

DERIVATE (foglio 1)

Calcolare, dove esiste, la derivata prima delle funzioni

$$\arcsin \frac{x^2-1}{x^2+1}, \arcsin(\cos x), x\left(\frac{\pi}{2} - \arctan x\right), \lg(\lg x), x^x, \sqrt[3]{\lg|x|},$$

$$\lg(\sin x), e^{-\frac{1}{x^2}}, x \arctan \frac{1}{x}, x|x|+x^2, \frac{1}{\sin x + \cos x}, x^{\frac{1}{x}}, (\sin x)^{\cos x},$$

$$(1+\sin x)^{\frac{1}{\lg x}}, \frac{x^2 \sin \frac{1}{x}}{\sin^4 x + \cos^2 x}, \arcsin(e^{2x+3}), \arctan \frac{1+x}{1-x}, \arccos 2x^2,$$

$$\frac{x^2+1}{x^2+x+1}, \frac{\sqrt{4-x^2}}{1+\sin x}, |x+|x-1||, (x^x)^x, x^{(x^x)}, \arctan \sqrt{x-1},$$

$$\lg\left(x + \arctan \frac{1}{x}\right), \lg x + \arctan \frac{1}{x}, \sqrt{x} \sqrt{x}, \lg_d 3, \frac{e^x \sin x}{\cos x - \sin x}, \arctan \frac{1}{x},$$

$$\sin(\sin(\cos x)), \frac{x \arcsin x}{\sqrt{1-x^2}}, \arctan\left(\frac{1+x}{1-x}\right), \frac{x^2+1}{x^3+x+8}, (x+1)^2 (\cos x)^2,$$

$$(1+\sin 3x)^{\frac{1}{\lg x}}, |x+||x|-1|, \sqrt[3]{\arcsin(|x|^3)}, \lg(x^2+x^2), \sin x \cos(2x+1)$$

Discutere la derivabilità delle seguenti funzioni ($a, b, c \in \mathbb{R}, m \in \mathbb{N}$)

$$f(x) = \begin{cases} x^m \sin \frac{1}{x} & x \neq 0 \\ 0 & x = 0 \end{cases}$$

$$g(x) = \begin{cases} 1 - \frac{x}{1+e^{1/x}} & x \neq 0 \\ 1 & x = 0 \end{cases}$$

$$h(x) = \begin{cases} -|1-2x^2| & x < 0 \\ -\lg(1-2x) & 0 \leq x < \frac{1}{2} \end{cases}$$

$$l(x) = \begin{cases} x^2 & x \leq c \\ ax+b & x > c \end{cases}$$

$$p(x) = \begin{cases} \frac{1}{|x|} & |x| > c \\ ax+b & |x| \leq c \end{cases}$$

$$q(x) = \begin{cases} \sin x & x \leq c \\ ax+b & x > c \end{cases}$$

$$r(x) = [x] + \sqrt{x - [x]}$$

$$s(x) = \begin{cases} e^{ax} + b & x > 0 \\ \arctan \frac{1}{x} & x < 0 \end{cases}$$

$$t(x) = \arcsin \frac{\sin x}{\cos x - \sqrt{2}}$$

$$u(x) = \arccos \frac{2 \cos x - 1}{\cos x - 2}$$

$$v(x) = \begin{cases} 3x + \frac{\arctan(bx^2)}{1-\cos x} & x < 0 \\ \lg(1+ax) & x \geq 0 \end{cases}$$