Derivatives
\[
\frac{d}{dx} c = 0 \quad \frac{d}{dx} \left( cf(x) \right) = c \left( \frac{d}{dx} f(x) \right) = cf'(x)
\]
\[
\frac{d}{dx} \left( f(x) \pm g(x) \right) = \frac{d}{dx} f(x) \pm \frac{d}{dx} g(x) = f'(x) \pm g'(x)
\]
\[
\frac{d}{dx} \left( f(x)g(x) \right) = \left( \frac{d}{dx} f(x) \right) g(x) + f(x) \left( \frac{d}{dx} g(x) \right) = f'(x)g(x) + f(x)g'(x)
\]
\[
\frac{d}{dx} \left( \frac{f(x)}{g(x)} \right) = \frac{\left( \frac{d}{dx} f(x) \right) g(x) - \left( \frac{d}{dx} g(x) \right) f(x)}{(g(x))^2} = \frac{f'(x)g(x) - g(x)f'(x)}{(g(x))^2}
\]
\[
\frac{d}{dx} x = 1
\]
\[
\frac{d}{dx} x^n = nx^{n-1} \quad \frac{d}{dx} e^x = e^x \quad \frac{d}{dx} \ln x = \frac{1}{x}
\]
\[
\frac{d}{dx} \sin x = \cos x \quad \frac{d}{dx} \cos x = -\sin x \quad \frac{d}{dx} \tan x = \sec^2 x
\]
\[
\frac{d}{dx} \arcsin x = \frac{1}{\sqrt{1 - x^2}} \quad \frac{d}{dx} \arccos x = -\frac{1}{\sqrt{1 - x^2}} \quad \frac{d}{dx} \arctan x = \frac{1}{1 + x^2}
\]

The Fundamental Theorem of Calculus: \( \frac{d}{dx} \int_a^x f(t) \, dt = f(x) \)

The Chain Rule: \( \frac{d}{dx} f(u) = \left( \frac{d}{du} f(u) \right) \frac{du}{dx} \), or letting \( y = f(x) \) we have \( \frac{dy}{dx} = \frac{dy}{du} \frac{du}{dx} \)