

CH - 17 INDEFINITE INTEGRALS

AI24BTECH11001 - Abhijeet Kumar

I. A : JEE ADVANCE / IIT-JEE

A. Fill in the Blanks

1) If

$$\int \frac{4e^x + 6e^{-x}}{9e^x + 4e^{-x}} = Ax + B \log(9e^{2x} - 4) + C$$

Then $A = \dots$, $B = \dots$ and $C = \dots$

(1990 – 2Marks)

B. MCQs with One Correct Answer

1) The value of the integral

$$\int \frac{\cos^3 x + \cos^5 x}{\sin^2 x + \sin^4 x} dx$$

is

(1995S)

- a) $\sin x - 6 \tan^{-1}(\sin x) + c$
- b) $\sin x - 2(\sin x)^{-1} + c$
- c) $\sin x - 2(\sin x)^{-1} - 6 \tan^{-1}(\sin x) + c$
- d) $\sin x - 2(\sin x)^{-1} - 6 \tan^{-1}(\sin x) + c$

2) If

$$\int_{\sin x}^1 t^2 f(t) dt = 1 - \sin x,$$

then $f\left(\frac{1}{\sqrt{3}}\right)$ is

(2005S)

- a) $\frac{1}{3}$
- b) $\frac{1}{\sqrt{3}}$
- c) 3
- d) $\sqrt{3}$

3)

$$\int \frac{x^2 - 1}{x^3 \sqrt{2x^4 + 2x^2 + 1}} dx =$$

(2006 – 3M, –1)

- a) $\frac{\sqrt{2x^4 - 2x^2 + 1}}{x^2} + c$
- b) $\frac{\sqrt{2x^4 - 2x^2 + 1}}{x^3} + c$
- c) $\frac{\sqrt{2x^4 - 2x^2 + 1}}{x} + c$
- d) $\frac{\sqrt{2x^4 - 2x^2 + 1}}{2x^2} + c$

4) Let

$$I = \int \frac{e^x}{e^{4x} + e^{2x} + 1} dx, J = \int \frac{e^{-x}}{e^{-4x} + e^{-2x} + 1} dx,$$

Then for an arbitrary constant C, the value of $J - I$ equals

(2008)

a) $\frac{1}{2} \log \left(\frac{e^{4x} - e^{2x} + 1}{e^{4x} + e^{2x} + 1} \right) + C$

b) $\frac{1}{2} \log \left(\frac{e^{2x} + e^x + 1}{e^{2x} - e^x + 1} \right) + C$

c) $\frac{1}{2} \log \left(\frac{e^{2x} - e^x + 1}{e^{2x} + e^x + 1} \right) + C$

d) $\frac{1}{2} \log \left(\frac{e^{4x} + e^{2x} + 1}{e^{4x} - e^{2x} + 1} \right) + C$

5) The Integral $\int \frac{\sec^2 x}{(\sec x + \tan x)^{\frac{9}{2}}} dx$ equals (for some arbitrary constant K) (2012)

a) $-\frac{1}{(\sec x + \tan x)^{\frac{11}{2}}} \left\{ \frac{1}{11} - \frac{1}{7} (\sec x + \tan x)^2 \right\} + K$

b) $\frac{1}{(\sec x + \tan x)^{\frac{11}{2}}} \left\{ \frac{1}{11} - \frac{1}{7} (\sec x + \tan x)^2 \right\} + K$

c) $-\frac{1}{(\sec x + \tan x)^{\frac{11}{2}}} \left\{ \frac{1}{11} + \frac{1}{7} (\sec x + \tan x)^2 \right\} + K$

d) $\frac{1}{(\sec x + \tan x)^{\frac{11}{2}}} \left\{ \frac{1}{11} + \frac{1}{7} (\sec x + \tan x)^2 \right\} + K$

C. Subjective Problems

1) Evaluate $\int \frac{\sin x}{\sin x - \cos x} dx$ (1978)

2) Evaluate $\int \frac{x^2}{(a+bx)^2} dx$ (1979)

3) Evaluate $\int (e^{\log x} + \sin x) \cos x dx$ (1981 – 2Marks)

4) Evaluate $\int \frac{(x-1)e^x}{(x+1)^3} dx$ (1983 – 2Marks)