

Derivative Rules

Mathematics

Every differentiation rule a first course expects on recall.

u and v are differentiable functions of x.

Function	Derivative
Power: x^n	$n x^{n-1}$
Product: uv	$u'v + uv'$
Quotient: u/v	$(u'v - uv')/v^2$
Chain: $f(g(x))$	$f'(g(x)) g'(x)$
$e^{(kx)} \cdot \ln x$	$k e^{(kx)} \cdot 1/x$
$\sin x \cdot \cos x$	$\cos x \cdot -\sin x$
$\tan x \cdot \arctan x$	$\sec^2 x \cdot 1/(1 + x^2)$

Differentiability implies continuity. The converse fails: $|x|$ is continuous at 0 and has no derivative there.