martedì 19 maggio 2020 16:38

$$\lim_{x \to 1} (2-3x) = -1$$

$$|(2-3x)+1| < \varepsilon$$

$$\begin{cases} 2-3x+1 < \varepsilon \\ 2-3x+1 > -\varepsilon \end{cases}$$

$$\begin{cases} -3x+3 < \varepsilon \\ -3x+3 > -\varepsilon \end{cases} \qquad \begin{aligned} x &> \frac{3-\varepsilon}{3} = 1-\frac{\varepsilon}{3} \\ x &< \frac{3+\varepsilon}{3} = 1+\frac{\varepsilon}{3} \end{aligned}$$

$$1-\frac{\varepsilon}{3} < x < 1+\frac{\varepsilon}{3} \qquad \varepsilon > \phi$$

$1-\frac{\varepsilon}{3}$ $\quad$ $1+\frac{\varepsilon}{3}$

$$\lim_{x \to 1} (x^2-2x+2) = 1$$

$$|(x^2-2x+2)-1| < \varepsilon$$

$$\begin{cases} x^2-2x+2-1 < \varepsilon \\ x^2-2x+2-1 > \varepsilon \end{cases}$$

$$\begin{matrix} ① \\ ② \end{matrix}\begin{cases} x^2-2x+1 < \varepsilon \\ x^2-2x+1 > -\varepsilon \end{cases} \longrightarrow \begin{cases} x^2-2x+1-\varepsilon < \phi & (\qquad) \\ x^2-2x+1+\varepsilon > \phi & (\qquad) \end{cases}$$

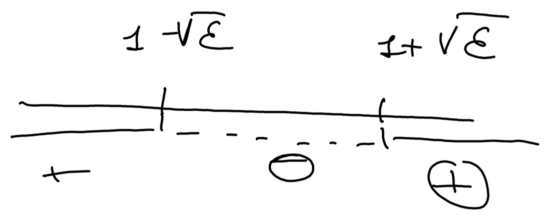
① $x^2-2x+(1-\varepsilon) < \phi$

$$x_{1,2} = \frac{2 \pm \sqrt{4-4(1-\varepsilon)}}{2}$$

$$x_1 = 1 + \frac{\sqrt{4(1-1+\varepsilon)}}{2} = $$

$$= 1 + \frac{2\sqrt{\varepsilon}}{2} = 1+\sqrt{\varepsilon}$$

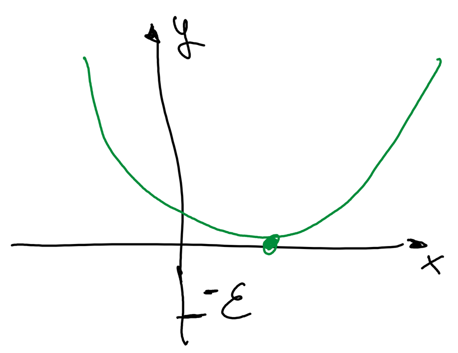
$$x_2 = 1-\sqrt{\varepsilon}$$



$$1-\sqrt{\varepsilon} < x_{①} < 1+\sqrt{\varepsilon}$$

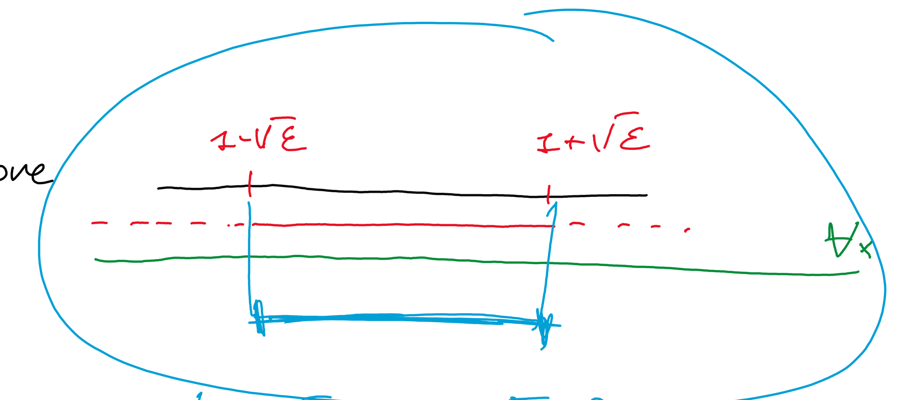
$$x^2-2x+(1+\varepsilon) > \phi$$

poiche $x^2-2x+1 > \phi$ è sempre verificata allora $x^2-2x+1 > -\varepsilon$
$(\Delta = \phi)$ è sempre vera $\forall x$



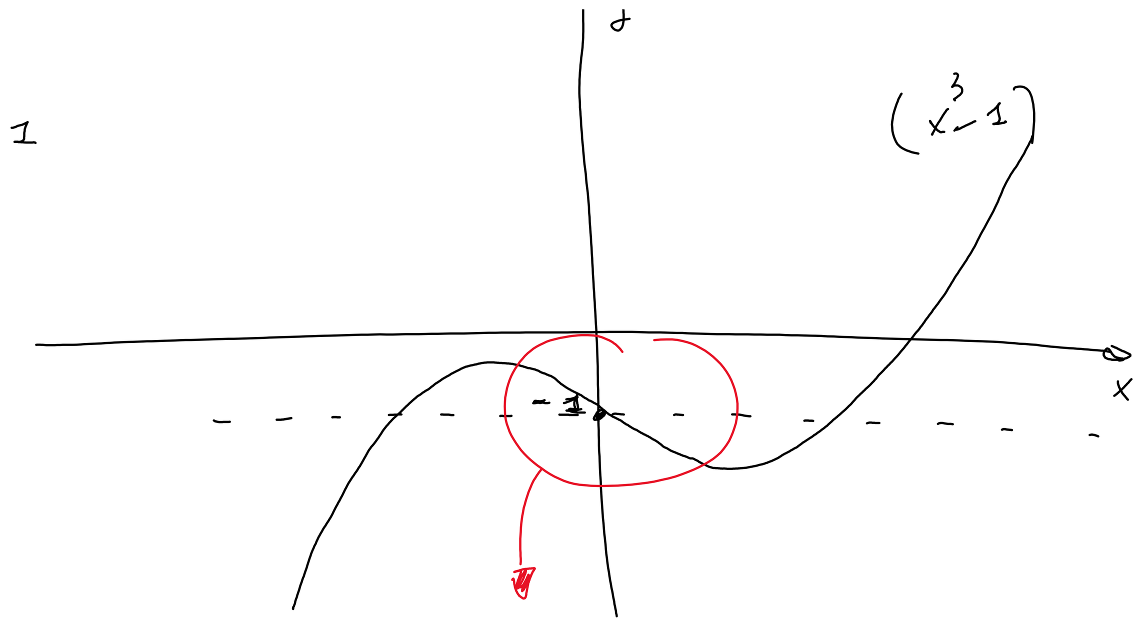
$$\begin{cases} 1-\sqrt{\varepsilon} < x < 1+\sqrt{\varepsilon} \\ \forall x \end{cases}$$

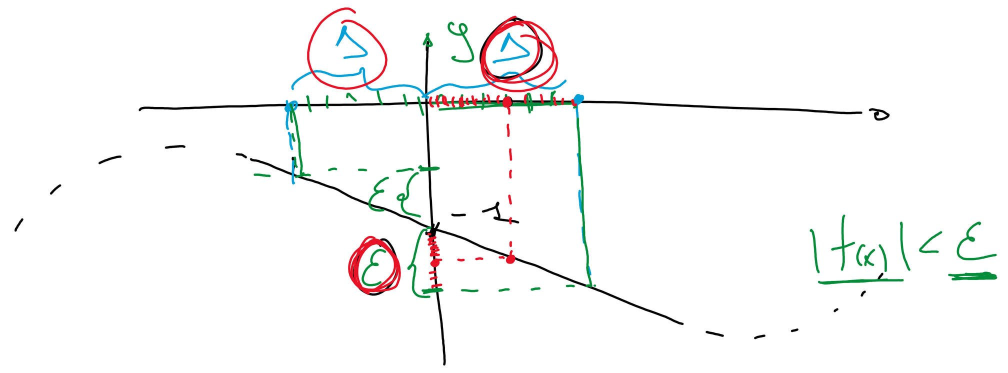
intersezione



$$(1-\sqrt{\varepsilon},\ 1+\sqrt{\varepsilon}) = \Delta$$

$$\lim_{x \to 0} (x^3 - 1) = -1$$





$$\forall \varepsilon > 0 \quad \exists \Delta > 0 \;\big|\; |x - x_0| < \Delta$$
$$\text{e } \boxed{|f(x) - f(x_0)| < \varepsilon}$$

$$\lim_{x \to 0} (x^3 - 1) = -1$$

$$|(x^3 - 1) + 1| < \varepsilon$$

$$\begin{cases} x^3 - 1 + 1 < \varepsilon \\ x^3 - 1 + 1 > -\varepsilon \end{cases} \longrightarrow \begin{cases} x^3 < \varepsilon \\ x^3 > -\varepsilon \end{cases}$$

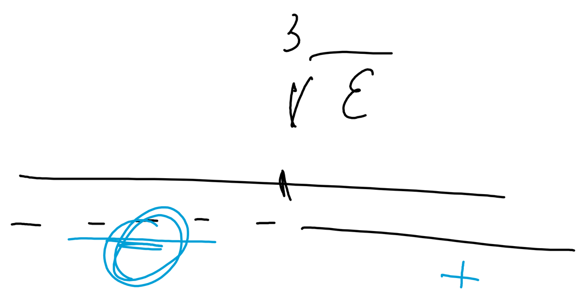
dispari $\varepsilon > 0$

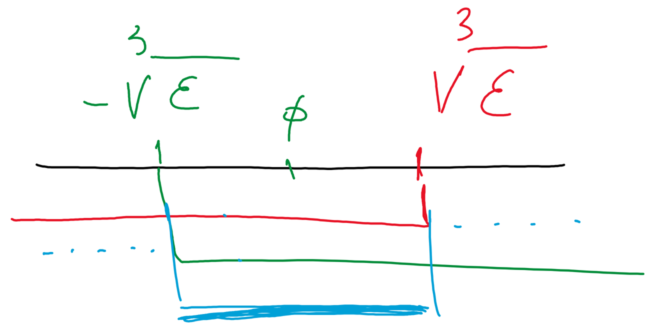
$\boxed{x^3 - \varepsilon \leq 0}$ $\quad x^3 - \varepsilon = 0$ $\quad \boxed{x = \sqrt[3]{\varepsilon}}$ $\quad \boxed{x^3 - \varepsilon = 0}$

$x^3 + \varepsilon > 0$

$$\begin{cases} x < \sqrt[3]{\varepsilon} \\ x > \sqrt[3]{-\varepsilon} \end{cases} \quad (x > -\sqrt[3]{\varepsilon})$$

$$x^3 = \varepsilon \longrightarrow x = \sqrt[3]{\varepsilon}$$





$$(-\sqrt[3]{\varepsilon}\,;\ \sqrt[3]{\varepsilon}) = \Delta$$