

PART 1 - MATHEMATICS

Topic : Complex numbers and quadratic equations

SECTION-1 : (Maximum Marks : 3)

- This section contains **ONE** question.
- Each question has **FOUR** options (A), (B), (C) and (D). **ONLY ONE** of these four options is the correct answer.
- For each question, choose the option corresponding to the correct answer.
- Answer to each question will be evaluated according to the following marking scheme :
Full Marks : +3 If **ONLY** the correct option is chosen;
Zero Marks : 0 If none of the options is chosen (i.e. the question is unanswered);
Negative Marks : -1 In all other cases.

1. Let R denote the set of all real numbers. Let $a_i, b_i \in R$ for $i \in \{1, 2, 3\}$.

Define the functions $f: R \rightarrow R$, $g: R \rightarrow R$, and $h: R \rightarrow R$ by

$$f(x) = a_1 + 10x + a_2x^2 + a_3x^3 + x^4,$$

$$g(x) = b_1 + 3x + b_2x^2 + b_3x^3 + x^4,$$

$$h(x) = f(x+1) - g(x+2).$$

If $f(x) \neq g(x)$ for every $x \in R$, then the coefficient of x^3 in $h(x)$ is

(A) 8

(B) 2

(C) -4

(D) -6

[JEE Advanced 2025 Paper 1]

Scan or tap for the
full solution



Space for Rough Work

SECTION-2 : (Maximum Marks : 4)

- This section contains **ONE** question.
- The answer to each question is a **NON-NEGATIVE INTEGER**.
- For each question, enter the correct integer corresponding to the answer in the place designated to enter the answer.
- Answer to each question will be evaluated according to the following marking scheme :

Full Marks : +4 If ONLY the correct answer is entered;

Zero Marks : 0 In all other cases.

2. Let $f(x) = x^4 + ax^3 + bx^2 + c$ be a polynomial with real coefficients such that $f(1) = -9$. Suppose that $i\sqrt{3}$ is a root of the equation $4x^3 + 3ax^2 + 2bx = 0$, where $i = \sqrt{-1}$. If $\alpha_1, \alpha_2, \alpha_3$, and α_4 are all the roots of the equation $f(x) = 0$, then $|\alpha_1|^2 + |\alpha_2|^2 + |\alpha_3|^2 + |\alpha_4|^2$ is equal to _____.

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JEE ADVANCED COMPLEX NUMBERS AND QUADRATIC EQUATIONS — POLYNOMIAL EQUATIONS OF HIGHER DEGREE (JEE) — PYQS

Test Pattern : JEE (Advanced)

ANSWER KEY

SECTION-1																											
Ques.	1																										
Ans.	C																										

SECTION-2																											
Ques.	2																										
Ans.	20																										