

54. The sum of two integers is 10 and the sum of their reciprocals is $\frac{5}{12}$. Then the larger of these integers is

CAT 1991, Q72

(A) 2

(B) 4

(C) 6

(D) 8

CAT 1990 - Questions 55-55

55. 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

- End of PYQ Collection -
