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SUSAN AND JOHN MATHTUBE

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DIFFERENTIATION (DERIVATIVE) FORMULAE

DIFFERENTIATION (DERIVATIVES)

$y = f(x)$	$\frac{dy}{dx} = f'(x)$
x^n	$n\,x^{n-1}$
a^x	$a^x \ln a$
e^x	e^x

Note: a,b,c, … l,m,n. are treated as constants unless otherwise specified.
ln a stands for $\log_e a$ (natural logarithm)

Note: x,y,z,u,v,w stands for variables.

$y = f(x)$	$\frac{dy}{dx} = f'(x)$
$\sqrt{x}$	$\frac{1}{2\sqrt{x}}$
$\frac{1}{x}$	$\frac{-1}{x^2}$
$\ln x$	$\frac{1}{x}$

$y = f(x)$	$\frac{dy}{dx} = f'(x)$
$\sin x$	$\cos x$
$\cos x$	$-\sin x$
$\tan x$	$\sec^2 x$
$\cot x$	$-\text{cosec}^2 x$
$\sec x$	$\sec x \tan x$
$\text{cosec } x$	$-\text{cosec } x \cot x$
$\sin^{-1} x$	$\frac{1}{\sqrt{1-x^2}}$
$\cos^{-1} x$	$\frac{-1}{\sqrt{1-x^2}}$
$\tan^{-1} x$	$\frac{1}{1+x^2}$
$\cot^{-1} x$	$\frac{-1}{1+x^2}$

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$y = f(x)$	$\frac{dy}{dx} = f'(x)$
$\sec^{-1} x$	$\frac{1}{x\sqrt{x^2-1}}$
$\operatorname{cosec}^{-1} x$	$\frac{-1}{x\sqrt{x^2-1}}$
c	0
$c\ u(x)$	$c\ \frac{du}{dx}$
$u(x)\ v(x)$	$u\ \frac{dv}{dx} + v\ \frac{du}{dx}$
$\frac{u(x)}{v(x)}$	$\frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}$
$u(x)\ v(x)\ w(x)$	$u'vw + uv'w + uvw'$

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