1 | **Basics**

1.1 | **Monomial**

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

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**

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