

Alcuni Limiti Notevoli

$$\lim_{x \rightarrow 0} \frac{e^x - 1}{x} = 1 \quad \lim_{x \rightarrow 0} \frac{\log(1+x)}{x} = 1 \quad \lim_{x \rightarrow 0} \frac{\sqrt{1+x} - 1}{x} = \frac{1}{2}$$

$$\lim_{x \rightarrow 0} \frac{a^x - 1}{x} = \log a \quad \lim_{x \rightarrow 0} \frac{\log_a(1+x)}{x} = \frac{1}{\log a} \quad \lim_{x \rightarrow 0} \frac{(1+x)^\alpha - 1}{x} = \alpha \quad \text{con } \alpha > 0$$

$$\lim_{x \rightarrow \pm\infty} \frac{a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x + a_0}{b_m x^m + b_{m-1} x^{m-1} + \dots + b_1 x + b_0} = \begin{cases} \frac{a_n}{b_m} & \text{se } n = m \\ \frac{a_n}{b_m} \lim_{x \rightarrow \pm\infty} x^{n-m} & \text{se } n > m \\ 0 & \text{se } n < m \end{cases}$$

$$\lim_{x \rightarrow +\infty} [\sqrt{x^2 + bx + c} - x] = \frac{b}{2}$$

Alcune Forme Determinate

$$+\infty \cdot a = a \cdot +\infty = \begin{cases} +\infty & \text{se } a > 0 \\ -\infty & \text{se } a < 0 \end{cases} \quad -\infty \cdot a = a \cdot -\infty = \begin{cases} -\infty & \text{se } a > 0 \\ +\infty & \text{se } a < 0 \end{cases}$$

$$\frac{a}{0+} = \begin{cases} +\infty & \text{se } a > 0 \\ -\infty & \text{se } a < 0 \end{cases} \quad \frac{a}{0-} = \begin{cases} -\infty & \text{se } a > 0 \\ +\infty & \text{se } a < 0 \end{cases} \quad \frac{a}{+\infty} = \begin{cases} 0+ & \text{se } a > 0 \\ 0- & \text{se } a < 0 \end{cases} \quad \frac{a}{-\infty} = \begin{cases} 0- & \text{se } a > 0 \\ 0+ & \text{se } a < 0 \end{cases}$$

$$\frac{\pm\infty}{0+} = \pm\infty \quad \frac{\pm\infty}{0-} = \mp\infty \quad \frac{0}{\infty} = 0 \quad (+\infty) + (+\infty) = +\infty \quad (-\infty) + (-\infty) = -\infty$$

Derivazione

$$D \log f(x) = \frac{f'(x)}{f(x)} \quad D e^{f(x)} = f'(x) e^{f(x)} \quad D \sqrt{f(x)} = \frac{f'(x)}{2\sqrt{f(x)}}$$

$$D \log_a f(x) = \frac{f'(x)}{\log a f(x)} \quad D a^{f(x)} = \log a f'(x) a^{f(x)} \quad D \sqrt[n]{f(x)} = \frac{f'(x)}{n \sqrt[n]{f(x)^{n-1}}}$$

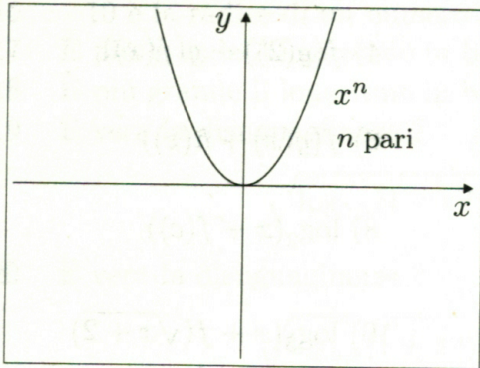
$$D x^\alpha = \alpha x^{\alpha-1} \quad D \frac{f(x)}{g(x)} = \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2} \quad D \frac{1}{f(x)} = -\frac{f'(x)}{[f(x)]^2}$$

$$D f(x)g(x) = f'(x)g(x) + f(x)g'(x) \quad D f(x) + g(x) = f'(x) + g'(x) \quad D c f(x) = c f'(x)$$

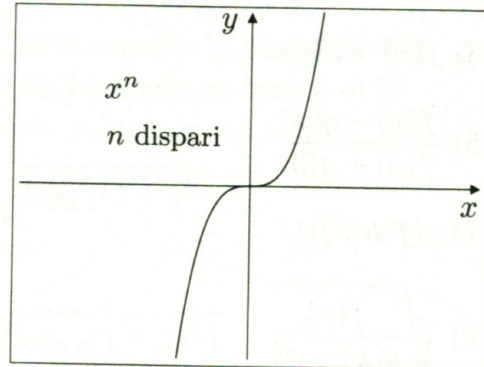
Polinomio di Taylor e Resto secondo Lagrange

$$P_c(x) = f(c) + f'(c)(x-c) + \frac{1}{2}f''(c)(x-c)^2 + \dots + \frac{1}{n!}f^{(n)}(c)(x-c)^n$$

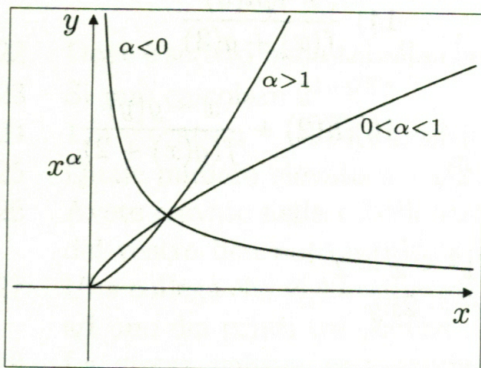
$$R_c(x) = \frac{1}{(n+1)!}f^{(n+1)}(\xi)(x-c)^{n+1}$$



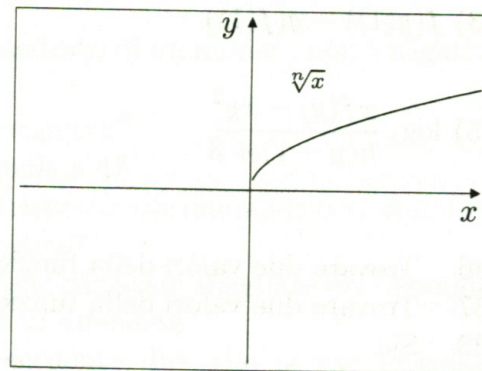
Potenza con esponente pari



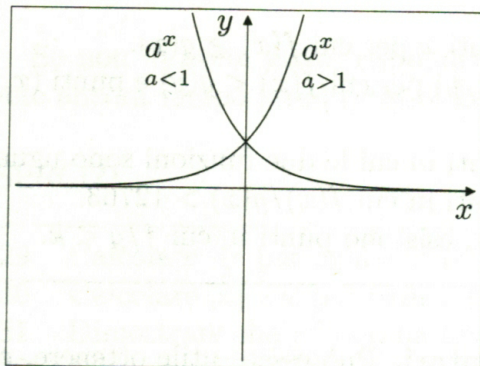
Potenza con esponente dispari



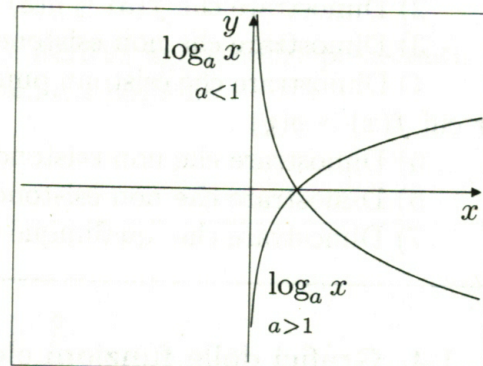
Potenza con esponente reale



Radice



Esponenziale



Logaritmo