MATHS

BOOKS - JEE MAINS PREVIOUS YEAR

ENGLISH

INTEGRALS

Others

1. $\int \frac{dx}{\cos x + \sqrt{3}\sin x}$ equals: (1)

$\frac{1}{2}\log \tan\left(\frac{x}{2} + \frac{\pi}{12}\right) + c$ (2)

$\frac{1}{2}\log\tan\left(\frac{x}{2}-\frac{\pi}{12}\right)+c$ (3)

$\log\tan\left(\frac{x}{2}+\frac{\pi}{12}\right)+c$ (4)

$\log\tan\left(\frac{x}{2}-\frac{\pi}{12}\right)+c$

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2. The value of $\sqrt{2}\int\frac{\sin x dx}{\sin\left(x-\frac{\pi}{4}\right)}$ is: (1)

$x+\log\left|\cos\left(x-\frac{\pi}{4}\right)\right|+c$ (2)

$x-\log\left|\sin\left(x-\frac{\pi}{4}\right)\right|+c$ (3)

$x+\log\left|\sin\left(x-\frac{\pi}{4}\right)\right|+c$ (4)

$x-\log\left|\cos\left(x-\frac{\pi}{4}\right)\right|+c$

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3. Let $I = \int_0^1 \frac{\sin x}{\sqrt{x}} dx \text{and} J = \int_0^1 \frac{\cos x}{\sqrt{x}} dx$

Then which one of the following is true? (1) $I > \frac{2}{3} \text{and} j > 2$ (2) $I < \frac{2}{3} \text{and} j < 2$ (3) $I < \frac{2}{3} \text{and} j > 2$ (4) $I > \frac{2}{3} \text{and} j < 2$

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4. Let p(x) be a function defined on R such that

$p'(x) = p'(1-x)$, for all

$x \in [0, 1], p(0) = 1$ and $p(1) = 41$. Then $\int_0^1 p(x)dx$ equals (1) 21 (2) 41 (3) 42 (4) $\sqrt{41}$

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5. The value of $\int_0^1 \frac{8\log(1+x)}{1+x^2}dx$ is

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6. If $g(x) = \int 0x \cos 4t \mathrm{dt}$, then $g(x + \pi)$ equals: (1) $\frac{g(x)}{g(\pi)}$ (2) $g(x) + g(\pi)$ (3) $g(x) - g(\pi)$ (4) $g(x)g(\pi)$

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7. If the integral $\int \frac{5\tan x}{\tan x - 2} dx = x + a\ln|\sin x - 2\cos x| + k$ then a is equal to (1) -1 (2) -2 (3) 1 (4) 2

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8. If $\int f(x)dx = \psi(x)$, then $\int x^5 f(x^3)dx$ is equal to (1) $\frac{1}{3}x^3\psi(x^3) - 3\int x^3\psi(x^3)dx + C$ (2) $\frac{1}{3}x^3\psi(x^3) - \int x^2\psi(x^3)dx + C$ (3)

$$\frac{1}{3}x^3\psi\left(x^3\right) - \int x^3\psi\left(x^3\right)dx + C \quad (4)$$

$$\frac{1}{3}\left[x^3\psi\left(x^3\right) - \int x^2\psi\left(x^3\right)dx\right] + C$$

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9. The integral $\int\left(1+x-\frac{1}{x}\right)e^{x+\frac{1}{x}}dx$ is equal to (1) $(x-1)e^{x+\frac{1}{x}}+C$ (2) $xe^{x+\frac{1}{x}}+C$ (3) $(x+1)e^{x+\frac{1}{x}}+C$ (4) $-xe^{x+\frac{1}{x}}+C$

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10. The integral $\int_0^{\pi} \sqrt{1+4\sin^2\left(\frac{x}{2}\right)-4\sin\left(\frac{x}{2}\right)}dx$ equal

(1) $\pi-4$ (2) $\frac{2\pi}{3}-4-4\sqrt{3}$ (3) $4\sqrt{3}-4$ (4) $4\sqrt{3}-4-\frac{\pi}{3}$

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