$$\lim_{x \to c} f(x) = \ell$$

LIMITE PER ECCESSO

$$\lim_{x \to c} f(x) = \ell^+$$

$\forall \varepsilon > 0 \; \exists \, I^+_\varepsilon(\ell)$ e corrispondentemente $\exists \, I_\sigma(c) \,/\, \forall x \in I_\sigma(c)$ si ha

$$\begin{cases} |f(x) - \ell| < \varepsilon \\ f(x) \geq \ell \end{cases} \iff$$

$$0 \leq f(x) - \ell < \varepsilon$$

LIMITE DESTRO

$$\lim_{x \to c^+} f(x) = \ell$$

$\forall \varepsilon > 0 \; \exists \, I_\varepsilon(\ell)$ e corrispondentemente $\exists \, I^+_\sigma(c) \,/\, \forall x \in I^+_\sigma(c)$ si ha

$$\begin{cases} |f(x) - \ell| < \varepsilon \\ x > c \end{cases}$$

LIMITE PER DIFETTO

$$\lim_{x \to c} f(x) = \ell^-$$

$\forall \varepsilon > 0 \; \exists \, I^-_\varepsilon(\ell)$ e corrispondentemente $\exists \, I_\sigma(c) \,/\, \forall x \in I_\sigma(c)$ si ha:

$$\begin{cases} |f(x) - \ell| < \varepsilon \\ f(x) \leq \ell \end{cases} \iff$$

$$\varepsilon < f(x) - \ell \leq 0$$

LIMITE SINISTRO

$$\lim_{x \to c^-} f(x) = \ell$$

$\forall \varepsilon > 0 \; \exists \, I_\varepsilon(\ell)$ e corrispondentemente $\exists \, I^-_\sigma(c) \,/\, \forall x \in I^-_\sigma(c)$ si ha:

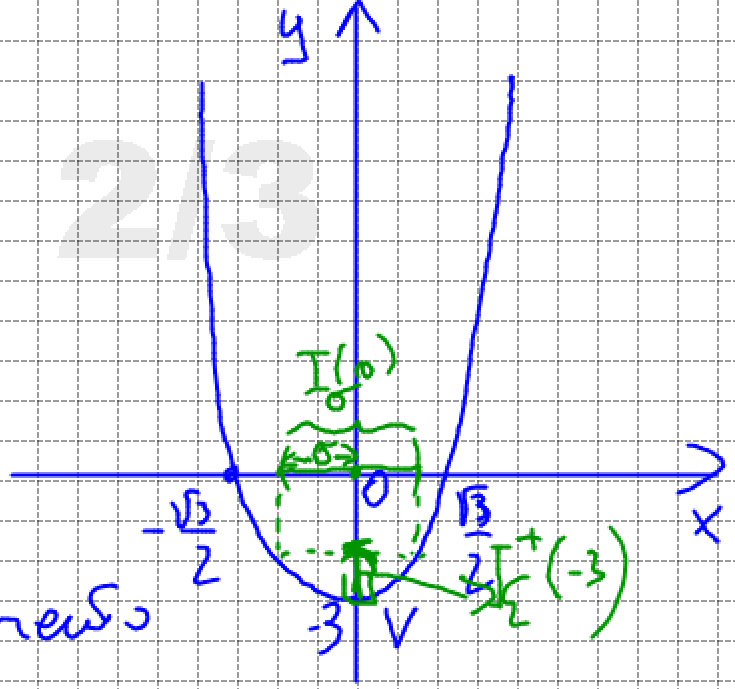
$$\begin{cases} |f(x) - \ell| < \varepsilon \\ x < c \end{cases}$$

ESEMPIO

$$\lim_{x\to 0} 4x^2-3 = -3^+$$

$y=4x^2-3$

$V(0;-3)$



$\forall \varepsilon>0 \ \exists\, I_\varepsilon^+(-3)$ e corrispondentemente $\exists\, I_\sigma(0) \mid \forall x \in I_\sigma(0)$ si ha che

$$\begin{cases} |f(x)-\ell|<\varepsilon \\ f(x)\geq \ell \end{cases} \iff \begin{cases} |4x^2-\cancel{3}+\cancel{3}|<\varepsilon \\ 4x^2-\cancel{3}\geq -\cancel{3} \end{cases}$$

$$\begin{cases} 0\leq 4x^2<\varepsilon \\ 4x^2\geq 0 \end{cases} \qquad \begin{cases} 4x^2\geq 0 \text{ ok!} \\ 4x^2<\varepsilon \\ 4x^2\geq 0 \text{ ok!} \end{cases}$$

$$0-\frac{\sqrt{\varepsilon}}{2}<x<+\frac{\sqrt{\varepsilon}}{2}+0$$

n 6

$$\lim_{x \to -1} x^3 - 3 = -4$$

$\forall \varepsilon > 0 \ \exists \ I_\varepsilon(-4)$ e corrispondentemente $\exists \ I_\sigma(-1) /$
$\forall \ x \in I_\sigma(-1)$ si ha che $|f(x) - l| < \varepsilon \iff$

$$|x^3 - 3 + 4| < \varepsilon$$

$$|x^3 + 1| < \varepsilon$$

$$-\varepsilon < x^3 + 1 < \varepsilon$$

$$\begin{cases} x^3 + 1 + \varepsilon > 0 & x > \sqrt[3]{(-\varepsilon - 1)} \\ x^3 + 1 - \varepsilon < 0 & x < \sqrt[3]{\varepsilon - 1} \end{cases}$$