(44) (b)

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

A.V. $x=0$

$\lim_{x\to 0^-} f(x) = -\infty$

$\lim_{x\to 0^+} f(x) = +\infty$

A.H. Non ha

A.OBLIQUA.

$$m = \lim_{x\to\infty} \frac{f(x)}{x} = -1 = m \neq 0$$

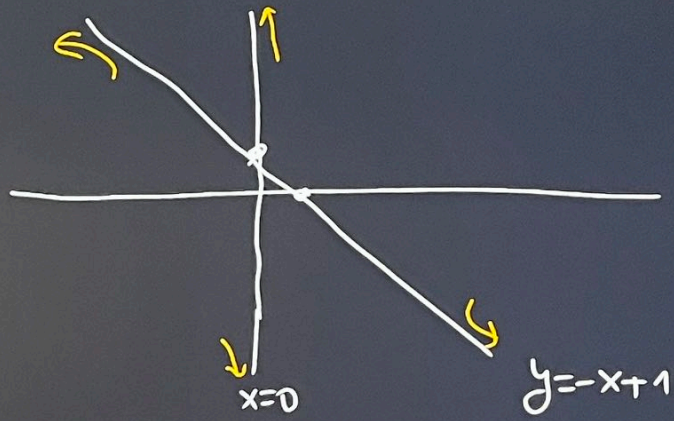
$$n = \lim_{x\to\infty} (f(x) - (-1)\cdot x) =$$

$$= \lim_{x\to\infty} \left(\frac{3+x-x^2}{x} + x \right) =$$

$$= \lim_{x\to\infty} \frac{3+x-x^2+x^2}{x} = \lim_{x\to\infty} \frac{3+x}{x} = \lim_{x\to\infty} \frac{x}{x} = 1$$

$y = -x+1$ ASÍNT. OBLICUA

x	y
0	↗
1	0



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

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

$\frac{3}{x} \xrightarrow{x\to\infty} 0^+ \Rightarrow f(x) > A.O.$

$\frac{3}{x} \xrightarrow{x\to-\infty} 0^- \Rightarrow f(x) < A.O.$

44 © $y = \frac{4x^2-3}{2x}$

A. horizontal

$\lim_{x\to\infty} \frac{4x^2-3}{2x} = \lim_{x\to\infty} \frac{4x^2}{2x} = \lim_{x\to\infty} \frac{2x}{1} =$

no hay horizontal

: Asintota vertical

$2x=0 \Rightarrow x = \frac{0}{2} \Rightarrow \boxed{x=0}$ hai AV en $x=0$

$\lim_{x\to 0} \frac{4x^2-3}{2x} = \lim_{x\to 0} \frac{-3}{0} = \mp\infty$

$\lim_{x\to 0^-} \frac{4x^2-3}{2x} \overset{-0'01}{=} +\infty$ (−)/(−)

$\lim_{x\to 0^+} \frac{4x^2-3}{2x} \overset{0'01}{=} -\infty$ (−)/(+)

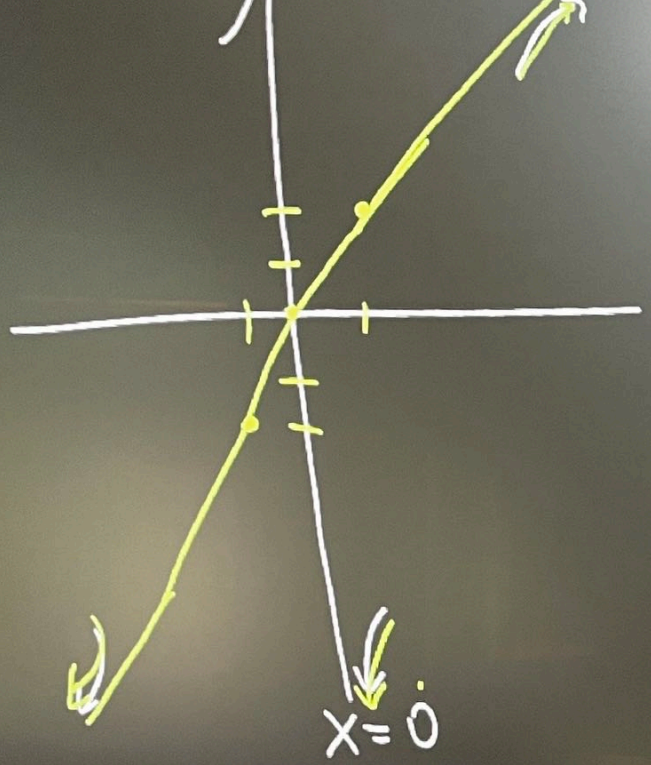
A. oblicua

$\lim_{x\to\infty} \frac{F(x)}{x} = \lim_{x\to\infty} \frac{\frac{4x^2-3}{2x}}{\frac{x}{1}} = \lim_{x\to\infty} \frac{4x^2-3}{2x^2}$

$\lim_{x\to\infty} \frac{4x^2}{2x^2} = \boxed{2 \neq 0}$ hay A.O $y_M = 2$

$\lim_{x\to\infty} (F(x) - Mx) = \lim_{x\to\infty} \left(\frac{4x^2-3}{2x} - 2x\right) =$

$\lim_{x\to\infty} \frac{\cancel{4x^2} - 3 \cancel{-4x^2}}{2x} = \lim_{x\to\infty} \frac{-3}{2x} = 0 = n$



$$\lim_{x\to\infty} \frac{4x^2-3-4x^2}{2x} = \lim_{x\to\infty} \frac{-3}{2x} = 0 = n$$

$$y = 2x + 0$$ è A.O.

x	y
0	0
1	2
-1	-2

$$F(x) - AO = \frac{4x^2-3}{2x} - 2x = \frac{-3}{2x}$$

$$F(x) - AO = \frac{-3}{2x}$$

$x \to \infty$: $-\frac{3}{2x} \xrightarrow{x\to\infty} 0^-$ ⇓ $f(x) < AO$

$x \to -\infty$: $0^+ \Rightarrow f(x) > AO$

45

d) $y = \dfrac{x^2}{x^2+x+1}$

ASÍNTOTA VERTICAL

$x^2 + x + 1 = 0$

$x = \dfrac{-1 \pm \sqrt{1-4}}{2} \notin \mathbb{R}$

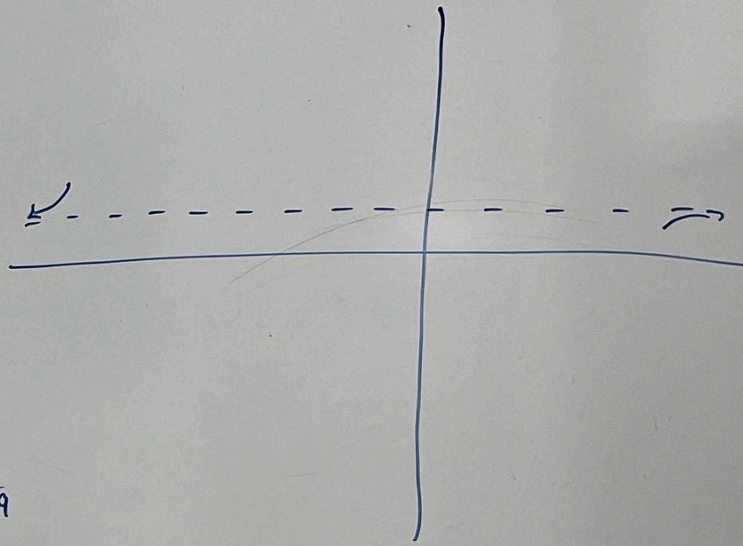
$x^2 + x + 1 \neq 0 \quad \forall x \in \mathbb{R}$

Non hai A.V.

ASÍNTOTA HORIZONTAL

$\lim\limits_{x\to\infty} \dfrac{x^2}{x^2+x+1} = \lim\limits_{x\to\infty} \dfrac{x^2}{x^2} = 1$ (Hai AH en $y=1$)

$\lim\limits_{x\to\infty} \dfrac{x^2}{x^2+x+1} = 1^-$ $\quad \lim\limits_{x\to\infty} \dfrac{x^2}{x^2+x+1} = 1^+$



x	1000	-1000
$f(x)$	$\dfrac{1000^2}{1000^2+1000+1} = 0{,}99$	$\dfrac{(-1000)^2}{(-1000)^2+(-1000)+1} = 1{,}0009$