TAVOLA DEGLI INTEGRALI INDEFINITI

Integrazione di funzioni elementari	Integrazione di funzioni composte
$\int dx = x + c$	
$\int x^{\alpha} dx = \frac{x^{\alpha+1}}{\alpha+1} + c$	$\int [f(x)]^{\alpha} \cdot f'(x) dx = \frac{[f(x)]^{\alpha+1}}{\alpha+1} + C$
$\int \frac{1}{x} dx = \ln\lvert x\rvert + c$	$\int \frac{f'(x)}{f(x)} dx = \ln\lvert f(x)\rvert + c$
$\int \frac{1}{1+x^2} dx = arc\tan x + c$	$\int \frac{f'(x)}{1+f^2(x)} dx = \arctan(f(x)) + c$
$\int \frac{1}{a^2+x^2} dx = \frac{1}{a} arc\tan\frac{x}{a} + c$	
$\int e^x dx = e^x + c$	$\int e^{f(x)} \cdot f'(x) dx = e^{f(x)} + c$
$\int a^x dx = \frac{a^x}{\ln a} + c$	$\int a^{f(x)} f'(x) dx = \frac{a^{f(x)}}{lna} + c$
$\int \frac{1}{\sqrt{1-x^2}} dx = \arcsin x + c$	$\int \frac{f'(x)}{\sqrt{1-[f(x)]^2}} dx = \arcsin f(x) + c$
$\int -\frac{1}{\sqrt{1-x^2}} dx = \arccos x + c$	$\int -\frac{f'(x)}{\sqrt{1-[f(x)]^2}} dx = \arccos f(x) + c$
$\int \cos x dx = \sin x + c$	$\int f'(x) \cdot \cos f(x) dx = \sin f(x) + c$
$\int \sin x dx = -\cos x + c$	$\int f'(x) \sin f(x) dx = -\cos f(x) + c$
$\int \tan x dx = -\ln\lvert\cos x\rvert + c$	

GLI INTEGRALI INDEFINITI IMMEDIATI

Calcola i seguenti integrali.

1	$\int \left(x^3 + 2x^2 - x - 2\right) dx$	18	$\int \left(\frac{3}{\sqrt{1-x^2}} - \frac{4}{1+x^2}\right) dx$
2	$\int \left(2x^3 + x^2 - 3x - 3\right) dx$	19	$\int x^2 \sqrt{x^3 - 1} dx$
3	$\int \left(\frac{1}{\sqrt{x}} - \frac{1}{x} + \frac{1}{x^2}\right) dx$	20	$\int x^3 \sqrt{x^4 - 2} dx$
4	$\int \left(\frac{1}{\sqrt{x}} + \frac{1}{x} - \frac{1}{x^3}\right) dx$	21	$\int \frac{7x^6 - 10x^4 - 2x^{-3}}{2x^7 - 4x^5 + 2x^{-2} + 4} dx$
5	$\int \frac{x^3 - x^2 - 3x - 2}{x^2} dx$	22	$\int \frac{6x^2 - 12x - 6x^{-4}}{x^3 - 3x^2 + x^{-3} + 7} dx$

6	$\int \frac{2x^3+2x^2-x-4}{x^2}dx$	23	$\int e^{\text{sen } x}\cdot \cos x dx$
7	$\int \frac{3x}{\sqrt{1-x^2}}dx$	24	$\int -e^{\cos x}\,\text{sen } x dx$
8	$\int -\frac{x}{2\sqrt{1-x^2}}dx$	25	$\int \frac{e^x+e^{-x}}{e^x-e^{-x}}dx$
9	$\int \frac{x^2}{\left(x^3+1\right)^2}dx$	26	$\int \frac{-2e^{-2x}-e^{-x}}{e^{-2x}+e^{-x}}dx$
10	$\int \frac{x^3}{\left(x^4-1\right)^2}dx$	27	$\int\left(\frac{1}{2x-1}+\frac{3}{x+5}\right)dx$
11	$\int\left(2e^x-\cos x+\sqrt[3]{x}\right)dx$	28	$\int\left(\frac{4}{3x+2}-\frac{1}{x-1}\right)dx$
12	$\int\left(3e^x-\text{sen } x-\sqrt[3]{x}\right)dx$	29	$\int \frac{2x+1}{4x^2-1}dx$
13	$\int \frac{4\text{sen}^3 x+\cos x+\text{sen}(3x)}{\text{sen } x}dx$	30	$\int \frac{x^2+3x+9}{x^3-27}dx$
14	$\int \frac{-4\cos^3 x+2\text{sen } x+\cos(3x)}{\cos x}dx$	31	$\int \frac{x^3}{\sqrt{1-x^8}}dx$
15	$\int\left(\frac{2}{1+x^2}-\frac{5}{\sqrt{1-x^2}}\right)dx$	32	$\int \frac{x^4}{\sqrt{1-x^{10}}}dx$
16	$\int \frac{5^{x+1}}{1+5^{2x}}dx$	33	$\int \frac{1+e^x}{\left(x+e^x\right)\ln\left(x+e^x\right)^2}dx$
17	$\int \frac{3^{x+2}}{1+3^{2x}}dx$	34	$\int \frac{2+\cos x}{(1+2x+\text{sen } x)\ln(1+2x+\text{sen } x)^2}dx$

L'INTEGRAZIONE PER PARTI

1	$\int (x+2)\text{sen } x dx$	9	$\int logx dx$
2	$\int (x+3)\cos x dx$	10	$\int log^2 x dx$
3	$\int x^3 \ln x dx$	11	$\int x^2 e^x dx$
4	$\int x^4 \ln x dx$	12	$\int x\cdot cosx dx$
5	$\int e^{2x}\,\text{arctg}\left(e^{-x}\right)dx$	13	$\int sin^2 x dx$
6	$\int x\,\text{arctg}\left(\frac{1}{2x}\right)dx$	14	$\int x\cdot sinx dx$
7	$\int 3^x \text{sen}^2(2x)dx$	15	$\int tg^2 x dx$
8	$\int 2^x \cos^2(3x)dx$	16	$\int x^2 cosx dx$

L'INTEGRAZIONE DI FUNZIONI RAZIONALI FRATTE

1	$\int \frac{5x^4+2x^2+4x}{3x^5+2x^3+6x^2-3}dx$	8	$\int \frac{3x-2}{9x^2-6x+1}dx$
2	$\int \frac{x^3+2x}{x^4+4x^2+1}dx$	9	$\int \frac{2}{x^2+8x+18}dx$
3	$\int \frac{3x-1}{x+2}dx$	10	$\int \frac{1}{4x^2-4x+3}dx$
4	$\int \frac{2x-1}{2x+1}dx$	11	$\int \frac{x+4}{x^2+2x+3}dx$
5	$\int \frac{2x-1}{x^2+2x-24}dx$	12	$\int \frac{x-2}{x^2+2x+5}dx$
6	$\int \frac{x-7}{x^2-2x-8}dx$	13	$\int \frac{2x+1}{x^3-1}dx$
7	$\int \frac{x+1}{x^2-8x+16}dx$	14	$\int \frac{x-3}{1-x^3}dx$

L'INTEGRAZIONE PER SOSTITUZIONE

$\int \boldsymbol{R(cosx, sins, tgx)dx}$, **con R funzione razionale**	$\boldsymbol{tg\left(\frac{x}{2}\right)=t}$ $\boldsymbol{x=2arctgt}$ $\boldsymbol{dx=\frac{2}{1+t^2}}$ $\boldsymbol{sinx=\frac{2t}{1+t^2}; cosx=\frac{1-t^2}{1+t^2}}$
$\int \boldsymbol{R(e^x)dx}$	$\boldsymbol{e^x=t}$ $\boldsymbol{x=logt}$ $\boldsymbol{dx=\frac{1}{t}}$
$\int \boldsymbol{R(tgx)dx}$	$\boldsymbol{tgx=t}$ $\boldsymbol{x=arctgt}$ $\boldsymbol{dx=\frac{1}{1+t^2}}$
$\int \boldsymbol{R(\sqrt{x})dx}$	$\boldsymbol{\sqrt{x}=t}$ $\boldsymbol{x=t^2}$ $\boldsymbol{dx=2t}$

1	$\int \frac{1}{1-cosx}dx$	9	$\int \frac{2}{1+sinx-2cosx}dx$
2	$\int \frac{sinx}{1+sinx}dx$	10	$\int \frac{2}{3+\sqrt{x}}dx$
3	$\int \frac{tgx}{1-cosx}dx$	11	$\int \frac{2}{e^x+e^{-x}}dx$

4	$\int \frac{dx}{cosx \cdot sin^2 x}$	12	$\int \frac{xcos\sqrt{x^2+1}}{\sqrt{x^2+1}}dx$
5	$\int \frac{cosx}{cos^2 x - 2sinx - 3}dx$	13	$\int \sqrt[3]{e^{2x}}(e^x+1)dx$
6	$\int \frac{dx}{1+sinx+cosx}$	14	$\int \frac{3e^{2x}+2e^x}{2e^{2x}+3e^x+1}dx$
7	$\int \frac{1+sinx}{1-sinx}dx$	15	$\int \frac{e^{2x}}{3e^{2x}-2e^x-1}dx$
8	$\int \frac{3+tgx}{cosx}dx$	16	$\int \frac{\sqrt{x}+3}{\sqrt{x}(2x-3\sqrt{x}-2)}dx$

IL TEOREMA FONDAMENTALE DEL CALCOLO INTEGRALE

1	$\int_1^2 \left(x^3 - x + 2\right)dx$	$\left[\frac{17}{4}\right]$
2	$\int_1^2 \left(x^3 + x - 1\right)dx$	$\left[\frac{17}{4}\right]$
3	$\int_1^4 \frac{2x^2+3}{x}dx$	$\left[15+3\ln 4\right]$
4	$\int_1^3 \frac{3x^3+2}{x}dx$	$\left[26+2\ln 3\right]$
5	$\int_0^{\frac{\pi}{4}} \left(\operatorname{sen} x - \cos x\right)dx$	$\left[1-\sqrt{2}\right]$
6	$\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} (\cos x - \operatorname{sen} x)dx$	$\left[1-\sqrt{2}\right]$
7	$\int_0^2 xe^{x^2}dx$	$\left[\frac{e^4-1}{2}\right]$
8	$\int_0^1 x^2 e^{x^3}dx$	$\left[\frac{e-1}{3}\right]$
9	$\int_{-1}^1 \frac{2x^3-3x^2-10x+9}{x+2}dx$	$\left[\frac{28}{3}+\ln 3\right]$
10	$\int_3^6 \frac{x^3+2x^2-2x+2}{x-1}dx$	$\left[\frac{213}{2}+3\ln\frac{5}{2}\right]$
11	$\int_0^{\frac{1}{2}} \frac{2x}{\sqrt{1-x}}dx$	$\left[\frac{8-5\sqrt{2}}{3}\right]$
12	$\int_0^{\frac{1}{2}} \frac{2x}{\sqrt{1+x}}dx$	$\left[\frac{8-3\sqrt{6}}{3}\right]$
13	$\int_{\frac{\pi}{2}}^{\frac{3\pi}{4}} \frac{\operatorname{sen} x}{1+2\cos^2 x}dx$	$\left[\frac{\pi\sqrt{2}}{8}\right]$

14	$\int_0^{\frac{\pi}{4}} \frac{\cos x}{1+2\operatorname{sen}^2 x}\,dx$	$\left[\frac{\pi\sqrt{2}}{8}\right]$
15	$\int_0^{\frac{\pi}{4}} (x+1)\operatorname{sen} x\;dx$	$\left[1-\frac{\pi\sqrt{2}}{8}\right]$
16	$\int_0^{\frac{\pi}{4}} (x+1)\cos x dx$	$\left[\frac{\pi\sqrt{2}}{8}+\sqrt{2}-1\right]$

IL CALCOLO DELLE AREE DI SUPERFICI PIANE

Disegna le superfici delimitate dall'asse *x* e dal grafico delle funzioni seguenti, definite negli intervalli indicati, poi calcolane l'area.

1	$y=e^x+1,\ [0;2]$.	$\left[e^2+1\right]$
2	$y=e^x+2,\ [0;1]$.	$[e+1]$
3	$y=-x^2+2x,\ [-1;2]$.	$\left[\frac{8}{3}\right]$
4	$y=-x^2-2x,\ [-2;1]$.	$\left[\frac{8}{3}\right]$
5	$y=x^3-6x^2+11x-6,\ [1;3]$	$\left[\frac{1}{2}\right]$
6	$y=x^3-3x^2+2x,\ [0;2]$.	$\left[\frac{1}{2}\right]$
7	Determina l'area della regione finita di piano delimitata dalla retta di equazione $2x+2y-9=0$ e dall'iperbole di equazione $y=\frac{2}{x}$. $\left[\frac{63}{8}-3\ln 4\right]$	
8	Determina l'area della regione finita di piano delimitata dalla retta di equazione $2x-2y-9=0$ e dall'iperbole di equazione $y=-\frac{2}{x}$. $\left[\frac{63}{8}-3\ln 4\right]$	