

Property: Constant in Derivative

For any differentiable function f and constant $c \in \mathbb{R}$, we have :

$$(cf(x))' = cf'(x)$$

Proof

It follows from the fact that we can pull the constant out of a limit:

$$(cf(x))' \stackrel{D}{=} \lim_{x \rightarrow a} \frac{cf(x) - cf(a)}{x - a} = c \lim_{x \rightarrow a} \frac{f(x) - f(a)}{x - a} \stackrel{D}{=} cf'(x)$$

