

SN	অন্তরজের সূত্রাবলি	যোগজীকরণের সূত্রাবলি
1.	$\frac{d}{dx}(x^n) = nx^{n-1}$ এবং $\frac{d}{dx}(x^{n+1}) = (n+1)x^n$	$\int x^n dx = \frac{x^{n+1}}{n+1} + c, (n \neq -1)$
2.	$\frac{d}{dx}(x) = 1$	$\int dx = x + c$
3.	$\frac{d}{dx}(\sqrt{x}) = \frac{1}{2\sqrt{x}}$	$\int \frac{1}{\sqrt{x}} dx = 2\sqrt{x} + c$
4.	$\frac{d}{dx}(x^{-1}) = \frac{d}{dx}\left(\frac{1}{x}\right) = -\frac{1}{x^2}$	$\int \frac{1}{x^2} dx = -\frac{1}{x} + c$
5.	$\frac{d}{dx}(c) = 0$	$\int 0 dx = c$
6.	$\frac{d}{dx}(e^x) = e^x$	$\int e^x dx = e^x + c$
7.	$\frac{d}{dx}(a^x) = a^x \ln a$	$\int a^x dx = \frac{a^x}{\ln a} + c, a > 0, a \neq 1$
8.	$\frac{d}{dx}(\ln x) = \frac{1}{x}$	$\int \frac{1}{x} dx = \ln x + c, x \neq 0$

18.	$\frac{d}{dx}(\cot^{-1} x) = -\frac{1}{1+x^2}$	$\int \frac{-1}{1+x^2} dx = \cot^{-1} x + c$
19.	$\frac{d}{dx}(\sec^{-1} x) = \frac{1}{x\sqrt{x^2-1}}$	$\int \frac{1}{x\sqrt{x^2-1}} dx = \sec^{-1} x + c$
20.	$\frac{d}{dx}(\operatorname{cosec}^{-1} x) = -\frac{1}{x\sqrt{x^2-1}}$	$\int \frac{-1}{x\sqrt{x^2-1}} dx = \operatorname{cosec}^{-1} x + c$

লক্ষ্য কর যে, $\sin^2 x, \cos^2 x, \tan^2 x$ এবং $\cot^2 x$ এর সরাসরি যোগজীকরণ নাই তাই,

i. $\sin^2 x = \frac{1}{2}(1 - \cos 2x)$

ii. $\cos^2 x = \frac{1}{2}(1 + \cos 2x)$

iii. $\tan^2 x = \sec^2 x - 1$

iv. $\cot^2 x = \operatorname{cosec}^2 x - 1$; আকারে এনে যোগজীকরণ করতে হবে।

9.	$\frac{d}{dx}(\sin x) = \cos x$	$\int \cos x dx = \sin x + c$
10.	$\frac{d}{dx}(\cos x) = -\sin x$	$\int \sin x dx = -\cos x + c$
11.	$\frac{d}{dx}(\tan x) = \sec^2 x$	$\int \sec^2 x dx = \tan x + c$
12.	$\frac{d}{dx}(\cot x) = -\operatorname{cosec}^2 x$	$\int \operatorname{cosec}^2 x dx = -\cot x + c$
13.	$\frac{d}{dx}(\sec x) = \sec x \tan x$	$\int \sec x \tan x dx = \sec x + c$
14.	$\frac{d}{dx}(\operatorname{cosec} x) = -\operatorname{cosec} x \cot x$	$\int \operatorname{cosec} x \cot x dx = -\operatorname{cosec} x + c$
15.	$\frac{d}{dx}(\sin^{-1} x) = \frac{1}{\sqrt{1-x^2}}$	$\int \frac{1}{\sqrt{1-x^2}} dx = \sin^{-1} x + c$
16.	$\frac{d}{dx}(\cos^{-1} x) = -\frac{1}{\sqrt{1-x^2}}$	$\int \frac{-1}{\sqrt{1-x^2}} dx = \cos^{-1} x + c$
17.	$\frac{d}{dx}(\tan^{-1} x) = \frac{1}{1+x^2}$	$\int \frac{1}{1+x^2} dx = \tan^{-1} x + c$

SSC Formula:

সূক্ষ্মকোণের ত্রিকোণমিতিক অনুপাতগুলোর মধ্যে সম্পর্ক:

$$\begin{aligned} \sin \theta &= \frac{1}{\operatorname{cosec} \theta} & \cos \theta &= \frac{1}{\sec \theta} \\ \tan \theta &= \frac{1}{\cot \theta} = \frac{\sin \theta}{\cos \theta} & \cot \theta &= \frac{1}{\tan \theta} = \frac{\cos \theta}{\sin \theta} \\ \sec \theta &= \frac{1}{\cos \theta} & \operatorname{cosec} \theta &= \frac{1}{\sin \theta} \end{aligned}$$

পিথাগোরাসের প্রতিজ্ঞা ব্যবহার করে যে সম্পর্ক পাওয়া যায়:

$$\begin{aligned} \sin^2 \theta + \cos^2 \theta &= 1 & \operatorname{cosec}^2 \theta &= 1 + \cot^2 \theta \\ \sin^2 \theta &= 1 - \cos^2 \theta & \cot^2 \theta &= \operatorname{cosec}^2 \theta - 1 \\ \cos^2 \theta &= 1 - \sin^2 \theta & \operatorname{cosec}^2 \theta - \cot^2 \theta &= 1 \\ \sec^2 \theta - \tan^2 \theta &= 1 & \sec^2 \theta &= 1 + \tan^2 \theta \\ \tan^2 \theta &= \sec^2 \theta - 1 \end{aligned}$$

HSC Formula:

$$\begin{aligned} \sin 2A &= 2 \sin A \cos A \\ \sin 2A &= \frac{2 \tan A}{1 + \tan^2 A} \\ 2 \sin^2 A &= 1 - \cos 2A \\ \sin 3A &= 3 \sin A - 4 \sin^3 A \\ \cos 2A &= \cos^2 A - \sin^2 A \\ &= 2 \cos^2 A - 1 \\ &= 1 - 2 \sin^2 A \\ \cos 2A &= \frac{1 - \tan^2 A}{1 + \tan^2 A} \\ 2 \cos^2 A &= 1 + \cos 2A \\ \cos 3A &= 4 \cos^3 A - 3 \cos A \\ \cot 2A &= \frac{\cot^2 A - 1}{2 \cot A} \\ \tan^2 A &= \frac{1 - \cos 2A}{1 + \cos 2A} \end{aligned}$$

1.	$\int (ax+b)^n dx = \frac{1}{a} \cdot \frac{(ax+b)^{n+1}}{n+1} + c$	6.	$\int \sin(ax+b) dx = -\frac{1}{a} \cos(ax+b) + c$
2.	$\int e^{ax+b} dx = \frac{1}{a} e^{ax+b} + c$	7.	$\int \sec^2(ax+b) dx = \frac{1}{a} \tan(ax+b) + c$
3.	$\int a^{px+q} dx = \frac{1}{p} \cdot \frac{a^{px+q}}{\ln a} + c$	8.	$\int \operatorname{cosec}^2(ax+b) dx = -\frac{1}{a} \cot(ax+b) + c$
4.	$\int \frac{1}{ax+b} dx = \frac{1}{a} \ln ax+b + c$	9.	$\int \sec(ax+b) \tan(ax+b) dx = \frac{1}{a} \sec(ax+b) + c$
5.	$\int \cos(ax+b) dx = \frac{1}{a} \sin(ax+b) + c$	10.	$\int \operatorname{cosec}(ax+b) \cot(ax+b) dx = -\frac{1}{a} \operatorname{cosec}(ax+b) + c$

FORMULA

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

$$\int e^{mx} dx = \frac{1}{m} e^{mx} + c$$

$$\int e^{ax+b} dx = \frac{1}{a} e^{ax+b} + c$$

REMINDER

$$\int x^n dx = \frac{x^{n+1}}{n+1} + c. (n \neq -1)$$

$$\frac{d}{dx}(e^{ax+b}) = ae^{ax+b}$$

$\frac{d}{dx}(\cos ax) = -a \sin ax$	$\int \cos ax = \frac{1}{a} \sin ax + c$
$\frac{d}{dx}(\tan ax) = a \sec^2 ax$	$\int \sec^2 ax dx = \frac{1}{a} \tan ax + c$
$\frac{d}{dx}(\cot ax) = -a \operatorname{cosec}^2 ax$	$\int \operatorname{cosec}^2 ax dx = -\frac{1}{a} \cot ax + c$
$[f_1(x) + f_2(x) \dots \dots] dx = \int f_1(x) dx + \int f_2(x) dx \dots \dots$	

$$1. \int \frac{1}{a^2+x^2} dx = \frac{1}{a} \tan^{-1}\left(\frac{x}{a}\right) + c,$$

$$2. \int \frac{1}{\sqrt{a^2-x^2}} dx = \sin^{-1}\left(\frac{x}{a}\right) + c,$$

$$3. \int \frac{1}{x\sqrt{x^2-a^2}} dx = \frac{1}{a} \sec^{-1}\left(\frac{x}{a}\right) + c,$$

$$4. \int \frac{1}{a^2-x^2} dx = \frac{1}{2a} \ln \left| \frac{a+x}{a-x} \right| + c$$

$$5. \int \frac{1}{x^2-a^2} dx = \frac{1}{2a} \ln \left| \frac{x-a}{x+a} \right| + c$$

$$7. \int \frac{1}{\sqrt{x^2-a^2}} dx = \ln|\sqrt{x^2-a^2} + x| + c$$

$$\text{অনুসিদ্ধান্ত : } \int \frac{1}{1+x^2} dx = \tan^{-1} x + c$$

$$\text{অনুসিদ্ধান্ত : } \int \frac{1}{\sqrt{1-x^2}} dx = \sin^{-1} x + c$$

$$\text{অনুসিদ্ধান্ত : } \int \frac{1}{x\sqrt{x^2-1}} dx = \sec^{-1} x + c$$

$$6. \int \frac{1}{\sqrt{a^2+x^2}} dx = \ln|\sqrt{a^2+x^2} + x| + c$$

$$8. \int \sqrt{a^2-x^2} dx' = \frac{x\sqrt{a^2-x^2}}{2} + \frac{a^2}{2} \sin^{-1}\left(\frac{x}{a}\right) + c$$

সূত্রাবলি

$\frac{d}{dx}(\sin x) = \cos x$	$\int \cos x dx = \sin x + c$
$\frac{d}{dx}(\cos x) = -\sin x$	$\int \sin x dx = -\cos x + c$
$\frac{d}{dx}(\tan x) = \sec^2 x$	$\int \sec^2 x dx = \tan x + c$
$\frac{d}{dx}(\cot x) = -\operatorname{cosec}^2 x$	$\int \operatorname{cosec}^2 x dx = -\cot x + c$
$\frac{d}{dx}(\sec x) = \sec x \tan x$	$\int \sec x \tan x dx = \sec x + c$
$\frac{d}{dx}(\operatorname{cosec} x) = -\operatorname{cosec} x \cot x$	$\int \operatorname{cosec} x \cot x dx = -\operatorname{cosec} x + c$
$\frac{d}{dx}(\sin ax) = a \cos ax$	$\int \sin ax dx = -\frac{1}{a} \cos ax + c$