

PYQSide

JEE MAIN COMPLEX NUMBERS AND QUADRATIC EQUATIONS — RELATION BETWEEN ROOTS AND COEFFICIENTS, FORMATION OF EQUATIONS — PYQS

Max. Marks: 36

Questions: 9

Section A (MCQ)

- Q.1** 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:

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

- (1) 160 (2) 176 (3) 194 (4) 187

Scan or tap for the full solution



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

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

- (1) 16 (2) 32 (3) 34 (4) 38

Scan or tap for the full solution



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

[JEE Main 2026 (Online) 2nd April Morning Shift]

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

Scan or tap for the full solution



- Q.4** Let α, β be the roots of the equation $x^2 - 3x + r = 0$, and $\frac{\alpha}{2}, 2\beta$ be the roots of the equation $x^2 + 3x + r = 0$.

If the roots of the equation $x^2 + 6x = m$ are $2\alpha + \beta + 2r$ and $\alpha - 2\beta - \frac{r}{2}$, then m is equal to :

[JEE Main 2026 (Online) 2nd April Evening Shift]

- (1) -135 (2) -567 (3) 135 (4) 567

Scan or tap for the full solution



- Q.5** Let α, β be the roots of the quadratic equation $12x^2 - 20x + 3\lambda = 0, \lambda \in \mathbb{Z}$. If $\frac{1}{2} \leq |\beta - \alpha| \leq \frac{3}{2}$, then the sum of all possible values of λ is :

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

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

Scan or tap for the full solution



- Q.6** 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 $Q_n = \gamma^n + \delta^n$, then $\frac{P_{25} + \sqrt{3}P_{24}}{2P_{23}} + \frac{Q_{25} - Q_{23}}{Q_{24}}$ is equal to

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

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

Scan or tap for the full solution



- Q.7** Let $z \in \mathbb{C}$ be such that $\frac{z^2 + 3i}{z - 2 + i} = 2 + 3i$. Then the sum of all possible values of z^2 is :

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

- (1)
- $-19 + 2i$
- (2)
- $-19 - 2i$
- (3)
- $19 - 2i$
- (4)
- $19 + 2i$

Scan or tap for the full solution



- Q.8** Let $P_n = \alpha^n + \beta^n, n \in \mathbb{N}$. 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 :

[JEE Main 2025 (Online) 2nd April Morning Shift]

- (1) $x^2 + x - 1 = 0$ (2) $x^2 - x + 1 = 0$
(3) $x^2 + x + 1 = 0$ (4) $x^2 - x - 1 = 0$

Scan or tap for the full solution



Section B (Numerical)

- Q.9** For $t > -1$, let α_t and β_t be the roots of the equation $((t+2)^{1/7} - 1)x^2 + ((t+2)^{1/6} - 1)x + ((t+2)^{1/21} - 1) = 0$. If $\lim_{t \rightarrow -1^+} \alpha_t = a$ and $\lim_{t \rightarrow -1^+} \beta_t = b$, then $72(a+b)^2$ is equal to _____.

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

Scan or tap for the full solution



ANSWER KEY**Section A (MCQ)**

Ques.	1	2	3	4	5	6	7	8			
Ans.	2	3	3	4	1	3	2	1			

Section B (Numerical)

Ques.	9										
Ans.	98										