

1 Table of Derivatives

- $(const)' = 0.$
- $x' = 1.$
- $(x^m)' = mx^{m-1}, m \in \mathbb{R}.$
- $\left(\frac{1}{x}\right)' = -\frac{1}{x^2}.$
- $\left(\frac{1}{x^m}\right)' = -\frac{m}{x^{m+1}}.$
- $(\sqrt{x})' = \frac{1}{2\sqrt{x}}.$
- $(\sqrt[n]{x})' = \frac{1}{n\sqrt[n]{x^{n-1}}}.$
- $(\sin x)' = \cos x.$
- $(\cos x)' = -\sin x$
- $(\operatorname{tg} x)' = \frac{1}{\cos^2 x}.$
- $(\operatorname{ctg} x)' = -\frac{1}{\sin^2 x}.$
- $(\operatorname{sh} x)' = \operatorname{ch} x.$
- $(\operatorname{ch} x)' = \operatorname{sh} x.$
- $(\operatorname{th} x)' = \frac{1}{\operatorname{ch}^2 x}.$
- $(\operatorname{cth} x)' = -\frac{1}{\operatorname{sh}^2 x}.$
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- $(\arcsin x)' = \frac{1}{\sqrt{1-x^2}}.$
- $(\arccos x)' = -\frac{1}{\sqrt{1-x^2}}.$
- $(\operatorname{arctg} x)' = \frac{1}{1+x^2}.$
- $(\operatorname{arcctg} x)' = -\frac{1}{1+x^2}.$
- $(\operatorname{arsh} x)' = \frac{1}{\sqrt{x^2+1}}.$
- $(\operatorname{arch} x)' = \frac{1}{\sqrt{x^2-1}}.$
- $(\operatorname{arth} x)' = \frac{1}{1-x^2}$ при $|x| < 1.$
- $(\operatorname{arch} x)' = \frac{1}{1-x^2}$ при $|x| > 1.$
- $(e^x)' = e^x.$
- $(a^x)' = a^x \ln a.$
- $(\ln x)' = \frac{1}{x}.$
- $(\log_a x)' = \frac{1}{x \ln a}.$
- $(|x|)' = \operatorname{sgn} x$ при $x \neq 0.$
- $(\operatorname{sgn} x)' = 0.$

$$\begin{aligned}
 (f(x)^{g(x)})' &= (e^{g(x) \ln f(x)})' = e^{g(x) \ln f(x)} \cdot \left(g'(x) \ln f(x) + \frac{g(x) f'(x)}{f(x)} \right) = \\
 &= f(x)^{g(x)} \left(g'(x) \ln f(x) + \frac{g(x) f'(x)}{f(x)} \right).
 \end{aligned}$$