Deriválás

$f(x)$	$f'(x)$
c	0
x^α	$\alpha x^{\alpha-1}$
e^x	e^x
a^x	$a^x \ln a$
$\ln x$	$\frac{1}{x}$
$\log_a x$	$\frac{1}{x \ln a}$
$\sin x$	$\cos x$
$\cos x$	$-\sin x$
$\mathrm{tg}x$	$\frac{1}{\cos^2 x}$
$\mathrm{ctg}x$	$-\frac{1}{\sin^2 x}$
$\arcsin x$	$\frac{1}{\sqrt{1-x^2}}$
$\arccos x$	$-\frac{1}{\sqrt{1-x^2}}$
$\mathrm{arctg}x$	$\frac{1}{1+x^2}$
$\mathrm{arcctg}x$	$-\frac{1}{1+x^2}$
$\mathrm{sh}x$	$\mathrm{ch}x$
$\mathrm{ch}x$	$\mathrm{sh}x$
$\mathrm{th}x$	$\frac{1}{\mathrm{ch}^2 x}$
$\mathrm{cth}x$	$-\frac{1}{\mathrm{sh}^2 x}$
$\mathrm{arsh}x$	$\frac{1}{\sqrt{1+x^2}}$
$\mathrm{arch}x$	$\frac{1}{\sqrt{x^2-1}}$
$\mathrm{arth}x$	$\frac{1}{1-x^2} \quad \lvert x\rvert<1$
$\mathrm{arcth}x$	$\frac{1}{1-x^2} \quad \lvert x\rvert>1$

Deriválási szabályok

$$(cf)' = cf'$$
$$(f \pm g)' = f' \pm g'$$
$$(fg)' = f'g + fg'$$
$$\left(\frac{f}{g}\right)' = \frac{f'g - fg'}{g^2}$$
$$(f \circ g)' = (f' \circ g)\, g'$$
$$\left(\bar{f}\right)' = \frac{1}{f' \circ \bar{f}}$$

Paraméteres megadású függvény:

$$f(x) : \begin{cases} x = \varphi(t) \\ y = \psi(t) \end{cases} \qquad f'(x) = \frac{\dot{\psi}(t)}{\dot{\varphi}(t)}$$

Kiegészítések

$$\sin^2 x = \frac{1-\cos 2x}{2} \qquad \cos^2 x = \frac{1+\cos 2x}{2}$$
$$\mathrm{sh}^2 x = \frac{\mathrm{ch}2x - 1}{2} \qquad \mathrm{ch}^2 x = \frac{\mathrm{ch}2x + 1}{2}$$
$$2\sin\alpha\sin\beta = \cos(\alpha-\beta) - \cos(\alpha+\beta)$$
$$2\cos\alpha\cos\beta = \cos(\alpha-\beta) + \cos(\alpha+\beta)$$
$$2\sin\alpha\cos\beta = \sin(\alpha+\beta) + \sin(\alpha-\beta)$$

Integrálás

$f(x)$	$F(x)$
x^α	$\frac{x^{\alpha+1}}{\alpha+1} \quad \alpha \neq -1$
$\frac{1}{x}$	$\ln\lvert x\rvert$
e^x	e^x
a^x	$\frac{a^x}{\ln a}$
$\sin x$	$-\cos x$
$\cos x$	$\sin x$
$\frac{1}{\cos^2 x}$	$\mathrm{tg}x$
$\frac{1}{\sin^2 x}$	$-\mathrm{ctg}x$
$\mathrm{sh}x$	$\mathrm{ch}x$
$\mathrm{ch}x$	$\mathrm{sh}x$
$\frac{1}{\mathrm{ch}^2 x}$	$\mathrm{th}x$
$\frac{1}{\mathrm{sh}^2 x}$	$-\mathrm{cth}x$
$\frac{1}{\sqrt{1-x^2}}$	$\arcsin x$
$\frac{1}{\sqrt{1+x^2}}$	$\mathrm{arsh}x$
$\frac{1}{\sqrt{x^2-1}}$	$\mathrm{arch}x$
$\frac{1}{1+x^2}$	$\mathrm{arctg}x$
$\frac{1}{1-x^2}$	$\frac{1}{2}\ln\left\lvert\frac{1+x}{1-x}\right\rvert$

Integrálási szabályok

$$\int f(ax+b)\,dx = \frac{F(ax+b)}{a} + C$$
$$\int f^\alpha(x)\, f'(x)\,dx = \frac{f^{\alpha+1}(x)}{\alpha+1} + C \quad \text{ha} \quad \alpha \neq -1$$
$$\int \frac{f'(x)}{f(x)}dx = \ln\lvert f(x)\rvert + C$$
$$\int f(g(x))\, g'(x)\,dx = F(g(x)) + C$$
$$\int u'(x)\,v(x)\,dx = u(x)\,v(x) - \int u(x)\,v'(x)\,dx$$

$t = \mathrm{tg}\frac{x}{2}$ helyettesítés:

$$\sin x = \frac{2t}{1+t^2} \qquad \cos x = \frac{1-t^2}{1+t^2}$$

$$V = \pi\int_a^b f^2(x)dx$$
$$L = \int_a^b \sqrt{1+(f'(x))^2}dx$$
$$F = 2\pi\int_a^b f(x)\sqrt{1+(f'(x))^2}dx$$
$$\begin{cases} x = \varphi(t) \\ y = \psi(t) \end{cases}$$
$$V = \pi\int_{t_1}^{t_2} \psi^2(t)\dot{\varphi}(t)dt$$
$$L = \int_{t_1}^{t_2} \sqrt{\dot{\varphi}^2(t) + \dot{\psi}^2(t)}dt$$
$$F = 2\pi\int_{t_1}^{t_2} \psi(t)\sqrt{\dot{\varphi}^2(t) + \dot{\psi}^2(t)}dt$$

Laplace-transzformáció

$f(t)$	$\bar{f}(s) = L[f(t)]$
e^{at}	$\frac{1}{s-a}$
$\sin(at)$	$\frac{a}{s^2+a^2}$
$\cos(at)$	$\frac{s}{s^2+a^2}$
t^n	$\frac{n!}{s^{n+1}}$
$\mathrm{sh}(at)$	$\frac{a}{s^2-a^2}$
$\mathrm{ch}(at)$	$\frac{s}{s^2-a^2}$
$e^{at}f(t)$	$\bar{f}(s-a)$
$t^n f(t)$	$(-1)^n \frac{d^n \bar{f}(s)}{ds^n}$
$f'(t)$	$s\bar{f}(s) - f(0)$
$f''(t)$	$s^2\bar{f}(s) - sf(0) - f'(0)$
$f^{(n)}(t)$	$s^n\bar{f}(s) - s^{n-1}f(0) - \ldots$ $\ldots - f^{(n-1)}(0)$
$\int_0^t f(u)\,du$	$\frac{1}{s}\bar{f}(s)$
$f(t-a)$	$e^{-as}\bar{f}(s)$

Taylor-sorok

$$e^x = \sum_{n=0}^{\infty} \frac{x^n}{n!}$$
$$\sin x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!}$$
$$\cos x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n}}{(2n)!}$$
$$(1+x)^\alpha = \sum_{n=0}^{\infty} \binom{\alpha}{n} x^n \quad \lvert x\rvert < 1$$
$$\binom{\alpha}{0} = 1 \quad \binom{\alpha}{n} = \frac{\alpha(\alpha-1)\cdot\ldots\cdot(\alpha-n+1)}{n!}$$

Fourier-sorok

$$f(x) = a_0 + \sum_{n=1}^{\infty} \left(a_n \cos(n\omega x) + b_n \sin(n\omega x)\right)$$
$$a_0 = \frac{1}{T}\int_a^{a+T} f(x)\,dx$$
$$a_n = \frac{2}{T}\int_a^{a+T} f(x)\cos(n\omega x)\,dx$$
$$b_n = \frac{2}{T}\int_a^{a+T} f(x)\sin(n\omega x)\,dx$$
$$f(x+T) = f(x) \text{ és } \omega = \frac{2\pi}{T}$$

Vektoranalízis

$$s = \int_{t_1}^{t_2} \lvert\dot{\underline{r}}\rvert\, dt$$
$$G = \frac{\lvert\dot{\underline{r}} \times \ddot{\underline{r}}\rvert}{\lvert\dot{\underline{r}}\rvert^3} \qquad T = \frac{\dot{\underline{r}}\,\ddot{\underline{r}}\,\dddot{\underline{r}}}{\lvert\dot{\underline{r}} \times \ddot{\underline{r}}\rvert^2}$$
$$\nabla = \left(\frac{\partial}{\partial x}, \frac{\partial}{\partial y}, \frac{\partial}{\partial z}\right)$$
$$\mathrm{grad}u = \nabla u$$
$$\mathrm{div}\underline{v} = \nabla\underline{v} \qquad \mathrm{rot}\underline{v} = \nabla \times \underline{v}$$