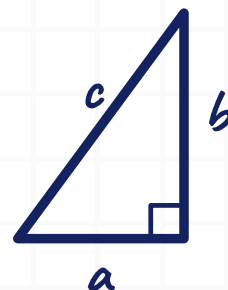
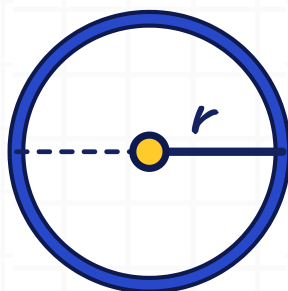


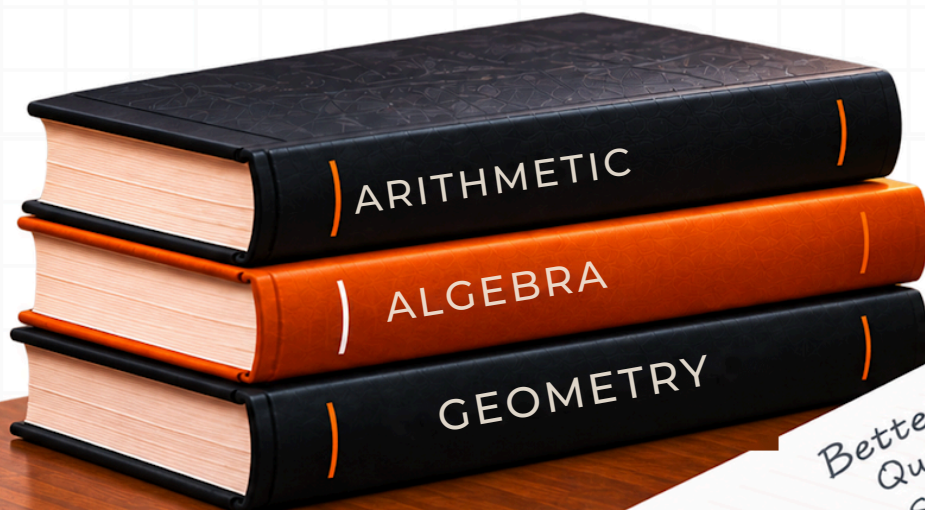
CAT PYQ

Surds & Indices

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



$$D = S \times T$$



Better
Questions
Stronger
Concepts
Brighter Future

Surds & Indices CAT PYQ



Common Admission Test - Indian Institutes of Management

26 Questions

Quantitative Aptitude

Years: 1997-2025

General Instructions

- (i) This collection contains **26 Quantitative Aptitude questions** classified under **Surds & Indices**, following the supplied CD PYQ sheet.
- (ii) **Coverage:** CAT 1997-2025. Questions are grouped by their source year and sitting, with continuous numbering from **1 to 26**.
- (iii) This collection has **21 multiple choice questions (MCQs)** and **5 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 1-1

1. 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

2. 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) $44850\sqrt{3}$

3. 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:

4. 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) $-\frac{4}{3}$

5. 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

24 Nov 2024, Slot 1, Q67

(A) 18

(B) 22

(C) 4

(D) 6

6. 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.

7. 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

CAT 2023 Slot 1 - Questions 8-8

8. 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) $2\sqrt{7}$

CAT 2023 Slot 2 - Questions 9-9

9. 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) $\frac{1}{2}$

CAT 2023 Slot 3 - Questions 10-10

10. 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) $34\sqrt{5}$

CAT 2022 Slot 3 - Questions 11-11

11. 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.

12. 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) $\frac{x^7}{x^{4\sqrt{3}}}$

CAT 2019 Slot 1 - Questions 13-13

13. 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

CAT 2019 Slot 2 - Questions 14-15

14. 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.

15. 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) $\frac{\log_2 7}{3}$

16. 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) $\frac{33}{4}$

CAT 2018 Slot 2 - Questions 17-17

17. 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.

CAT 2017 Slot 1 - Questions 18-18

18. 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
-

19. 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) $4/9$

CAT 2006 - Questions 20-22

20. 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) $1/\sqrt{-x}$
-

21. 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) $12^{1/12}$
-

22. 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) $x = 5, y = 2$
-

23. 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) $\sqrt{13}$

24. 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) $\frac{\sqrt{15} - 3}{2}$

25. 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) $28 < x < 60$

26. 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

- End of PYQ Collection -
