Derivace

$c'=0$

$x'=1$

$(cx)' = cx^{c-1}$

$(f(x) + g(x))' = f(x)' + g(x)'$

$(c * f(x))' = c * f(x)'$

$\left(f(x) * g(x)\right)' = f(x)' * g(x) + f(x) * g(x)'$

$\left(\frac{f(x)}{g(x)}\right)' = \frac{f(x)' * g(x) - f(x) * g(x)'}{g(x)^2}$

$(f(g(x)))' = f'(g(x)) \cdot g'(x)$

$(c^x)' = c^x \ln c\,;\; c > 0$

$(e^x)' = e^x$

$\left(e^{-x^2}\right) = e^{-x^2} * (-x^2)'$

$(\log_c x)' = \frac{1}{x * \ln c}; c > 0$

$(\ln x)' = \frac{1}{x}$

$(\sin x)' = \cos x$

$(\cos x)' = -\sin x$

$(\tan x)' = \frac{1}{\cos^2 x}$

$(\text{cotan } x)' = -\frac{1}{\sin^2 x}$

$(\arcsin x)' = \frac{1}{\sqrt{1-x^2}}$

$(\arccos x)' = -\frac{1}{\sqrt{1-x^2}}$

$(\arctan x)' = \frac{1}{1+x^2}$

$(\text{arccotan } x)' = -\frac{1}{1+x^2}$

Konvergence řad

Leibnizova věta

$\lim a_n = 0 \;\&\; a_n > 0 \;\&\; a_n \geq a_{n+1} \Rightarrow \sum(-1)^n a_n \boldsymbol{K}$

srovnávací kritérium

$a_n < b_n \Leftrightarrow \sum b_n \boldsymbol{K} \Rightarrow \sum a_n \boldsymbol{K},\; \sum a_n \boldsymbol{D} \Rightarrow \sum a_n \boldsymbol{D}$

Cauchyho kritérium

$a_n > 0 \;\&\; \lim_{n\to\infty} \sqrt[n]{a_n} = k \Leftrightarrow \quad k < 1 \Rightarrow \sum K,\; k > 1 \Rightarrow \sum D$

d'Alembertovo kritérium

$a_n > 0 \;\&\; \lim_{n\to\infty} \frac{a_{n+1}}{a_n} = k \Leftrightarrow \quad k < 1 \Rightarrow \sum K,\; k > 1 \Rightarrow \sum D$

(Raabeovo kritérium)

$a_n > 0 \;\&\; \lim_{n\to\infty} n\left(\frac{a_n}{a_{n+1}} - 1\right) = k \;\Leftrightarrow k < 1 \Rightarrow \sum D,\; k > 1 \Rightarrow \sum K$

L'Hospitalovo pravidlo

$f(x_0) = g(x_0) = 0 \Rightarrow \lim_{x\to x_0} \frac{f(x)}{g(x)} = \lim_{x\to x_0} \frac{f(x)'}{g(x)'}$

$\lim_{x\to 0^-} sgn(x) = -1$

$\lim_{x\to 0^+} sgn(x) = 1$

sgn(0) = 0

$x = sgn(x) * |x|$

$\exp(x) = e^x$

$|x|' = \begin{cases} 1, x > 0 \\ -1, x < 0 \end{cases}$

$\sin^2 x + \cos^2 x = 1$

$\tan x \cdot \cot x = 1 \quad \left(x \neq k\frac{\pi}{2}\right)$

$1 + \tan^2 x = \frac{1}{\cos^2 x} \quad \left(x \neq k\frac{\pi}{2}\right)$

$1 + \cot^2 x = \frac{1}{\sin^2 x} \quad \left(x \neq k\frac{\pi}{2}\right)$

$f'_-(x_0) = \lim_{\Delta x\to 0^-} \frac{f(x_0+\Delta x) - f(x_0)}{\Delta x}$

$f'_+(x_0) = \lim_{\Delta x\to 0^+} \frac{f(x_0+\Delta x) - f(x_0)}{\Delta x}$

$\sin^2 x + \cos^2 x = 1 \qquad \left|\sin\frac{x}{2}\right| = \sqrt{\frac{1-\cos x}{2}}$

$\sin 2x = 2\sin x \cos x$

$\cos 2x = \cos^2 x - \sin^2 x \qquad \left|\cos\frac{x}{2}\right| = \sqrt{\frac{1+\cos x}{2}}$

$\sin x \pm \sin y = 2\sin\frac{x \pm y}{2}\cos\frac{x \mp y}{2}$

$\cos x + \cos y = 2\cos\frac{x+y}{2}\cos\frac{x-y}{2}$

$\cos x - \cos y = -2\sin\frac{x+y}{2}\sin\frac{x-y}{2}$

$\mathrm{arctg}(\mathrm{cotg}(x)) = \frac{1}{\pi} - x, \qquad x \in \langle 0, \pi \rangle$

$\arcsin(\cos(x)) = \frac{1}{\pi} - x, \qquad x \in \langle 0, \pi \rangle$

$\mathrm{arcsec}(\csc(x)) = \frac{1}{\pi} - x, \qquad x \in \langle 0, \frac{\pi}{2} \rangle$

$\sin(\arccos(x)) = \sqrt{1-x^2} \qquad \sin(\mathrm{arctg}(x)) = \frac{x}{\sqrt{1-x^2}}$

$\cos(\arcsin(x)) = \sqrt{1-x^2} \qquad \cos(\mathrm{arctg}(x)) = \frac{1}{\sqrt{1-x^2}}$

$\mathrm{tg}(\arcsin(x)) = \frac{x}{\sqrt{1-x^2}} \qquad \mathrm{tg}(\arccos(x)) = \frac{\sqrt{1-x^2}}{x}$

$\arcsin(x) + \arccos(x) = \frac{1}{\pi}$

$\mathrm{arctg}(x) + \mathrm{arccotg}(x) = \frac{1}{\pi}$

$\mathrm{arcsec}(x) + \mathrm{arccsc}(x) = \frac{1}{\pi}$

$a^{\log_a x} = \log_a a^x = x$

$\log_b(ac) = \log_b a + \log_b c$

$\log_b \frac{a}{c} = \log_b a - \log_b c$

$\log_b MN = \log_b M + \log_b N$

$\log_b \frac{M}{N} = \log_b M - \log_b N$

$\log_b N^y = y \log_b N$

$\log_b a^r = r \log_b a$ (tzn. $\log_b \sqrt[n]{a} = \frac{1}{n}\log_b a$;

$\log_b b = 1$

$\log_b 1 = 0$

$a^b = e^{b \ln a}$

$\log_a x = \frac{\log_b x}{\log_b a} = \log_a b \log_b x$

$\log_a x = \frac{\log x}{\log a} = \frac{\ln x}{\ln a}$

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Nedefinováno:

0^0	1^∞
$\frac{0}{0}$	$\frac{\infty}{\infty}$
$0 * \infty$	$\infty - \infty$
∞^0	$\sqrt[0]{x}$