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MATHEMATICS · JEE MAIN

Quadratic Equations

Previous Year Questions with answers

238 questions · **184** papers · **2002–2026** · newest paper first

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What is in this PDF: every Quadratic Equations question we hold from past JEE Main and AIEEE papers, with its options and answer. Where an answer comes from a source other than the official final key, it says so next to the answer.

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Chapter at a glance

4%
of Mathematics questions, 2019–2026

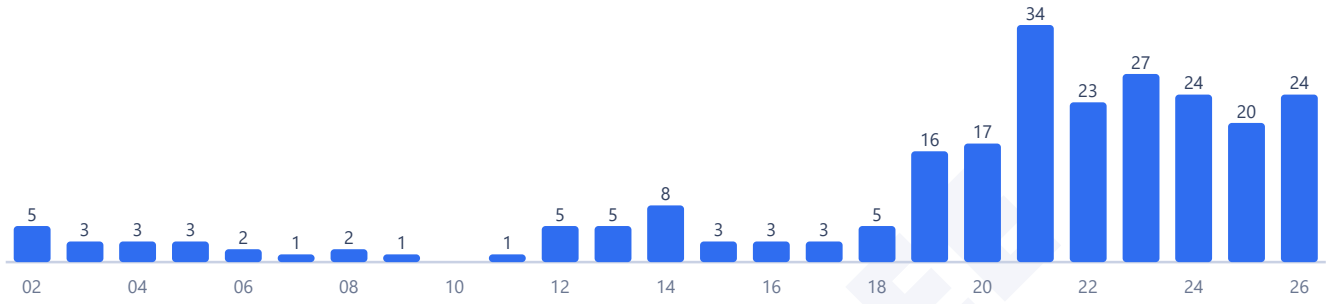
238
questions, 2002–2026

147 of 162
papers asked it, 2019–2026

186 / 52
MCQ / numerical, 2002–2026

Trend. Steady: 1.2 questions per paper in 2024–2026 against 1.1 in 2019–2023.

Questions per year



Counts are the questions we hold: 238 in 184 papers. No question in this chapter was found repeated across papers.

Most-asked topics in this chapter (2002–2026)

Roots & Coefficients	115
Higher Degree & Special Equations	94
Quadratic Expressions & Location of Roots	29

How often it comes up

Quadratic equations serves as a foundational algebraic unit under Unit 2: Complex Numbers and Quadratic Equations in the Class 11 curriculum, holding rank 12 of 29 chapters with a 4.0% share of the mathematics section. In the 2019 to 2026 exam window, Quadratic Equations accounted for 185 questions across 162 test papers, delivering 4.0% of the mathematics section and holding rank 12 of 29 chapters. During the earlier 2002 to 2018 testing span, it contributed 53 questions across 38 papers with an identical 4.0% share. Over the recent 2024 to 2026 sessions, question volume reached 68 questions across 58 papers, capturing a 4.4% share. Comparing both earlier periods against 2024 to 2026, the chapter's share of mathematics questions has remained about the same.

Questions have appeared every year from 2019 to 2026. Students faced an average of 1.1 questions per paper across 2019 to 2026, and 1.2 questions per paper between 2024 and 2026. A substantial 52 numerical answer questions were set between 2019 and 2026, frequently asking for parameter bounds or counts of distinct real solutions.

Most-asked topics

The syllabus organizes across three key topics:

- Roots & Coefficients: The largest topic with 115 total questions (82 in 2019 to 2026), examined continuously through 2026. Key concepts evaluate Vieta's formulas relating sum (alpha + beta) and product (alpha * beta) to polynomial coefficients, symmetric root expressions like alpha^n + beta^n via Newton's recurrence relation, forming new equations with transformed roots, and common root conditions.
- Higher Degree & Special Equations: Generated 94 total questions (81 in 2019 to 2026), active through 2026. Focuses on equations involving absolute values like |x - a|, biquadratic equations in x^2, logarithmic equations reducible to quadratics, and real solution counting across piecewise domains.
- Quadratic Expressions & Location of Roots: Contributed 29 total questions (22 in 2019 to 2026), tested through 2026. Explores discriminant conditions (D >= 0 for real roots), vertex coordinates (-b/2a), sign of a * f(k) ensuring

roots lie on opposite sides or one side of a specified number k, and global extrema on bounded intervals.

What the questions look like

Test problems combine algebraic identities with case-by-case boundary analysis. A very frequent pattern introduces equations featuring absolute values, such as x|x + a| + b|x + c| + d = 0, requiring candidates to split the real number line across critical points and check for valid solutions within each region.

Another staple pattern involves Newton's identity: given an equation like ax^2 + bx + c = 0 with roots alpha and beta and setting S_n = alpha^n + beta^n, students exploit a * S_n + b * S_{n-1} + c * S_{n-2} = 0 to rapidly compute complex fraction ratios without evaluating roots explicitly. Location of roots questions typically ask for parameter ranges such that both roots exceed a given value or a specified number lies strictly between the roots.

How to practise it

Develop fluency in Vieta transformations alongside geometric graphing of parabolas:

1. Master Newton's sums: For any quadratic ax^2 + bx + c = 0 with roots alpha and beta, write a * (alpha^n + beta^n) + b * (alpha^{n-1} + beta^{n-1}) + c * (alpha^{n-2} + beta^{n-2}) = 0 to evaluate high-power root combinations. 2. Sketch parabolas for location of roots: Translate verbal conditions into visual graphs. Both roots greater than k requires D >= 0, -b/2a > k, and a * f(k) > 0; k lying between roots simply requires a * f(k) < 0. 3. Solve modulus equations systematically: Identify all critical boundary points where expressions inside absolute value bars change sign. Solve the corresponding quadratic in each sub-interval and reject roots falling outside the domain. 4. Check substitution validity in special equations: When substituting t = x^2, remember that each positive value of t yields two real values of x, t = 0 yields one, and negative t yields zero real roots. 5. Review common root conditions: For two quadratics to share both roots, their corresponding coefficients must be proportional; for one common root, eliminate the quadratic term using cross-multiplication.

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Q1 JEE Main 2026 · 8 Apr · Shift 2 Numerical

The sum of squares of all the real solutions of the equation $\log_{(x+1)}(2x^2+5x+3) = 4 - \log_{(2x+3)}(x^2+2x+1)$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 2. · Official NTA final key

Q2 JEE Main 2026 · 6 Apr · Shift 1 MCQ

Let one root of the quadratic equation in x:

$(k^2-15k+27)x^2+9(k-1)x+18=0$

be twice the other. Then the length of the latus rectum of the parabola $y^2=6kx$ is equal to:

(A) 4
(B) 6
(C) 8
(D) 12

Answer: (D) 12 · Official NTA final key

Q3 JEE Main 2026 · 6 Apr · Shift 1 MCQ

Let e_1 and e_2 be two distinct roots of the equation $x^2-ax+2=0$. Let the sets $\{a \in \mathbb{R} : e_1 \text{ and } e_2 \text{ are the eccentricities of hyperbolas}\} = (\alpha, \beta)$, and $\{a \in \mathbb{R} : e_1 \text{ and } e_2 \text{ are the eccentricities of an ellipse and a hyperbola, respectively}\} = (\gamma, \infty)$.

Then $\alpha^2+\beta^2+\gamma^2$ is equal to:

(A) 18
(B) 22
(C) 26
(D) 34

Answer: (C) 26 · Official NTA final key

Q4 JEE Main 2026 · 6 Apr · Shift 2 MCQ

Consider the quadratic equation $(n^2-2n+2)x^2-3x+(n^2-2n+2)^2=0$, $n \in \mathbf{R}$. Let α be the minimum value of the product of its roots and β be the maximum value of the sum of its roots. Then the sum of the first six terms of the G.P., whose first term is α and the common ratio is $\frac{\alpha}{\beta}$, is :

(A) $\frac{61}{37}$
(B) $\frac{121}{81}$
(C) $\frac{364}{243}$
(D) $\frac{1093}{729}$

Answer: (C) $\frac{364}{243}$ · Official NTA final key

Q5 JEE Main 2026 · 6 Apr · Shift 2 MCQ

Let $\lim_{x\to 2} \frac{(\tan(x-2))\left(rx^2+(p-2)x-2p\right)}{(x-2)^2} = 5$ for some $r, p \in \mathbf{R}$. If the set of all possible values of q, such that the roots of the equation $rx^2 - px + q = 0$ lie in $(0, 2)$, be the interval $(\alpha, \beta]$, then $4(\alpha+\beta)$ equals :

(A) 11
(B) 13
(C) 17
(D) 21

Answer: (C) 17 · Official NTA final key

Q6 JEE Main 2026 · 5 Apr · Shift 1 MCQ

Let $a, b \in \mathbb{C}$. Let α, β be the roots of the equation $x^2 + ax + b = 0$. If $\beta - \alpha = \sqrt{11}$ and $\beta^2 - \alpha^2 = 3i\sqrt{11}$, then $(\beta^3 - \alpha^3)^2$ is equal to:

(A) 160
(B) 176
(C) 194
(D) 187

Answer: (B) 176 · Official NTA final key

Q7 JEE Main 2026 · 5 Apr · Shift 2 MCQ

Let α, β be the roots of the equation $x^2 - x + p = 0$ and γ, δ be the roots the equation $x^2 - 4x + q = 0$; $p, q \in \mathbf{Z}$. If $\alpha, \beta, \gamma, \delta$ are in G.P., then $|p+q|$ equals :

(A) 16
(B) 32
(C) 34
(D) 38

Answer: (C) 34 · Official NTA final key

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Q8 JEE Main 2026 · 4 Apr · Shift 1 MCQ

If the set of all solutions of $|x^2+x-9| = |x| + |x^2-9|$ is $[\alpha, \beta] \cup [\gamma, \infty)$, then $(\alpha^2+\beta^2+\gamma^2)$ is equal to:

(A) 9
(B) 18
(C) 36
(D) 72

Answer: (B) 18 · Official NTA final key

Q9 JEE Main 2026 · 4 Apr · Shift 2 MCQ

If $\alpha = 1$ and $\beta = 1 + i\sqrt{2}$, where $i = \sqrt{-1}$ are two roots of the equation $x^3 + ax^2 + bx + c = 0$, $a, b, c \in \mathbb{R}$, then $\int_{-1}^{1} (x^3 + ax^2 + bx + c)\, dx$ is equal to:

(A) -2
(B) -4
(C) -8
(D) -10

Answer: (C) -8 · Official NTA final key

Q10 JEE Main 2026 · 4 Apr · Shift 2 MCQ

If the quadratic equation $(\lambda+2)x^2 - 3\lambda x + 4\lambda = 0$, $\lambda \neq -2$, has two positive roots, then the number of possible integral values of λ is:

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

Answer: (B) 2 · Official NTA final key

Q11 JEE Main 2026 · 2 Apr · Shift 1 MCQ

Let α, $\alpha+2$, $\alpha \in \mathbf{Z}$, be the roots of the quadratic equation
$x(x+2) + (x+1)(x+3) + (x+2)(x+4) + \ldots + (x+n-1)(x+n+1) = 4n$ for some $n \in \mathbf{N}$.
Then $n + \alpha$ is equal to :

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

Answer: (C) 2 · Official NTA final key

Q12 JEE Main 2026 · 2 Apr · Shift 2 MCQ

Let α, β be the roots of the equation $x^2 - 3x + \mathrm{r} = 0$, and $\frac{\alpha}{2}, 2\beta$ be the roots of the equation $x^2 + 3x + \mathrm{r} = 0$. If the roots of the equation $x^2 + 6x = \mathrm{m}$ are $2\alpha + \beta + 2\mathrm{r}$ and $\alpha - 2\beta - \frac{\mathrm{r}}{2}$, then m is equal to :

(A) -135
(B) -567
(C) 135
(D) 567

Answer: (D) 567 · Official NTA final key

Q13 JEE Main 2026 · 28 Jan · Shift 1 MCQ

Let $\mathrm{S} = \{x^3 + ax^2 + bx + c : a, b, c \in \mathbf{N} \text{ and } a, b, c \leq 20\}$ be a set of polynomials. Then the number of polynomials in S, which are divisible by $x^2 + 2$, is

(A) 120
(B) 10
(C) 20
(D) 6

Answer: (B) 10 · Official NTA final key

Q14 JEE Main 2026 · 28 Jan · Shift 1 MCQ

If α, β, where $\alpha < \beta$, are the roots of the equation $\lambda x^2 - (\lambda + 3)x + 3 = 0$ such that $\frac{1}{\alpha} - \frac{1}{\beta} = \frac{1}{3}$, then the sum of all possible values of λ is

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

Answer: (B) 6 · Official NTA final key

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Q15 JEE Main 2026 · 28 Jan · Shift 2 MCQ

Let the arithmetic mean of $\frac{1}{a}$ and $\frac{1}{b}$ be $\frac{5}{16}$, $a > 2$. If α is such that a, 4, α, b are in A.P., then the equation $\alpha x^2 - ax + 2(\alpha - 2b) = 0$ has :

(A) one root in (1, 4) and another in $(-2, 0)$
(B) complex roots of magnitude less than 2
(C) both roots in the interval $(-2, 0)$
(D) one root in (0, 2) and another in $(-4, -2)$

Answer: (A) one root in (1, 4) and another in $(-2, 0)$ · Official NTA final key

Q16 JEE Main 2026 · 24 Jan · Shift 1 MCQ

The number of the real solutions of the equation:

$x|x + 3| + |x - 1| - 2 = 0$ is

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

Answer: (D) 3 · Official NTA final key

Q17 JEE Main 2026 · 24 Jan · Shift 2 MCQ

The smallest positive integral value of a, for which all the roots of $x^4 - ax^2 + 9 = 0$ are real and distinct, is equal to

(A) 3
(B) 9
(C) 7
(D) 4

Answer: (C) 7 · Official NTA final key

Q18 JEE Main 2026 · 23 Jan · Shift 1 MCQ

If α and β ($\alpha < \beta$) are the roots of the equation $\left(-2 + \sqrt{3}\right)(|\sqrt{x} - 3|) + (x - 6\sqrt{x}) + \left(9 - 2\sqrt{3}\right) = 0$, $x \geq 0$, then $\sqrt{\frac{\beta}{\alpha}} + \sqrt{\alpha\beta}$ is equal to :

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

Answer: (D) 10 · Official NTA final key

Q19 JEE Main 2026 · 23 Jan · Shift 1 MCQ

A building construction work can be completed by two masons A and B together in 22.5 days. Mason A alone can complete the construction work in 24 days less than mason B alone. Then mason A alone will complete the construction work in :

(A) 42 days
(B) 24 days
(C) 36 days
(D) 30 days

Answer: (C) 36 days · Official NTA final key

Q20 JEE Main 2026 · 23 Jan · Shift 2 MCQ

The sum of all the real solutions of the equation

$\log_{(x+3)}\left(6x^2+28x+30\right)=5-2\log_{(6x+10)}\left(x^2+6x+9\right)$ is equal to

(A) 1
(B) 0
(C) 2
(D) 4

Answer: (B) 0 · Official NTA final key

Q21 JEE Main 2026 · 22 Jan · Shift 1 MCQ

The number of distinct real solutions of the equation $x|x+4|+3|x+2|+10=0$ is

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

Answer: (D) 1 · Official NTA final key

Q22 JEE Main 2026 · 22 Jan · Shift 2 MCQ

Let α, β be the roots of the quadratic equation $12x^2-20x+3\lambda=0$, $\lambda\in\mathbf{Z}$. If $\frac{1}{2}\le|\beta-\alpha|\le\frac{3}{2}$, then the sum of all possible values of λ is :

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

Answer: (D) 3 · Official NTA final key

Q23 JEE Main 2026 · 21 Jan · Shift 1 MCQ

The sum of all the roots of the equation $(x-1)^2 - 5|x-1| + 6 = 0$, is :

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

Answer: (C) 4 · Official NTA final key

Q24 JEE Main 2026 · 21 Jan · Shift 2 MCQ

Let α and β be the roots of the equation $x^2 + 2ax + (3a + 10) = 0$ such that $\alpha < 1 < \beta$. Then the set of all possible values of a is :

(A) $\left(-\infty, \frac{-11}{5}\right) \cup (5, \infty)$
(B) $(-\infty, -3)$
(C) $(-\infty, -2) \cup (5, \infty)$
(D) $\left(-\infty, \frac{-11}{5}\right)$

Answer: (D) $\left(-\infty, \frac{-11}{5}\right)$ · Official NTA final key

Q25 JEE Main 2025 · 8 Apr · Shift 2 MCQ

The sum of the squares of the roots of $|x-2|^2 + |x-2| - 2 = 0$ and the squares of the roots of $x^2 - 2|x-3| - 5 = 0$, is

(A) 26
(B) 30
(C) 24
(D) 36

Answer: (D) 36 · Key from source paper

Q26 JEE Main 2025 · 7 Apr · Shift 1 MCQ

Let the set of all values of $p \in \mathbb{R}$, for which both the roots of the equation $x^2 - (p+2)x + (2p+9) = 0$ are negative real numbers, be the interval $(\alpha, \beta]$. Then $\beta - 2\alpha$ is equal to

(A) 9
(B) 0
(C) 5
(D) 20

Answer: (C) 5 · Key from source paper

Q27 JEE Main 2025 · 7 Apr · Shift 2 MCQ

The number of real roots of the equation $x|x-2|+3|x-3|+1=0$ is :

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

Answer: (C) 1 · Key from source paper

Q28 JEE Main 2025 · 4 Apr · Shift 1 MCQ

Consider the equation $x^2+4x-n=0$, where $n \in [20, 100]$ is a natural number. Then the number of all distinct values of n, for which the given equation has integral roots, is equal to

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

Answer: (B) 6 · Key from source paper

Q29 JEE Main 2025 · 3 Apr · Shift 1 MCQ

Let α and β be the roots of $x^2+\sqrt{3}x-16=0$, and γ and δ be the roots of $x^2+3x-1=0$. If $P_n=\alpha^n+\beta^n$ and $Q_n=\gamma^n+\hat{\delta}^n$, then $\frac{P_{25}+\sqrt{3}P_{24}}{2P_{23}}+\frac{Q_{25}-Q_{23}}{Q_{24}}$ is equal to

(A) 4
(B) 7
(C) 3
(D) 5

Answer: (D) 5 · Key from source paper

Q30 JEE Main 2025 · 3 Apr · Shift 2 MCQ

Let the equation $x(x+2)(12-k)=2$ have equal roots. Then the distance of the point $\left(k, \frac{k}{2}\right)$ from the line $3x+4y+5=0$ is

(A) $15\sqrt{5}$
(B) 15
(C) $5\sqrt{3}$
(D) 12

Answer: (B) 15 · Key from source paper

Q31 JEE Main 2025 · 2 Apr · Shift 1 MCQ

Let $P_n = \alpha^n + \beta^n, n \in N$. If $P_{10} = 123, P_9 = 76, P_8 = 47$ and $P_1 = 1$, then the quadratic equation having roots $\frac{1}{\alpha}$ and $\frac{1}{\beta}$ is :

(A) $x^2 - x + 1 = 0$
(B) $x^2 - x - 1 = 0$
(C) $x^2 + x + 1 = 0$
(D) $x^2 + x - 1 = 0$

Answer: (D) $x^2 + x - 1 = 0$ · Key from source paper

Q32 JEE Main 2025 · 2 Apr · Shift 2 Numerical

If the set of all $a \in R - \{1\}$, for which the roots of the equation $(1-a)x^2 + 2(a-3)x + 9 = 0$ are positive is $(-\infty, -\alpha] \cup [\beta, \gamma)$, then $2\alpha + \beta + \gamma$ is equal to _____

Numerical value type: the answer is a number.

Answer: 7. · Key from source paper

Q33 JEE Main 2025 · 29 Jan · Shift 1 MCQ

The number of solutions of the equation $\left(\frac{9}{x} - \frac{9}{\sqrt{x}} + 2\right)\left(\frac{2}{x} - \frac{7}{\sqrt{x}} + 3\right) = 0$ is:

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

Answer: (D) 4 · Key from source paper

Q34 JEE Main 2025 · 29 Jan · Shift 2 MCQ

If the set of all $\mathrm{a} \in \mathbf{R}$, for which the equation $2x^2 + (a-5)x + 15 = 3\mathrm{a}$ has no real root, is the interval (α, β), and $X = \{x \in \mathbf{Z} : \alpha < x < \beta\}$, then $\sum_{x \in X} x^2$ is equal to :

(A) 2109
(B) 2129
(C) 2119
(D) 2139

Answer: (D) 2139 · Key from source paper

Q35 JEE Main 2025 · 28 Jan · Shift 1 MCQ

The sum, of the squares of all the roots of the equation $x^2 + |2x - 3| - 4 = 0$, is

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

Answer: (C) $6(2 - \sqrt{2})$ · Key from source paper

Q36 JEE Main 2025 · 24 Jan · Shift 1 MCQ

The product of all the rational roots of the equation $(x^2 - 9x + 11)^2 - (x - 4)(x - 5) = 3$, is equal to

(A) 14
(B) 21
(C) 28
(D) 7

Answer: (A) 14 · Key from source paper

Q37 JEE Main 2025 · 24 Jan · Shift 1 MCQ

If α and β are the roots of the equation $2z^2 - 3z - 2\mathrm{i} = 0$, where $\mathrm{i} = \sqrt{-1}$, then $16 \cdot \mathrm{Re}\left(\frac{\alpha^{19}+\beta^{19}+\alpha^{11}+\beta^{11}}{\alpha^{15}+\beta^{15}}\right) \cdot \mathrm{Im}\left(\frac{\alpha^{19}+\beta^{19}+\alpha^{11}+\beta^{11}}{\alpha^{15}+\beta^{15}}\right)$ is equal to

(A) 441
(B) 398
(C) 312
(D) 409

Answer: (A) 441 · Key from source paper

Q38 JEE Main 2025 · 24 Jan · Shift 2 MCQ

Let $\mathrm{A} = \left\{x \in (0, \pi) - \left\{\frac{\pi}{2}\right\} : \log_{(2/\pi)} |\sin x| + \log_{(2/\pi)} |\cos x| = 2\right\}$ and $\mathrm{B} = \{x \geqslant 0 : \sqrt{x}(\sqrt{x} - 4) - 3|\sqrt{x} - 2| + 6 = 0\}$. Then $\mathrm{n}(\mathrm{A} \cup \mathrm{B})$ is equal to :

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

Answer: (B) 8 · Key from source paper

Q39 JEE Main 2025 · 24 Jan · Shift 2 MCQ

The number of real solution(s) of the equation $x^2 + 3x + 2 = \min\{|x - 3|, |x + 2|\}$ is :

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

Answer: (C) 2 · Key from source paper

Q40 JEE Main 2025 · 23 Jan · Shift 1 Numerical

If the equation $\mathrm{a}(\mathrm{b} - \mathrm{c})x^2 + \mathrm{b}(\mathrm{c} - \mathrm{a})x + \mathrm{c}(\mathrm{a} - \mathrm{b}) = 0$ has equal roots, where $\mathrm{a} + \mathrm{c} = 15$ and $\mathrm{b} = \frac{36}{5}$, then $a^2 + c^2$ is equal to _____

Numerical value type: the answer is a number.

Answer: 117. · Key from source paper

Q41 JEE Main 2025 · 23 Jan · Shift 1 Numerical

If the set of all values of a, for which the equation $5x^3 - 15x - a = 0$ has three distinct real roots, is the interval (α, β), then $\beta - 2\alpha$ is equal to _____

Numerical value type: the answer is a number.

Answer: 30. · Key from source paper

Q42 JEE Main 2025 · 23 Jan · Shift 2 Numerical

Let α, β be the roots of the equation $x^2 - ax - b = 0$ with $\mathrm{Im}(\alpha) < \mathrm{Im}(\beta)$. Let $P_n = \alpha^n - \beta^n$. If $P_3 = -5\sqrt{7}i, P_4 = -3\sqrt{7}i, P_5 = 11\sqrt{7}i$ and $P_6 = 45\sqrt{7}i$, then $|\alpha^4 + \beta^4|$ is equal to .

Numerical value type: the answer is a number.

Answer: 31. · Key from source paper

Q43 JEE Main 2025 · 22 Jan · Shift 1 MCQ

The product of all solutions of the equation $\mathrm{e}^{5(\log_e x)^2 + 3} = x^8$, $x > 0$, is :

(A) $e^{8/5}$

(B) $e^{6/5}$

(C) e^2

(D) e

Answer: (A) $e^{8/5}$ · Key from source paper

Q44 JEE Main 2025 · 22 Jan · Shift 2 MCQ

Let α_θ and β_θ be the distinct roots of $2x^2 + (\cos\theta)x - 1 = 0, \theta \in (0, 2\pi)$. If m and M are the minimum and the maximum values of $\alpha_\theta^4 + \beta_\theta^4$, then $16(M + m)$ equals :

(A) 24

(B) 25

(C) 17

(D) 27

Answer: (B) 25 · Key from source paper

Q45 JEE Main 2024 · 9 Apr · Shift 1 MCQ

Let α, β be the roots of the equation $x^2 + 2\sqrt{2}x - 1 = 0$. The quadratic equation, whose roots are $\alpha^4 + \beta^4$ and $\frac{1}{10}(\alpha^6 + \beta^6)$, is :

(A) $x^2 - 190x + 9466 = 0$

(B) $x^2 - 180x + 9506 = 0$

(C) $x^2 - 195x + 9506 = 0$

(D) $x^2 - 195x + 9466 = 0$

Answer: (C) $x^2 - 195x + 9506 = 0$ · Key from source paper

Q46 JEE Main 2024 · 9 Apr · Shift 2 MCQ

Let $\alpha, \beta;\ \alpha > \beta$, be the roots of the equation $x^2 - \sqrt{2}x - \sqrt{3} = 0$. Let $\mathrm{P}_n = \alpha^n - \beta^n, n \in \mathrm{N}$. Then $(11\sqrt{3} - 10\sqrt{2})\mathrm{P}_{10} + (11\sqrt{2} + 10)\mathrm{P}_{11} - 11\mathrm{P}_{12}$ is equal to

(A) $10\sqrt{3}\mathrm{P}_9$

(B) $11\sqrt{3}P_9$

(C) $10\sqrt{2}\mathrm{P}_9$

(D) $11\sqrt{2}\mathrm{P}_9$

Answer: (A) $10\sqrt{3}\mathrm{P}_9$ · Key from source paper

Q47 JEE Main 2024 · 8 Apr · Shift 1 MCQ

The sum of all the solutions of the equation $(8)^{2x} - 16 \cdot (8)^x + 48 = 0$ is :

(A) $1+\log_8(6)$
(B) $1+\log_6(8)$
(C) $\log_8(6)$
(D) $\log_8(4)$

Answer: (A) $1+\log_8(6)$ · Key from source paper

Q48 JEE Main 2024 · 8 Apr · Shift 2 Numerical

The number of distinct real roots of the equation $|x+1||x+3|-4|x+2|+5=0$, is _____

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q49 JEE Main 2024 · 6 Apr · Shift 1 MCQ

Let α, β be the distinct roots of the equation $x^2-(t^2-5t+6)x+1=0, t\in\mathbb{R}$ and $a_n=\alpha^n+\beta^n$. Then the minimum value of $\frac{a_{2023}+a_{2025}}{a_{2024}}$ is

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

Answer: (B) $-1/4$ · Key from source paper

Q50 JEE Main 2024 · 6 Apr · Shift 1 Numerical

Let x_1, x_2, x_3, x_4 be the solution of the equation $4x^4+8x^3-17x^2-12x+9=0$ and $(4+x_1^2)(4+x_2^2)(4+x_3^2)(4+x_4^2)=\frac{125}{16}m$. Then the value of m is

Numerical value type: the answer is a number.

Answer: 221. · Key from source paper

Q51 JEE Main 2024 · 6 Apr · Shift 2 Numerical

Let α, β be roots of $x^2+\sqrt{2}x-8=0$. If $U_n=\alpha^n+\beta^n$, then $\frac{U_{10}+\sqrt{2}U_9}{2U_8}$ is equal to _____

Numerical value type: the answer is a number.

Answer: 4. · Key from source paper

Q52 JEE Main 2024 · 5 Apr · Shift 1 Numerical

The number of distinct real roots of the equation $|x||x+2|-5|x+1|-1=0$ is _____

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q53 JEE Main 2024 · 5 Apr · Shift 2 Numerical

The number of real solutions of the equation $x|x+5|+2|x+7|-2=0$ is _____

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q54 JEE Main 2024 · 4 Apr · Shift 1 MCQ

If 2 and 6 are the roots of the equation $ax^2+bx+1=0$, then the quadratic equation, whose roots are $\frac{1}{2a+b}$ and $\frac{1}{6a+b}$, is :

(A) $2x^2+11x+12=0$

(B) $x^2+8x+12=0$

(C) $4x^2+14x+12=0$

(D) $x^2+10x+16=0$

Answer: (B) $x^2+8x+12=0$ · Key from source paper

Q55 JEE Main 2024 · 4 Apr · Shift 2 Numerical

Let $S=\{\sin^2 2\theta : (\sin^4\theta+\cos^4\theta)x^2+(\sin 2\theta)x+(\sin^6\theta+\cos^6\theta)=0 \text{ has real roots }\}$. If α and β be the smallest and largest elements of the set S, respectively, then $3\left((\alpha-2)^2+(\beta-1)^2\right)$ equals _____

Numerical value type: the answer is a number.

Answer: 4. · Key from source paper

Q56 JEE Main 2024 · 1 Feb · Shift 1 MCQ

Let $S=x\in R:\sqrt{3}+\sqrt{2}^x+\sqrt{3}-\sqrt{2}^x=10$. Then the number of elements in S is:

(A) 4

(B) 0

(C) 2

(D) 1

Answer: (C) 2 · Key from source paper

Q57 JEE Main 2024 · 1 Feb · Shift 2 MCQ

Let α and β be the roots of the equation $px^2+qx-r=0$, where $p\neq 0$. If p, q and r be the consecutive terms of a non-constant G.P and $\frac{1}{\alpha}+\frac{1}{\beta}=\frac{3}{4}$, then the value of $\alpha-\beta^2$ is:

(A) $\frac{80}{9}$
(B) 9
(C) $\frac{20}{3}$
(D) 8

Answer: (A) $\frac{80}{9}$ · Key from source paper

Q58 JEE Main 2024 · 31 Jan · Shift 1 MCQ

Let S be the set of positive integral values of a for which $\frac{ax^2+2a+1x+9a+4}{x^2-8x+32} < 0, \forall x \in \mathbb{R}$. Then, the number of elements in S is:

(A) 1
(B) 0
(C) ∞
(D) 3

Answer: (B) 0 · Key from source paper

Q59 JEE Main 2024 · 31 Jan · Shift 1 MCQ

For $0 < c < b < a$, let $(a+b-2c)x^2 + (b+c-2a)x + (c+a-2b) = 0$ and $\alpha \neq 1$ be one of its root. Then, among the two statements

(I) If $\alpha \in -1,\ 0$, then b cannot be the geometric mean of a and c.

(II) If $\alpha \in 0,\ 1$, then b may be the geometric mean of a and c.

(A) Both (I) and (II) are true
(B) Neither (I) nor (II) is true
(C) Only (II) is true
(D) Only (I) is true

Answer: (A) Both (I) and (II) are true · Key from source paper

Q60 JEE Main 2024 · 31 Jan · Shift 1 MCQ

Let a be the sum of all coefficients in the expansion of $(1-2x+2x^2)^{2023}(3-4x^2+2x^3)^{2024}$ and $b = \lim_{x\to 0} \frac{\int_0^x \frac{\log(1+t)}{t^{2024}+1}dt}{x^2}$. If the equations $cx^2+dx+e=0$ and $2bx^2+ax+4=0$ have a common root, where $c,\ d,\ e \in R$, then $d : c : e$ equals

(A) 2 : 1 : 4
(B) 4 : 1 : 4
(C) 1 : 2 : 4
(D) 1 : 1 : 4

Answer: (D) 1 : 1 : 4 · Key from source paper

Q61 JEE Main 2024 · 31 Jan · Shift 2 MCQ

The number of solutions, of the equation $e^{\sin x} - 2e^{-\sin x} = 2$ is

(A) 2
(B) more than 2
(C) 1
(D) 0

Answer: (D) 0 · Key from source paper

Q62 JEE Main 2024 · 31 Jan · Shift 2 Numerical

Let a, b, c be the length of three sides of a triangle satisfying the condition $a^2 + b^2x^2 - 2ba + c\,x + b^2 + c^2 = 0$. If the set of all possible values of x is in the interval α, β, then $12\alpha^2 + \beta^2$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 36. · Key from source paper

Q63 JEE Main 2024 · 30 Jan · Shift 1 Numerical

Let $\alpha, \beta \in$ be roots of equation $x^2 - 70x + \lambda = 0$, where $\frac{\lambda}{2}, \frac{\lambda}{3} \notin$. If λ assumes the minimum possible value, then $\frac{(\sqrt{\alpha-1}+\sqrt{\beta-1})(\lambda+35)}{|\alpha-\beta|}$ is equal to :

Numerical value type: the answer is a number.

Answer: 60. · Key from source paper

Q64 JEE Main 2024 · 30 Jan · Shift 2 Numerical

The number of real solutions of the equation $x\left(x^2 + 3|x| + 5|x-1| + 6|x-2|\right) = 0$ is _____.

Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

Q65 JEE Main 2024 · 29 Jan · Shift 1 MCQ

Consider the function $f : \left[\frac{1}{2}, 1\right] \to \mathrm{R}$ defined by $f(x) = 4\sqrt{2}x^3 - 3\sqrt{2}x - 1$. Consider the statements

(I) The curve $y = f(x)$ intersects the x-axis exactly at one point

(II) The curve $y = f(x)$ intersects the x-axis at $x = \cos\frac{\pi}{12}$

Then

(A) Only (II) is correct
(B) Both (I) and (II) are incorrect
(C) Only (I) is correct
(D) Both (I) and (II) are correct

Answer: (D) Both (I) and (II) are correct · Key from source paper

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Q66 JEE Main 2024 · 29 Jan · Shift 1 Numerical

Let α, β be the roots of the equation $x^2 - x + 2 = 0$ with $\text{Im}(\alpha) > \text{Im}(\beta)$. Then $\alpha^6 + \alpha^4 + \beta^4 - 5\alpha^2$ is equal to

Numerical value type: the answer is a number.

Answer: 13. · Key from source paper

Q67 JEE Main 2024 · 29 Jan · Shift 2 Numerical

Let the set $C = \{(x, y) \mid x^2 - 2^y = 2023, x, y \in \mathbb{N}\}$. Then $\sum_{(x,y)\in C}(x + y)$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 46. · Key from source paper

Q68 JEE Main 2024 · 27 Jan · Shift 2 MCQ

If α, β are the roots of the equation, $x^2 - x - 1 = 0$ and $S_n = 2023\alpha^n + 2024\beta^n$, then

(A) $2\,S_{12} = S_{11} + S_{10}$
(B) $S_{12} = S_{11} + S_{10}$
(C) $2\,S_{11} = S_{12} + S_{10}$
(D) $S_{11} = S_{10} + S_{12}$

Answer: (B) $S_{12} = S_{11} + S_{10}$ · Key from source paper

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Q69 JEE Main 2023 · 15 Apr · Shift 1 MCQ

The number of real roots of the equation $x|x| - 5|x + 2| + 6 = 0$, is

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

Answer: (D) 3 · Key from source paper

Q70 JEE Main 2023 · 13 Apr · Shift 1 MCQ

The set of all $a \in \mathbb{R}$ for which the equation $x|x - 1| + |x + 2| + a = 0$ has exactly one real root, is

(A) $(-7, \infty)$
(B) $(-\infty, \infty)$
(C) $(-6, -3)$
(D) $(-\infty, -3)$

Answer: (B) $(-\infty, \infty)$ · Key from source paper

Q71 JEE Main 2023 · 13 Apr · Shift 2 MCQ

Let α, β be the roots of the equation $x^2 - \sqrt{2x} + 2 = 0$ Then $\alpha^{14} + \beta^{14}$ is equal to

(A) -64
(B) $-64\sqrt{2}$
(C) -128
(D) $-128\sqrt{2}$

Answer: (C) -128 · Key from source paper

Q72 JEE Main 2023 · 12 Apr · Shift 1 MCQ

Let α, β be the roots of the quadratic equation $x^2 + \sqrt{6}x + 3 = 0$. Then $\frac{\alpha^{23}+\beta^{23}+\alpha^{14}+\beta^{14}}{\alpha^{15}+\beta^{15}+\alpha^{10}+\beta^{10}}$ is equal to

(A) 81
(B) 9
(C) 72
(D) 729

Answer: (A) 81 · Key from source paper

Q73 JEE Main 2023 · 11 Apr · Shift 1 MCQ

The number of integral solution x of $\log_{x+\frac{7}{2}} \frac{x-7}{2x-3}^2 \geq 0$ is

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

Answer: (C) 6 · Key from source paper

Q74 JEE Main 2023 · 11 Apr · Shift 1 Numerical

If a and b are the roots of the equation $x^2 - 7x - 1 = 0$, then the value of $\frac{a^{21}+b^{21}+a^{17}+b^{17}}{a^{19}+b^{19}}$ is equal to

Numerical value type: the answer is a number.

Answer: 51. · Key from source paper

EdLoop JEE

Q75 JEE Main 2023 · 11 Apr · Shift 2 Numerical

The number of points, where the curve $f(x) = e^{8x} - e^{6x} - 3e^{4x} - e^{2x} + 1$, $x \in \mathbb{R}$ cuts x-axis, is equal to _____

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q76 JEE Main 2023 · 10 Apr · Shift 1 Numerical

Let a, b, c be the three distinct positive real numbers such that $2a^{\log_e a} = bc^{\log_e b}$ and $b^{\log_e 2} = a^{\log_e c}$ Then $6a + 5bc$ is equal to _____

Numerical value type: the answer is a number.

Answer: 8. · Key from source paper

Q77 JEE Main 2023 · 10 Apr · Shift 1 Numerical

The number of elements in the set $n \in \mathbb{Z} : n^2 - 10n + 19 < 6$ is _____ .

Numerical value type: the answer is a number.

Answer: 6. · Key from source paper

Q78 JEE Main 2023 · 8 Apr · Shift 1 MCQ

Let α, β, γ be the three roots of the equation $x^3 + bx + c = 0$ if $\beta\gamma = 1 = -\alpha$ then $b^3 + 2c^3 - 3\alpha^3 - 6\beta^3 - 8\gamma^3$ is equal to

(A) $\frac{155}{8}$
(B) 21
(C) $\frac{169}{8}$
(D) 19

Answer: (D) 19 · Key from source paper

Q79 JEE Main 2023 · 8 Apr · Shift 2 Numerical

Let m and n be the numbers of real roots of the quadratic equations $x^2 - 12x + [x] + 31 = 0$ and $x^2 - 5|x + 2| - 4 = 0$ respectively, where $[x]$ denotes the greatest integer $\leq x$. Then $m^2 + mn + n^2$ is equal to

Numerical value type: the answer is a number.

Answer: 9. · Key from source paper

Q80 JEE Main 2023 · 6 Apr · Shift 1 MCQ

The sum of all the roots of the equation $x^2 - 8x + 15 - 2x + 7 = 0$ is

(A) $9-\sqrt{3}$
(B) $9+\sqrt{3}$
(C) $11-\sqrt{3}$
(D) $11+\sqrt{3}$

Answer: (B) $9+\sqrt{3}$ · Key from source paper

Q81 JEE Main 2023 · 1 Feb · Shift 1 MCQ

Let $S=x:x\in\mathbb{R}$ and $\sqrt{3}+\sqrt{2}^{x^2-4}+\sqrt{3}-\sqrt{2}^{x^2-4}=10$. Then nS is equal to

(A) 2
(B) 4
(C) 6
(D) 0

Answer: (B) 4 · Key from source paper

Q82 JEE Main 2023 · 1 Feb · Shift 2 MCQ

The number of integral values of k, for which one root of the equation $2x^2-8x+k=0$ lies in the interval $(1,2)$ and its other root lies in the interval $(2,3)$, is :

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

Answer: (C) 1 · Key from source paper

Q83 JEE Main 2023 · 31 Jan · Shift 1 MCQ

The number of real roots of the equation $\sqrt{x^2-4x+3}+\sqrt{x^2-9}=\sqrt{4x^2-14x+6}$, is:

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

Answer: (B) 1 · Key from source paper

Q84 JEE Main 2023 · 31 Jan · Shift 2 MCQ

The equation $e^{4x}+8e^{3x}+13e^{2x}-8e^{x}+1=0$, $x\in R$ has :

(A) four solutions two of which are negative
(B) two solutions and both are negative
(C) no solution
(D) two solutions and only one of them is negative

Answer: (B) two solutions and both are negative · Key from source paper

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Q85 JEE Main 2023 · 30 Jan · Shift 1 MCQ

If the solution of the equation $\log_{\cos x} \cot x + 4 \log_{\sin x} \tan x = 1$, $x \in 0, \frac{\pi}{2}$ is $\sin^{-1} \frac{\alpha+\sqrt{\beta}}{2}$, where α, β are integers, then $\alpha + \beta$ is equal to:

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

Answer: (D) 4 · Key from source paper

Q86 JEE Main 2023 · 30 Jan · Shift 2 Numerical

If the value of real number $\alpha > 0$ for which $x^2 - 5\alpha x + 1 = 0$ and $x^2 - \alpha x - 5 = 0$ have a common real roots is $\frac{3}{\sqrt{2\beta}}$ then β is equal to _____ .

Numerical value type: the answer is a number.

Answer: 13. · Key from source paper

Q87 JEE Main 2023 · 30 Jan · Shift 2 MCQ

The parabolas : $ax^2 + 2bx + cy = 0$ and $d^2 + 2ex + fy = 0$ intersect on the line $y = 1$. If a, b, c, d, e, f are positive real numbers and a, b, c are in G. P., then

(A) d, e, f are in A.P.
(B) $\frac{d}{a}, \frac{e}{b}, \frac{f}{c}$ are in G.P.
(C) $\frac{d}{a}, \frac{e}{b}, \frac{f}{c}$ are in A.P.
(D) d, e, f are in G.P.

Answer: (C) $\frac{d}{a}, \frac{e}{b}, \frac{f}{c}$ are in A.P. · Key from source paper

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Q88 JEE Main 2023 · 30 Jan · Shift 2 MCQ

Let q be the maximum integral value of p in $[0, 10]$ for which the roots of the equation $x^2 - px + \frac{5}{4}p = 0$ are rational. Then the area of the region $\{(x, y) : 0 \leq y \leq (x - q)^2, 0 \leq x \leq q\}$ is

(A) 243
(B) 25
(C) $\frac{125}{3}$
(D) 164

Answer: (A) 243 · Key from source paper

Q89 JEE Main 2023 · 29 Jan · Shift 1 MCQ

Let $\lambda \neq 0$ be a real number. Let α, β be the roots of the equation $14x^2 - 31x + 3\lambda = 0$ and α, γ be the roots of the equation $35x^2 - 53x + 4\lambda = 0$. Then $\frac{3\alpha}{\beta}$ and $\frac{4\alpha}{\gamma}$ are the roots of the equation :

(A) $7x^2 + 245x - 250 = 0$
(B) $7x^2 - 245x + 250 = 0$
(C) $49x^2 - 245x + 250 = 0$
(D) $49x^2 + 245x + 250 = 0$

Answer: (C) $49x^2 - 245x + 250 = 0$ · Key from source paper

Q90 JEE Main 2023 · 29 Jan · Shift 2 Numerical

Let $\alpha_1, \alpha_2, \ldots, \alpha_7$ be the roots of the equation $x^7 + 3x^5 - 13x^3 - 15x = 0$ and $|\alpha_1| \geq |\alpha_2| \geq \ldots \geq |\alpha_7|$.
Then, $\alpha_1\alpha_2 - \alpha_3\alpha_4 + \alpha_5\alpha_6$ is equal to _____

Numerical value type: the answer is a number.

Answer: 9. · Key from source paper

Q91 JEE Main 2023 · 25 Jan · Shift 1 Numerical

Let $S = \{\alpha : \log_2(9^{2\alpha-4} + 13) - \log_2\left(\frac{5}{2} \cdot 3^{2\alpha-4} + 1\right) = 2\}$. Then the maximum value of β for which the equation $x^2 - 2\left(\sum_{\alpha \in S} \alpha\right)^2 x + \sum_{\alpha \in S}(\alpha+1)^2\beta = 0$ has real roots, is _____ .

Numerical value type: the answer is a number.

Answer: 25. · Key from source paper

Q92 JEE Main 2023 · 25 Jan · Shift 2 Numerical

Let $a \in R$ and let α, β be the roots of the equation $x^2 + 60^{\frac{1}{4}}x + a = 0$. If $\alpha^4 + \beta^4 = -30$, then the product of all possible values of a is _____ .

Numerical value type: the answer is a number.

Answer: 45. · Key from source paper

Q93 JEE Main 2023 · 24 Jan · Shift 1 MCQ

For three positive integers p, q, r, $x^{pq^2} = y^{qr} = z^{p^2r}$ and $r = pq + 1$ such that
$3,\ 3\log_y x,\ 3\log_z y,\ 7\log_x z$ are in A.P. with common difference $\frac{1}{2}$. The $r - p - q$ is equal to

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

Answer: (A) 2 · Key from source paper

Q94 JEE Main 2023 · 24 Jan · Shift 1 · Numerical

Let $\lambda \in \mathbb{R}$ and let the equation E be $|x|^2 - 2|x| + |\lambda - 3| = 0$. Then the largest element in the set $S = \{x + \lambda : x \text{ is an integer solution of } E\}$ is _____.

Numerical value type: the answer is a number.

Answer: 5. · Key from source paper

Q95 JEE Main 2023 · 24 Jan · Shift 2 · MCQ

The number of real solutions of the equation $3\left(x^2 + \frac{1}{x^2}\right) - 2\left(x + \frac{1}{x}\right) + 5 = 0$, is

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

Answer: (B) 0 · Key from source paper

Q96 JEE Main 2022 · 29 Jul · Shift 1 · Numerical

Let $S = \{4, 6, 9\}$ and $T = \{9, 10, 11, \ldots, 1000\}$. If $A = \{a_1 + a_2 + \ldots + a_k : k \in N, a_1, a_2, a_3, \ldots, a_k \in S\}$ then the sum of all the elements in the set $T - A$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 11. · Key from source paper

Q97 JEE Main 2022 · 29 Jul · Shift 2 · Numerical

Let $\alpha, \beta\alpha > \beta$ be the roots of the quadratic equation $x^2 - x - 4 = 0$. If $P_n = \alpha^n - \beta^n, n \in \mathbb{N}$, then $\frac{P_{15}P_{16} - P_{14}P_{16} - P_{15}^2 + P_{14}P_{15}}{P_{13}P_{14}}$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 16. · Key from source paper

Q98 JEE Main 2022 · 28 Jul · Shift 1 · Numerical

The sum of all real values of x for which $\frac{3x^2 - 9x + 17}{x^2 + 3x + 10} = \frac{5x^2 - 7x + 19}{3x^2 + 5x + 12}$ is equal to

Numerical value type: the answer is a number.

Answer: 6. · Key from source paper

Q99 JEE Main 2022 · 28 Jul · Shift 1 · Numerical

For $p, q \in R$, consider the real valued function $fx = x - p^2 - q, x \in R$ and $q > 0$. Let a_1, a_2, a_3 and a_4 be in arithmetic progression with mean p and positive common difference. If $fa_i = 500$ for all $i = 1, 2, 3, 4$, then the absolute difference between the roots of $fx = 0$ is

Numerical value type: the answer is a number.

Answer: 50. · Key from source paper

Q100 JEE Main 2022 · 28 Jul · Shift 2 · MCQ

Let $S = \left\{x \in [-6, 3] - \{-2, 2\} : \frac{|x+3|-1}{|x|-2} \geq 0\right\}$ and $T = \{x \in Z : x^2 - 7|x| + 9 \leq 0\}$. Then the number of elements in $S \cap T$ is

(A) 7
(B) 5
(C) 4
(D) 3

Answer: (D) 3 · Key from source paper

Q101 JEE Main 2022 · 28 Jul · Shift 2 · MCQ

Let α, β be the roots of the equation $x^2 - \sqrt{2}x + \sqrt{6} = 0$ and $\frac{1}{\alpha^2} + 1, \frac{1}{\beta^2} + 1$ be the roots of the equation $x^2 + ax + b = 0$. Then the roots of the equation $x^2 - (a + b - 2)x + (a + b + 2) = 0$ are :

(A) non-real complex numbers
(B) real and both negative
(C) real and both positive
(D) real and exactly one of them is positive

Answer: (B) real and both negative · Key from source paper

Q102 JEE Main 2022 · 28 Jul · Shift 2 · MCQ

Let $f(x) = ax^2 + bx + c$ be such that $f(1) = 3$, $f(-2) = \lambda$ and $f(3) = 4$. If $f(0) + f(1) + f(-2) + f(3) = 14$, then λ is equal to

(A) -4
(B) $\frac{13}{2}$
(C) $\frac{23}{2}$
(D) 4

Answer: (D) 4 · Key from source paper

Q103 JEE Main 2022 · 27 Jul · Shift 1 · Numerical

Let $f(x) = 2x^2 - x - 1$ and $S = \{n \in \mathbb{Z} : |f(n)| \leq 800\}$. Then, the value of $\sum_{n \in S} f(n)$ is equal to _____ .

Numerical value type: the answer is a number.

Answer: 10620. · Key from source paper

Q104 JEE Main 2022 · 27 Jul · Shift 2 · MCQ

If α, β are the roots of the equation $x^2 - \left(5 + 3^{\sqrt{\log_3 5}} - 5^{\sqrt{\log_5 3}}\right)x + 3\left(3^{(\log_3 5)^{\frac{1}{3}}} - 5^{(\log_5 3)^{\frac{2}{3}}} - 1\right) = 0$ then the equation, whose roots are $\alpha + \frac{1}{\beta}$ and $\beta + \frac{1}{\alpha}$,

(A) $3x^2 - 20x - 12 = 0$

(B) $3x^2 - 10x - 4 = 0$

(C) $3x^2 - 10x + 2 = 0$

(D) $3x^2 - 20x + 16 = 0$

Answer: (B) $3x^2 - 10x - 4 = 0$ · Key from source paper

Q105 JEE Main 2022 · 26 Jul · Shift 1 · Numerical

If for some $p, q, r \in R$, all have positive sign, one of the roots of the equation $(p^2 + q^2)x^2 - 2q(p + r)x + q^2 + r^2 = 0$ is also a root of the equation $x^2 + 2x - 8 = 0$, then $\frac{q^2+r^2}{p^2}$ is equal to-

Numerical value type: the answer is a number.

Answer: 20. · Checked by our team

Q106 JEE Main 2022 · 26 Jul · Shift 1 · Numerical

The number of distinct real roots of the equation $x^5(x^3 - x^2 - x + 1) + x(3x^3 - 4x^2 - 2x + 4) - 1 = 0$ is

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q107 JEE Main 2022 · 26 Jul · Shift 2 · MCQ

The minimum value of the sum of the squares of the roots of $x^2 + 3 - ax = 2a - 1$ is

(A) 6

(B) 4

(C) 5

(D) 8

Answer: (A) 6 · Key from source paper

Q108 JEE Main 2022 · 25 Jul · Shift 1 · Numerical

Let a, b be two non-zero real numbers. If p and r are the roots of the equation $x^2 - 8ax + 2a = 0$ and q and s are the roots of the equation $x^2 + 12bx + 6b = 0$, such that $\frac{1}{p}, \frac{1}{q}, \frac{1}{r}, \frac{1}{s}$ are in A.P., then $a^{-1} - b^{-1}$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 38. · Key from source paper

Q109 JEE Main 2022 · 28 Jun · Shift 1 · Numerical

The number of real solutions of the equation $e^{4x} + 4e^{3x} - 58e^{2x} + 4e^{x} + 1 = 0$ is _____.

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q110 JEE Main 2022 · 28 Jun · Shift 2 · MCQ

Let $f(x)$ be a quadratic polynomial such that $f(-2) + f(3) = 0$. If one of the roots of $f(x) = 0$ is -1, then the sum of the roots of $f(x) = 0$ is equal to

(A) $\frac{11}{3}$
(B) $\frac{7}{3}$
(C) $\frac{12}{3}$
(D) $\frac{14}{3}$

Answer: (A) $\frac{11}{3}$ · Key from source paper

Q111 JEE Main 2022 · 27 Jun · Shift 1 · MCQ

The number of distinct real roots of $x^4 - 4x + 1 = 0$ is

(A) 0
(B) 1
(C) 2
(D) 4

Answer: (C) 2 · Key from source paper

Q112 JEE Main 2022 · 27 Jun · Shift 1 · Numerical

If the sum of all the roots of the equation $e^{2x} - 11e^{x} - 45e^{-x} + \frac{81}{2} = 0$ is $\log_e P$, then P is equal to _____ .

Numerical value type: the answer is a number.

Answer: 2. · Checked by our team

Q113 JEE Main 2022 · 27 Jun · Shift 2 Numerical

Let α, β be the roots of the equation $x^2 - 4\lambda x + 5 = 0$ and α, γ be the roots of the equation $x^2 - \left(3\sqrt{2} + 2\sqrt{3}\right)x + 7 + 3\lambda\sqrt{3} = 0$. If $\beta + \gamma = 3\sqrt{2}$, then $(\alpha + 2\beta + \gamma)^2$ is equal to

Numerical value type: the answer is a number.

Answer: 98. · Key from source paper

Q114 JEE Main 2022 · 26 Jun · Shift 1 Numerical

The sum of the cubes of all the roots of the equation $x^4 - 3x^3 - 2x^2 + 3x + 1 = 0$ is _____ .

Numerical value type: the answer is a number.

Answer: 36. · Key from source paper

Q115 JEE Main 2022 · 26 Jun · Shift 2 Numerical

If p and q are real number such that $p + q = 3, p^4 + q^4 = 369$, then the value of $\left(\frac{1}{p} + \frac{1}{q}\right)^{-2}$ is equal to _____ .

Numerical value type: the answer is a number.

Answer: 4. · Key from source paper

Q116 JEE Main 2022 · 25 Jun · Shift 2 MCQ

Let $a, b \in R$ be such that the equation $ax^2 - 2bx + 15 = 0$ has repeated root α and if α and β are the roots of the equation $x^2 - 2bx + 21 = 0$, then $\alpha^2 + \beta^2$ is equal to:

(A) 37
(B) 58
(C) 68
(D) 92

Answer: (B) 58 · Key from source paper

Q117 JEE Main 2022 · 24 Jun · Shift 1 MCQ

If the sum of the squares of the reciprocals of the roots α and β of the equation $3x^2 + \lambda x - 1 = 0$ is 15, then $6\left(\alpha^3 + \beta^3\right)^2$ is equal to

(A) 46
(B) 36
(C) 24
(D) 18

Answer: (C) 24 · Key from source paper

Q118 JEE Main 2022 · 24 Jun · Shift 2 MCQ

The sum of all real roots of equation $\left(e^{2x}-4\right)\left(6e^{2x}-5e^{x}+1\right)=0$ is

(A) $\ln 4$
(B) $-\ln 3$
(C) $\ln 3$
(D) $\ln 5$

Answer: (B) $-\ln 3$ · Key from source paper

Q119 JEE Main 2021 · 1 Sep · Shift 2 MCQ

The number of pairs a, b of real numbers, such that whenever α is a root of the equation $x^2+ax+b=0$, α^2-2 is also a root of this equation, is :

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

Answer: (A) 6 · Key from source paper

Q120 JEE Main 2021 · 1 Sep · Shift 2 Numerical

Let $f(x)$ be a polynomial of degree 3 such that $fk=-\frac{2}{k}$ for $k=2,3,4,5$. Then the value of $52-10\,f(10)$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 26. · Key from source paper

Q121 JEE Main 2021 · 31 Aug · Shift 1 MCQ

The number of real roots of the equation $e^{4x}+2e^{3x}-e^{x}-6=0$ is :

(A) 0
(B) 1
(C) 4
(D) 2

Answer: (B) 1 · Key from source paper

Q122 JEE Main 2021 · 31 Aug · Shift 2 MCQ

The sum of the roots of the equation, $x+1-2\log_2 3+2^{x}+2\log_4 10-2^{-x}=0$, is :

(A) $\log_2 14$
(B) $\log_2 12$
(C) $\log_2 13$
(D) $\log_2 11$

Answer: (D) $\log_2 11$ · Key from source paper

Q123 JEE Main 2021 · 27 Aug · Shift 1 MCQ

If $x^2 + 9y^2 - 4x + 3 = 0$, $x, y \in R$, then x and y respectively lie in the intervals

(A) $\left[-\frac{1}{3}, \frac{1}{3}\right]$ and $\left[-\frac{1}{3}, \frac{1}{3}\right]$
(B) $[1, 3]$ and $\left[-\frac{1}{3}, \frac{1}{3}\right]$
(C) $\left[-\frac{1}{3}, \frac{1}{3}\right]$ and $[1, 3]$
(D) $[1, 3]$ and $[1, 3]$

Answer: (B) $[1, 3]$ and $\left[-\frac{1}{3}, \frac{1}{3}\right]$ · Key from source paper

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Q124 JEE Main 2021 · 27 Aug · Shift 2 MCQ

The set of all values of $k > -1$, for which the equation $\left(3x^2 + 4x + 3\right)^2 - (k+1)\left(3x^2 + 4x + 3\right)\left(3x^2 + 4x + 2\right) + k\left(3x^2 + 4x + 2\right)^2 = 0$ has real roots, is:

(A) $\left[-\frac{1}{2}, 1\right)$
(B) $\left(1, \frac{5}{2}\right]$
(C) $\left(\frac{1}{2}, \frac{3}{2}\right] - \{1\}$
(D) $[2, 3)$

Answer: (B) $\left(1, \frac{5}{2}\right]$ · Key from source paper

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Q125 JEE Main 2021 · 26 Aug · Shift 1 Numerical

The sum of all integral values of $k (k \neq 0)$ for which the equation $\frac{2}{x-1} - \frac{1}{x-2} = \frac{2}{k}$ in x has no real roots, is _____.

Numerical value type: the answer is a number.

Answer: 66. · Key from source paper

Q126 JEE Main 2021 · 26 Aug · Shift 2 Numerical

Let $\lambda \neq 0$ be in R. If α and β are the roots of the equation $x^2 - x + 2\lambda = 0$, and α and γ are the roots of the equation $3x^2 - 10x + 27\lambda = 0$, then $\frac{\beta\gamma}{\lambda}$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 18. · Key from source paper

Q127 JEE Main 2021 · 27 Jul · Shift 1 MCQ

Let α, β be two roots of the equation $x^2 + (20)^{1/4}x + (5)^{1/2} = 0$. Then $\alpha^8 + \beta^8$ is equal to

(A) 10
(B) 100
(C) 50
(D) 160

Answer: (C) 50 · Key from source paper

Q128 JEE Main 2021 · 27 Jul · Shift 1 Numerical

If $\log_3 2, \log_3(2^x - 5), \log_3\left(2^x - \frac{7}{2}\right)$ are in an arithmetic progression, then the value of x is equal to _____.

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q129 JEE Main 2021 · 27 Jul · Shift 2 Numerical

The number of real roots of the equation $e^{4x} - e^{3x} - 4e^{2x} - e^x + 1 = 0$ is equal to

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q130 JEE Main 2021 · 25 Jul · Shift 1 MCQ

The number of real roots of the equation $e^{6x} - e^{4x} - 2e^{3x} - 12e^{2x} + e^x + 1 = 0$ is:

(A) 2
(B) 4
(C) 6
(D) 1

Answer: (A) 2 · Key from source paper

Q131 JEE Main 2021 · 25 Jul · Shift 1 Numerical

If α, β are roots of the equation $x^2 + 5\sqrt{2}x + 10 = 0$, $\alpha > \beta$ and $P_n = \alpha^n - \beta^n$ for each positive integer n, then the value of $\frac{P_{17}P_{20} + 5\sqrt{2}P_{17}P_{19}}{P_{18}P_{19} + 5\sqrt{2}P_{18}^2}$ is equal to

Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

Q132 JEE Main 2021 · 25 Jul · Shift 2 MCQ

The number of real solutions of the equation, $x^2 - |x| - 12 = 0$ is:

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

Answer: (A) 2 · Key from source paper

Q133 JEE Main 2021 · 25 Jul · Shift 2 Numerical

If $a+b+c=1$, $ab+bc+ca=2$ and $abc=3$, then the value of $a^4+b^4+c^4$ is equal to:

Numerical value type: the answer is a number.

Answer: 13. · Key from source paper

Q134 JEE Main 2021 · 20 Jul · Shift 1 MCQ

The probability of selecting integers $a \in [-5, 30]$ such that $x^2+2(a+4)x-5a+64>0$, for all $x \in R$, is:

(A) $\frac{7}{36}$
(B) $\frac{2}{9}$
(C) $\frac{1}{6}$
(D) $\frac{1}{4}$

Answer: (B) $\frac{2}{9}$ · Key from source paper

Q135 JEE Main 2021 · 20 Jul · Shift 2 MCQ

If sum of the first 21 terms of the series $\log_{9^{1/2}} x + \log_{9^{1/3}} x + \log_{9^{1/4}} x + \ldots\ldots$ where $x>0$ is 504, then x is equal to

(A) 243
(B) 9
(C) 7
(D) 81

Answer: (D) 81 · Key from source paper

Q136 JEE Main 2021 · 20 Jul · Shift 2 Numerical

The number of solutions of the equation $\log_{(x+1)}\left(2x^2+7x+5\right)+\log_{(2x+5)}(x+1)^2-4=0,\ x>0$, is

Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

EdLoop JEE

Q137 JEE Main 2021 · 18 Mar · Shift 1 MCQ

The value of $3+\cfrac{1}{4+\cfrac{1}{3+\cfrac{1}{4+\cfrac{1}{3+\ldots\infty}}}}$ is equal to

(A) $1.5+\sqrt{3}$
(B) $2+\sqrt{3}$
(C) $3+2\sqrt{3}$
(D) $4+\sqrt{3}$

Answer: (A) $1.5+\sqrt{3}$ · Key from source paper

Q138 JEE Main 2021 · 17 Mar · Shift 1 MCQ

The value of $4+\cfrac{1}{5+\cfrac{1}{4+\cfrac{1}{5+\cfrac{1}{4+\ldots\ldots\infty}}}}$ is:

(A) $2+\frac{2}{5}\sqrt{30}$
(B) $2+\frac{4}{\sqrt{5}}\sqrt{30}$
(C) $4+\frac{4}{\sqrt{5}}\sqrt{30}$
(D) $5+\frac{2}{5}\sqrt{30}$

Answer: (A) $2+\frac{2}{5}\sqrt{30}$ · Key from source paper

Q139 JEE Main 2021 · 17 Mar · Shift 2 Numerical

If $1, \log_{10}(4^x-2)$ and $\log_{10}\left(4^x+\frac{18}{5}\right)$ are in arithmetic progression for a real number x then the value of the determinant $\begin{vmatrix} 2\left(x-\frac{1}{2}\right) & x-1 & x^2 \\ 1 & 0 & x \\ x & 1 & 0 \end{vmatrix}$ is equal to:

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q140 JEE Main 2021 · 16 Mar · Shift 1 MCQ

If for $x \in \left(0, \frac{\pi}{2}\right)$, $\log_{10}\sin x+\log_{10}\cos x=-1$ and $\log_{10}(\sin x+\cos x)=\frac{1}{2}\left(\log_{10} n-1\right)$, $n>0$, then the value of n is equal to :

(A) 20
(B) 12
(C) 9
(D) 16

Answer: (B) 12 · Key from source paper

Q141 JEE Main 2021 · 16 Mar · Shift 1 MCQ

Let a complex number $z, |z| \neq 1$, satisfy $\log_{\frac{1}{\sqrt{2}}}\left(\frac{|z|+11}{(|z|-1)^2}\right) \leq 2$. Then, the largest value of $|z|$ is equal to _____.

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

Answer: (B) 7 · Key from source paper

Q142 JEE Main 2021 · 16 Mar · Shift 1 MCQ

The number of elements in the set $\{x \in R : (|x|-3)|x+4| = 6\}$ is equal to

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

Answer: (B) 2 · Key from source paper

Q143 JEE Main 2021 · 16 Mar · Shift 2 MCQ

The least value of $|z|$ where z is complex number which satisfies the inequality $e^{\left(\frac{(|z|+3)(|z|-1)}{||z|+1|}\log_e 2\right)} \geq \log_{\sqrt{2}}\left|5\sqrt{7}+9i\right|, i = \sqrt{-1}$, is equal to :

(A) 3
(B) $\sqrt{5}$
(C) 2
(D) 8

Answer: (A) 3 · Key from source paper

Q144 JEE Main 2021 · 16 Mar · Shift 2 MCQ

Let $P(x) = x^2 + bx + c$ be a quadratic polynomial with real coefficients such that $\int_0^1 P(x)\,dx = 1$ and $P(x)$ leaves remainder 5 when it is divided by $(x-2)$ Then the value of $9(b+c)$ is equal to:

(A) 9
(B) 15
(C) 7
(D) 11

Answer: (C) 7 · Key from source paper

Q145 JEE Main 2021 · 26 Feb · Shift 1 Numerical

The number of solutions of the equation $\log_4(x-1) = \log_2(x-3)$ is _____.

Numerical value type: the answer is a number.

Answer: 1. · Key from source paper

Q146 JEE Main 2021 · 26 Feb · Shift 2 Numerical

Let α and β be two real numbers such that $\alpha + \beta = 1$ and $\alpha\beta = -1$. Let $p_n = (\alpha)^n + (\beta)^n$, $p_{n-1} = 11$ and $p_{n+1} = 29$ for some integer $n \geq 1$. Then, the value of p_n^2 is _____.

Numerical value type: the answer is a number.

Answer: 324. · Key from source paper

Q147 JEE Main 2021 · 25 Feb · Shift 1 MCQ

The integer k, for which the inequality $x^2 - 2(3k-1)x + 8k^2 - 7 > 0$ is valid for every x in R is:

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

Answer: (C) 3 · Key from source paper

Q148 JEE Main 2021 · 25 Feb · Shift 2 MCQ

Let α and β be the roots of $x^2 - 6x - 2 = 0$. If $a_n = \alpha^n - \beta^n$ for $n \geqslant 1$, then the value of $\frac{a_{10} - 2a_8}{3a_9}$ is:

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

Answer: (C) 2 · Key from source paper

Q149 JEE Main 2021 · 25 Feb · Shift 2 MCQ

If $\alpha, \beta \in R$ are such that $1 - 2i$ (here $i^2 = -1$) is a root of $z^2 + \alpha z + \beta = 0$, then $(\alpha - \beta)$ is equal to:

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

Answer: (A) -7 · Key from source paper

Q150 JEE Main 2021 · 24 Feb · Shift 1 MCQ

Let p and q be two positive numbers such that $p+q=2$ and $p^4+q^4=272$. Then p and q are roots of the equation:

(A) $x^2-2x+2=0$
(B) $x^2-2x+8=0$
(C) $x^2-2x+136=0$
(D) $x^2-2x+16=0$

Answer: (D) $x^2-2x+16=0$ · Key from source paper

Q151 JEE Main 2021 · 24 Feb · Shift 2 MCQ

Let a, b, c be in arithmetic progression. Let the centroid of the triangle with vertices (a, c), $(2, b)$ and (a, b) be $\left(\frac{10}{3}, \frac{7}{3}\right)$. If α, β are the roots of the equation $ax^2+bx+1=0$, then the value of $\alpha^2+\beta^2-\alpha\beta$ is:

(A) $-\frac{71}{256}$
(B) $\frac{69}{256}$
(C) $\frac{71}{256}$
(D) $-\frac{69}{256}$

Answer: (A) $-\frac{71}{256}$ · Key from source paper

Q152 JEE Main 2021 · 24 Feb · Shift 2 Numerical

The number of the real roots of the equation $(x+1)^2+|x-5|=\frac{27}{4}$ is _____.

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q153 JEE Main 2020 · 6 Sep · Shift 1 MCQ

If α and β be two roots of the equation $x^2-64x+256=0$. Then the value of $\left(\frac{\alpha^3}{\beta^5}\right)^{\frac{1}{8}}+\left(\frac{\beta^3}{\alpha^5}\right)^{\frac{1}{8}}$ is :

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

Answer: (A) 2 · Key from source paper

Q154 JEE Main 2020 · 6 Sep · Shift 2 MCQ

If α and β are the roots of the equation $2x(2x+1)=1$, then β is equal to :

(A) $2\alpha(\alpha+1)$
(B) $-2\alpha(\alpha+1)$
(C) $2\alpha(\alpha-1)$
(D) $2\alpha^2$

Answer: (B) $-2\alpha(\alpha+1)$ · Key from source paper

Q155 JEE Main 2020 · 5 Sep · Shift 1 MCQ

The product of the roots of the equation $9x^2-18|x|+5=0$ is :

(A) $\frac{5}{9}$
(B) $\frac{25}{81}$
(C) $\frac{5}{27}$
(D) $\frac{25}{9}$

Answer: (B) $\frac{25}{81}$ · Key from source paper

Q156 JEE Main 2020 · 5 Sep · Shift 2 MCQ

If α and β are the roots of the equation, $7x^2-3x-2=0$, then the value of $\frac{\alpha}{1-\alpha^2}+\frac{\beta}{1-\beta^2}$ is equal to:

(A) $\frac{27}{32}$
(B) $\frac{1}{24}$
(C) $\frac{3}{8}$
(D) $\frac{27}{16}$

Answer: (D) $\frac{27}{16}$ · Key from source paper

Q157 JEE Main 2020 · 5 Sep · Shift 2 MCQ

If the sum of the first 20 terms of the series $\log_{(7^{1/2})}x+\log_{(7^{1/3})}x+\log_{(7^{1/4})}x+\ldots$.is 460, then x is equal to:

(A) 7^2
(B) $7^{1/2}$
(C) e^2
(D) $7^{46/21}$

Answer: (A) 7^2 · Key from source paper

Q158 JEE Main 2020 · 4 Sep · Shift 1 MCQ

Let α and β be the roots of $x^2 - 3x + p = 0$ and γ and δ be the roots of $x^2 - 6x + q = 0$. If $\alpha, \beta, \gamma, \delta$ from a geometric progression. Then ratio $(2q + p) : (2q - p)$ is

(A) 3 : 1
(B) 9 : 7
(C) 5 : 3
(D) 33 : 31

Answer: (B) 9 : 7 · Key from source paper

Q159 JEE Main 2020 · 4 Sep · Shift 2 MCQ

Let $\lambda \neq 0$ be in R. If α and β are the roots of the equation, $x^2 - x + 2\lambda = 0$ and α and γ are the roots of the equation, $3x^2 - 10x + 27\lambda = 0$, then $\frac{\beta\gamma}{\lambda}$ is equal to:

(A) 27
(B) 18
(C) 9
(D) 36

Answer: (B) 18 · Key from source paper

Q160 JEE Main 2020 · 3 Sep · Shift 1 MCQ

If α and β are the roots of the equation $x^2 + px + 2 = 0$ and $\frac{1}{\alpha}$ and $\frac{1}{\beta}$ are the roots of the equation $2x^2 + 2qx + 1 = 0$, then $\left(\alpha - \frac{1}{\alpha}\right)\left(\beta - \frac{1}{\beta}\right)\left(\alpha + \frac{1}{\beta}\right)\left(\beta + \frac{1}{\alpha}\right)$ is equal to :

(A) $\frac{9}{4}(9 + q^2)$
(B) $\frac{9}{4}(9 - q^2)$
(C) $\frac{9}{4}(9 + p^2)$
(D) $\frac{9}{4}(9 - p^2)$

Answer: (D) $\frac{9}{4}(9 - p^2)$ · Key from source paper

Q161 JEE Main 2020 · 3 Sep · Shift 2 MCQ

The set of all real values of λ for which the quadratic equation $(\lambda^2 + 1)x^2 - 4\lambda x + 2 = 0$ always have exactly one root in the interval $(0, 1)$ is :

(A) $(-3,\ -1)$
(B) $(0,\ 2)$
(C) $(1,\ 3]$
(D) $(2,\ 4]$

Answer: (C) $(1,\ 3]$ · Key from source paper

Q162 JEE Main 2020 · 2 Sep · Shift 1 MCQ

Let α and β be the roots of the equation, $5x^2 + 6x - 2 = 0$. If $S_n = \alpha^n + \beta^n$, $n = 1, 2, 3, \ldots$., then

(A) $6S_6 + 5S_5 = 2S_4$
(B) $5S_6 + 6S_5 + 2S_4 = 0$
(C) $5S_6 + 6S_5 = 2S_4$
(D) $6S_6 + 5S_5 + 2S_4 = 0$

Answer: (C) $5S_6 + 6S_5 = 2S_4$ · Key from source paper

Q163 JEE Main 2020 · 2 Sep · Shift 2 MCQ

Let $f(x)$ be a quadratic polynomial such that $f(-1) + f(2) = 0$. If one of the roots of $f(x) = 0$ is 3, then its other root lies in

(A) $(-1, 0)$
(B) $(1, 3)$
(C) $(-3, -1)$
(D) $(0, 1)$

Answer: (A) $(-1, 0)$ · Key from source paper

Q164 JEE Main 2020 · 9 Jan · Shift 1 MCQ

The number of real roots of the equation, $e^{4x} + e^{3x} - 4e^{2x} + e^x + 1 = 0$ is:

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

Answer: (A) 1 · Key from source paper

Q165 JEE Main 2020 · 9 Jan · Shift 2 MCQ

Let $a, b \in R, a \neq 0$ be such that the equation, $ax^2 - 2bx + 5 = 0$ has a repeated root α, which is also a root of the equation, $x^2 - 2bx - 10 = 0$. If β is the other root of this equation, then $\alpha^2 + \beta^2$ is equal to:

(A) 25
(B) 26
(C) 28
(D) 24

Answer: (A) 25 · Key from source paper

Q166 JEE Main 2020 · 8 Jan · Shift 1 MCQ

If the equation $x^2 + bx + 45 = 0, b \in R$ has conjugate complex roots and they satisfy $|z + 1| = 2\sqrt{10}$, then

(A) $b^2 - b = 30$
(B) $b^2 + b = 72$
(C) $b^2 - b = 42$
(D) $b^2 + b = 12$

Answer: (A) $b^2 - b = 30$ · Key from source paper

Q167 JEE Main 2020 · 8 Jan · Shift 1 Numerical

The least positive value of ' a ' for which the equation, $2x^2 + (a - 10)x + \frac{33}{2} = 2a$ has real roots is _____.

Numerical value type: the answer is a number.

Answer: 8. · Key from source paper

Q168 JEE Main 2020 · 8 Jan · Shift 2 MCQ

Let S, be the set of all real roots of the equation, $3^x(3^x - 1) + 2 = |3^x - 1| + |3^x - 2|$, then

(A) contains exactly two elements.
(B) is a singleton.
(C) is an empty set.
(D) contains at least four elements.

Answer: (B) is a singleton. · Key from source paper

Q169 JEE Main 2020 · 7 Jan · Shift 2 MCQ

Let α and β be the roots of the equation $x^2 - x - 1 = 0$. If $p_k = (\alpha)^k + (\beta)^k, k \geq 1$, then which one of the following statements is not true?

(A) $p_3 = p_5 - p_4$

(B) $p_5 = 11$

(C) $(p_1 + p_2 + p_3 + p_4 + p_5) = 26$

(D) $p_5 = p_2 \cdot p_3$

Answer: (D) $p_5 = p_2 \cdot p_3$ · Key from source paper

Q170 JEE Main 2019 · 12 Apr · Shift 2 MCQ

If α, β and γ are three consecutive terms of a non-constant G.P. Such that the equations $\alpha x^2 + 2\beta x + \gamma = 0$ and $x^2 + x - 1 = 0$ have a common root, then $\alpha(\beta + \gamma)$ is equal to:

(A) $\beta\gamma$

(B) $\alpha\beta$

(C) $\alpha\gamma$

(D) 0

Answer: (A) $\beta\gamma$ · Key from source paper

Q171 JEE Main 2019 · 10 Apr · Shift 1 MCQ

If α and β are the roots of the quadratic equation $x^2 + x\sin\theta - 2\sin\theta = 0,\ \theta \in \left(0, \frac{\pi}{2}\right)$, then $\frac{\alpha^{12}+\beta^{12}}{(\alpha^{-12}+\beta^{-12})\cdot(\alpha-\beta)^{24}}$ is equal to :

(A) $\frac{2^6}{(\sin\theta+8)^{12}}$

(B) $\frac{2^{12}}{(\sin\theta-4)^{12}}$

(C) $\frac{2^{12}}{(\sin\theta+8)^{12}}$

(D) $\frac{2^{12}}{(\sin\theta-8)^6}$

Answer: (C) $\frac{2^{12}}{(\sin\theta+8)^{12}}$ · Key from source paper

Q172 JEE Main 2019 · 10 Apr · Shift 2 MCQ

The number of real roots of the equation $5 + 2^x - 1 = 2^x 2^x - 2$ is :

(A) 2

(B) 3

(C) 1

(D) 4

Answer: (C) 1 · Key from source paper

Q173 JEE Main 2019 · 9 Apr · Shift 1 MCQ

Let $p, q \in Q$. If $2 - \sqrt{3}$ is a root of the quadratic equation $x^2 + px + q = 0$, then

(A) $p^2 - 4q + 12 = 0$
(B) $q^2 + 4p + 14 = 0$
(C) $p^2 - 4q - 12 = 0$
(D) $q^2 - 4p - 16 = 0$

Answer: (C) $p^2 - 4q - 12 = 0$ · Key from source paper

Q174 JEE Main 2019 · 9 Apr · Shift 2 MCQ

If m is chosen in the quadratic equation $(m^2+1)x^2 - 3x + (m^2+1)^2 = 0$ such that the sum of its roots is greatest, then the absolute difference of the cubes of its roots is:

(A) $4\sqrt{3}$
(B) $10\sqrt{5}$
(C) $8\sqrt{3}$
(D) $8\sqrt{5}$

Answer: (D) $8\sqrt{5}$ · Key from source paper

Q175 JEE Main 2019 · 8 Apr · Shift 1 MCQ

The sum of the solutions of the equation $\sqrt{x} - 2 + \sqrt{x}\sqrt{x} - 4 + 2 = 0, x > 0$ is equal to

(A) 10
(B) 9
(C) 12
(D) 4

Answer: (A) 10 · Key from source paper

Q176 JEE Main 2019 · 8 Apr · Shift 2 MCQ

If three distinct numbers a, b, c are in G.P. and the equations $ax^2 + 2bx + c = 0$ and $dx^2 + 2ex + f = 0$ have a common root, then which one of the following statements is correct?

(A) $\frac{d}{a}, \frac{e}{b}, \frac{f}{c}$ are in A.P.
(B) $d,\ e,\ f$ are in A.P.
(C) $d,\ e,\ f$ are in G.P.
(D) $\frac{d}{a}, \frac{e}{b}, \frac{f}{c}$ are in G.P.

Answer: (A) $\frac{d}{a}, \frac{e}{b}, \frac{f}{c}$ are in A.P. · Key from source paper

Q177 JEE Main 2019 · 8 Apr · Shift 2 MCQ

The number of integral values of m for which the equation, $1 + m^2x^2 - 21 + 3mx + 1 + 8m = 0$ has no real root, is

(A) 2
(B) 3
(C) Infinitely many
(D) 1

Answer: (C) Infinitely many · Key from source paper

Q178 JEE Main 2019 · 12 Jan · Shift 1 MCQ

If λ be the ratio of the roots of the quadratic equation in x, $3m^2x^2 + m(m-4)x + 2 = 0$, then the least value of m for which $\lambda + \frac{1}{\lambda} = 1$, is :

(A) $2 - \sqrt{3}$
(B) $-2 + \sqrt{2}$
(C) $4 - 2\sqrt{3}$
(D) $4 - 3\sqrt{2}$

Answer: (D) $4 - 3\sqrt{2}$ · Key from source paper

Q179 JEE Main 2019 · 12 Jan · Shift 2 MCQ

The number of integral values of m for which the quadratic expression $(1+2m)\,x^2 - 2(1+3m)x + 4(1+m)$, $x \in R$ is always positive, is

(A) 7
(B) 3
(C) 6
(D) 8

Answer: (A) 7 · Key from source paper

Q180 JEE Main 2019 · 11 Jan · Shift 1 MCQ

If one real root of the quadratic equation $81x^2 + kx + 256 = 0$ is cube of the other root, then a value of k is :

(A) -81
(B) 100
(C) 144
(D) -300

Answer: (D) -300 · Key from source paper

Q181 JEE Main 2019 · 10 Jan · Shift 1 MCQ

Consider the quadratic equation $(c-5)x^2 - 2cx + (c-4) = 0,\ c \neq 5$. Let S be the set of all integral values of c for which one root of the equation lies in the interval $(0,\ 2)$ and its other root lies in the interval $(2,\ 3)$. Then the number of elements in S is

(A) 11
(B) 12
(C) 18
(D) 10

Answer: (A) 11 · Key from source paper

Q182 JEE Main 2019 · 10 Jan · Shift 1 MCQ

If 5, $5r$, $5r^2$ are the lengths of the sides of a triangle, then r can not be equal to:

(A) $\frac{3}{4}$
(B) $\frac{3}{2}$
(C) $\frac{5}{4}$
(D) $\frac{7}{4}$

Answer: (D) $\frac{7}{4}$ · Key from source paper

Q183 JEE Main 2019 · 10 Jan · Shift 2 MCQ

The value of λ such that sum of the squares of the roots of the quadratic equation, $x^2 + (3 - \lambda)\, x + 2 = \lambda$ has the least value is:

(A) 2
(B) $\frac{4}{9}$
(C) $\frac{15}{8}$
(D) 1

Answer: (A) 2 · Key from source paper

Q184 JEE Main 2019 · 9 Jan · Shift 2 MCQ

The number of all possible positive integral value of α for which the roots of the quadratic equation $6x^2 - 11x + \alpha = 0$ are rational numbers is:

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

Answer: (B) 3 · Key from source paper

Q185 JEE Main 2019 · 9 Jan · Shift 2 MCQ

If both the roots of the quadratic equation $x^2 - mx + 4 = 0$ are real and distinct and they lie in the interval $(1,\ 5)$, then m lies in the interval:
Note: In the actual JEE paper interval was $[1,\ 5]$

(A) $(-5, -4)$
(B) $(3,\ 4)$
(C) $(5,\ 6)$
(D) $(4,\ 5)$

Answer: (D) $(4,\ 5)$ · Key from source paper

Q186 JEE Main 2018 · 16 Apr · Online MCQ

Let p, q and r be real numbers ($p \neq q$, $r \neq 0$), such that the roots of the equation $\frac{1}{x+p} + \frac{1}{x+q} = \frac{1}{r}$ are equal in magnitude but opposite in sign, then the sum of squares of these roots is equal to

(A) $p^2 + q^2$
(B) $\frac{p^2+q^2}{2}$
(C) $2\left(p^2 + q^2\right)$
(D) $p^2 + q^2 + r^2$

Answer: (A) $p^2 + q^2$ · Key from source paper

Q187 JEE Main 2018 · 16 Apr · Online MCQ

If an angle A of a ΔABC satisfies $5\cos A + 3 = 0$, then the roots of the quadratic equation $9x^2 + 27x + 20 = 0$ are

(A) $\sec A$, $\cot A$
(B) $\sec A$, $\tan A$
(C) $\tan A$, $\cos A$
(D) $\sin A$, $\sec A$

Answer: (B) $\sec A$, $\tan A$ · Key from source paper

Q188 JEE Main 2018 · 15 Apr · Shift 1 MCQ

If $\lambda \in \mathrm{R}$ is such that the sum of the cubes of the roots of the equation, $x^2 + (2-\lambda)x + (10-\lambda) = 0$ is minimum, then the magnitude of the difference of the roots of this equation is

(A) 20
(B) $2\sqrt{5}$
(C) $2\sqrt{7}$
(D) $4\sqrt{2}$

Answer: (B) $2\sqrt{5}$ · Key from source paper

Q189 JEE Main 2018 · 15 Apr · Shift 2 MCQ

If $f(x)$ is a quadratic expression such that $f(1) + f\,(2) = 0$, and -1 is a root of $f(x) = 0$, then the other root of $f(x) = 0$ is

(A) $-\frac{5}{8}$

(B) $-\frac{8}{5}$

(C) $\frac{5}{8}$

(D) $\frac{8}{5}$

Answer: (D) $\frac{8}{5}$ · Key from source paper

Q190 JEE Main 2018 · 8 Apr · Offline · MCQ

Let $S = \{x \in R : x \geq 0 \,\&\, 2\,|\sqrt{x} - 3| + \sqrt{x}\,(\sqrt{x} - 6) + 6 = 0\}$. Then S:

(A) Contains exactly four elements

(B) Is an empty set

(C) Contains exactly one element

(D) Contains exactly two elements

Answer: (D) Contains exactly two elements · Key from source paper

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Q191 JEE Main 2017 · 9 Apr · Online · MCQ

The sum of all the real values of x Satisfying the equation $2^{(x-1)(x^2+5x-50)} = 1$ is:

(A) 16

(B) -5

(C) -4

(D) 14

Answer: (C) -4 · Key from source paper

Q192 JEE Main 2017 · 8 Apr · Online · MCQ

Let $p(x)$ be a quadratic polynomial such that $p(0) = 1$. If $p(x)$ leaves remainder 4 when divided by $x - 1$ and it leaves remainder 6 when divided by $x + 1$ then:

(A) $p(-2) = 19$

(B) $p(2) = 19$

(C) $p(-2) = 11$

(D) $p(2) = 11$

Answer: (A) $p(-2) = 19$ · Key from source paper

Q193 JEE Main 2017 · 2 Apr · Offline · MCQ

If, for a positive integer n, the quadratic equation,
$x(x+1) + (x+1)(x+2) + \ldots + (x+n-1)(x+n) = 10n$
has two consecutive integral solutions, then n is equal to:

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

Answer: (D) 11 · Key from source paper

Q194 JEE Main 2016 · 10 Apr · Online MCQ

If x is a solution of the equation $\sqrt{2x+1}-\sqrt{2x-1}=1$, $\left(x \geq \frac{1}{2}\right)$, then $\sqrt{4x^2-1}$ is equal to :

(A) $\frac{3}{4}$
(B) $\frac{1}{2}$
(C) $2\sqrt{2}$
(D) 2

Answer: (A) $\frac{3}{4}$ · Key from source paper

Q195 JEE Main 2016 · 9 Apr · Online MCQ

If the equations $x^2+bx-1=0$ and $x^2+x+b=0$ have a common root different from -1, then $|b|$ is equal to :

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

Answer: (C) $\sqrt{3}$ · Key from source paper

Q196 JEE Main 2016 · 3 Apr · Offline MCQ

The sum of all real values of x satisfying the equation $\left(x^2-5x+5\right)^{x^2+4x-60}=1$ is

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

Answer: (C) 3 · Key from source paper

Q197 JEE Main 2015 · 11 Apr · Online MCQ

If the two roots of the equation, $(a-1)\left(x^4+x^2+1\right)+(a+1)\left(x^2+x+1\right)^2=0$ are real and distinct, then the set of all values of a is equal to

(A) $(0, \frac{1}{2})$
(B) $(-\frac{1}{2}, 0) \cup (0, \frac{1}{2})$
(C) $(-\infty, -2) \cup (2, \infty)$
(D) $(-\frac{1}{2}, 0)$

Answer: (B) $(-\frac{1}{2}, 0) \cup (0, \frac{1}{2})$ · Key from source paper

Q198 JEE Main 2015 · 10 Apr · Online MCQ

If $2 + 3i$ is one of the roots of the equation $2x^3 - 9x^2 + kx - 13 = 0$, $k \in R$, then the real root of this equation (where $i^2 = -1$) :

(A) Exists and is equal to $\frac{1}{2}$
(B) Does not exist
(C) Exists and is equal to 1
(D) Exists and is equal to $-\frac{1}{2}$

Answer: (A) Exists and is equal to $\frac{1}{2}$ · Key from source paper

Q199 JEE Main 2015 · 4 Apr · Offline MCQ

Let α and β be the roots of equation $x^2 - 6x - 2 = 0$. If $a_n = \alpha^n - \beta^n$, $\forall\ n \geq 1$, then the value of $\frac{a_{10} - 2a_8}{2a_9}$ is equal to

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

Answer: (D) 3 · Key from source paper

Q200 JEE Main 2014 · 19 Apr · Online MCQ

The equation $\sqrt{3x^2 + x + 5} = x - 3$, where x is real, has

(A) no solution
(B) exactly four solutions
(C) exactly one solution
(D) exactly two solutions

Answer: (A) no solution · Key from source paper

Q201 JEE Main 2014 · 19 Apr · Online MCQ

If non-zero real numbers b and c are such that $min\ f(x) > max\ g(x)$, where $f(x) = x^2 + 2bx + 2c^2$ and $g(x) = -x^2 - 2cx + b^2$, $(x \in R)$; then $\left|\frac{c}{b}\right|$ lies in the interval

(A) $(\sqrt{2}, \infty)$
(B) $\left[\frac{1}{2}, \frac{1}{\sqrt{2}}\right)$
(C) $\left(0, \frac{1}{2}\right)$
(D) $\left[\frac{1}{\sqrt{2}}, \sqrt{2}\right]$

Answer: (A) $(\sqrt{2}, \infty)$ · Key from source paper

Q202

JEE Main 2014 · 12 Apr · Online · MCQ

The sum of the roots of the equation, $x^2 + |2x - 3| - 4 = 0$, is:

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

Answer: (C) $\sqrt{2}$ · Key from source paper

Q203

JEE Main 2014 · 11 Apr · Online · MCQ

If α and β are roots of the equation, $x^2 - 4\sqrt{2}kx + 2e^{4\ln k} - 1 = 0$ for some k, and $\alpha^2 + \beta^2 = 66$, then $\alpha^3 + \beta^3$ is equal to:

(A) $248\sqrt{2}$
(B) $280\sqrt{2}$
(C) $-32\sqrt{2}$
(D) $-280\sqrt{2}$

Answer: (B) $280\sqrt{2}$ · Checked by our team

Q204

JEE Main 2014 · 9 Apr · Online · MCQ

If $\frac{1}{\sqrt{\alpha}}, \frac{1}{\sqrt{\beta}}$ are the roots of the equation $ax^2 + bx + 1 = 0$, $(a \neq 0, a, b \in R)$, then the equation $x(x + b^3) + (a^3 - 3abx) = 0$ has roots:

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

Answer: (D) $\alpha^{\frac{3}{2}}$ and $\beta^{\frac{3}{2}}$ · Key from source paper

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Q205

JEE Main 2014 · 9 Apr · Online · MCQ

If equations $ax^2 + bx + c = 0$, $(a, b, c \in R, a \neq 0)$ and $2x^2 + 3x + 4 = 0$ have a common root, then $a : b : c$ equals :

(A) $2:3:4$

(B) $4:3:2$

(C) $1:2:3$

(D) $3:2:1$

Answer: (A) $2:3:4$ · Key from source paper

Q206 JEE Main 2014 · 9 Apr · Online MCQ

If $f(x)=\left(\frac{3}{5}\right)^x+\left(\frac{4}{5}\right)^x-1,\ x\in R$, then the equation $f(x)=0$ has :

(A) No solution

(B) More than two solutions

(C) One solution

(D) Two solutions

Answer: (C) One solution · Key from source paper

Q207 JEE Main 2014 · 6 Apr · Offline MCQ

Let α and β be the roots of equation $px^2+qx+r=0,\ p\neq 0$. If p, q, r are in A.P. and $\frac{1}{\alpha}+\frac{1}{\beta}=4$, then the value of $|\alpha-\beta|$ is

(A) $\frac{\sqrt{34}}{9}$

(B) $\frac{2\sqrt{13}}{9}$

(C) $\frac{\sqrt{61}}{9}$

(D) $\frac{2\sqrt{17}}{9}$

Answer: (B) $\frac{2\sqrt{13}}{9}$ · Key from source paper

Q208 JEE Main 2013 · 25 Apr · Online MCQ

If p and q are non-zero real numbers and $\alpha^3+\beta^3=-p, \alpha\beta=q$, then a quadratic equation whose roots are $\frac{\alpha^2}{\beta}, \frac{\beta^2}{\alpha}$ is :

(A) $px^2-qx+p^2=0$

(B) $qx^2+px+q^2=0$

(C) $px^2+qx+p^2=0$

(D) $qx^2-px+q^2=0$

Answer: (B) $qx^2+px+q^2=0$ · Key from source paper

Q209 JEE Main 2013 · 23 Apr · Online MCQ

The least integral value α of x such that $\frac{x-5}{x^2+5x-14}>0$, satisfies :

(A) $\alpha^2 + 3\alpha - 4 = 0$
(B) $\alpha^2 - 5\alpha + 4 = 0$
(C) $\alpha^2 - 7\alpha + 6 = 0$
(D) $\alpha^2 + 5\alpha - 6 = 0$

Answer: (D) $\alpha^2 + 5\alpha - 6 = 0$ · Checked by our team

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Q210 JEE Main 2013 · 22 Apr · Online MCQ

If α and β are roots of the equation $x^2 + px + \frac{3p}{4} = 0$, such that $|\alpha - \beta| = \sqrt{10}$, then p belongs to the set :

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

Answer: (C) $\{-2, 5\}$ · Key from source paper

Q211 JEE Main 2013 · 9 Apr · Online MCQ

The values of ' a ' for which one root of the equation $x^2 - (a+1)x + a^2 + a - 8 = 0$ exceeds 2 and the other is lesser than 2 , are given by :

(A) $3 < a < 10$
(B) $a \geq 10$
(C) $-2 < a < 3$
(D) $a \leq -2$

Answer: (C) $-2 < a < 3$ · Key from source paper

Q212 JEE Main 2013 · 7 Apr · Offline MCQ

If the equations $x^2 + 2x + 3 = 0$ and $ax^2 + bx + c = 0$, $a, b, c \in R$, have a common root, then $a : b : c$ is:

(A) $1 : 3 : 2$
(B) $3 : 1 : 2$
(C) $1 : 2 : 3$
(D) $3 : 2 : 1$

Answer: (C) $1 : 2 : 3$ · Key from source paper

Q213 AIEEE 2012 · 26 May · Online MCQ

If $a, b, c \in \mathrm{R}$ and 1 is a root of equation $ax^2 + bx + c = 0$, then the curve $y = 4ax^2 + 3bx + 2c, a \neq 0$ intersect x-axis at

(A) two distinct points whose coordinates are always rational numbers
(B) no point
(C) exactly two distinct points
(D) exactly one point

Answer: (C) exactly two distinct points · Checked by our team

Q214 AIEEE 2012 · 19 May · Online MCQ

Let $p, q, r \in R$ and $r > p > 0$. If the quadratic equation $px^2 + qx + r = 0$ has two complex roots α and β, then $|\alpha| + |\beta|$ is

(A) equal to 1
(B) less than 2 but not equal to 1
(C) greater than 2
(D) equal to 2

Answer: (C) greater than 2 · Key from source paper

Q215 AIEEE 2012 · 12 May · Online MCQ

If the sum of the square of the roots of the equation $x^2 - (\sin\alpha - 2)x - (1 + \sin\alpha) = 0$ is least, then α is equal to

(A) $\frac{\pi}{6}$
(B) $\frac{\pi}{4}$
(C) $\frac{\pi}{3}$
(D) $\frac{\pi}{2}$

Answer: (D) $\frac{\pi}{2}$ · Key from source paper

Q216 AIEEE 2012 · 7 May · Online MCQ

The value of k for which the equation $(K-2)x^2 + 8x + K + 4 = 0$ has both roots real, distinct and negative is

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

Answer: (B) 3 · Key from source paper

Q217 AIEEE 2012 · Offline MCQ

The equation $e^{\sin x} - e^{-\sin x} - 4 = 0$ has

(A) infinite number of real roots
(B) no real roots
(C) exactly one real root
(D) exactly four real roots

Answer: (B) no real roots · Key from source paper

Q218 AIEEE 2011 MCQ

Let α, β be real and z be a complex number. If $z^2 + \alpha z + \beta = 0$ has two distinct roots on the line $\mathrm{Re}\, z = 1$, then it is necessary that

(A) $\beta \in (-1, 0)$
(B) $|\beta| = 1$
(C) $\beta \in (1, \infty)$
(D) $\beta \in (0, 1)$

Answer: (C) $\beta \in (1, \infty)$ · Key from source paper

Q219 AIEEE 2009 MCQ

If the roots of the equation $bx^2 + cx + a = 0$ be imaginary, then for all real values of x, the expression $3b^2x^2 + 6bcx + 2c^2$ is

(A) greater than $4ab$
(B) less than $4ab$
(C) greater than $-4ab$
(D) less than - 4ab

Answer: (C) greater than $-4ab$ · Key from source paper

Q220 AIEEE 2008 MCQ

The quadratic equations $x^2 - 6x + a = 0$ and $x^2 - cx + 6 = 0$ have one root in common. The other roots of the first and second equations are integers in the ratio $4 : 3$. Then the common root is

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

Answer: (D) 2 · Key from source paper

Q221 AIEEE 2008 MCQ

How many real solutions does the equation $x^7 + 14x^5 + 16x^3 + 30x - 560 = 0$ have?

(A) 7
(B) 1
(C) 3
(D) 5

Answer: (B) 1 · Key from source paper

Q222 AIEEE 2007 MCQ

If the difference between the roots of the equation $x^2 + ax + 1 = 0$ is less than $\sqrt{5}$, then the set of possible values of a is

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

Answer: (A) $(-3, 3)$ · Key from source paper

Q223 AIEEE 2006 MCQ

All the values of m for which both roots of the equations $x^2 - 2mx + m^2 - 1 = 0$ are greater than -2 but less than 4 , lie in the interval

(A) $-2 < \mathrm{m} < 0$
(B) $\mathrm{m} > 3$
(C) $-1 < \mathrm{m} < 3$
(D) $1 < \mathrm{m} < 4$

Answer: (C) $-1 < \mathrm{m} < 3$ · Key from source paper

Q224 AIEEE 2006 MCQ

If x is real, the maximum value of $\frac{3x^2+9x+17}{3x^2+9x+7}$ is

(A) 1/4
(B) 41
(C) 1
(D) 17/7

Answer: (B) 41 · Key from source paper

Q225 AIEEE 2005 MCQ

The value of α for which the sum of the squares of the roots of the equation $x^2 - (a-2)x - a - 1 = 0$ assume the least value is

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

Answer: (A) 1 · Key from source paper

Q226 AIEEE 2005 MCQ

If roots of the equation $x^2 - bx + c = 0$ be two consecutive integers, then $b^2 - 4c$ equals

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

Answer: (D) 1 · Key from source paper

Q227 AIEEE 2005 MCQ

If both the roots of the quadratic equation $x^2 - 2kx + k^2 + k - 5 = 0$ are less than 5 , then k lies in the interval

(A) $(5, 6]$
(B) $(6, \infty)$
(C) $(-\infty, 4)$
(D) $[4, 5]$

Answer: (C) $(-\infty, 4)$ · Key from source paper

Q228 AIEEE 2004 MCQ

Let two numbers have arithmetic mean 9 and geometric mean 4. Then these numbers are the roots of the quadratic equation

(A) $x^2 + 18x + 16 = 0$
(B) $x^2 - 18x - 16 = 0$
(C) $x^2 + 18x - 16 = 0$
(D) $x^2 - 18x + 16 = 0$

Answer: (D) $x^2 - 18x + 16 = 0$ · Key from source paper

Q229 AIEEE 2004 MCQ

If $(1 - p)$ is a root of quadratic equation $x^2 + px + (1 - p) = 0$, then its roots are

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

Answer: (C) $0, -1$ · Key from source paper

Q230 AIEEE 2004 MCQ

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

(A) $\frac{49}{4}$
(B) 4
(C) 3
(D) 12

Answer: (A) $\frac{49}{4}$ · Key from source paper

Q231 AIEEE 2003 MCQ

If the sum of the roots of the quadratic equation $ax^2 + bx + c = 0$ is equal to the sum of the squares of their reciprocals, then $\frac{a}{c}, \frac{b}{a}$ and $\frac{c}{b}$ are in

(A) Arithmetic - Geometric Progression
(B) Arithmetic Progression
(C) Geometric Progression
(D) Harmonic Progression

Answer: (D) Harmonic Progression · Key from source paper

Q232 AIEEE 2003 MCQ

The value of ' a ' for which one root of the quadratic equation $(a^2 - 5a + 3)x^2 + (3a - 1)x + 2 = 0$ is twice as large as the other is

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

Answer: (B) $\frac{2}{3}$ · Key from source paper

Q233 AIEEE 2003 MCQ

The number of real solutions of the equation $x^2 - 3|x| + 2 = 0$ is

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

Answer: (C) 4 · Key from source paper

Q234 AIEEE 2002 MCQ

If $\alpha \neq \beta$ but $\alpha^2 = 5\alpha - 3$ and $\beta^2 = 5\beta - 3$ then the equation having α/β and β/α as its roots is

(A) $3x^2 - 19x + 3 = 0$
(B) $3x^2 + 19x - 3 = 0$
(C) $3x^2 - 19x - 3 = 0$
(D) $x^2 - 5x + 3 = 0$

Answer: (A) $3x^2 - 19x + 3 = 0$ · Key from source paper

Q235 AIEEE 2002 MCQ

Difference between the corresponding roots of $x^2 + ax + b = 0$ and $x^2 + bx + a = 0$ is same and $a \neq b$, then

(A) a + b + 4 = 0
(B) a + b - 4 = 0
(C) a - b - 4 = 0
(D) a - b + 4 = 0

Answer: (A) a + b + 4 = 0 · Key from source paper

Q236 AIEEE 2002 MCQ

Product of real roots of the equation $t^2x^2 + |x| + 9 = 0$

(A) is always positive
(B) is always negative
(C) does not exist
(D) none of these

Answer: (C) does not exist · Key from source paper

Q237 AIEEE 2002 MCQ

If p and q are the roots of the equation $x^2 + px + q = 0$, then

(A) p =1, q = -2
(B) p = 0, q = 1
(C) p = -2, q = 0
(D) p = -2, q = 1

Answer: (A) p =1, q = -2 · Key from source paper

Q238 AIEEE 2002 MCQ

If $1, \log_9(3^{1-x}+2), \log_3(4.3^x-1)$ are in A.P. then x equals

(A) $\log_3 4$
(B) $1+\log_3 4$
(C) 1 - $\log_3 4$
(D) $\log_4 3$

Answer: (C) 1 - $\log_3 4$ · Key from source paper

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