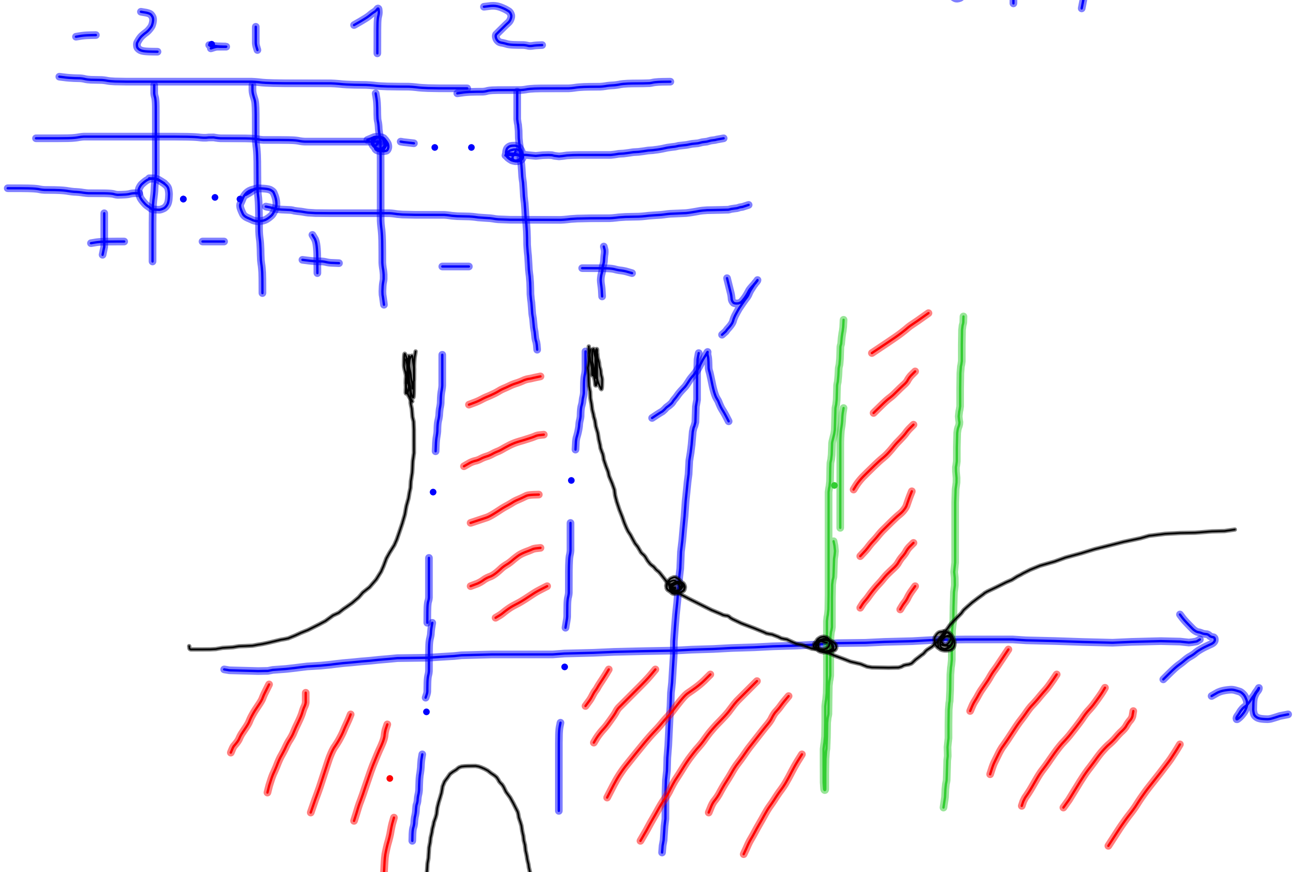
$$f(x) = \frac{x^2-3x+2}{x^2+3x+2}$$

$A(1,0)$
$B(2,0)$
$C(0,1)$

$D = \mathbb{R} - \{-1, -2\}$



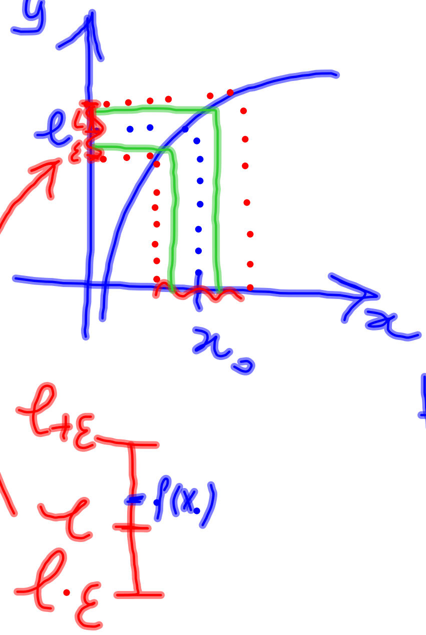
$$\lim_{x \to -2^{\mp}} f(x) = \pm\infty$$

$x = -2$ A.V.

$$\lim_{x \to -1^{\mp}} f(x) = \mp\infty$$

$x = -1$ A.V.

Limite finito per x che tende a un valore finito



$$\lim_{x\to x_0} f(x) = l$$

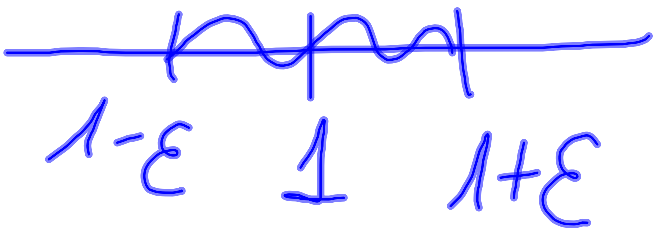
$$\lim_{x\to 1}(x+2)=3$$

$$\forall \varepsilon>0\ \exists I(1): \forall x\in I(1)-\{1\}$$

$$|f(x)-3|<\varepsilon$$

$$|x+2-3|<\varepsilon;\quad |x-1|<\varepsilon$$

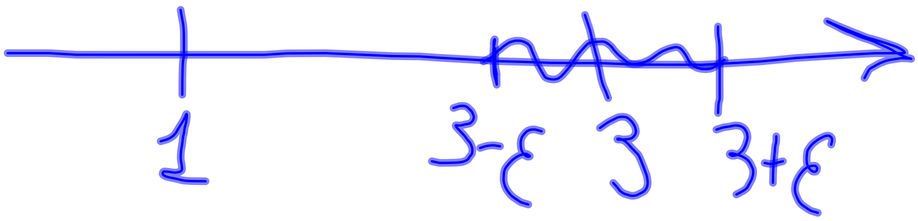
$$-\varepsilon<x-1<\varepsilon;\quad 1-\varepsilon<x<1+\varepsilon$$



$$\lim_{x\to 1}(x+2)=5$$ non è verificato.

$$|x+2-5|<\varepsilon;\quad |x-3|<\varepsilon;$$

$$-\varepsilon<x-3<\varepsilon;\quad 3-\varepsilon<x<3+\varepsilon$$



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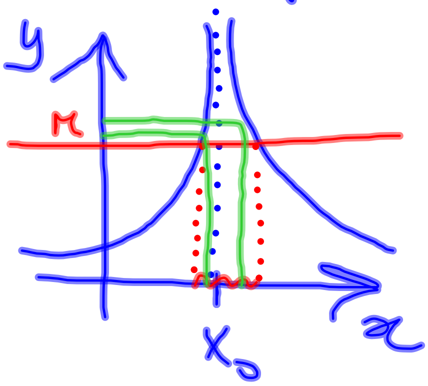
Limite infinito per x che tende a un valore finito



$$\lim_{x \to x_0} f(x) = +\infty$$

$$\forall M > 0 \ \exists I(x_0) :$$

$$\forall x \in I(x_0) - \{x_0\}$$

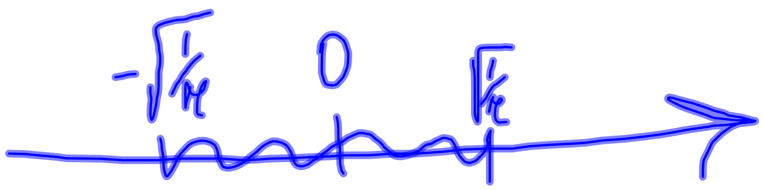
$$f(x) > M$$

Es: $\lim_{x \to 0} \frac{1}{x^2} = +\infty$

$\forall M > 0 \ \exists I(0) : \forall x \in I(0) - \{0\}$

$\frac{1}{x^2} > M$; $x^2 < \frac{1}{M}$

$-\sqrt{\frac{1}{M}} < x < \sqrt{\frac{1}{M}}$



oss.

$3 < 4$; $\frac{1}{3} > \frac{1}{4}$

Asintoto verticale

Una funzione $y = f(x)$ ammette la retta $x = x_0$ come asintoto verticale se:

$$\lim_{x \to x_0} f(x) = \infty$$

$$f(x) = \frac{1}{x}$$

$$\boxed{\frac{1}{0} = \infty}$$

$$x \neq 0 \quad D = \mathbb{R} - \{0\}$$

$$\frac{1}{1} > \frac{1}{2} > \frac{1}{3} > \frac{1}{4} > \cdots \longrightarrow 0$$

$$\frac{1}{\frac{1}{n}} = n \qquad \lim_{x \to 0} \frac{1}{x} = \infty$$

Disegnare il grafico probabile della funzione:

$$f(x) = \frac{x^2 - 4}{x^2 - 9}$$

$$F(x, y) = 0$$

$$y = \frac{X^2 - 4}{X^2 - 9}$$

$$\frac{X^2 y - 9y}{\cancel{X^2 - 9}} = \frac{X^2 - 4}{\cancel{X^2 - 9}}$$

$$\underbrace{X^2 y}_{3} - \underbrace{9y}_{1} - \underbrace{X^2}_{2} + \underbrace{4}_{0} = 0$$

$$f(x) = \frac{X^3 - X^2}{X^4 - 16}$$

$$f(x) = \frac{x^3 - x^2}{x^4 - 16}$$

1) fun alg. raz. fr. di 5° grado

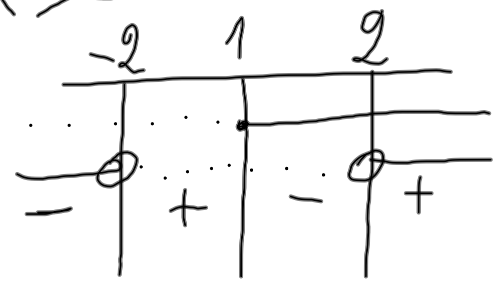
2) $x^4 - 16 \neq 0$; $(x^2-4)\cancel{(x^2+4)} \neq 0$

$x^2 \neq 4$; $x \neq \pm 2$ $D = \mathbb{R} - \{-2, 2\}$

3) $f(-x) = \dfrac{-x^3 - x^2}{x^4 - 16} \neq \pm f(x)$ non ammette simmetrie

4) $N \geq 0$; $x^2(x-1) \geq 0$ $x \geq 1$

$D > 0$; $x < -2 \vee x > 2$



5) A(1, 0)

B(0, 0)

$\lim_{x \to -2^{\mp}} f(x) = \mp\infty$ $x = -2$ A.V.

$\lim_{x \to 2^{\mp}} f(x) = \mp\infty$ $x = 2$ A.V.

$\mathbb{R} - \{-2; 2\}$

$x^2 + 4 \neq 0$