

Question

The function $f(x) = \frac{x+1}{x^2-1}$:

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

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

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

a) Domain: $x \in (-\infty, 1) \cup (1, \infty)$.

b) We have:

$$\begin{cases} f(x) = \frac{x+1}{x^2-1} = \frac{1}{x-1} \\ f(-x) = \frac{-x+1}{(-x)^2-1} = \frac{1-x}{x^2-1} = -\frac{x-1}{x^2-1} = -\frac{1}{x+1} \end{cases} \Rightarrow \text{function is not even, not odd} \Rightarrow \text{neither.}$$

Answer: neither.

c) We have:

$$f'(x) = -\frac{1}{(x-1)^2} = 0 \Rightarrow x \in \emptyset \Rightarrow \text{there is no any critical points.}$$