

JEE MAIN INTEGRALS — EVALUATION OF DEFINITE INTEGRALS BY SUBSTITUTION — PYQS

Max. Marks: 20
Questions: 5

Section A (MCQ) — 4 questions

Q.1 The value of the integral

$$\int_0^2 \frac{\sqrt{x(x^2 + x + 1)}}{(\sqrt{x+1})(\sqrt{x^4 + x^2 + 1})} dx \text{ is equal to :}$$

[JEE Main 2026 (Online) 8th April Evening Shift]

- (1) $\frac{1}{3} \log_e (3 - 2\sqrt{2})$ (2) $\frac{2}{3} \log_e (4 + \sqrt{2})$
 (3) $\frac{2}{3} \log_e (3 + 2\sqrt{2})$ (4) $\frac{1}{3} \log_e (1 + 6\sqrt{2})$

Scan or tap for the full solution


Q.2 The value of the integral $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \left(\frac{4 - \operatorname{cosec}^2 x}{\cos^4 x} \right) dx$ is :

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

- (1) $\frac{11}{\sqrt{3}}$ (2) $\frac{16}{\sqrt{3}}$ (3) $\frac{32}{3\sqrt{3}}$ (4) $\frac{64}{3\sqrt{3}}$

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Q.3 Let $(2^{1-a} + 2^{1+a})$, $f(a)$, $(3^a + 3^{-a})$ be in A.P. and α be the minimum value of $f(a)$. Then the value of the integral $\int_{\log_e(\alpha-1)}^{\log_e(\alpha)} \frac{dx}{(e^{2x} - e^{-2x})}$ is :

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

- (1) $\frac{1}{2} \log_e \left(\frac{4}{3} \right)$ (2) $\frac{1}{4} \log_e \left(\frac{4}{3} \right)$
 (3) $\frac{1}{2} \log_e \left(\frac{8}{5} \right)$ (4) $\frac{1}{4} \log_e \left(\frac{8}{5} \right)$

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Q.4 The integral $80 \int_0^{\frac{\pi}{4}} \left(\frac{\sin \theta + \cos \theta}{9 + 16 \sin 2\theta} \right) d\theta$ is equal to :

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

- (1) $3 \log 4$ (2) $4 \log 3$ (3) $6 \log \frac{4}{3}$ (4) $2 \log 3$

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Section B (Numerical) — 1 question

Q.5 If $\int_{\pi/6}^{\pi/4} \left(\cot \left(x - \frac{\pi}{3} \right) \cot \left(x + \frac{\pi}{3} \right) + 1 \right) dx = \alpha \log_e (\sqrt{3} - 1)$, then $9\alpha^2$ is equal to _____.

[JEE Main 2026 (Online) 8th April Evening Shift]

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ANSWER KEY

Section A (MCQ) — 4 questions

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

Section B (Numerical) — 1 question

Ques.	5										
Ans.	12										