Vidyarohi Learning

Integrals

Q.No.1:
Statement – I:

Then value of the integral $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{dx}{1+\sqrt{\tan x}}$ is equal to $\frac{\pi}{6}$.

Statement – II:
$\int_a^b f(x)dx = \int_a^b f(a+b-x)dx.$

JEE 2013

- **A.** Statement – I is true; Statement – II is true; Statement – II is a **correct** explanation for Statement – I.
- **B.** Statement – I is true; Statement – II is true; Statement – II is **not** a correct explanation for Statement – I.
- **C.** Statement – I is true; Statement – II is false.
- **D.** Statement – I is false; Statement – II is true.

Q.No.2: The integral $\int \frac{2x^{12}+5x^9}{(x^5+x^3+1)^3} dx$ is equal to :

(Where C is an arbitrary constant) **JEE 2016**

- **A.** $\frac{x^{10}}{2(x^5+x^3+1)^2} + C$
- **B.** $\frac{x^5}{2(x^5+x^3+1)^2} + C$
- **C.** $\frac{-x^{10}}{2(x^5+x^3+1)^2} + C$
- **D.** $\frac{-x^5}{(x^5+x^3+1)^2} + C$

JEE 2016

Q.No.3: $\lim\limits_{n\to\infty} \left(\frac{(n+1)\,(n+2)..........3n}{n^{2n}}\right)^{1/n}$ is equal to :

A. $\frac{27}{e^2}$

B. $\frac{9}{e^2}$

C. 3 *log* 3 – 2

D. $\frac{18}{e^4}$

Q.No.4: Let $I_n = \int \tan^n x \, dx \, , \, (n > 1)$. If $I_4 + I_6 = a \tan^5 x + bx^5 + C$, where C is a constant of integration, then the ordered pair (a, b) is equal to

JEE 2017

A. $\left(-\frac{1}{5}, 1\right)$

B. $\left(\frac{1}{5}, 0\right)$

C. $\left(\frac{1}{5}, -1\right)$

D. $\left(-\frac{1}{5}, 0\right)$

JEE 2017

Q.No.5: The integral $\int_{\frac{\pi}{4}}^{\frac{3\pi}{4}} \frac{dx}{1+\cos x}$ is equal to

A. −2

B. 2

C. 4

D. −1

JEE 2018

Q.No.6: The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{\sin^2 x}{1+2^x} \, dx$ is :

A. 4π

B. $\frac{\pi}{4}$

C. $\frac{\pi}{8}$

D. $\frac{\pi}{2}$

Q.No.7: The integral $\int \frac{\sin^2 x\ \cos^2 x}{\left(\sin^5 x+\cos^3 x\ \sin^2 x+\sin^3 x\ \cos^2 x+\cos^5 x\right)^2} dx$ is equal to :

(where C is a constant of integration) **JEE 2018**

- **A.** $\frac{1}{1+\cot^3 x}+\mathrm{C}$
- **B.** $\frac{-1}{1+\cot^3 x}+\mathrm{C}$
- **C.** $\frac{1}{3\left(1+\tan^3 x\right)}+\mathrm{C}$
- **D.** $\frac{-1}{3\left(1+\tan^3 x\right)}+\mathrm{C}$

JEE 2019

Q.No.8: The value of $\int\limits_0^{\pi} \left|\cos\ x\right|^3 dx$ is:

- **A.** 0
- **B.** $\frac{4}{3}$
- **C.** $\frac{2}{3}$
- **D.** $-\frac{4}{3}$

Q.No.9: For $x^2 \neq n\pi + 1$, $n \in \mathrm{N}$ (the set of natural numbers), the integral $\int x\sqrt{\frac{2\ \sin\ (x^2-1)-\sin\ 2(x^2-1)}{2\ \sin\ (x^2-1)+\sin\ 2(x^2-1)}}dx$ is equal to:

(where c is a constant of integration) **JEE 2019**

- **A.** $\log_e\left|\frac{1}{2}\sec^2\ \left(x^2-1\right)\right|+c$
- **B.** $\frac{1}{2}\log_e\left|\sec\ \left(x^2-1\right)\right|+c$
- **C.** $\frac{1}{2}\log_e\left|\sec^2\ \left(\frac{x^2-1}{2}\right)\right|+c$
- **D.** $\log_e\left|\sec\ \left(\frac{x^2-1}{2}\right)\right|+c$

Q.No.10: If $f\left(x\right)=\int \frac{5x^8+7x^6}{\left(x^2+1+2x^7\right)^2}dx, \left(x \geq 0\right)$, and $f(0) = 0$, then the value of $f(1)$ is: **JEE 2019**

- **A.** $-\frac{1}{2}$

B. $-\frac{1}{4}$

C. $\frac{1}{2}$

D. $\frac{1}{4}$