Some Important Rules Of Differential & Integral Calculus

	Differentiation Rules		Integration Rules
1.	$\frac{d}{dx}(c) = 0$	1.	$\int 0\,dx = 0 + c$
2.	$\frac{d}{dx}x = 1$	2.	$\int dx = x + c$
3.	$\frac{d}{dx}cx = c$	3.	$\int c\,dx = cx + i$
4.	$\frac{d}{dx}x^n = nx^{n-1}$	4.	$\int x^n\,dx = \frac{x^{n+1}}{n+1} + c$
5.	$\frac{d}{dx}\frac{1}{x^n} = -\frac{n}{x^{n+1}}$	5.	$\int \frac{1}{x^n}dx = -\frac{1}{(n-1)x^{n-1}} + c$
6.	$\frac{d}{dx}\sqrt{x} = \frac{1}{2\sqrt{x}}$	6.	$\int \frac{1}{\sqrt{x}}dx = 2\sqrt{x} + c$
7.	$\frac{d}{dx}e^x = e^x$	7.	$\int e^x\,dx = e^x + c$
8.	$\frac{d}{dx}e^{mx} = m\,e^{mx}$	8.	$\int e^{mx}\,dx = \frac{1}{m}e^{mx} + c$
9.	$\frac{d}{dx}a^x = a^x \ln a$	9.	$\int a^x\,dx = \frac{a^x}{\ln a} + c$
10.	$\frac{d}{dx}\ln x = \frac{1}{x}$	10.	$\int \frac{1}{x}dx = \ln x + c$
11.	$\frac{d}{dx}\log_a x = \frac{1}{x}\log_a e$	11.	
12.	$\frac{d}{dx}\sin x = \cos x$	12.	$\int \sin x\,dx = -\cos x + c$
13.	$\frac{d}{dx}\cos x = -\sin x$	13.	$\int \cos x\,dx = \sin x + c$
14.	$\frac{d}{dx}\tan x = \sec^2 x$	14.	$\int \sec^2 x\,dx = \tan x + c$
15.	$\frac{d}{dx}\cot x = -\operatorname{cosec}^2 x$	15.	$\int \operatorname{cosec}^2 x\,dx = -\cot x + c$
16.	$\frac{d}{dx}\sec x = \sec x \tan x$	16.	$\int \sec x \tan x = \sec x + c$
17.	$\frac{d}{dx}\operatorname{cosec} x = -\operatorname{cosec} x \cdot \cot x$	17.	$\int \operatorname{cosec} x \cot x = -\operatorname{cosec} x + c$
18.	$\frac{d}{dx}\sin^{-1} x = \frac{1}{\sqrt{1-x^2}}$	18.	$\int \frac{1}{\sqrt{1-x^2}}dx = \sin^{-1} x + c$
19.	$\frac{d}{dx}\cos^{-1} x = -\frac{1}{\sqrt{1-x^2}}$	19.	$\int -\frac{1}{\sqrt{1-x^2}}dx = \cos^{-1} x + c$
20.	$\frac{d}{dx}\tan^{-1} x = \frac{1}{1+x^2}$	20.	$\int \frac{1}{1+x^2}dx = \tan^{-1} x$
21.	$\frac{d}{dx}\cot^{-1} x = -\frac{1}{1+x^2}$	21.	
22.	$\frac{d}{dx}\sec^{-1} x = \frac{1}{x\sqrt{x^2-1}}$	22.	$\int \frac{1}{x\sqrt{x^2-1}}dx = \sec^{-1} x + c$
23.	$\frac{d}{dx}\operatorname{cosec}^{-1} x = -\frac{1}{x\sqrt{x^2-1}}$	23.	$\int \cos mx\,dx = \frac{\sin mx}{m} + c$
24.	$\frac{d}{dx}(uv) = u\frac{d}{dx}(v) + v\frac{d}{dx}(u)$	24.	$\int (uv)\,dx = u\int v\,dx - \int [\frac{d}{dx}(u).\int v\,dx]\,dx + c$
25.	$\frac{d}{dx}$	25.	$\int \frac{1}{x^2+a^2}dx = \frac{1}{a}\tan^{-1}\frac{x}{a} + c$
26.	$\frac{d}{dx}$	26.	$\int \frac{1}{x^2-a^2}dx = \frac{1}{2a}\ln\left\lvert\frac{x-a}{x+a}\right\rvert + c(x > a)$
27.	$\frac{d}{dx}$	27.	$\int \frac{1}{a^2-x^2}dx = \frac{1}{2a}\ln\lvert\frac{a+x}{a-x}\rvert + c\{x < a$
28.	$\frac{d}{dx}$	28.	$\int \frac{1}{\sqrt{x^2+a^2}}dx = \ln\lvert x + \sqrt{x^2+a^2}\rvert + c$
29.	$\frac{d}{dx}$	29.	$\int \frac{1}{\sqrt{x^2-a^2}}dx = \ln\lvert x + \sqrt{x^2-a^2}\rvert + c$
30.	$\frac{d}{dx}$	30.	$\int \frac{1}{\sqrt{a^2-x^2}} = \sin^{-1}\frac{x}{a} + c \quad (x < a)$
31.	$\frac{d}{dx}$	31.	$\int \frac{1}{\sqrt{x^2-a^2}} = \frac{1}{a}\sec^{-1}\frac{x}{a} + c$
32.	$\frac{d}{dx}$	32.	$\int \frac{f'(x)}{f(x)}dx = \log\lvert f(x)\rvert + c$
33.	$\frac{d}{dx}$	33.	$\int \cot x\,dx = \log\lvert\sin x\rvert + c$
34.	$\frac{d}{dx}$	34.	$\int \tan x\,dx = \ln\lvert\sec x\rvert + c$
35.	$\frac{d}{dx}$	35.	$\int \sin mx\,dx = -\frac{\cos mx}{m} + c$

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

$$\int \sqrt{x^2 + a^2}\, dx = \frac{x}{2}\sqrt{x^2 + a^2} + \frac{a^2}{2}\log\left| x + \sqrt{x^2 + a^2} \right| + C$$

$$\int \sqrt{x^2 - a^2}\, dx = \frac{x}{2}\sqrt{x^2 - a^2} - \frac{a^2}{2}\log\left| x + \sqrt{x^2 - a^2} \right| + C$$

$$\int e^x [f(x) + f'(x)]\, dx = f(x)\, e^x + C$$