

## 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

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