

PROPRIETA' LOGARITMI / Exp

$$\bullet \log_a x \cdot y = \log_a x + \log_a y \quad \longleftrightarrow \quad \bullet a^{c+d} = a^c \cdot a^d$$

$$\bullet \log_a \frac{x}{y} = \log_a x - \log_a y$$

$$\bullet \log_a x^\alpha = \alpha \log_a x$$

$$\bullet \log_a x = \frac{1}{\log_x a} = -\log_{\frac{1}{a}} x$$

$$\bullet \log_b x = \frac{\log_a x}{\log_a b}$$

Funzioni Iperboliche

$$\sinh(x) = \frac{e^x - e^{-x}}{2}$$

$$\cosh(x) = \frac{e^x + e^{-x}}{2}$$

$$\tanh(x) = \frac{\sinh(x)}{\cosh(x)}$$

MOAL DERIVATE

$$\bullet \frac{d}{dx} \log(f(x)) = \frac{f'(x)}{f(x)} \quad \bullet \text{ (per } g(x) = f^{-1}(x) \text{)} \quad \bullet g'(x) = \frac{1}{f'(x)}$$

DE L'HOPITAL RULE

$$\begin{cases} \lim f(x), g(x) = 0, \pm \infty \\ \lim \frac{f'(x)}{g'(x)} = L \in \mathbb{R} \end{cases} \quad \longrightarrow \quad \lim \frac{f(x)}{g(x)} = L$$

NUMERI COMPLESSI

$$z = a + ib$$

$$z = \rho(\cos \theta + i \sin \theta)$$

$$\rho = \sqrt{a^2 + b^2}, \quad \cos \theta = \frac{a}{\rho}, \quad \sin \theta = \frac{b}{\rho}$$

$$z^n = \rho^n (\cos(n\theta) + i \sin(n\theta)) \quad \text{DE MOIVRE}$$

$$\begin{cases} \rho_n = \rho^{1/n} \\ \theta_n = \frac{\theta + 2k\pi}{n} \end{cases} \quad \text{RADICI COMPLESSA} \quad n=1, 2, \dots, n$$

RETTA TANGENTE A GRAFICO:

$$y = f(x_0) + f'(x_0)(x - x_0)$$

in x_0 di $f(x)$

CALCOLO DERIVATE

$$\bullet (f \pm g)' = f' \pm g'$$

$$\bullet (f \cdot g)' = f'g + fg'$$

$$\bullet (1/g)' = \frac{f'g - fg'}{g^2} \rightarrow \left(\frac{1}{g}\right)' = -\frac{g'}{g^2}$$

$$\bullet (g \circ f)' = g'(f(x)) \cdot f'(x) \quad \text{LEIBNIZ' CHAIN RULE}$$

$$\frac{dw}{dx} = \frac{dw}{dy} \cdot \frac{dy}{dx}$$

CALCOLO INTEGRALE

$$\bullet \int_a^b f(x) dx = G(b) - G(a)$$

SCOMPOSIZIONE:

$$\bullet \int a f(x) + b g(x) dx = a \int f(x) dx + b \int g(x) dx$$

SOSTITUZIONE

$$\bullet \int f(x) dx = \int f(\varphi(t)) \cdot \varphi'(t) dt \quad x = \varphi(t)$$

PARTI

$$\bullet \int f(x) g'(x) dx = f(x) g(x) - \int f'(x) g(x) dx$$