

JEE MAIN COMPLEX NUMBERS AND QUADRATIC EQUATIONS — NATURE OF ROOTS AND DISCRIMINANT — PYQS

Max. Marks: 24
Questions: 6

Section A (MCQ) — 4 questions

Q.1 The number of distinct real solutions of the equation $x|x+4| + 3|x+2| + 10 = 0$ is

[JEE Main 2026 (Online) 22nd January Morning Shift]

- (1) 2 (2) 3 (3) 0 (4) 1

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full solution



Q.2 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

[JEE Main 2025 (Online) 4th April Morning Shift]

- (1) 6 (2) 5 (3) 8 (4) 7

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Q.3 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

[JEE Main 2025 (Online) 3rd April Evening Shift]

- (1) 15 (2) 12 (3) $5\sqrt{3}$ (4) $15\sqrt{5}$

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Q.4 If the set of all $a \in \mathbb{R}$, for which the equation $2x^2 + (a-5)x + 15 = 3a$ has no real root, is the interval (α, β) , and $X = \{x \in \mathbb{Z}; \alpha < x < \beta\}$, then $\sum_{x \in X} x^2$ is equal to:

[JEE Main 2025 (Online) 29th January Evening Shift]

- (1) 2139 (2) 2119 (3) 2109 (4) 2129

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Section B (Numerical) — 2 questions

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

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Q.6 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 $3((\alpha-2)^2 + (\beta-1)^2)$ equals

_____. [JEE Main 2024 (Online) 4th April Evening Shift]

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ANSWER KEY

Section A (MCQ) — 4 questions

Ques.	1	2	3	4								
Ans.	4	1	1	1								

Section B (Numerical) — 2 questions

Ques.	5	6						
Ans.	117	4						