

PYQSide

JEE MAIN INTEGRALS — INTEGRATION BY SUBSTITUTION — PYQS

Max. Marks: 28

Questions: 7

Section A (MCQ)

- Q.1** Let $f(x) = \int \frac{dx}{x^{2/3} + 2x^{1/2}}$, be such that $f(0) = -26 + 24\log_e(2)$. If $f(1) = a + b\log_e(3)$, where $a, b \in \mathbb{Z}$, then $a + b$ is equal to :

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

- (1) -5 (2) -11 (3) -18 (4) -26

Scan or tap for the full solution 

- Q.2** Let $I(x) = \int \frac{3dx}{(4x+6)(\sqrt{4x^2+8x+3})}$ and $I(0) = \frac{\sqrt{3}}{4} + 20$. If $I\left(\frac{1}{2}\right) = \frac{a\sqrt{2}}{b} + c$, where $a, b, c \in \mathbb{N}$, $\gcd(a, b) = 1$, then $a + b + c$ is equal to

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

- (1) 30 (2) 29 (3) 28 (4) 31

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- Q.3** Let $f(x) = \int x^3 \sqrt{3-x^2} dx$. If $5f(\sqrt{2}) = -4$, then $f(1)$ is equal to

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

- (1) $-\frac{6\sqrt{2}}{5}$ (2) $-\frac{8\sqrt{2}}{5}$ (3) $-\frac{2\sqrt{2}}{5}$ (4) $-\frac{4\sqrt{2}}{5}$

Scan or tap for the full solution 

- Q.4** If $f(x) = \int \frac{1}{x^{1/4}(1+x^{1/4})} dx$, $f(0) = -6$, then $f(1)$ is equal to :

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

- (1) $4(\log_e 2 - 2)$ (2) $\log_e 2 + 2$
(3) $2 - \log_e 2$ (4) $4(\log_e 2 + 2)$

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Section B (Numerical)

- Q.5** If $\int (\sin x)^{-\frac{11}{2}} (\cos x)^{-\frac{5}{2}} dx = -\frac{p_1}{q_1} (\cot x)^{\frac{9}{2}} - \frac{p_2}{q_2} (\cot x)^{\frac{5}{2}} - \frac{p_3}{q_3} (\cot x)^{\frac{1}{2}} + \frac{p_4}{q_4} (\cot x)^{-\frac{3}{2}} + C$, where p_i and q_i are positive integers with $\gcd(p_i, q_i) = 1$ for $i = 1, 2, 3, 4$ and C is the constant of integration, then $\frac{15p_1p_2p_3p_4}{q_1q_2q_3q_4}$ is equal to _____

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

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- Q.6** If $\int \left(\frac{1}{x} + \frac{1}{x^3}\right) \left(\sqrt[23]{3x^{-24} + x^{-26}}\right) dx = -\frac{\alpha}{3(\alpha+1)} (3x^\beta + x^\gamma)^{\frac{\alpha+1}{\alpha}} + C$, $x > 0$, $(\alpha, \beta, \gamma \in \mathbb{Z})$, where C is the constant of integration, then $\alpha + \beta + \gamma$ is equal to _____.

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

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- Q.7** If $\int \frac{(\sqrt{1+x^2} + x)^{10}}{(\sqrt{1+x^2} - x)^9} dx = \frac{1}{m} \left((\sqrt{1+x^2} + x)^n (n\sqrt{1+x^2} - x) \right) + C$ where C is the constant of integration and $m, n \in \mathbb{N}$, then $m + n$ is equal to _____.

[JEE Main 2025 (Online) 4th April Evening Shift]

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ANSWER KEY

Section A (MCQ)

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

Section B (Numerical)

Ques.	5	6	7				
Ans.	16	19	379				