Tabella degli integrali

$\int f(x)$ ***integrale***	$F(x)$ ***primitiva***	$\int f(x)$ ***integrale***	$F(x)$ ***primitiva***
$\int x\,dx$	$\frac{x^2}{2} + c$	$\int \frac{\pm 1}{\sqrt{1-x^2}}\,dx$	$\begin{cases} \pm\arcsin x + c \\ \mp\arccos x + c \end{cases}$
$\int a\,dx$	$ax + c$	$\int \frac{1}{\sqrt{x^2-1}}\,dx$	$\log\left\vert x+\sqrt{x^2-1}\right\vert + c$
$\int a^x\,dx$	$\frac{a^x}{\log a} + c$	$\int \frac{1}{a^x}\,dx$	$-\frac{a^{-x}}{\log a} + c$
$\int \frac{x}{x^2+1}\,dx$	$\frac{1}{2}\log\left\vert x^2+1\right\vert + c$	$\int \frac{1}{x^n}\,dx$	$-\frac{n-1}{x^{n-1}} + c$
$\int a\cdot x^n\,dx$	$\frac{a\cdot x^{n+1}}{n+1} + c$	$\int \frac{1}{a+x^2}\,dx \quad a>0$	$\frac{1}{\sqrt{a}}\arctan\frac{x}{\sqrt{a}} + c$
$\int \frac{1}{x}\,dx$	$\log\vert x\vert + c$	$\int \frac{1}{1-x^2}\,dx$	$\frac{1}{2}\log\left\vert\frac{1+x}{1-x}\right\vert + c$
$\int \frac{1}{\sqrt{x}}\,dx$	$2\sqrt{x} + c$	$\int \frac{1}{\sqrt{1+x^2}}\,dx$	$\begin{cases} arcSh\,x + c \\ \log\left(x+\sqrt{1+x^2}\right) + c \end{cases}$
$\int \sin x\,dx$	$-\cos x + c$	$\int \sin^2 x\,dx$	$\frac{1}{2}(x-\sin x\cos x) + c$
$\int \cos x\,dx$	$\sin x + c$	$\int \cos^2 x\,dx$	$\frac{1}{2}(x+\sin x\cos x) + c$
$\int \tan x\,dx$	$-\log(\cos x) + c$	$\int \frac{1}{\tan x}\,dx$	$\log(\sin x) + c$
$\int \arcsin x\,dx$	$\sqrt{1-x^2}+x\arcsin x + c$	$\int \frac{1}{\sqrt{x^2\pm a^2}}\,dx$	$\log\left\vert x+\sqrt{x\pm a^2}\right\vert + c$
$\int \arccos x\,dx$	$x\arccos x-\sqrt{1-x^2} + c$	$\int \sqrt{x^2\pm a^2}\,dx$	$\frac{x}{2}\sqrt{x^2\pm a^2}\pm\frac{a^2}{2}\log\left(x+\sqrt{x^2\pm a^2}\right) + c$
$\int e^{\pm kx}\,dx$	$\pm\frac{e^{\pm kx}}{k} + c$	$\int \frac{1}{e^{kx}}\,dx$	$-\frac{e^{-kx}}{k} + c$
$\int (1+\tan^2 x)\,dx = \int \frac{1}{\cos^2 x}\,dx$	$\tan x + c$	$\int \frac{1}{\cos x}\,dx$	$\log\left\vert\tan\left(\frac{x}{2}+\frac{\pi}{4}\right)\right\vert + c$
$\int (1+ctg^2 x)\,dx = \int \frac{1}{\sin^2 x}\,dx$	$-ctg\,x + c$	$\int \frac{1}{\sin x}\,dx$	$\log\left\vert\tan\frac{x}{2}\right\vert + c$
$\int Sh\,x\,dx$	$Ch\,x + c$	$\int \sqrt{a^2-x^2}\,dx$	$\frac{1}{2}\left(a^2\arcsin\frac{x}{a}+x\sqrt{a^2-x^2}\right) + c$
$\int Ch\,x\,dx$	$Sh\,x+c$	$\int \frac{1}{Ch^2 x}\,dx = \int (1-Th^2 x)\,dx + c$	$Th\,x + c$
$\int \frac{2x}{x^2+1}\,dx$	$\log(x^2+1) + c$	$\int \frac{1}{x^2+a^2}\,dx$	$\frac{1}{a}\arctan\frac{x}{a} + c$

Proprietà

$\int \boldsymbol{k} \cdot f(x)\,dx \quad = \quad \boldsymbol{k} \cdot \int f(x)\,dx$
$\int f(x) + g(x) + \ldots + f_n(x)\,dx \quad = \quad \int f(x)\,dx + \int g(x)\,dx + \ldots + f_n(x)\,dx$
$\int f(x)\,dx \quad = \quad \boldsymbol{a} \int \frac{\boldsymbol{1}}{\boldsymbol{a}} f(x)\,dx \quad = \quad \frac{\boldsymbol{1}}{\boldsymbol{a}} \int \boldsymbol{a} f(x)\,dx \quad = \quad \int \frac{\boldsymbol{a}}{\boldsymbol{a}} f(x)\,dx \qquad \boldsymbol{a} \in \boldsymbol{R}$

Integrali indefiniti riconducibili ad elementari

$\int f(x)$ ***integrale***	$F(x)$ ***primitiva***
$\int f^n(x) \cdot f'(x)\,dx$	$\frac{f^{n+1}(x)}{n+1} + c$
$\int \frac{f'(x)}{f(x)}\,dx$	$\log\lvert f(x)\rvert + c$
$\int f'(x) \cdot \cos f(x)\,dx$	$\sin f(x) + c$
$\int f'(x) \cdot \sin f(x)\,dx$	$-\cos f(x) + c$
$\int e^{f(x)} f'(x)\,dx$	$e^{f(x)} + c$
$\int a^{f(x)} f'(x)\,dx$	$\frac{a^{f(x)}}{\ln a} + c$
$\int \frac{f'(x)}{\sqrt{1-f^2(x)}}\,dx$	$\begin{cases} \arcsin f(x) + c \\ -\arccos f(x) + c \end{cases}$
$\int \frac{f'(x)}{1+f^2(x)}\,dx$	$\arctan f(x) + c$

Integrale definito

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

dove F è la primitiva di f(x)

Integrazione per parti

Integrale indefinito	$\int f(x) g'(x)\,dx = f(x) g(x) - \int f'(x) g(x)\,dx$ <u>*f(x) va derivata e g'(x) va integrata*</u>
Integrale definito	$\int_a^b f(x) g'(x)\,dx = [f(b) \cdot g(b) - f(a) \cdot g(a)] - \int_a^b f'(x) g(x)\,dx$

Si integrano per parti funzioni del tipo:

$P(x) \cdot e^x \qquad P(x) \cdot \sin x \qquad P(x) \cos x \qquad e^{\alpha x} \cdot \sin \beta x \qquad e^{\alpha x} \cdot \cos \beta x$

dove P(x) è un polinomio

Integrazione per sostituzione

Integrale indefinito	$\int f(h(x)) h'(x)\,dx = \int f(y)\,dy_{y=h(x)}$
Integrale definito	$\int_a^b f(h(x)) h'(x)\,dx = \int_{h(a)}^{h(b)} f(y)\,dy$