Derivadas

Notação: $f'(x) = \frac{d}{dx}f(x)$

Regras de Derivação

- $(cf(x))' = cf'(x)$

- Derivada da Soma
$$(f(x) + g(x))' = f'(x) + g'(x)$$

- Derivada do Produto
$$(f(x)g(x))' = f'(x)g(x) + f(x)g'(x)$$

- Derivada do Quociente
$$\left(\frac{f(x)}{g(x)}\right)' = \frac{f'(x)g(x) - f(x)g'(x)}{g(x)^2}$$

- Regra da Cadeia
$$(f(g(x)))' = (f'(g(x))g'(x)$$

Funções Simples

- $\frac{d}{dx}c = 0$

- $\frac{d}{dx}x = 1$

- $\frac{d}{dx}cx = c$

- $\frac{d}{dx}x^c = cx^{c-1}$

- $\frac{d}{dx}\left(\frac{1}{x}\right) = \frac{d}{dx}\left(x^{-1}\right) = -x^{-2} = -\frac{1}{x^2}$

- $\frac{d}{dx}\left(\frac{1}{x^c}\right) = \frac{d}{dx}\left(x^{-c}\right) = -\frac{c}{x^{c+1}}$

- $\frac{d}{dx}\sqrt{x} = \frac{d}{dx}x^{\frac{1}{2}} = \frac{1}{2}x^{-\frac{1}{2}} = \frac{1}{2\sqrt{x}},$

Funções Exponenciais e Logarítmicas

- $\frac{d}{dx}e^x = e^x$

- $\frac{d}{dx}\ln(x) = \frac{1}{x}$

- $\frac{d}{dx}a^x = a^x \ln(a)$

Funções Trigonométricas

- $\frac{d}{dx}\operatorname{sen} x = \cos x$

- $\frac{d}{dx}\cos x = -\operatorname{sen} x,$

- $\frac{d}{dx}\operatorname{tg} x = \sec^2 x$

- $\frac{d}{dx}\sec x = \operatorname{tg} x \sec x$

- $\frac{d}{dx}\operatorname{cotg} x = -\operatorname{cossec}^2 x$

- $\frac{d}{dx}\operatorname{cossec} x = -\operatorname{cossec} x \operatorname{cotg} x$

Funções Trigonométricas Inversas

- $\frac{d}{dx}\operatorname{arcsen} x = \frac{1}{\sqrt{1-x^2}}$

- $\frac{d}{dx}\operatorname{arccos} x = \frac{-1}{\sqrt{1-x^2}}$

- $\frac{d}{dx}\operatorname{arctg} x = \frac{1}{1+x^2}$

Funções Hiperbólicas

- $\frac{d}{dx}\operatorname{senh} x = \cosh x = \frac{e^x + e^{-x}}{2}$

- $\frac{d}{dx}\cosh x = \operatorname{senh} x = \frac{e^x - e^{-x}}{2}$

- $\frac{d}{dx}\operatorname{tgh} x = \operatorname{sech}^2 x$

- $\frac{d}{dx}\operatorname{sech} x = -\operatorname{tgh} x \operatorname{sech} x$

- $\frac{d}{dx}\operatorname{cotgh} x = -\operatorname{cossech}^2 x$

- $\frac{d}{dx}\operatorname{csch} x = -\coth x \operatorname{cossech} x$