ASINTOTAS

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

$$(x-2)(x+1) = 0 \rightarrow \begin{cases} x = 2 \\ x = -1 \end{cases} \rightarrow Dominio\ f(x) = \mathbb{R} - \{2, -1\}$$

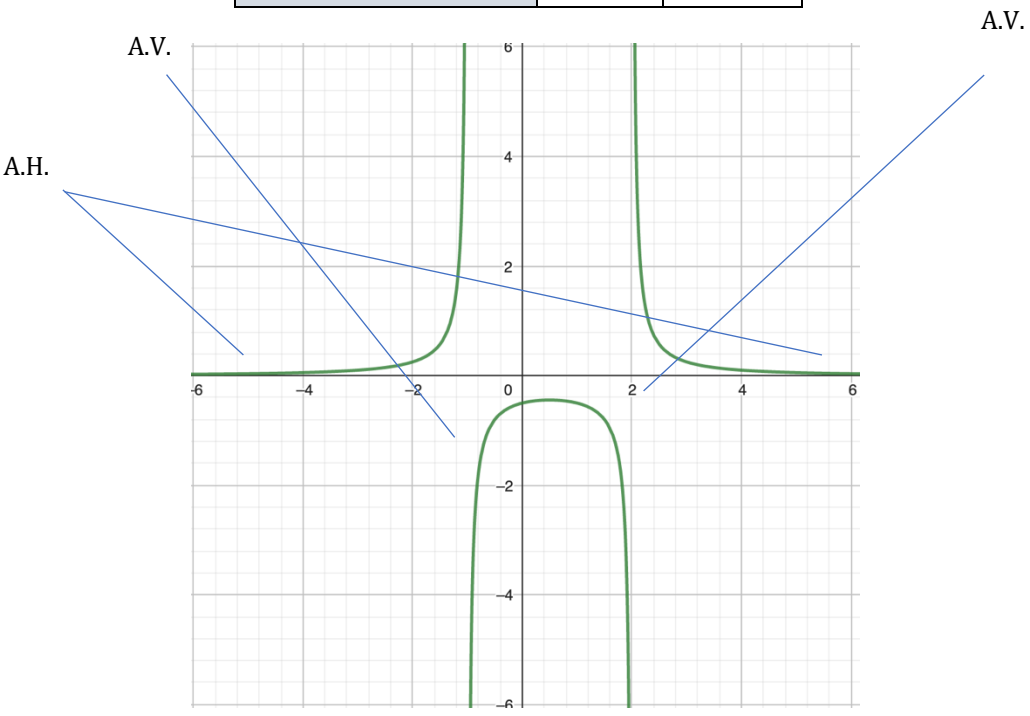
Asíntota vertical

$$A.V. \begin{cases} \lim_{x\to 2} \frac{1}{(x-2)(x+1)} = \frac{1}{0} \rightarrow \begin{cases} \lim_{x\to 2^+} \frac{1}{(x-2)(x+1)} \rightarrow \frac{1}{0^+} \rightarrow +\infty \\ \lim_{x\to 2^-} \frac{1}{(x-2)(x+1)} \rightarrow \frac{1}{0^-} \rightarrow -\infty \end{cases} \\ \lim_{x\to -1} \frac{1}{(x-2)(x+1)} = \frac{1}{0} \rightarrow \begin{cases} \lim_{x\to -1^+} \frac{1}{(x-2)(x+1)} \rightarrow \frac{1}{0^-} \rightarrow -\infty \\ \lim_{x\to -1^-} \frac{1}{(x-2)(x+1)} \rightarrow \frac{1}{0^+} \rightarrow +\infty \end{cases} \end{cases}$$

Asíntota horizontal

$$A.H. \begin{cases} \lim_{x\to \infty} \frac{1}{(x-2)(x+1)} \rightarrow \frac{1}{\infty} \rightarrow 0 \\ \lim_{x\to -\infty} \frac{1}{(x-2)(x+1)} \rightarrow \frac{1}{\infty} \rightarrow 0 \end{cases}$$

	-10	10
$y = 0$	0	0
$y = \frac{1}{(x-2)(x+1)}$	0,009	0,011



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

$$dom\, f(x) = \mathbb{R} - \{0\}$$

Asíntota vertical

$$A.V. \rightarrow \lim_{x\to 0} \frac{2x^2+x-2}{x} = \frac{-2}{0} \rightarrow \begin{cases} \lim_{x\to 0^-} \frac{2x^2+x-2}{x} \rightarrow \frac{-2}{0^-} \rightarrow \infty \\ \lim_{x\to 0^+} \frac{2x^2+x-2}{x} \rightarrow \frac{-2}{0^+} \rightarrow -\infty \end{cases}$$

Asíntota horizontal

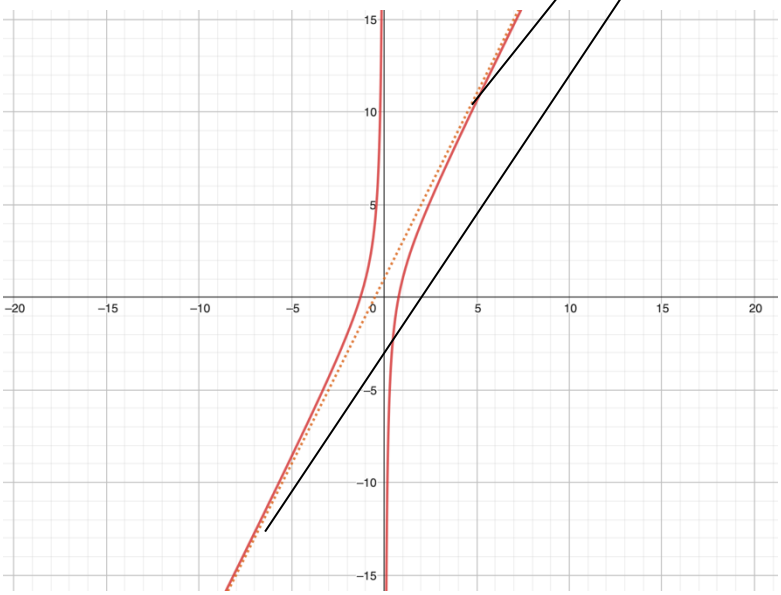
$$A.H. \rightarrow \begin{cases} \lim_{x\to \infty} \frac{2x^2+x-2}{x} \rightarrow \frac{\infty}{\infty} \rightarrow \infty \\ \lim_{x\to -\infty} \frac{2x^2+x-2}{x} \rightarrow \frac{\infty}{-\infty} \rightarrow -\infty \end{cases} \rightarrow No\ tiene\ A.H.$$

Asíntota Oblicua

$$A.O. \rightarrow \begin{array}{r|l} 2x^2+x-2 & x \\ \hline -2x^2 & 2x+1 \\ \hline +x-2 & \\ -x & \\ \hline -2 & \end{array}$$

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

Para saber representar la gráfica sobre la asintota oblicua $\begin{cases} \lim_{x\to \infty} \frac{-2}{x} \rightarrow 0^- \\ \lim_{x\to -\infty} \frac{-2}{x} \rightarrow 0^+ \end{cases}$



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

$$dom\, f(x) = \mathbb{R} - \{0\}$$

Asíntota vertical

$$A.V. \rightarrow \lim_{x\to 0} \frac{x^2-1}{x} = \frac{-1}{0} \rightarrow \begin{cases} \lim_{x\to 0^-} \frac{x^2-1}{x} \rightarrow \frac{-1}{0^-} \rightarrow +\infty \\ \lim_{x\to 0^+} \frac{x^2-1}{x} \rightarrow \frac{-1}{0^+} \rightarrow -\infty \end{cases}$$

Asíntota horizontal

$$A.H. \rightarrow \begin{cases} \lim_{x\to -\infty} \frac{x^2-1}{x} \rightarrow \frac{\infty}{-\infty} \rightarrow -\infty \\ \lim_{x\to +\infty} \frac{x^2-1}{x} \rightarrow \frac{\infty}{+\infty} \rightarrow +\infty \end{cases} \rightarrow No\ tiene\ A.H.$$

Recuerda, en esta indeterminación tienes que comparar los exponentes más grandes del numerador y denominador

Asíntota Oblicua

$$A.O. \rightarrow y = mx + n \rightarrow \begin{cases} m = \lim_{\pm\infty} \frac{f(x)}{x} \\ n = \lim_{x\to\pm\infty} f(x) - mx \end{cases}$$

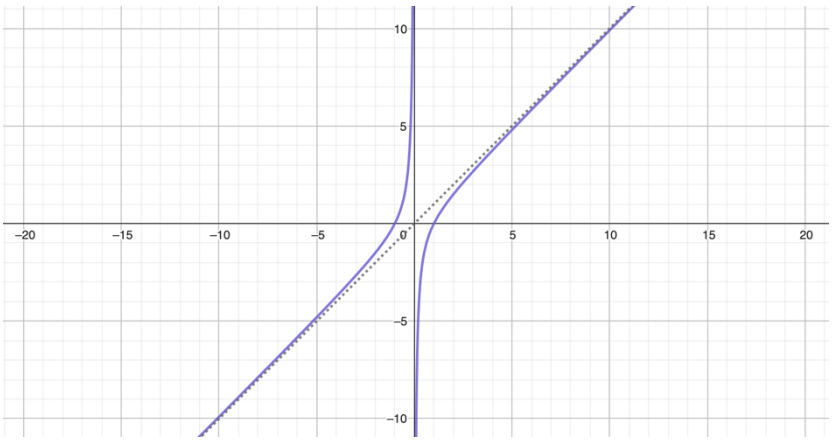
$$m = \lim_{x\to\pm\infty} \frac{\frac{x^2-1}{x}}{x} = \lim_{x\to\pm\infty} \frac{x^2-1}{x^2} \rightarrow \frac{\infty}{\infty} \rightarrow 1$$

$$n = \lim_{x\to\pm\infty} \frac{x^2-1}{x} - x = \lim_{x\to\pm\infty} \frac{x^1-1-x^2}{x} = \lim_{x\to\pm\infty} \frac{-1}{x} \rightarrow \frac{-1}{\infty} \rightarrow 0$$

$$y = x \rightarrow A.O.$$

Para saber representar la gráfica sobre la asíntota→

	-100	100
$y = x$	-100	100
$y = \frac{x^2-1}{x}$	$-99{,}99$	$99{,}99$



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

$$x + 2 = 0 \rightarrow x = -2 \rightarrow dom\, f(x) = \mathbb{R} - \{-2\}$$

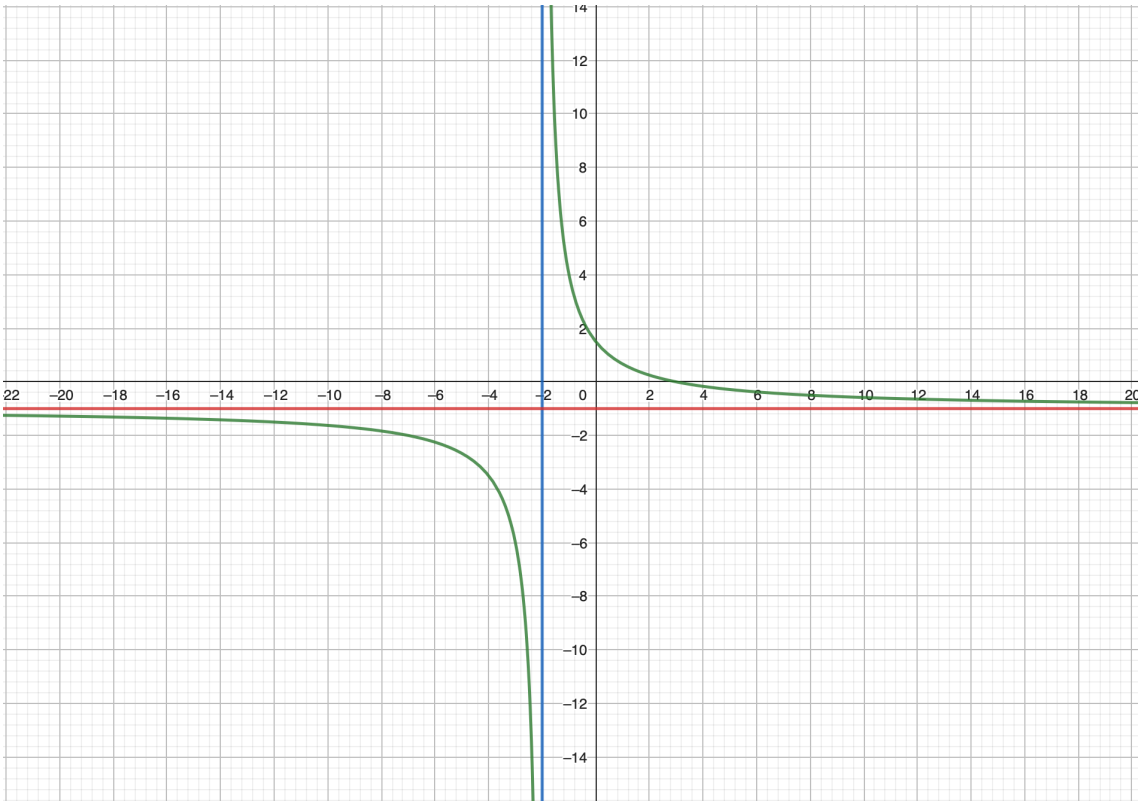
Asíntota vertical

$$. \rightarrow \lim_{x \to -2} \frac{3-x}{x+2} = \frac{5}{0} \rightarrow \begin{cases} \lim_{x \to -2^-} \frac{3-x}{x+2} \rightarrow \frac{5}{0^-} \rightarrow -\infty \\ \lim_{x \to -2^+} \frac{3-x}{x+2} \rightarrow \frac{5}{0^+} \rightarrow +\infty \end{cases}$$

Asíntota horizontal

$$A.H. \rightarrow \begin{cases} \lim_{x \to -\infty} \frac{3-x}{x+2} \rightarrow \frac{\infty}{-\infty} \rightarrow -1 \\ \lim_{x \to +\infty} \frac{3-x}{x+2} \rightarrow \frac{-\infty}{+\infty} \rightarrow -1 \end{cases} \rightarrow Tiene\ A.H.\ en\ y = -1$$

	-100	100
$y = -1$	-1	-1
$y = \frac{3-x}{x+2}$	$-1{,}05$	$-0{,}95$



5. $f(x) = \frac{3x^3+2x^2+4}{x^2+3x+2}$
6. $f(x) = \frac{x^2-16}{x^2-4}$
7. $f(x) = 2x + 3 + \frac{5}{x}$
8. $f(x) = \sqrt{x^2 - 4}$
9. $f(x) = \sqrt{\frac{x^3-1}{x+5}}$
10. $f(x) = e^{-x^2}$