

SCHEDA SULLE FUNZIONI DERIVATE

Derivate fondamentali

| Funzione $y = f(x)$ | Funzione derivata $y' = f'(x)$ | Funzione composta $y = g(f(x))$ | Funzione composta derivata $y = g'(f(x))f'(x)$ |
|--------------------------------|--|------------------------------------|--|
| $y = k$ (costante) | $y' = 0$ | | |
| $y = x$ | $y' = 1$ | | |
| $y = x $ | $y' = \frac{ x }{x}$ | $y = f(x) $ | $y' = \frac{ f(x) }{f(x)} f'(x)$ |
| $y = x^\alpha$ | $y' = \alpha x^{\alpha-1}$ | $y = f^\alpha(x)$ | $y' = (\alpha f^{\alpha-1}(x))f'(x)$ |
| $y = \sqrt{x}$ | $y' = \frac{1}{2\sqrt{x}}$ | $y = \sqrt{f(x)}$ | $y' = \frac{1}{2\sqrt{f(x)}} f'(x)$ |
| $y = a^x$ | $y' = a^x \ln a$ | $y = a^{f(x)}$ | $y' = (a^{f(x)} \ln a) f'(x)$ |
| $y = e^x$ | $y' = e^x$ | $y = e^{f(x)}$ | $y' = e^{f(x)} f'(x)$ |
| $y = \log_a x$ | $y' = \frac{1}{x} \log_a e$ | $y = \log_a f(x)$ | $y' = \left(\frac{1}{f(x)} \log_a e \right) f'(x)$ |
| $y = \ln x$ | $y' = \frac{1}{x}$ | $y = \ln f(x)$ | $y' = \frac{1}{f(x)} f'(x)$ |
| $y = \operatorname{sen} x$ | $y' = \cos x$ | $y = \operatorname{sen} f(x)$ | $y' = (\cos f(x)) f'(x)$ |
| $y = \cos x$ | $y' = -\operatorname{sen} x$ | $y = \cos f(x)$ | $y' = (-\operatorname{sen} f(x)) f'(x)$ |
| $y = \operatorname{tg} x$ | $y' = 1 + \operatorname{tg}^2 x = \frac{1}{\cos^2 x}$ | $y = \operatorname{tg} f(x)$ | $y' = (1 + \operatorname{tg}^2 f(x)) f'(x) = \frac{1}{\cos^2 f(x)} f'(x)$ |
| $y = \operatorname{cot} gx$ | $y' = -1 - \operatorname{cot}^2 x = -\frac{1}{\operatorname{sen}^2 x}$ | $y = \operatorname{cot} g f(x)$ | $y' = (-1 - \operatorname{cot}^2 f(x)) f'(x) = -\frac{1}{\operatorname{sen}^2 f(x)} f'(x)$ |
| $y = \operatorname{arcsen} x$ | $y' = \frac{1}{\sqrt{1-x^2}}$ | $y = \operatorname{arcsen} f(x)$ | $y' = \frac{1}{\sqrt{1-f^2(x)}} f'(x)$ |
| $y = \operatorname{ar} \cos x$ | $y' = -\frac{1}{\sqrt{1-x^2}}$ | $y = \operatorname{ar} \cos f(x)$ | $y' = -\frac{1}{\sqrt{1-f^2(x)}} f'(x)$ |
| $y = \operatorname{arctg} x$ | $y' = \frac{1}{1+x^2}$ | $y = \operatorname{arctg} f(x)$ | $y' = \frac{1}{1+f^2(x)} f'(x)$ |

Operazioni con le derivate

| | | |
|---------------------------|-------------------------|---|
| Somma di funzioni | $y = f(x) + g(x)$ | $y' = f'(x) + g'(x)$ |
| Costante per una funzione | $y = k \cdot f(x)$ | $y' = k \cdot f'(x)$ |
| Prodotto di funzioni | $y = f(x) \cdot g(x)$ | $y' = f'(x) \cdot g(x) + f(x) \cdot g'(x)$ |
| Reciproco di una funzione | $y = \frac{1}{f(x)}$ | $y' = -\frac{f'(x)}{f^2(x)}$ |
| Quoziente di due funzioni | $y = \frac{f(x)}{g(x)}$ | $y' = \frac{f'(x)g(x) - f(x)g'(x)}{g^2(x)}$ |