Consider the function f and its derivatives below.

Graph this:

$$f(x) = \frac{2x^2 - 3x}{x-2}, f'(x) = \frac{2(x-3)(x-1)}{(x-2)^2}, f''(x) = \frac{4}{(x-2)^3}$$

No slant asymptotes in the curriculum.

Domain:

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

$(-\infty, 2), (2, \infty)$

V.A. $x=2$

sign charts include VA

Consider the function f and its derivatives below.

$$f(x) = \frac{2x^2 - 3x}{x-2}, f'(x) = \frac{2(x-3)(x-1)}{(x-2)^2}, f''(x) = \frac{4}{(x-2)^3}$$

Asymptotes:

$x=2$ V.A. $x \to 2^+, -$ $y \to ?$

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

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

$x=2$ is actually VA.

H.A. $x \to \pm\infty$ $y \to ?$

$$\lim_{x\to \infty} \left(\frac{2x^2-3x}{x-2}\right) \overset{DSP}{=} \frac{\infty}{\infty} \Rightarrow \overset{H}{=} \lim_{x\to\infty} \left(\frac{4x-3}{1}\right) = \infty$$

$$\lim_{x\to -\infty} \left(\frac{2x^2-3x}{x-2}\right) \overset{DSP}{=} \frac{\infty}{-\infty} \Rightarrow \overset{H}{=} \lim_{x\to-\infty} \left(\frac{4x-3}{1}\right) = -\infty$$

No H.A.

Intercepts:

x-int: $y=0 \Rightarrow 0 = \frac{2x^2-3x}{x-2} \Rightarrow x(2x-3)=0$

$x=0, \quad x=\frac{3}{2}$

$(0,0), \left(\frac{3}{2}, 0\right)$

y-int: $x=0 \Rightarrow f(0)=0$

Consider the function f and its derivatives below.

$$f(x) = \frac{2x^2 - 3x}{x-2}, f'(x) = \frac{2(x-3)(x-1)}{(x-2)^2}, f''(x) = \frac{4}{(x-2)^3}$$

Critical Points (f', f'')

$f'(x) = \frac{2(x-3)(x-1)}{(x-2)^2}$ → 0 → $f'(x)=0$ or DNE

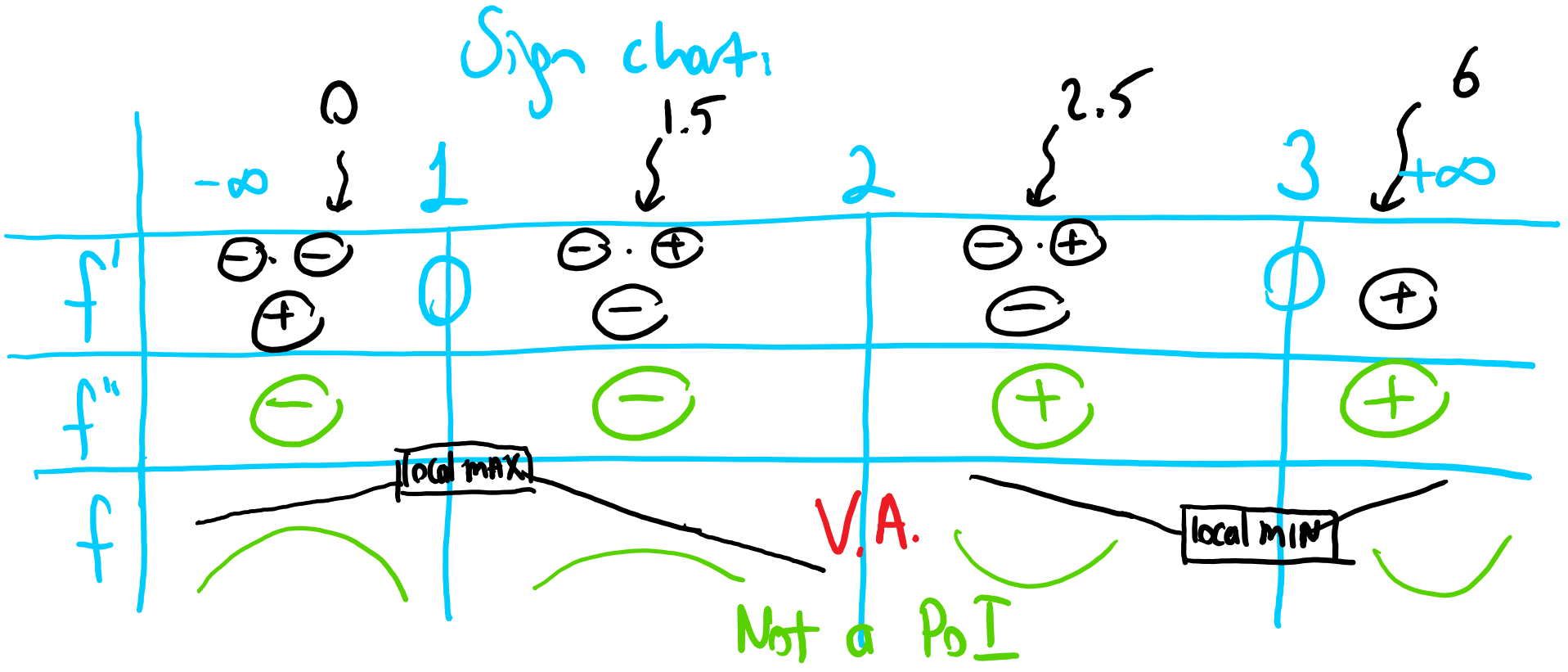
~~DNE~~ because $x=2$ is NOT in domain

$f'(x)=0 \Rightarrow x=3, 1$ first-order crit. points

$f''(x) = \frac{4}{(x-2)^3} = 0$ or DNE second-order critical P.

None

Sign chart:



f is increasing on $(-\infty, 1), (3, \infty)$

f is decreasing on $(1, 2), (2, 3)$

f is concave up on $(2, \infty)$

f is concave down on $(-\infty, 2)$

Local max at $x=1$, local min at $x=3$

No PoI, $x=2$ V.A.