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:

$$(cf\,(x))' \overset{\mathtt{D}}{=} \lim_{x \to a} \frac{cf\,(x) - cf\,(a)}{x - a} = c \lim_{x \to a} \frac{f\,(x) - f\,(a)}{x - a} \overset{\mathtt{D}}{=} cf'\,(x)$$

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