Graphing1

Friday, November 20, 2020 2:02 PM

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

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

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

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

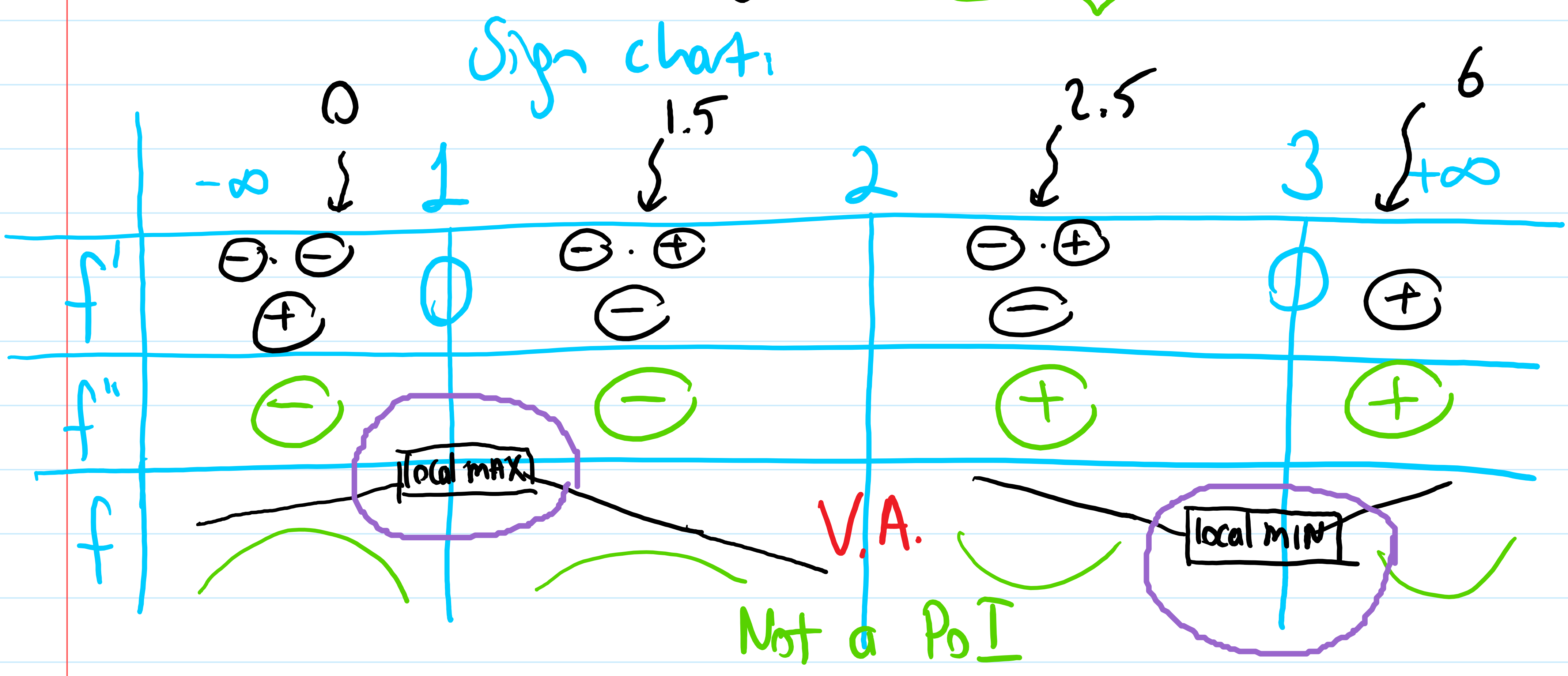
Graphing2

Friday, November 20, 2020 1:53 PM

Consider the function f and its derivatives below.

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

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.