BROAD ROOT SCHOLARS ACADEMY

Formulae On Integrals

Indefinite Integrals of some important functions

The indefinite integral, also known as the **anti-derivative**, represents a family of functions whose derivative is the given function. It includes an arbitrary constant C, since differentiation of a constant is zero. The notation for an indefinite integral is:

$$\int f(x)\,dx = F(x) + C$$

Where, $F(x)$ is the antiderivative of $f(x)$.

1. $\int dx = x + C$	**2.** $\int a\,dx = ax + C$
3. $\int x^n dx = \frac{x^{n+1}}{n+1} + C$	**4.** $\int a^x dx = \frac{a^x}{\log a} + C$
5. $\int \frac{1}{x} dx = \log\lvert x\rvert + C$	**6.** $\int (ax+b)^n\,dx = \frac{(ax+b)^{n-1}}{a(n+1)} + C$
7. $\int \frac{1}{ax+b} dx = \frac{1}{a}\log\lvert ax+b\rvert + C$	**8.** $\int a^{px+q} dx = \frac{1}{p}\frac{a^{px+q}}{\log a} + C$
9. $\int e^x\,dx = e^x + C$	**10.** $\int e^{ax}\,dx = \frac{e^{ax}}{a}$
11. $\int \sin x\ dx = -\cos x + C$	**12.** $\int \cos x\ dx = \sin x + C$
13. $\int \tan x\,dx = \log\lvert\sec x\rvert + C = -\log\lvert\cos x\rvert + C$	
14. $\int \cot x\,dx = \log\lvert\sin x\rvert + C = -\log\lvert cosec\ x\rvert + C$	
15. $\int \sec x\,dx = \log(\sec x + \tan x) + C$	**16.** $\int cosec\ x\,dx = \log(cosec\ x - \cot x) + C$
17. $\int sec^2 x\ dx = \tan x + C$	**18.** $\int cosec^2 x\,dx = -\cot x + C$
19. $\int \sec x \tan x\,dx = \sec x + C$	**20.** $\int cosec\ x \cot x\,dx = -cosec\ x + C$

Indefinite Integrals Of Some Particular

1. $\int \frac{dx}{\sqrt{1-x^2}} = sin^{-1}x + C = -cos^{-1}x + C$
2. $\int \frac{dx}{1+x^2} = tan^{-1}x + C = -cot^{-1}x + C$
3. $\int \frac{dx}{x\sqrt{x^2-1}} = sec^{-1}x + C = -cosec\, x^{-1} + C$
4. $\int \frac{dx}{x^2-a^2} = \frac{1}{2a}\log\left|\frac{x-a}{x+a}\right| + C$
5. $\int \frac{dx}{a^2-x^2} = \frac{1}{2a}\log\left|\frac{a+x}{a-x}\right| + C$
6. $\int \frac{dx}{x^2+a^2} = \frac{1}{a}tan^{-1}\frac{x}{a} + C$
7. $\int \frac{dx}{\sqrt{x^2-a^2}} = \log\left|x + \sqrt{x^2-a^2}\right| + C$
8. $\int \frac{dx}{\sqrt{a^2-x^2}} = sin^{-1}\frac{x}{a} + C$
9. $\int \frac{dx}{\sqrt{x^2+a^2}} = \log\left|x + \sqrt{x^2+a^2}\right| + C$
10. $\int \sqrt{x^2+a^2}\, dx = \frac{1}{2}x\sqrt{x^2+a^2} + \frac{a^2}{2}\log\left|x + \sqrt{x^2+a^2}\right| + C$
11. $\int \sqrt{a^2-x^2}\, dx = \frac{1}{2}x\sqrt{a^2-x^2} + \frac{a^2}{2}sin^{-1}\frac{x}{a} + C$
12. $\int e^{ax} \sin bx\, dx = \frac{e^{ax}}{a^2+b^2}[\mathrm{a}\sin bx - b\cos bx]$
13. $\int e^{ax} \cos bx\, dx = \frac{e^{ax}}{a^2+b^2}[\mathrm{a}\cos bx + b\sin bx]$

Definite Integrals Of Some Particular

The notation for an indefinite integral is:

$$\int_a^b f(x)\,dx = [F(x)]_a^b = F(b) - F(a)$$

1. $\int_a^a f(x)\,dx = 0$
2. $\int_a^b f(x)\,dx = \int_a^b f(t)\,dt$
3. $\int_a^b f(x)\,dx = -\int_b^a f(x)\,dx$
4. $\int_a^b f(x)\,dx = \int_a^c f(x)\,dx + \int_c^b f(x)\,dx$
5. $\int_a^b f(x)\,dx = \int_a^b f(a+b-x)\,dx$
   - $\int_0^a f(x)\,dx = \int_0^a f(a-x)\,dx$
6. $\int_0^{2a} f(x)\,dx = \int_0^a f(x)\,dx + \int_0^a f(2a-x)\,dx$
   - $\int_0^{2a} f(x)\,dx = \begin{cases} 2\int_0^a f(x)\,dx, & \text{if } f(2a-x) = f(x) \\ 0, & \text{if } f(2a-x) = -f(x) \end{cases}$
7. $\int_{-a}^a f(x)\,dx = \begin{cases} 2\int_0^a f(x)\,dx, & \text{if } f(-x) = f(x) \text{ i.e. } f \text{ is an even function} \\ 0, & \text{if } f(-x) = -f(x) \text{ i.e. } f \text{ is an odd function} \end{cases}$

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COMPLETE GUIDANCE FOR BOARD + NEET/JEE

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[Class XI-XII]

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HOW LEARNING HAPPENS HERE

- CONCEPT CLARITY FIRST
- REGULAR TESTS + FEEDBACK
- DOUBT CLEARING SESSIONS
- PERSONAL ATTENTION TO EVERY STUDENT
- NO ROTE LEARNING METHODS

RESULTS ARE A BY-PRODUCT OF THE PROCESS

IS THIS COACHING CENTRE RIGHT FOR YOUR CHILD?

DOES YOUR CHILD

- STRUGGLE WITH CONCEPT?
- NEED PERSONAL ATTENTION?
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