Student Name:_____ Student Number:_____ Q6

Consider the function $y = f(x) = \frac{x-1}{x^2}$ with $f'(x) = \frac{2-x}{x^3}$ and $f''(x) = \frac{2(x-3)}{x^4}$

a. Find the domain $\mathbb{R} - \{0\}$

b. Find the asymptotes if any exist.

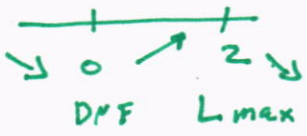
Horizontal: $\lim_{x\to\infty} f(x) = 0 = \lim_{x\to-\infty} f(x)$ $y = 0$

Vertical: $x = 0$ $\lim_{x\to 0^-} f(x) = -\infty$, $\lim_{x\to 0^+} f(x) = \infty$

Slant: None

c. Find the critical numbers. $x = 0, 2$ 0 f' DNE 2 $f' = 0$

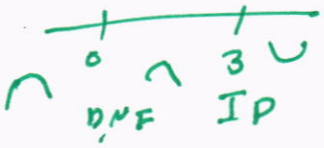
d. Find intervals where the function is increasing and those where it is decreasing.



e. Find the local maximum and minimum of the function.

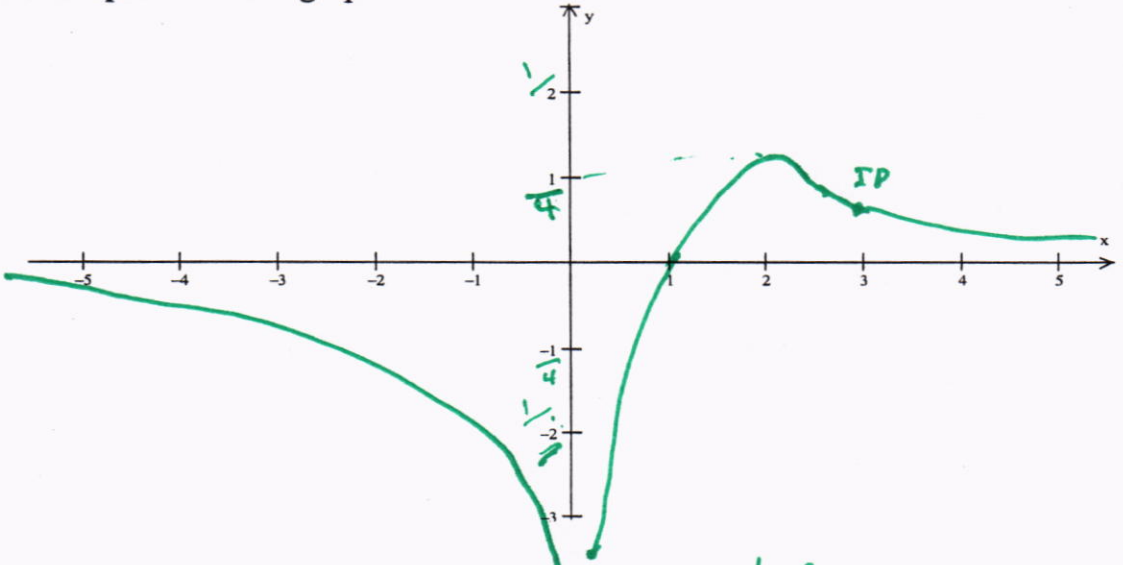
$(2, \frac{1}{4})$ L Max

f. Discuss the concavity of the function and find the infection points.



$(3, \frac{2}{9})$

g. Sketch the graph of the function. Clearly indicate the **critical numbers**, **extrema** and **inflection points** on the graph.



h. Find the absolute extrema of the function if exist.

Abs Max $(2, \frac{1}{4})$ point, value