j) $\lim_{x\to\infty} \dfrac{2x - x^2}{3x+5} = \lim_{x\to\infty} \dfrac{\frac{2}{x} - 1}{\frac{3}{x} + \frac{5}{x^2}} = -\infty$

$-1 < 0$

0^+

k) $\lim_{x\to\infty} \dfrac{x^2}{x+1} = \infty$

l) $\lim_{x\to\infty} \dfrac{7x^3 - 15x^2}{13x} = \infty$

Assíntotas

1. a) $f(x) = \dfrac{5x}{3x-1}$ $\quad D(f) = \{x \in \mathbb{R} / x \neq 1/3\}$

$\lim_{x\to\frac{1}{3}^+} \left(\dfrac{5x}{3x-1}\right) = \infty$ $\quad \therefore x = \frac{1}{3}$ é Assíntota Vertical

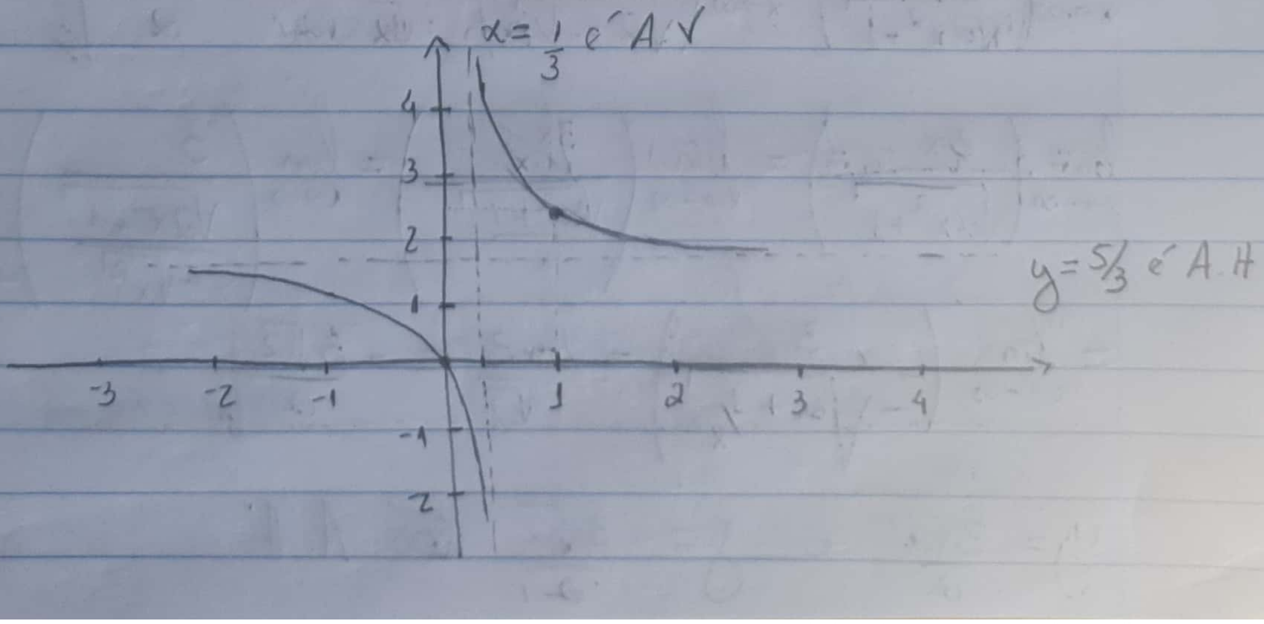
$\frac{5}{3} > 0$

0^+

$\lim_{x\to\infty} \left(\dfrac{5x}{3x-1}\right) = \lim_{x\to\infty} \left(\dfrac{5x/x}{\frac{3x-1}{x}}\right) = \lim_{x\to\infty} \left(\dfrac{5}{3 - 1/x}\right) = \dfrac{5}{3}$

$y = 5/3$ é Assíntota Horizontal

$\lim_{x\to-\infty} \left(\dfrac{5x}{3x-1}\right) = \lim_{x\to-\infty} \left(\dfrac{5}{3 - 1/x}\right) = 5/3$



ⓑ $f(x) = \dfrac{2-3x}{3+5x}$ $\qquad 3+5x \neq 0 \Rightarrow x \neq -\dfrac{3}{5}$

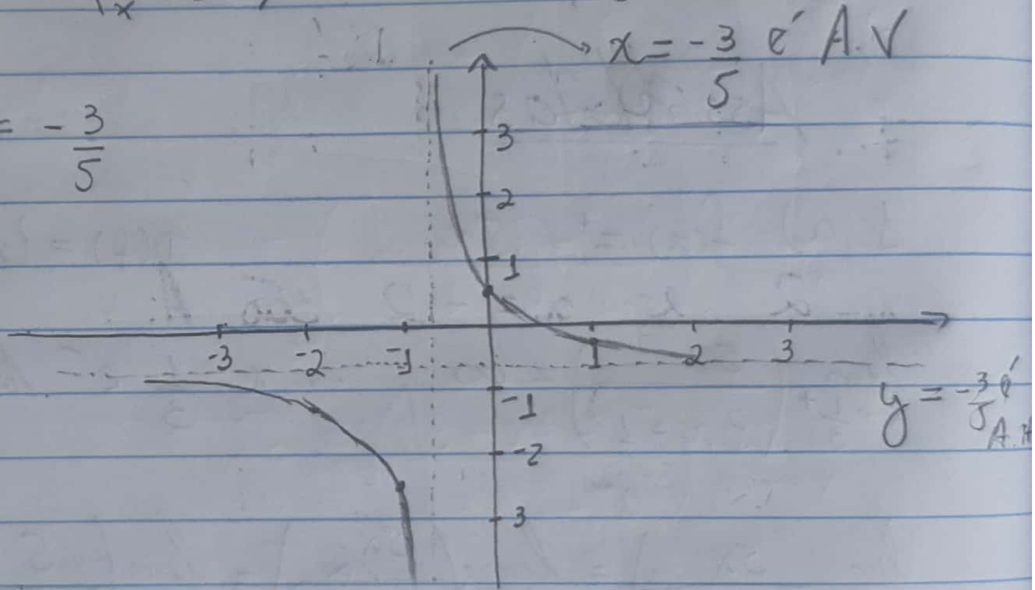
$D(f) = \{x \in \mathbb{R} / x \neq -3/5\}$

$\therefore x = -\dfrac{3}{5}$ é A.V

$$\lim_{x \to -3/5^+} \left(\frac{\overset{c<0}{2-3x}}{\underset{0^+}{3+5x}} \right) = \infty$$

$$\lim_{x \to \infty} \left(\frac{2-3x}{3+5x} \right) = \lim_{x \to \infty} \left(\frac{\frac{2}{x} - 3}{\frac{3}{x} + 5} \right) = -\frac{3}{5} \quad \therefore y = -\frac{3}{5} \text{ é A.H}$$

$$\lim_{x \to -\infty} \left(\frac{2-3x}{3+5x} \right) = -\frac{3}{5}$$



c) $f(x) = \dfrac{3x}{\sqrt{2x^2+1}}$ $\qquad D(f) = \mathbb{R}$

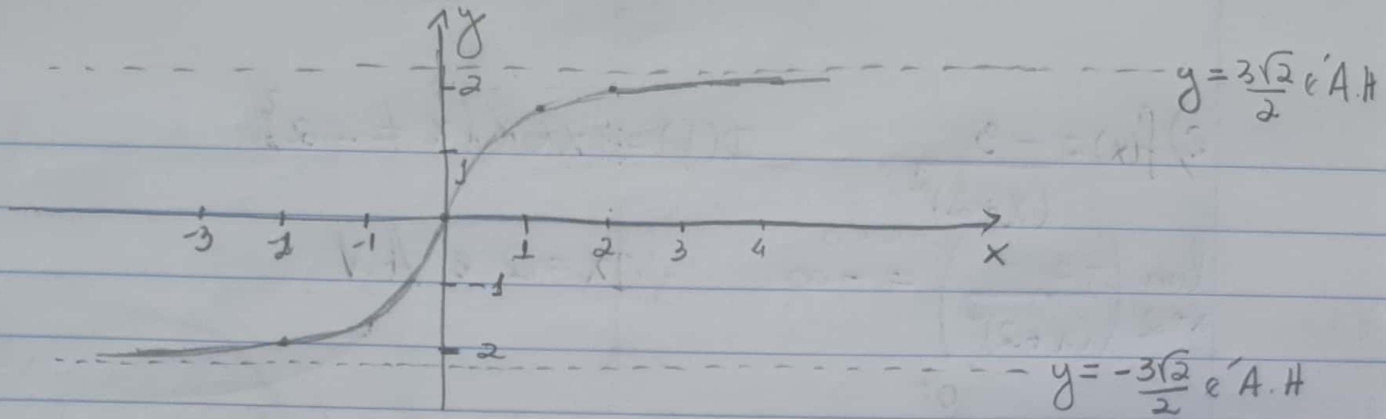
Não tem A.V

$$\lim_{x \to \infty} \left(\frac{3x}{\sqrt{2x^2+1}} \right) = \lim_{x \to \infty} \left(\frac{3}{\sqrt{2 + 1/x^2}} \right) = \frac{3}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{3\sqrt{2}}{2}$$

$$\lim_{x \to -\infty} \left(\frac{3x}{\sqrt{2x^2+1}} \right) = \lim_{x \to -\infty} \left(\frac{3x/x}{\frac{\sqrt{2x^2+1}}{x}} \right) = \lim_{x \to \infty} \left(\frac{3}{\frac{\sqrt{2x^2+1}}{-\sqrt{x^2}}} \right) =$$

$$= \lim_{x \to -\infty} \left(\frac{3}{-\sqrt{2 + 1/x^2}} \right) = -\frac{3}{\sqrt{2}} = -\frac{3\sqrt{2}}{2}$$

$y = \dfrac{3\sqrt{2}}{2}$ e $y = -\dfrac{3\sqrt{2}}{2}$ são A.H



d) $f(x) = \dfrac{2}{\sqrt{x^2-4}}$ $x^2-4>0$ $x^2>4 \Rightarrow x>2$ ou $x<-2$.

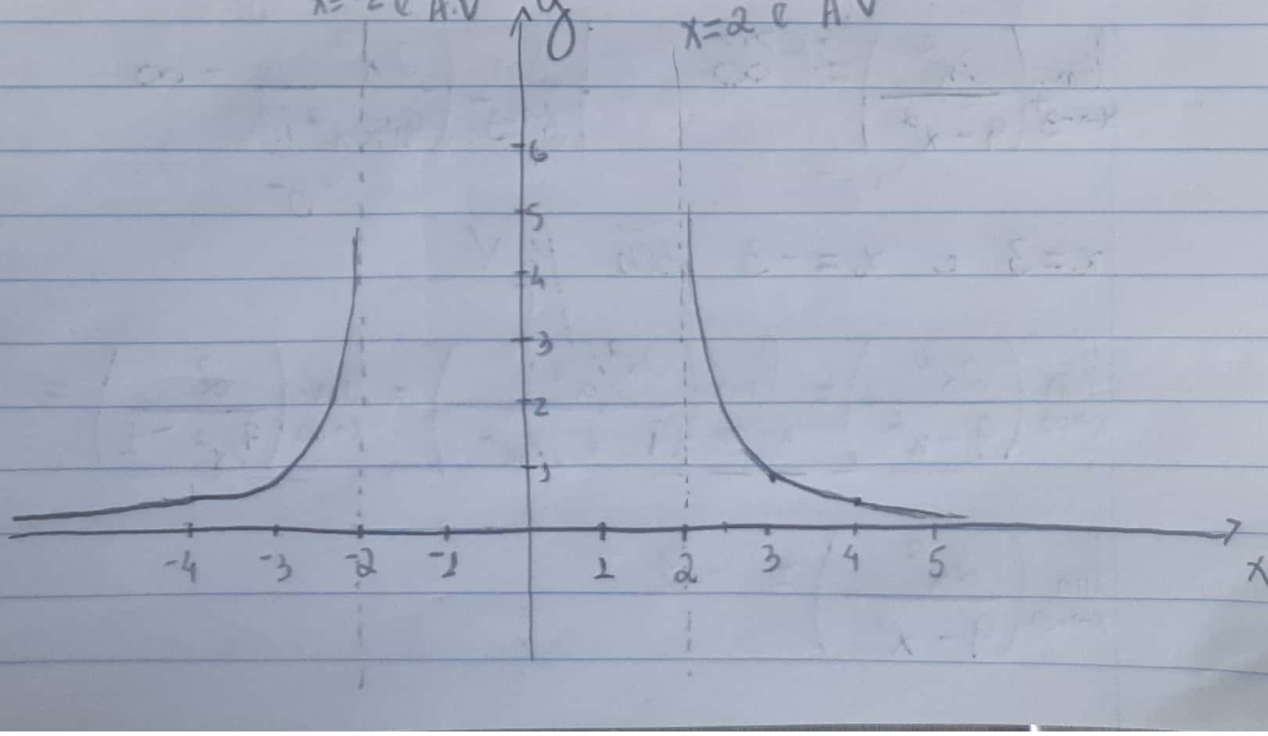
$D(f) = \{x \in \mathbb{R} / x>2 \text{ ou } x<-2\}$

$\lim\limits_{x\to 2^+} \dfrac{\overset{\to\, c>0}{2}}{\underset{\to\, 0^+}{\sqrt{x^2-4}}} = \infty$; $\lim\limits_{x\to -2^-} \left(\dfrac{2}{\sqrt{x^2-4}}\right) = \infty$

$x = 2$ e $x = -2$ são A.V

$\lim\limits_{x\to\infty} \left(\dfrac{2}{\sqrt{x^2-4}}\right) = \lim\limits_{x\to\infty} \left(\dfrac{2/x}{\sqrt{1-4/x^2}}\right) = \dfrac{0}{1} = 0 \Rightarrow y=0$ é A.H

$\lim\limits_{x\to-\infty} \left(\dfrac{2}{\sqrt{x^2-4}}\right) = \lim\limits_{x\to-\infty} \left(\dfrac{2/x}{\dfrac{\sqrt{x^2-4}}{-\sqrt{x^2}}}\right) = \lim\limits_{x\to-\infty} \left(\dfrac{2/x}{-\sqrt{1-4/x^2}}\right) = \dfrac{0}{-1} = 0$



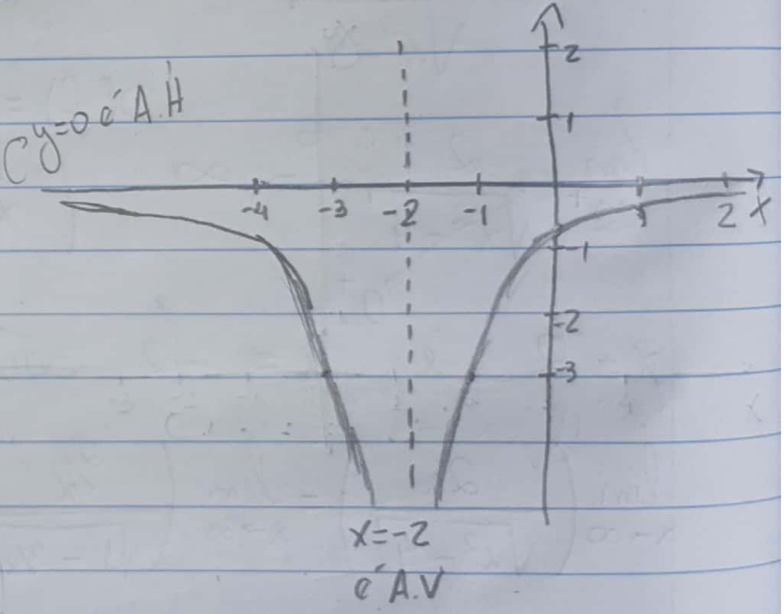
e) $f(x) = \dfrac{-3}{(x+2)^2}$ $\qquad D(f) = \{x \in \mathbb{R} / x \neq -2\}$

$$\lim_{x \to 2} \left(\frac{\overset{\to c<0}{-3}}{\underset{\to 0^+}{(x+2)^2}} \right) = -\infty \qquad \therefore x = 2 \text{ é A.V}$$

$$\lim_{x \to \infty} \left(\frac{-3}{(x+2)^2} \right) = \lim_{x \to \infty} \left(\frac{-3}{x^2 + 4x + 4} \right) = \lim_{x \to \infty} \left(\frac{-3/x^2}{1 + 4/x + 4/x^2} \right) = \frac{0}{1} = 0$$

$\therefore y = 0$ é A.H

$$\lim_{x \to -\infty} \left(\frac{-3}{(x+2)^2} \right) = 0$$



f) $f(x) = \dfrac{2x^2}{9 - x^2}$ $\qquad D(f) = \{x \in \mathbb{R} / x \neq 3 \text{ e } x \neq -3\}$

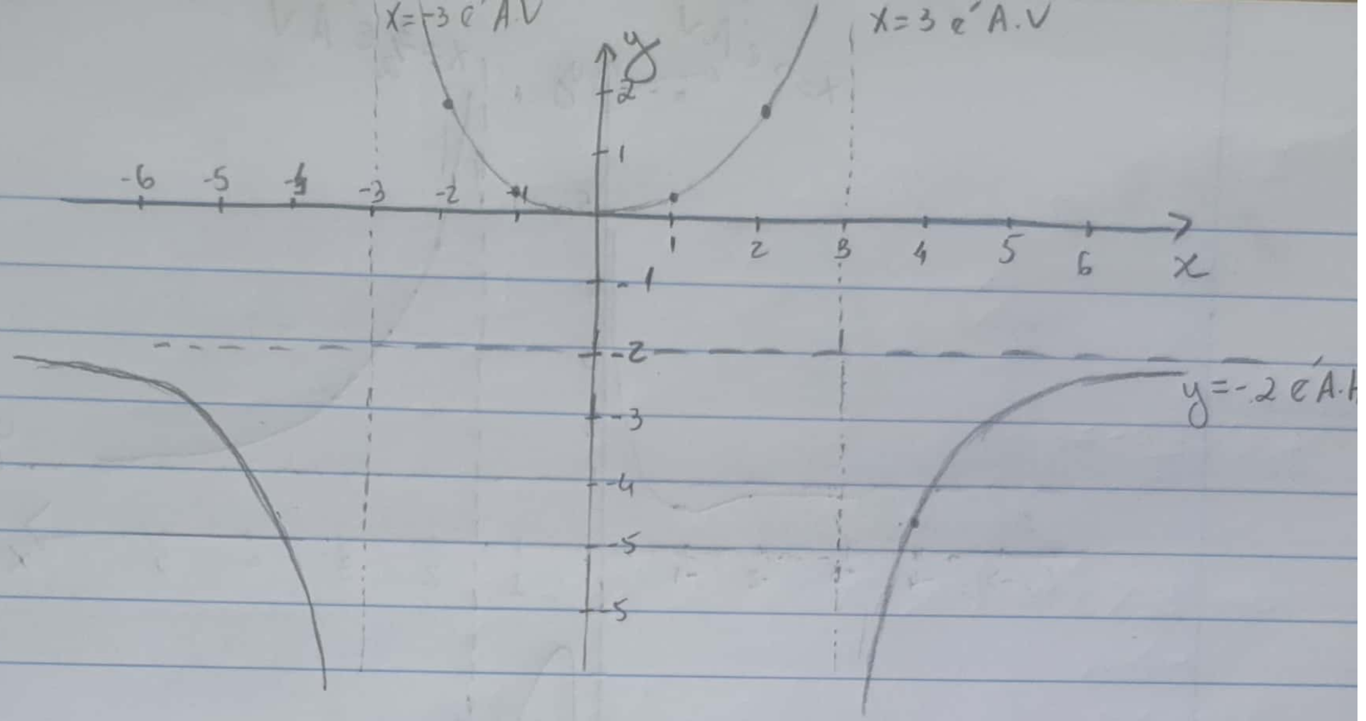
$$\lim_{x \to 3^+} \left(\frac{\overset{\to 18>0}{2x^2}}{\underset{\to 0^-}{9 - x^2}} \right) = -\infty \qquad \lim_{x \to 3^-} \left(\frac{2x^2}{\underset{\to 0^+}{9 - x^2}} \right) = +\infty$$

$$\lim_{x \to -3^+} \left(\frac{\overset{\to c>0}{2x^2}}{\underset{\to 0^+}{9 - x^2}} \right) = \infty \qquad \lim_{x \to -3^-} \left(\frac{2x^2}{\underset{\to 0^-}{9 - x^2}} \right) - \infty$$

$x = 3$ e $x = -3$ são A.V

$$\lim_{x \to \infty} \left(\frac{2x^2}{9 - x^2} \right) = \lim_{x \to \infty} \left(\frac{2x^2/x^2}{(9 - x^2)/x^2} \right) = \lim_{x \to \infty} \left(\frac{2}{9/x^2 - 1} \right) = -2$$

$$\lim_{x \to -\infty} \left(\frac{2x^2}{9 - x^2} \right) = -2$$



g) $f(x) = \dfrac{2x^2+1}{2x^2-3x}$ $\qquad 2x^2-3x = 0 \Rightarrow x.(2x-3)=0$

$x = 0$ ou $2x-3=0 \Rightarrow x = 3/2$.

$D(f) = \{x \in \mathbb{R} \,/\, x \neq 0 \text{ e } x \neq 3/2\}$

$$\lim_{x\to 0^+}\left(\frac{\overbrace{2x^2+1}^{1>0}}{\underbrace{2x^2-3x}_{0^-}}\right) = -\infty \qquad \lim_{x\to 0^-}\left(\frac{\overbrace{2x^2+1}^{1>0}}{\underbrace{2x^2-3x}_{0^+}}\right) = \infty$$

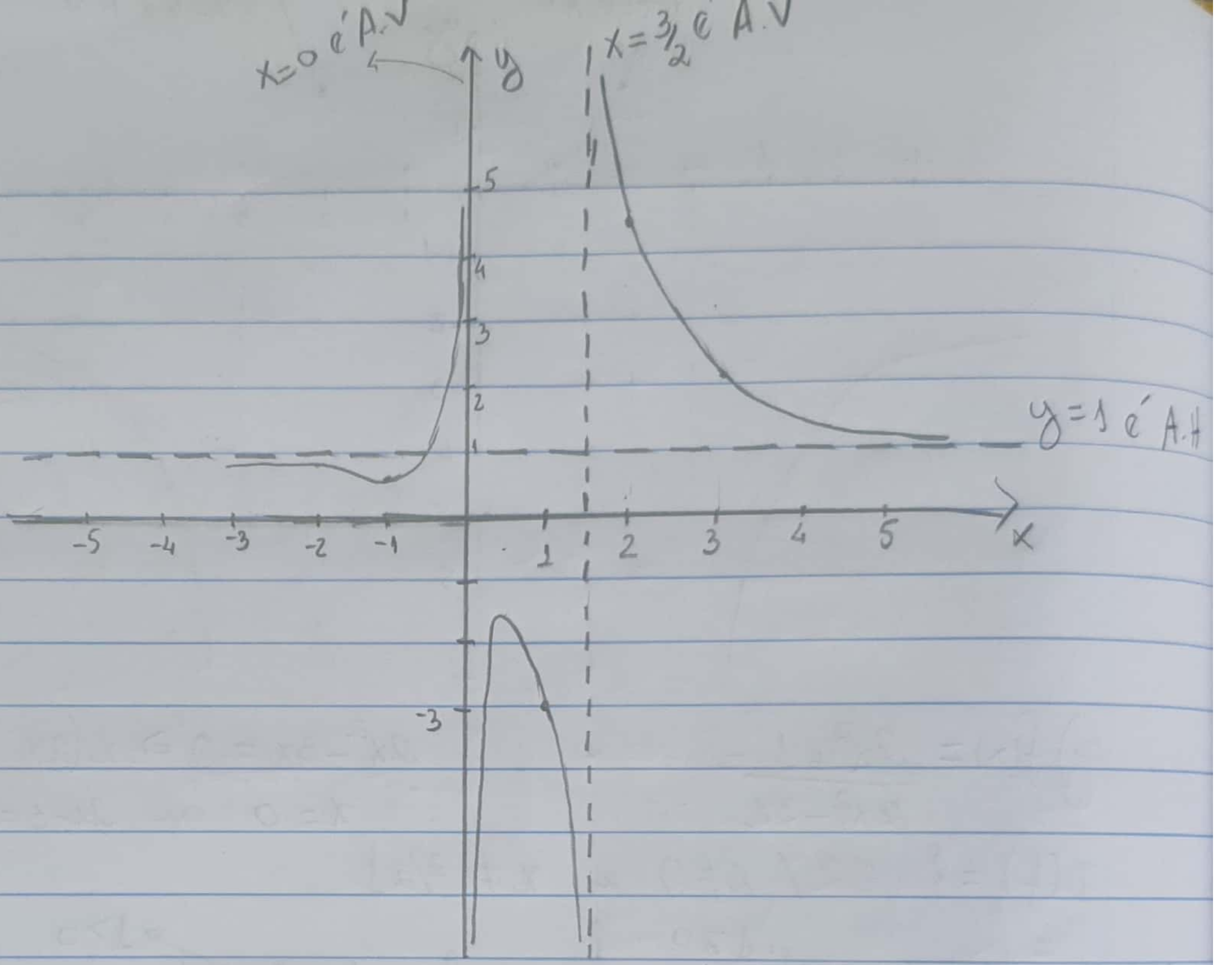
$$\lim_{x\to 3/2^+}\left(\frac{\overbrace{2x^2+1}^{5,5>0}}{\underbrace{2x^2-3x}_{0^+}}\right) = \infty \qquad \lim_{x\to \frac{3}{2}^-}\left(\frac{2x^2+1}{\underbrace{2x^2-3x}_{0^-}}\right) = -\infty$$

$\therefore\ x = 0$ e $x = 3/2$ são A.V

$$\lim_{x\to\infty}\left(\frac{2x^2+1}{2x^2-3x}\right) = \lim_{x\to\infty}\left(\frac{2+1/x^2}{2-3/x}\right) = \frac{2}{2} = 1 \Rightarrow y = 1 \text{ é A.H}$$

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

$\frac{3}{2+3} = \frac{3}{5}$ $\qquad \frac{19}{18-9}$ $\frac{19}{9}$



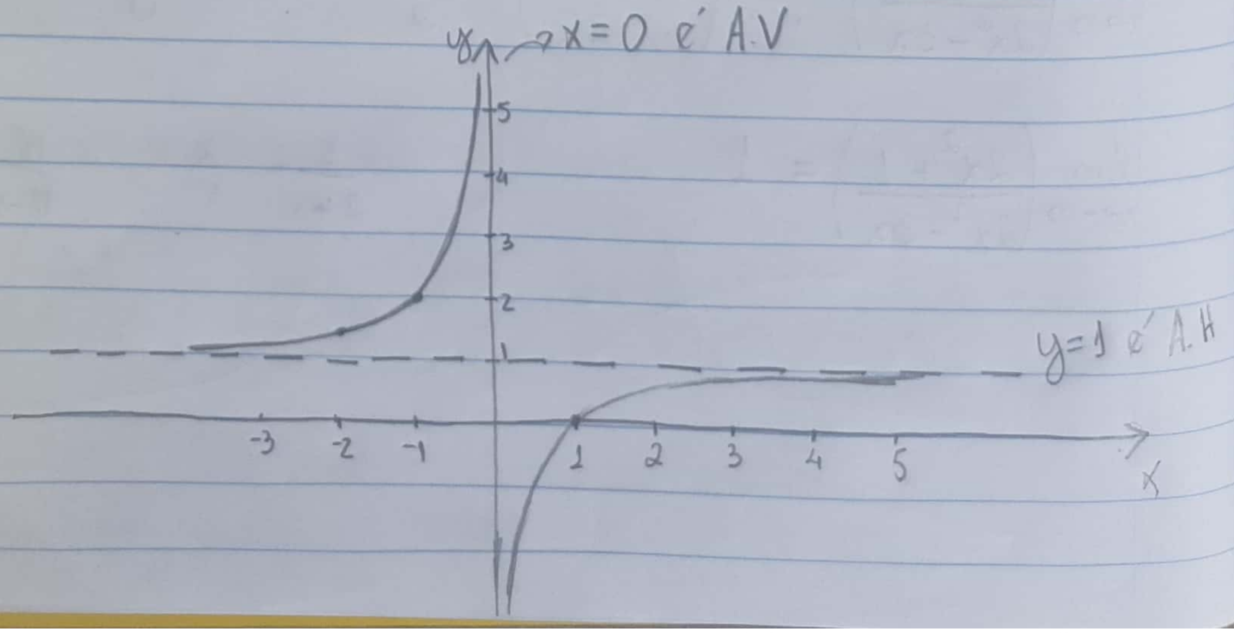
h) $g(x) = 1 - \frac{1}{x}$ $D(f) = \{x \in \mathbb{R} / x \neq 0\}$

$\lim_{x \to 0^+} \left(1 - \frac{1}{x}\right) = -\infty$ | $\lim_{x \to 0^-} \left(1 - \frac{1}{x}\right) = \infty$

$\therefore x = 0$ é A.V

$\lim_{x \to \infty} \left(1 - \frac{1}{x}\right) = 1 - 0 = 1$ | $\lim_{x \to -\infty} \left(1 - \frac{1}{x}\right) = 1$

$y = 1$ é A.H



i) $F(x) = \dfrac{4x^2}{x^2 - 9}$ $D(f) = \{x \in \mathbb{R} / x \neq 3 \text{ e } x \neq -3\}$

$\lim\limits_{x \to 3^+} \left(\dfrac{4x^2}{x^2 - 9} \right) = \infty$ ($4x^2 \to c > 0$; $x^2 - 9 \to 0^+$)

$\lim\limits_{x \to 3^-} \left(\dfrac{4x^2}{x^2 - 9} \right) = -\infty$ ($4x^2 \to 36 > 0$; $x^2 - 9 \to 0^-$)

$\lim\limits_{x \to -3^+} \left(\dfrac{4x^2}{x^2 - 9} \right) = -\infty$ ($4x^2 \to 36 > 0$; $x^2 - 9 \to 0^-$)

$\lim\limits_{x \to -3^-} \left(\dfrac{4x^2}{x^2 - 9} \right) = \infty$ ($4x^2 \to c > 0$; $x^2 - 9 \to 0^+$)

$x = 3$ e $x = -3$ são A.V.

$\lim\limits_{x \to \infty} \left(\dfrac{4x^2}{x^2 - 9} \right) = \lim\limits_{x \to \infty} \left(\dfrac{4}{1 - 9/x^2} \right) = 4$

$\lim\limits_{x \to -\infty} \left(\dfrac{4x^2}{x^2 - 9} \right) = 4$ $y = 4$ é A.H.