LIMITI

$$1) \lim_{x\to 0} \frac{\sin x + 2x}{x^2 - x}$$

$$2) \lim_{x\to 0} \frac{\sin^2 x - 2(1-\cos x)}{1-\cos x}$$

$$3) \lim_{x\to 0} \frac{1-\cos x}{3\sin^2 x}$$

$$4) \lim_{x\to 0} \frac{\sin^2 x}{1-\cos^3 x}$$

$$5) \lim_{x\to 0} \left[\frac{1}{2(1-\cos x)} - \frac{1}{\sin^2 x}\right]$$

	risultati		risultati
1)	-3	2)	0
3)	1/6	4)	2/3
5)	-1/4		

Calcolare il rapporto incrementale delle funzioni nei punti indicati:

funzione	rapporto incrementale
$f(x) = x + 3$ in $x_0 = 2$	R= 1
$f(x) = x^2$+3x-4 in $x_0 = 2$	R=h+7
$f(x) = x^2 - 3x - 4$ in $x_0 = 2$	R=h+1
$f(x) = \frac{x^2+4}{x}$ in x_1 =2	R= $\frac{h}{h+2}$
$f(x) = \sqrt{x^2-1}$ in $x_0 = 1$	R=$\frac{\sqrt{h(h+2)}}{h}$
$f(x) = 2^x$-4 in $x_0 = 1$	R=$\frac{2^{h+1}-2}{h}$
$f(x) = \ln(x+2)$ in $x_0 = 1$	R=$\frac{ln(h+3)-ln(3)}{h}$

DERIVATE

funzione	derivata
$(x^2+x^3)\log_2 x$	$x\left[(2+3x)\log_2 x+(1+x)\log_2 e\right]$
$e^x(2-e^x)$	$2e^x(1-e^x)$
$e^x(\sin x+\cos x)$	$2e^x\cos x$
$\sqrt{x^4+x^2-2x}$	$\frac{2x^3+x-1}{\sqrt{x^4+x^2-2x}}$
$\sqrt[3]{4x^3+6x^2-5}$	$\frac{4x(x+1)}{\sqrt[3]{(4x^3+6x^2-5)^2}}$
$\frac{x-1}{\sqrt{x^2-1}}$	$\frac{1}{(x+1)\sqrt{x^2-1}}$
$\frac{\ln x-1}{\ln x+1}$	$\frac{2}{x(\ln x+1)^2}$
$\frac{1}{2}e^{2x}\cos x$	$\frac{1}{2}e^{2x}(2\cos x-\sin x)$
$\ln(5e^x\sqrt{x^2-1})$	$\frac{x^2+x-1}{x^2-1}$

Calcolare le rette tangenti alle funzioni nei punti indicati:

funzione	tangente
$f(x)=\ln(3x+2)$ in $x_0=0$	$y=\frac{3x}{2}+\ln 2$
$f(x)=e^{4x+1}$ in $x_0=$ -1/2	$y=\frac{4x}{e}+\frac{3}{e}$
$f(x)=\sin^2 x-\cos x$ in $x_0=\pi/2$	$y=x-\frac{\pi}{2}+1$
$f(x)=\sin^2 x-\cos x$ in $x_0=\pi/2$	$y=x-\frac{\pi}{2}+1$
$f(x)=\frac{\ln(x+3)}{x+1}$ in $x_0=$ -2	$y=-x-2$
$f(x)=e^{2x}$ in $x_0=1/2$	$y=2ex$
$f(x)=\sin 2x$ in $x_0=\pi/8$	$y=(x-\frac{\pi}{8}+\frac{1}{2})\sqrt{2}$
$f(x)=\ln(x+2)-3$ in $x_0=$ -1	$y=x-2$

INTEGRALI INDEFINITI

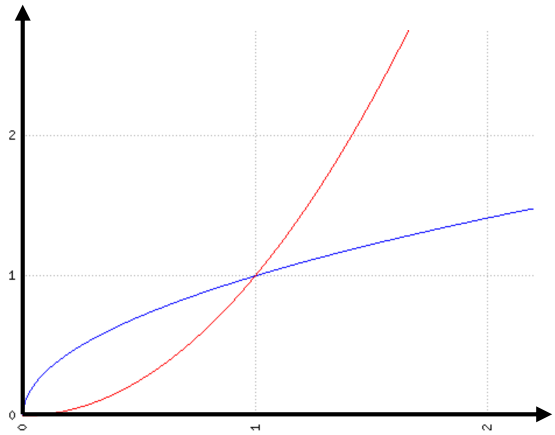
$\int \frac{e^x}{2e^x+5}\ dx$	$\frac{1}{2}\ln(2e^x+5)+C$
$\int \frac{1}{x\ln x}\ dx$	$\ln\lvert\ln x\rvert+C$
$\int x^2\sin x^3\ dx$	$-\frac{1}{3}\cos x^3+C$
$\int \frac{x}{x^2+1}\ dx$	$\frac{1}{2}\ln(x^2+1)+C$
$\int \frac{2+x^2-x^4}{x^2}\ dx$	$\frac{-2}{x}+x-\frac{x^3}{3}+C$
$\int (x\sqrt{x}+\frac{x^2}{\sqrt[3]{x^2}}-8x^7)\ dx$	$\frac{2x^2\sqrt{x}}{5}+\frac{3x^2\sqrt[3]{x}}{7}-x^8+C$
$\int (2^x+2x)\ dx$	$2^x\log_2 e+x^2+C$
$\int (2x+1)^7\ dx$	$\frac{(2x+1)^8}{16}+C$
$\int \sin^2 x\cos x\ dx$	$\frac{\sin^3 x}{3}+C$
$\int \frac{1}{3x+2}\ dx$	$\frac{\ln\lvert 3x-2\rvert}{3}+C$
$\int \frac{x+2}{x^2+4x+1}\ dx$	$\frac{\ln\left\lvert x^2+4x+1\right\rvert}{2}+C$
$\int \sin x\cos^4 x\ dx$	$\frac{-\cos^5 x}{5}+C$
$\int (2x-1)(x^2-x)^3\ dx$	$\frac{(x^2-x)^4}{4}+C$
$\int \frac{1}{x\ln x}\ dx$	$\ln\lvert\ln x\rvert+C$
$\int \frac{\ln^2 x}{x}\ dx$	$\frac{\ln^3 x}{3}+C$
$\int (e^x+2)^3e^x\ dx$	$\frac{(e^x+2)^4}{4}+C$
$\int \sqrt{3-x}\ dx$	$\frac{-2(3-x)\sqrt{3-x}}{3}+C$
$\int \frac{1}{1-2x}\ dx$	$\frac{-\ln\lvert 1-2x\rvert}{2}+C$
$\int \frac{e^x+1}{e^x+x}\ dx$	$\ln\lvert e^x+x\rvert+C$
$\int (3x\sqrt{4+x^2})\ dx$	$(4+x^2)\sqrt{4+x^2}+C$
$\int \frac{e^x-e^{-x}}{e^x+e^{-x}}\ dx$	$\ln\lvert e^x+e^{-x}\rvert+C$
$\int \frac{e^{\sqrt{x}}}{\sqrt{x}}\ dx$	$2e^{\sqrt{x}}+C$
$\int e^{(\sin x+2)}\cos x\ dx$	$e^{(\sin x+2)}+C$
$\int xe^{(x^2+4)}\ dx$	$\frac{e^{(x^2+4)}}{2}+C$

INTEGRALI DEFINITI

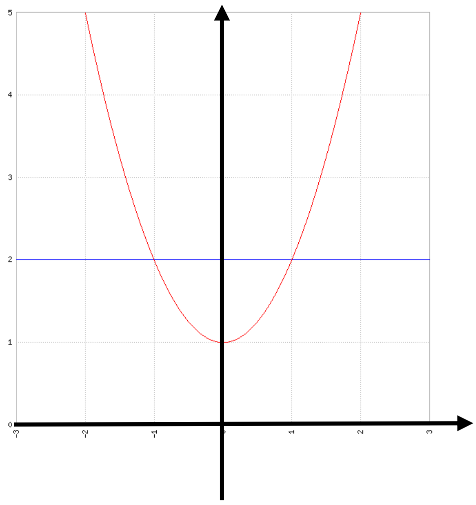
$\int_0^{\pi/4} \tan x \ dx$	$\ln(\sqrt{2}/2)$
$\int_1^3 \frac{4x+3}{2x^2+3x} \ dx$	$\ln 5$
$\int_1^2 (x^2 - \frac{1}{x^2}) \ dx$	$11/6$
$\int_0^1 (\sqrt[3]{x} - x) \ dx$	$1/4$
$\int_0^{\pi/2} \sin^2 x \cos x \ dx$	$1/3$
$\int_{-1}^0 x e^{x^2} \ dx$	$(1-e)/2$

Calcolare le aree tra le due curve:

$f(x) = x^2$ *e* $g(x) = \sqrt{x}$



$f(x) = x^2 + 1$ *e* $g(x) = 2$



$f(x) = -2x^2 + 4x + 3$ *e* $g(x) = 2x - 1$