

Topic(s):

Previous Years Questions (PYQ) Part 1

Chapter 2: Integration by Substitution (प्रतिस्थापन द्वारा समाकलन)

1: $f(x)$

$f'(x)$

let $f(x) = t$ -----

For PDF Download : Join Telegram Group [KHUSHI FOUNDATION ACADEMY](#)

For any error: [Read pin comment](#)

Q.

$$I = \int \frac{1}{x \log x} dx$$

$$\text{let } \log x = t$$

$$\frac{d}{dx} \log x = \frac{d}{dx} t$$

$$\frac{1}{x} dx = dt$$

$$I = \int \frac{1}{t} dt$$

$$= \log |t| + C$$

$$= \log |\log x| + C \quad \underline{\text{Ans}}$$



Khushi Foundation
Academy

Q.

$$I = \int \frac{\sin(\tan^{-1}x)}{1+x^2} dx$$

$$\text{let } \tan^{-1}x = t$$

$$\frac{d}{dx} \tan^{-1}x = \frac{dt}{dx}$$

$$\frac{1}{1+x^2} = \frac{dt}{dx}$$

$$\left(\frac{dx}{1+x^2} = dt \right)$$

$$I = \int \sin t \, dt$$

$$= -\cos t + c$$

$$= -\cos(\tan^{-1}x) + c \quad \text{Ans}$$

Q.

$$I = \int \frac{\cot x}{\sqrt{\sin x}} dx$$

$$I = \int \frac{\cos x}{(\sin x)' (\sin x)^{1/2}} dx$$

$$I = \int \frac{1 \cos x}{(\sin x)^{3/2}} dx$$

$$\text{let } \sin x = t$$

$$\frac{d}{dx} \sin x = \frac{d}{dx} t$$

$$\cos x dx = dt$$

$$I = \int \frac{1}{t^{3/2}} dt = \int t^{-3/2} dt = \frac{t^{-\frac{3}{2} + 1}}{-\frac{3}{2} + 1} + c$$

$$= \frac{t^{-1/2}}{-1/2} + c = \frac{-2}{t^{1/2}} + c = \frac{-2}{(\sin x)^{1/2}} + c = \frac{-2}{\sqrt{\sin x}} + c$$

$$\int t^n dt = \frac{t^{n+1}}{n+1} + c$$

Q.

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

$$\text{let } \tan^{-1}x = t$$

$$\frac{d}{dx} \tan^{-1}x = \frac{dt}{dx}$$

$$\frac{1}{1+x^2} dx = dt$$

$$I = \int e^t dt$$

$$= e^t + c$$

$$I = e^{\tan^{-1}x} + c$$



Khushi Foundation
Academy

Q. $I = \int \sin^4 x \cos x \, dx$

$$I = \int (\sin x)^4 \cos x \, dx$$

let $\sin x = t$

$$\frac{d}{dx} \sin x = \frac{d}{dx} t$$

$$\cos x \, dx = dt$$

$$I = \int t^4 \, dt$$

$$= \frac{t^5}{5} + c$$

$$= \frac{(\sin x)^5}{5} + c =$$

$$\int t^n \, dt = \frac{t^{n+1}}{n+1} + c$$
$$\frac{\sin^5 x}{5} + c \quad \underline{\text{Ans}}$$

Q. $I = \int \frac{x^3}{1+x^8} dx$

$$I = \int \frac{x^3}{1+(x^4)^2} dx$$

let $x^4 = t$
 $\frac{d}{dx} x^4 = \frac{d}{dx} t$

$$4x^3 = \frac{dt}{dx}$$

$$x^3 dx = \frac{dt}{4}$$

$$I = \int \frac{1}{1+t^2} \frac{dt}{4} = \frac{1}{4} \int \frac{1}{1+t^2} dt = \frac{1}{4} \tan^{-1} t + c$$
$$= \frac{1}{4} \tan^{-1}(x^4) + c \text{ Ans}$$

$$\frac{d}{dx} x^\eta = \eta x^{\eta-1}$$

$$\frac{d}{dx} x^4 = 4x^3$$

Solution to previous HW Question:

$$\int \sin x \, dx = -\cos x + C$$

HW Question:

$$\int \frac{f'(x)}{f(x)} \, dx = ?$$

Comment



Khushi Foundation
Academy

Next video:

Previous Years Questions Part 2

UPBTE 2018

Q. $I = \int \frac{dx}{1+e^x}$

Q. $I = \int \frac{a}{b+ce^x} dx$

UPBTE 2003

Q. $I = \int \frac{1}{x(1+\log x)} dx$

UPBTE 2017

Q. $I = \int \frac{\cos x - \sin x}{\cos x + \sin x} dx$

UPBTE 2002,08...

Q. $I = \int \frac{(p + q \tan^{-1} x)^m}{1+x^2} dx$

UPBTE 2022

Q. $I = \int \frac{e^x - e^{-x}}{e^x + e^{-x}} dx$

Q. $I = \int \frac{x^7}{1+x^{16}} dx$

LIKE

SHARE

SUBSCRIBE

YouTube Channel

Khushi Foundation Academy



THANK YOU