RzM_5

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DERIVÁCIA FUNKCIE:

$f(x)$	$f'(x)$
konštanta	0
$k \cdot x$	k $\quad k \in \mathbb{R}$
x^k	$k\,x^{k-1}$
$\log_a x$	$\frac{1}{x \ln a}$ $\quad a \neq 1,\ a > 0$
$\ln x$	$\frac{1}{x}$ $\quad x \in (0, \infty)$
a^x	$a^x \ln a$ $\quad a \neq 1,\ a > 0$
e^x	e^x

$f(x)$	$f'(x)$
$\sin x$	$\cos x$
$\cos x$	$-\sin x$
$\operatorname{tg} x$	$\frac{1}{\cos^2 x}$
cotg	$-\frac{1}{\sin^2 x}$
$\arcsin x$	$\frac{1}{\sqrt{1-x^2}}$
$\arccos x$	$-\frac{1}{\sqrt{1-x^2}}$
$\operatorname{arctg} x$	$\frac{1}{1+x^2}$
$\operatorname{arccotg} x$	$-\frac{1}{1+x^2}$

Pr: $f(x) = 2x^5 - \frac{3}{x^4} + \sqrt[6]{x^{11}} + \frac{2}{\sqrt{x}} - \frac{15}{17} + 4x$

$f(x) = 2x^5 - 3x^{-4} + x^{\frac{11}{6}} + 2x^{-\frac{1}{2}} - \frac{15}{17} + 4x^1$

$f'(x) = 2.5x^4 - 3.(-4)x^{-5} + \frac{11}{6} \cdot x^{\frac{5}{6}} + 2.\left(-\frac{1}{2}\right)x^{-\frac{3}{2}} + 0 + 4.1$

$f'(x) = 10x^4 + \frac{12}{x^5} + \frac{11}{6}\sqrt[6]{x^5} - \frac{1}{\sqrt[2]{x^3}} + 4$

$(k f(x))' = k f'(x)$

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

$(x^n)' = n x^{n-1}$

$\frac{1}{x^k} = x^{-k}$

$\sqrt[s]{x^r} = x^{\frac{r}{s}}$

$(\text{konštanta})' = 0$

Pr: $f(x) = 3.6^x + \frac{1}{2}\log_6 x - \frac{2}{3}\cos x + \arccos x$

$f'(x) = 3.6^x \ln 6 + \frac{1}{2} \cdot \frac{1}{x \ln 6} + \frac{2}{3}\sin x - \frac{1}{\sqrt{1-x^2}}$

$(a^x)' = a^x \ln a$

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

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

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

Př: $f(x) = (2\ln x + \frac{1}{x}) \cdot (3\sin x + 5\cos x)$

$f(x)$ x^{-1} $g(x)$

$f'(x) = (\frac{2}{x} - 1 \cdot x^{-2})(3\sin x + 5\cos x) + (2\ln x + \frac{1}{x})(3\cos x - 5\sin x)$

f' g f g'

$\frac{2}{x} - \frac{1}{x^2}$

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

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

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

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

Př: $f(x) = (3\operatorname{tg} x + e^x + e) \cdot \arcsin x$

$f(x)$ $g(x)$

$f'(x) = (\frac{3}{\cos^2 x} + e^x + 0)\arcsin x + (3\operatorname{tg} x + e^x + e) \cdot \frac{1}{\sqrt{1-x^2}}$

f' g f g'

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

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

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

Př: $f(x) = \frac{\operatorname{cotg} x + 3^x}{x - 4\pi}$ $f(x)$ $g(x)$

$f'(x) = \frac{(-\frac{1}{\sin^2 x} + 3^x \ln 3)(x - 4\pi) - (\operatorname{cotg} x + 3^x) \cdot (1 - 0)}{(x - 4\pi)^2}$

f' g f g' g^2

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

$(\operatorname{cotg} x)' = -\frac{1}{\sin^2 x}$

$(a^x)' = a^x \ln a$

Př: $f(x) = \frac{x^{-2} + x^2 + 2^x}{1 - \operatorname{arctg} x}$

$f'(x) = \frac{(-2x^{-3} + 2x + 2^x \ln 2)(1 - \operatorname{arctg} x) - (x^{-2} + x^2 + 2^x)(-\frac{1}{1+x^2})}{(1 - \operatorname{arctg} x)^2}$

$(x^n)' = n x^{n-1}$

$(a^x)' = a^x \ln a$

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

Př: $f(x) = \ln \operatorname{tg} \cos(4x^2 + 5^x + 3)$

$f'(x) = \frac{1}{\operatorname{tg} \cos(4x^2+5^x+3)} \cdot \frac{1}{\cos^2(\cos(4x^2+5^x+3))} \cdot (-\sin(4x^2+5^x+3)) \cdot (4 \cdot 2 \cdot x + 5^x \ln 5 + 0)$

$(\ln \heartsuit)' = \frac{1}{\heartsuit} \cdot \heartsuit'$

$(\operatorname{tg} \heartsuit)' = \frac{1}{\cos^2 \heartsuit} \heartsuit'$

$(\cos \heartsuit)' = -\sin \heartsuit \, \heartsuit'$

$$(x^n)' = n x^{n-1} \cdot \heartsuit'$$

$$(\sin \heartsuit)' = \cos \heartsuit \cdot \heartsuit'$$

R: $f(x) = \sqrt[3]{\sin^2(x^2+x)}$

$$f(x) = \sin^{\frac{2}{3}}(x^2+x) = \left(\sin(x^2+x)\right)^{\frac{2}{3}}$$

$$f'(x) = \frac{2}{3}\left(\sin(x^2+x)\right)^{-\frac{1}{3}} \cdot \cos(x^2+x) \cdot (2x+1)$$

$$f'(x) = \frac{2 \cdot \cos(x^2+x)(2x+1)}{3\sqrt[3]{\sin(x^2+x)}}$$