Derivative Rules April 28, 2021

1 | Basics

1.1 | Monomial

$$\frac{\partial}{\partial x}x^a = ax^{a-1}$$

1.2 | Exponential

$$\frac{\partial}{\partial x}a^x = (\ln a) \, a^x$$

2 | Composing

2.1 | **Sum**

$$\frac{\partial}{\partial x}(f+g)(x) = \frac{\partial}{\partial x}f(x) + \frac{\partial}{\partial x}g(x)$$

2.2 | **Product**

$$\frac{\partial}{\partial x}(fg)(x) = \left(f\frac{\partial}{\partial x}g\right)(x) + \left(g\frac{\partial}{\partial x}f\right)(x)$$

2.3 | Product

$$\frac{\partial}{\partial x} \left(\frac{f}{g} \right) (x) = \frac{\left(g \frac{\partial}{\partial x} f \right) (x) - \left(f \frac{\partial}{\partial x} g \right) (x)}{g^2(x)}$$

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