DERIVADA $f(x)\,g(x)$

$$\lim_{\Delta x \to 0} \frac{f(x+\Delta x)\,g(x+\Delta x) - f(x)\,g(x)}{\Delta x}$$

$$\lim_{\Delta x \to 0} \left[\frac{f(x+\Delta x)\,g(x+\Delta x) - f(x+\Delta x)\,g(x)}{\Delta x} + \frac{f(x+\Delta x)\,g(x) - f(x)\,g(x)}{\Delta x} \right]$$

$$\lim_{\Delta x \to 0} \left[f(x+\Delta x)\,\frac{g(x+\Delta x) - g(x)}{\Delta x} + \frac{f(x+\Delta x) - f(x)}{\Delta x}\,g(x) \right]$$

$$\boxed{f(x)\,g'(x) + f'(x)\,g(x)}$$

usando $[f^n(x)]' = n\,f^{n-1}(x)\,f'(x)$

podemos imediatamente encontrar $f(x)/g(x)$

$$\left[f(x)\,\frac{1}{g(x)}\right]' = f(x)\left[\frac{1}{g(x)}\right]' + f'(x)\,\frac{1}{g(x)}$$

$$[g^{-1}(x)]' = -1\,g^{-2}(x)\,g'(x)$$

$$-\frac{f(x)\,g'(x)}{g^2(x)} + \frac{f'(x)}{g(x)}$$

$$\boxed{\left[\frac{f(x)}{g(x)}\right]' = \frac{f'(x)\,g(x) - f(x)\,g'(x)}{g^2(x)}}$$

ENCONTRAR A DERIVADA DE $\dfrac{x-1}{x-2}$

$$\frac{(x-1)'(x-2) - (x-1)(x-2)'}{(x-2)^2} = \frac{\cancel{x} - 2 - \cancel{x} + 1}{(x-2)^2} = \boxed{-\frac{1}{(x-2)^2}}$$

ENCONTRAR A DERIVADA DE $\dfrac{x^2-1}{x-2}$

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

$$= \boxed{\frac{x^2 - 4x + 1}{(x-2)^2}}$$

GRAFICAMOS ESTAS FUNÇÕES

$\dfrac{x-1}{x-2}$ $\quad x \to -\infty \quad (-\infty/-\infty = +1) \quad x \to 2^- \ (1.9)\ \frac{+}{-}\ -\infty$

$\quad x \to +\infty \quad (+\infty/+\infty = +1) \quad x \to 2^+ \ (2.1)\ \frac{+}{+}\ +\infty$

DERIVADA $\neq 0$ NÃO TEMOS MAX OU MIN

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

$\boxed{\text{ZEROS}}$ $x^2=1$ $\boxed{x=\pm 1}$

$\boxed{\infty}$ $x=2^{\pm}$ $\boxed{\begin{matrix} 2^-, -\infty \\ 2^+, +\infty \end{matrix}}$

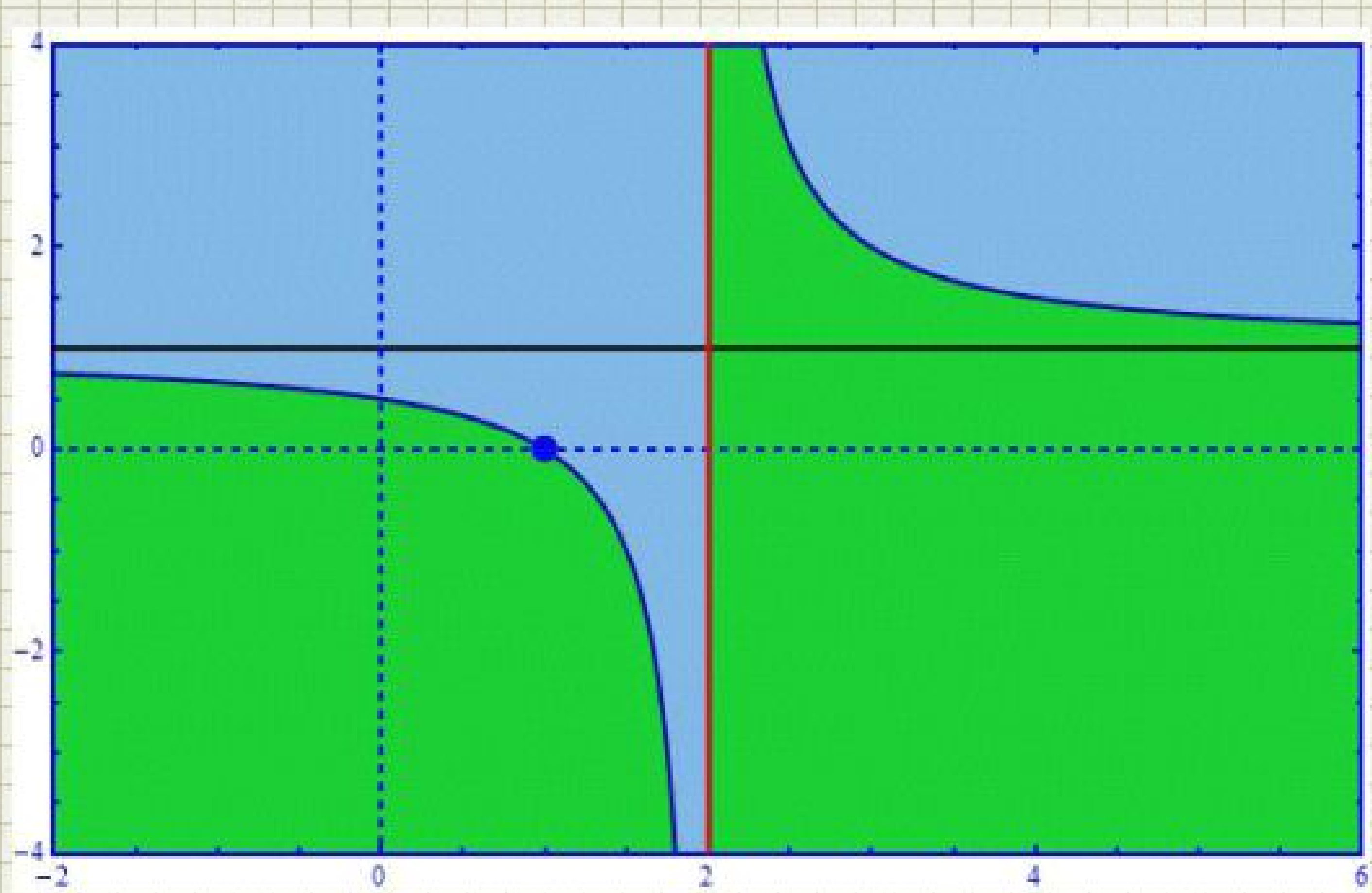
$\boxed{\begin{matrix}\text{DERIVADA} = 0 \\ x = 2 \pm \sqrt{3}\end{matrix}}$ $x^2-4x+1=0$

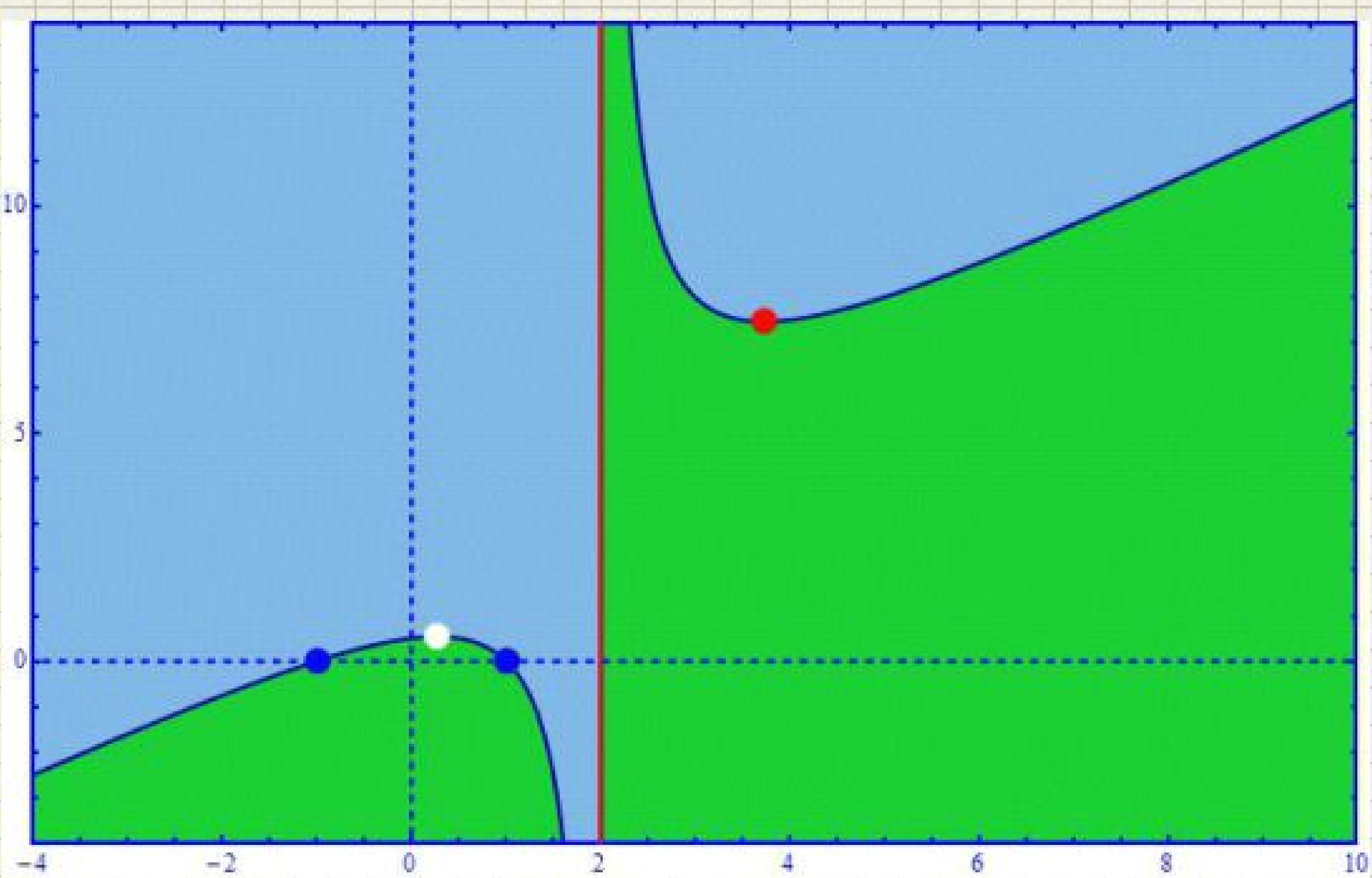
$x \to \pm\infty$ $\frac{x^2}{x}=x$

$\boxed{(-\infty, -\infty) \quad (+\infty, +\infty)}$

min $x=2+\sqrt{3}$

Max $x=2-\sqrt{3}$





min

$(2+\sqrt{3}, \ 2(2+\sqrt{3}))$

Max

$(2-\sqrt{3}, \ 4-2\sqrt{3})$