

JEE MAIN APPLICATION OF INTEGRALS — AREA UNDER SIMPLE CURVES — PYQS

Max. Marks: 24
Questions: 6

Section A (MCQ) — 3 questions

- Q.1** If the area of the region $\{(x, y) : -1 \leq x \leq 1, 0 \leq y \leq a + e^{|x|} - e^{-x}, a > 0\}$ is $\frac{e^2 + 8e + 1}{e}$, then the value of a is :

[JEE Main 2025 (Online) 23rd January Evening Shift]

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

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- Q.2** Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a twice differentiable function such that $f(x + y) = f(x)f(y)$ for all $x, y \in \mathbb{R}$. If $f'(0) = 4a$ and f satisfies $f''(x) - 3af'(x) - f(x) = 0$, $a > 0$, then the area of the region $R = \{(x, y) | 0 \leq y \leq f(ax), 0 \leq x \leq 2\}$ is :

[JEE Main 2025 (Online) 22nd January Morning Shift]

- (1) $e^2 - 1$ (2) $e^4 + 1$ (3) $e^2 + 1$ (4) $e^4 - 1$

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- Q.3** The area of the region $\left\{ (x, y) : y^2 \leq 4x, x < 4, \frac{xy(x-1)(x-2)}{(x-3)(x-4)} > 0, x \neq 3 \right\}$ is
- [JEE Main 2024 (Online) 31st January Morning Shift]
- (1) $\frac{32}{3}$ (2) $\frac{16}{3}$ (3) $\frac{8}{3}$ (4) $\frac{64}{3}$

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Section B (Numerical) — 3 questions

- Q.4** Let the area of the region bounded by the curve $y = \max\{\sin x, \cos x\}$, lines $x = 0, x = \frac{3\pi}{2}$, and the x -axis be A . Then, $A + A^2$ is equal to _____.

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

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- Q.5** The area of the region bounded by the curve $y = \max\{|x|, x|x-2|\}$, the x -axis and the lines $x = -2$ and $x = 4$ is equal to _____

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

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- Q.6** Let the area of the region enclosed by the curve $y = \min\{\sin x, \cos x\}$ and the x axis between $x = -\pi$ to $x = \pi$ be A . Then A^2 is equal to _____.

[JEE Main 2024 (Online) 8th April Morning Shift]

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ANSWER KEY

Section A (MCQ) — 3 questions

Ques.	1	2	3								
Ans.	2	1	1								

Section B (Numerical) — 3 questions

Ques.	4	5	6								
Ans.	12	12	16								