# LIMITI NOTEVOLI

$$\lim_{x\to\pm\infty}\frac{a_n x^n + a_{n-1}x^{n-1}+\ldots+a_0}{b_m x^m + b_{m-1}x^{m-1}+\ldots+b_0} = \begin{cases} +\infty \text{ se } n>m \text{ e } \dfrac{a_n}{b_m}>0; \quad -\infty \text{ se } n>m \text{ e } \dfrac{a_n}{b_m}<0 \\ \dfrac{a_n}{b_m} \text{ se } n=m; \\ 0 \text{ se } n<m \end{cases}$$

$\lim_{x\to\pm\infty}\left(1+\frac{1}{x}\right)^x = e$ $\quad \lim_{x\to 0}(1+x)^{\frac{1}{x}} = e$ $\quad \lim_{x\to\pm\infty}\left(1+\frac{a}{x}\right)^x = e^a$ $\quad \lim_{x\to\pm\infty}\left(1+\frac{a}{x}\right)^{bx} = e^{ab}$

$\lim_{x\to\pm\infty}\left(\frac{x}{x+1}\right)^x = \frac{1}{e}$ $\quad \lim_{x\to 0}(1+ax)^{\frac{1}{x}} = e^a$ $\quad \lim_{x\to 0}\frac{\ln(1+x)}{x} = 1$

$\lim_{x\to 0}\frac{\log_a(1+x)}{x} = \log_a e = \frac{1}{\ln a} \quad \forall a\in R^+/\{1\}$ $\quad \lim_{x\to 0}\frac{(1+x)^a-1}{x} = a$

$\lim_{x\to 0}\frac{a^x-1}{x} = \ln a, \ \forall a\in R^+/\{1\}$ $\quad \lim_{x\to 0}\frac{e^x-1}{x} = 1$

$\lim_{x\to 0^+}\log_a x = -\infty \ \forall a\in(1,+\infty)$ $\quad \lim_{x\to 0}\log_a x = +\infty \ \forall a\in(0,1)$

$\lim_{x\to+\infty}\log_a x = +\infty \ \forall a\in(1,+\infty)$ $\quad \lim_{x\to+\infty}\log_a x = -\infty \ \forall a\in(0,1)$

$\lim_{x\to 0}a^x = 1$ $\quad \lim_{x\to-\infty}a^x = 0 \ \forall a\in(1,+\infty)$

$\lim_{x\to-\infty}a^x = +\infty \ \forall a\in(0,1)$ $\quad \lim_{x\to+\infty}a^x = +\infty \ \forall a\in(1,+\infty)$

$\lim_{x\to+\infty}a^x = 0 \ \forall a\in(0,1)$ $\quad \lim_{x\to+\infty}x^b = 0 \ \forall b\in(-\infty,0)$

$\lim_{x\to+\infty}x^b = +\infty \ \forall b\in(0,+\infty)$ $\quad \lim_{x\to 0^+}x^r\log_a x = 0 \ \forall a\in R^+/\{1\}, \forall r\in R^+$

$\lim_{x\to 0^+}\frac{\log_a x}{x^r} = +\infty \ \forall a\in(0,1), \forall r\in R^+$ $\quad \lim_{x\to 0^+}\frac{\log_a x}{x^r} = -\infty \ \forall a\in(1,+\infty), \forall r\in R^+$

$\lim_{x\to+\infty}x^b a^x = \lim_{x\to+\infty}a^x, \forall b\in R^+, \forall a\in R^+/\{1\}$ $\quad \lim_{x\to-\infty}|x|^b a^x = \lim_{x\to-\infty}a^x, \forall b\in R^+$

$\lim_{x\to+\infty}\frac{a^x}{x^b} = \lim_{x\to+\infty}a^x, \forall b\in R^+, \forall a\in R^+/\{1\}$ $\quad \lim_{x\to+\infty}\frac{x^b}{a^x} = \lim_{x\to-\infty}a^x, \forall b\in R^+, \forall a\in R^+/\{1\}$

$\lim_{x\to-\infty}e^x x^b = 0, \forall b\in R^+$

$\lim_{x\to 0}\frac{\sin x}{x} = 1$ $\quad \lim_{x\to 0}\frac{\sin mx}{nx} = \frac{m}{n}$ $\quad \lim_{x\to 0}\frac{1-\cos x}{x} = 0$ $\quad \lim_{x\to 0}\frac{1-\cos x}{x^2} = \frac{1}{2}$

$\lim_{x\to 0}\frac{\tan x}{x} = 1$ $\quad \lim_{x\to 0}\frac{\tan mx}{nx} = \frac{m}{n}$ $\quad \lim_{x\to 0}\frac{\arcsin x}{x} = 1$ $\quad \lim_{x\to 0}\frac{\arcsin mx}{nx} = \frac{m}{n}$

$\lim_{x\to 0}\frac{\arctan x}{x} = 1$ $\quad \lim_{x\to 0}\frac{\arctan mx}{nx} = \frac{m}{n}$ $\quad \lim_{x\to 0}\frac{\sinh x}{x} = 1$ $\quad \lim_{x\to 0}\frac{\tanh x}{x} = 1$

$\lim_{x\to 0}\frac{x-\sin x}{x^3} = \frac{1}{6}$ $\quad \lim_{x\to 0}\frac{\tanh x}{x} = 1$ $\quad \lim_{x\to 0}\frac{\text{settsinh}(x)}{x} = 1$ $\quad \lim_{x\to 0}\frac{\text{setttanh}(x)}{x} = 1$

$\lim_{x\to -\frac{\pi}{2}^+}\tan x = -\infty$ $\quad \lim_{x\to \frac{\pi}{2}^-}\tan x = +\infty$ $\quad \lim_{x\to-\infty}\arctan x = -\frac{\pi}{2}$ $\quad \lim_{x\to+\infty}\arctan x = \frac{\pi}{2}$

$\lim_{x\to 0^+}\cot x = +\infty$ $\quad \lim_{x\to \pi^-}\cot x = -\infty$ $\quad \lim_{x\to-\infty}\text{arccot}x = \pi$ $\quad \lim_{x\to+\infty}\text{arccot}x = 0$