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Rules of Differentiation

"Civilization advances by extending the number of important operatons which can be performed without thinking about them." --- A.N. Whitehead

Rule name (if any)	$f(x)$	$\dfrac{df}{dx}$
	any constant c	0
	x^n	$n\,x^{n-1}$
	$c\,u(x)$	$c\,\dfrac{du}{dx}$
The Sum rule	$u(x)+v(x)$	$\dfrac{du}{dx}+\dfrac{dv}{dx}$
The Product rule	$u(x)\,v(x)$	$u(x)\,\dfrac{dv}{dx}+v(x)\,\dfrac{du}{dx}$

The Quotient rule	$\frac{u(x)}{v(x)}$	$\frac{v(x)\,\frac{du}{dx} - u(x)\,\frac{dv}{dx}}{(v(x))^2}$
The Chain rule	$y\,(u(x))$	$\frac{dy}{du}\,\frac{du}{dx}$
The Power rule	$(u(x))^n$	$n\,\,(u(x))^{n-1}\,\frac{du}{dx}$
	$\sin(x)$	$\cos(x)$
	$\cos(x)$	$-\sin(x)$
	$\tan(x)$	$\sec^2(x)$
	$\cot(x)$	$-\csc^2(x)$
	$\sec(x)$	$\sec(x)\,\tan(x)$
	$\csc(x)$	$-\csc(x)\cot(x)$

	$\ln(x)$	$\frac{1}{x}$
	e^x	e^x
	$\tan^{-1}(x)$	$\frac{1}{1+x^2}$
	$\sin^{-1}(x)$	$\frac{1}{\sqrt{1-x^2}}$
	$\sinh(x)$	$\cosh(x)$
	$\cosh(x)$	$\sinh(x)$
	$\tanh(x)$	$\operatorname{sech}^2(x)$
	$\coth(x)$	$-\operatorname{csch}^2(x)$
	$\operatorname{sech}(x)$	$-\operatorname{sech}(x)\tanh(x)$
	$\operatorname{csch}(x)$	$-\operatorname{csch}(x)\coth(x)$

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Last modified October 14, 1999