TAREFA 2 calcular as asíntotas de $f(x)=\dfrac{x^2}{x+1}$

Asíntotas verticais (A.V.)

$\mathrm{Dom} f = \mathbb{R}-\{-1\} \to$ en $x=-1$ pode haber unh

$$x=-1\ \begin{cases} \lim\limits_{x\to -1^-} \dfrac{x^2}{x+1} = \dfrac{1}{0^-} = -\infty \\ \lim\limits_{x\to -1^+} \dfrac{x^2}{x+1} = \dfrac{1}{0^+} = +\infty \end{cases} \to \{\text{En } x=-1 \text{ Asíntota}$$

Asíntotas horizontais (A.H.)

$$\lim_{x\to+\infty} \frac{x^2}{x+1} = \underset{\text{inde}}{\left[\frac{\infty}{\infty}\right]} = \lim_{x\to+\infty} \frac{x^2}{x} = \lim_{x\to+\infty} x = +\infty$$

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

$\{ f$ N

Asíntotas oblícuas (A.O)

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

$$n = \lim_{x\to+\infty} (f(x) - mx) = \lim_{x\to+\infty}\left(\frac{x^2}{x+1} - 1\cdot x\right) = \lim_{x\to+\infty} \frac{x^2-x^2-x}{x+1}$$

$$= \lim_{x\to+\infty} \frac{-x}{x+1} = \left[\frac{\infty}{\infty}\right] = \lim_{x\to+\infty} \frac{-x}{x} = \boxed{-1 = n}$$

Entón $\overset{(y=mx+n)}{y = x-1}$ é unha A.O. de f cando

→ Hai que facer o mesmo cando $x\to-\infty$ Os c son

$$m = \lim_{x\to-\infty} \frac{x^2/x+1}{x} = \lim_{x\to-\infty} \frac{x^2}{x^2+x} = 1$$

$$n = \lim_{x\to-\infty}\left[\frac{x^2}{x+1} - 1\cdot x\right] = \lim_{x\to-\infty} \frac{-x}{x+1} = -1$$

(Pequeno esboço)