(A) $y = \dfrac{2x}{x-1}$

$\lim\limits_{x \to \infty} \dfrac{2x}{x-1} = 2$ ($y = 2$ HA)

$\lim\limits_{x \to 1} \dfrac{2x}{x-1} = \begin{cases} +\infty & x \to 1^+ \\ -\infty & x \to 1^- \end{cases}$

VA @ $x = 1$

$(0,0)$ intercept

$y' = \dfrac{(x-1)2 - 2x(1)}{(x-1)^2} = \dfrac{-2}{(x-1)^2}$

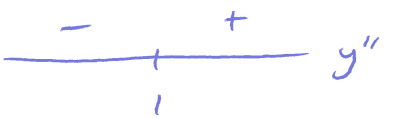
Decr $(-\infty, 1) \cup (1, \infty)$

No extrema

$y' = -2(x-1)^{-2}$

$y'' = 4(x-1)^{-3}$

$= \dfrac{4}{(x-1)^3}$

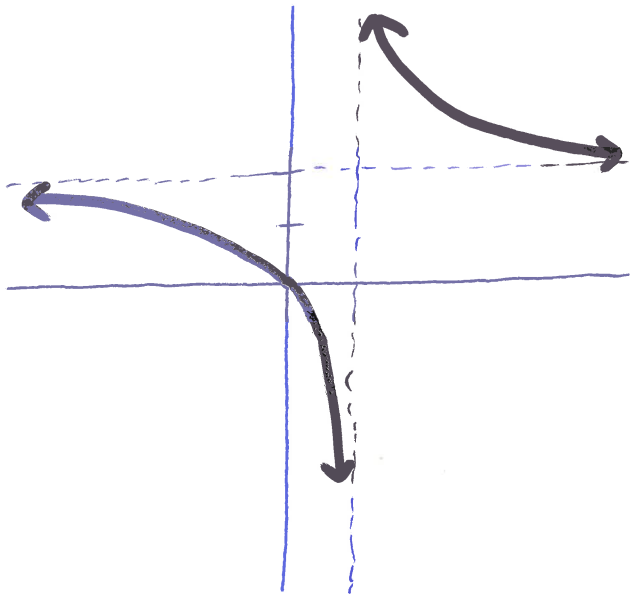


CC ↓: $(-\infty, 1)$

CC ↑: $(1, \infty)$

No inflection point

($x = 1$ is a VA)



(B) $f(x) = 2 - x - x^3$

$(0, 2)$ intercept

$f'(x) = \underbrace{-1 - 3x^2}_{\text{always negative}} < 0$

$- - - - - \quad f'$

Always decreasing;

No extrema

$f''(x) = -6x \overset{\text{set}}{\downarrow} = 0$

$x = 0$ (ppoi)

$+ \quad - \quad f''$

0

CC↑ : $(-\infty, 0)$

CC↓ : $(0, \infty)$

$(0, 2)$ (point of inflection)