

Derivatives of the most important functions

No	Function	Derivative	Remarks
1	c	0	$c \in \mathbb{R}$
2	x^α	$\alpha x^{\alpha-1}$	$x, \alpha \in \mathbb{R} \quad \alpha \neq 0$
3	e^x	e^x	$x \in \mathbb{R}$
4	a^x	$a^x \ln a$	$a > 0 \quad a \neq 1 \quad x \in \mathbb{R}$
5	$\sin x$	$\cos x$	$x \in \mathbb{R}$
6	$\cos x$	$-\sin x$	$x \in \mathbb{R}$
7	$\operatorname{tg} x$	$1 + \operatorname{tg}^2 x = 1/\cos^2 x$	$x \neq (2k+1)\pi/2$
8	$\operatorname{ctg} x$	$-1 - \operatorname{ctg}^2 x = -1/\sin^2 x$	$x \neq k\pi$
9	$\ln x$	$1/x$	$x > 0$
10	$\log_a x$	$1/(x \ln a)$	$a, x > 0 \quad a \neq 1$
11	$\arcsin x$	$1/\sqrt{1-x^2}$	$ x < 1$
12	$\arccos x$	$-1/\sqrt{1-x^2}$	$ x < 1$
13	$\operatorname{arctg} x$	$1/(1+x^2)$	$x \in \mathbb{R}$
14	$\operatorname{arcctg} x$	$-1/(1+x^2)$	$x \in \mathbb{R}$
15	$\operatorname{sh} x$	$\operatorname{ch} x$	$x \in \mathbb{R}$
16	$\operatorname{ch} x$	$\operatorname{sh} x$	$x \in \mathbb{R}$
17	$\operatorname{th} x$	$1 - \operatorname{th}^2 x = 1/\operatorname{ch}^2 x$	$x \in \mathbb{R}$
18	$\operatorname{cth} x$	$1 - \operatorname{cth}^2 x = -1/\operatorname{sh}^2 x$	$x \in \mathbb{R} \quad x \neq 0$