

JEE MAIN COMPLEX NUMBERS AND QUADRATIC EQUATIONS — QUADRATIC EQUATIONS WITH REAL AND COMPLEX ROOTS — PYQS

Max. Marks: 48
Questions: 12

Section A (MCQ) — 12 questions

Q.1 Let $z_1, z_2 \in \mathbb{C}$ be the distinct solutions of the equation $z^2 + 4z - (1 + 12i) = 0$.

Then $|z_1|^2 + |z_2|^2$ is equal to :

[JEE Main 2026 (Online) 5th April Evening Shift]

- (1) 18 (2) 22 (3) 29 (4) 34

Scan or tap for the full solution



Q.2 Let $S = \{z \in \mathbb{C} : z^2 + 4z + 16 = 0\}$. Then

$\sum_{z \in S} |z + \sqrt{3}i|^2$ is equal to :

[JEE Main 2026 (Online) 4th April Evening Shift]

- (1) 42 (2) 23 (3) 27 (4) 38

Scan or tap for the full solution



Q.3 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

[JEE Main 2026 (Online) 28th January Morning Shift]

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

Scan or tap for the full solution



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

[JEE Main 2026 (Online) 24th January Morning Shift]

- (1) 3 (2) 2 (3) 5 (4) 4

Scan or tap for the full solution



Q.5 If α and β ($\alpha < \beta$) are the roots of the equation $(-2 + \sqrt{3})(|\sqrt{x} - 3|) + (x - 6\sqrt{x}) + (9 - 2\sqrt{3}) = 0$, $x \geq 0$,

then $\sqrt{\frac{\beta}{\alpha}} + \sqrt{\alpha\beta}$ is equal to :

[JEE Main 2026 (Online) 23rd January Morning Shift]

- (1) 8 (2) 10 (3) 9 (4) 11

Scan or tap for the full solution



Q.6 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 :

[JEE Main 2026 (Online) 23rd January Morning Shift]

- (1) 36 days (2) 24 days (3) 30 days (4) 42 days

Scan or tap for the full solution



Q.7 The sum of all the roots of the equation $(x - 1)^2 - 5|x - 1| + 6 = 0$, is :

[JEE Main 2026 (Online) 21st January Morning Shift]

- (1) 3 (2) 1 (3) 4 (4) 5

Scan or tap for the full solution



Q.8 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

[JEE Main 2025 (Online) 8th April Evening Shift]

- (1) 24 (2) 26 (3) 36 (4) 30

Scan or tap for the full solution



Q.9 The number of real roots of the equation $x|x - 2| + 3|x - 3| + 1 = 0$ is :

[JEE Main 2025 (Online) 7th April Evening Shift]

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

Scan or tap for the full solution



Q.10 The number of solutions of the equation

$$\left(\frac{9}{x} - \frac{9}{\sqrt{x}} + 2\right)\left(\frac{2}{x} - \frac{7}{\sqrt{x}} + 3\right) = 0 \text{ is :}$$

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

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

Scan or tap for the full solution



Q.11 If $\alpha + i\beta$ and $\gamma + i\delta$ are the roots of $x^2 - (3 - 2i)x - (2i - 2) = 0$, $i = \sqrt{-1}$, then $\alpha\gamma + \beta\delta$ is equal to:

[JEE Main 2025 (Online) 28th January Evening Shift]

- (1) 2 (2) -6 (3) 6 (4) -2

Scan or tap for the full solution



Q.12 The sum, of the squares of all the roots of the equation $x^2 + |2x - 3| - 4 = 0$, is

[JEE Main 2025 (Online) 28th January Morning Shift]

(1) $6(2 - \sqrt{2})$

(2) $3(3 - \sqrt{2})$

(3) $3(2 - \sqrt{2})$

(4) $6(3 - \sqrt{2})$

Scan or tap for the
full solution



ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	4	4	2	1	2	1	3	3	4	4	1
Ques.	12										
Ans.	1										