INTEGRALS
Class - 1

Integration is the inverse process of differentiation. The process of finding the original function when derivative of a function is given is called integration. After integration we have to add a constant called constant of integration.

If $\frac{d}{dx}F(x) = f(x)$ then

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

Results

1, $\int x^n\,dx = \frac{x^{n+1}}{n+1} + c, \quad n \neq -1$

2, $\int \frac{1}{x}\,dx = \log|x| + c$

3, $\int 1 \cdot dx = x + c$

4, $\int \frac{1}{\sqrt{x}}\,dx = 2\sqrt{x} + c$

5, $\int \frac{1}{x^2}\,dx = \frac{-1}{x} + c$

6, $\int e^x\,dx = e^x + c$

7, $\int a^x \, dx = \frac{a^x}{\log a} + c$

8, $\int \sqrt{x} \, dx = \frac{x^{3/2}}{3/2} + c$

9 $\int \sin x \, dx = -\cos x + c$

10 $\int \cos x \, dx = \sin x + c$

11 $\int \sec^2 x \, dx = \tan x + c$

12 $\int \sec x \cdot \tan x \, dx = \sec x + c$

13 $\int \operatorname{cosec}^2 x \, dx = -\cot x + c$

14 $\int \operatorname{cosec} x \cdot \cot x \, dx = -\operatorname{cosec} x + c$

15 $\int \frac{1}{\sqrt{1-x^2}} \, dx = \sin^{-1} x + c$

16 $\int \frac{-1}{\sqrt{1-x^2}} \, dx = \cos^{-1} x + c$

17 $\int \frac{1}{1+x^2} \, dx = \tan^{-1} x + c$

18 $\int \frac{-1}{1+x^2} \, dx = \cot^{-1} x + c$

19 $\int \frac{1}{|x|\sqrt{x^2-1}} \, dx = \sec^{-1} x + c$

20 $\int \frac{-1}{|x|\sqrt{x^2-1}} \, dx = \operatorname{cosec}^{-1} x + c$

21, $\int k \cdot f(x)\,dx = k\int f(x)\,dx$

22, $\int k \cdot dx = kx + c$

23, $\int [f(x) + g(x)]\,dx = \int f(x)\,dx + \int g(x)\,dx$

24, $\int [f(x) - g(x)]\,dx = \int f(x)\,dx - \int g(x)\,dx$