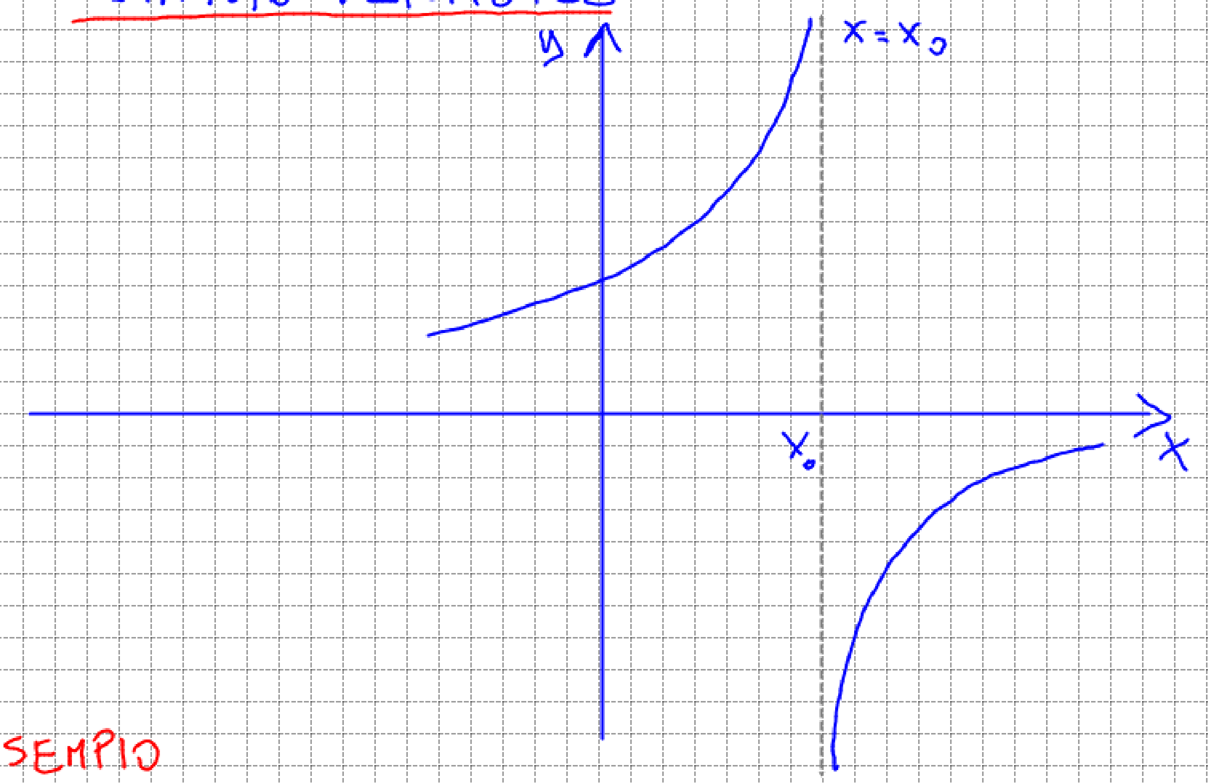
ASINTOTO VERTICALE

Def.: Data la funzione $y = f(x)$ e supponiamo che $\lim_{x \to x_0} f(x) = \infty$ allora $x = x_0$ si chiama **ASINTOTO VERTICALE**



ESEMPIO

$$y = \frac{2x^2 - 1}{x+3}$$

- $C.E._f = \{x \in \mathbb{R} / x+3 \neq 0\} = \{x \in \mathbb{R} / x \neq -3\} =$
  $= (-\infty; -3) \cup (-3; +\infty)$

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

$$\lim_{x \to -3^-} f(x) = \lim_{x \to -3^-} \frac{2x^2 - 1}{x+3} = -\infty \qquad \left[\frac{n^+}{0^-} = -\infty\right]$$

$$\lim_{x \to -3^+} f(x) = \lim_{x \to -3^+} \frac{2x^2 - 1}{x+3} = +\infty \qquad \left[\frac{n^+}{0^+} = +\infty\right]$$

$\Downarrow$

$\lim_{x \to -3} f(x) = \infty$ $\quad x = -3$ è asintoto verticale

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

- $\begin{cases} y = f(x) \\ y = 0 \end{cases}$ intersezioni con asse x (zeri della funzione)

$$\begin{cases} y = \dfrac{2x^2 - 1}{x+3} \\ y = 0 \end{cases} \qquad \begin{cases} \dfrac{2x^2 - 1}{x+3} = 0 \\ y = 0 \end{cases} \qquad \begin{cases} x = \pm \dfrac{\sqrt{2}}{2} \\ y = 0 \end{cases}$$

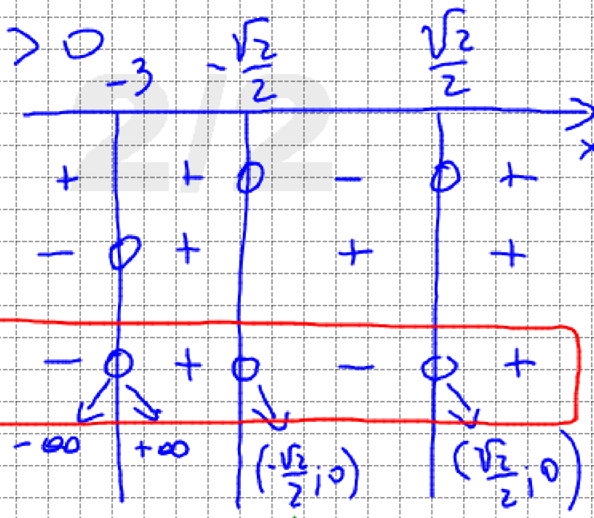
$$A\left(\frac{\sqrt{2}}{2}; 0\right) \quad B\left(-\frac{\sqrt{2}}{2}; 0\right)$$

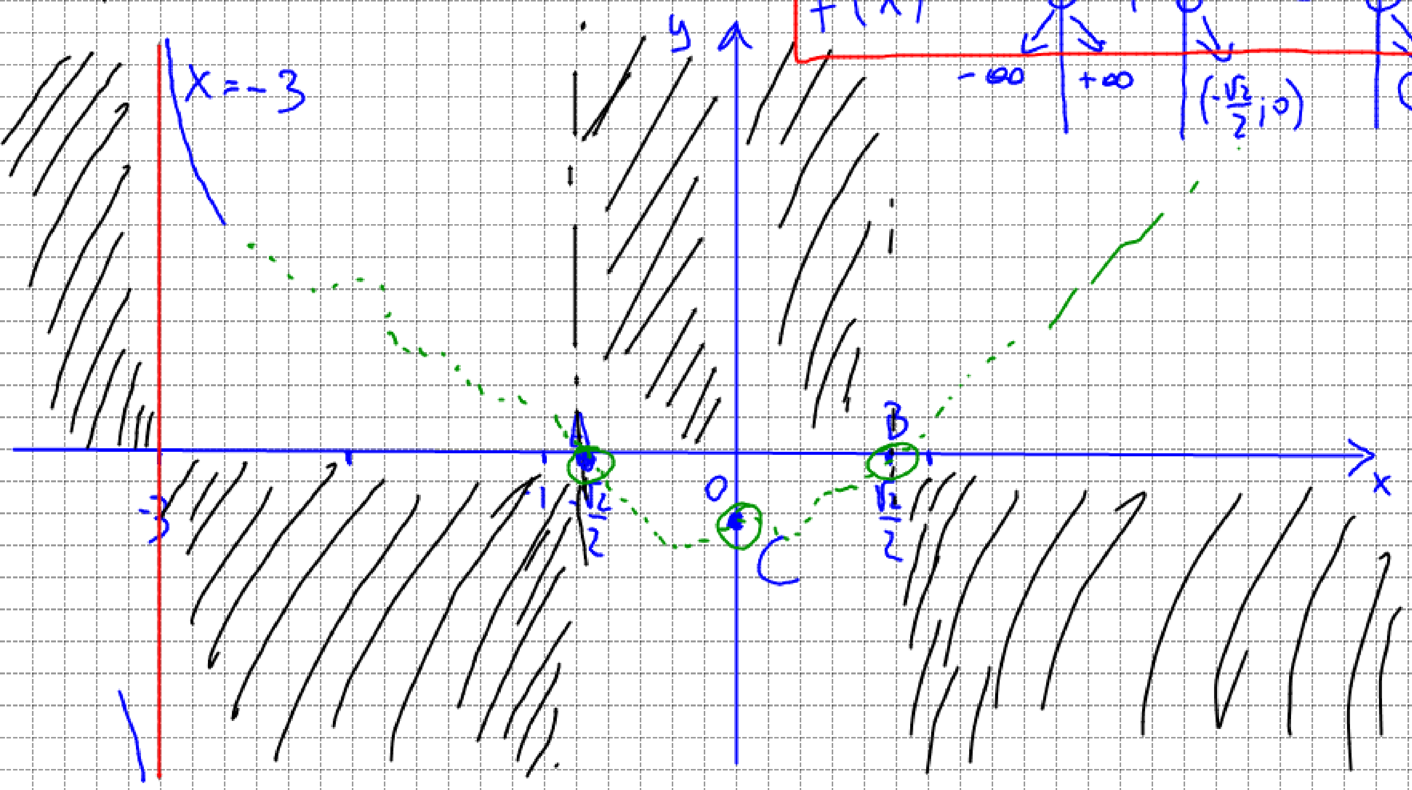
$$\begin{cases} y = f(x) \\ x = 0 \end{cases} \qquad \begin{cases} y = \dfrac{2x^2 - 1}{x+3} \\ x = 0 \end{cases} \qquad \begin{cases} y = -\dfrac{1}{3} \\ x = 0 \end{cases} \qquad C\left(0; -\frac{1}{3}\right)$$

– Segno: $f(x) > 0 \qquad \frac{2x^2-1}{x+3} > 0$

$N > 0 \quad x < -\frac{\sqrt{2}}{2} \cup x > \frac{\sqrt{2}}{2}$

$D > 0 \quad x > -3$





– Simmetrie

$$f(x) = \frac{2x^2-1}{x+3}$$

$$f(-x) = \frac{2(-x)^2-1}{(-x)+3} = \frac{2x^2-1}{3-x}$$

$$-f(-x) = \frac{2x^2-1}{x-3}$$