

PROBLEM

Determining $\lim_{x \rightarrow \infty} \left(x - \sqrt{x^2 + x} \right) \dots$

(a) What does your intuition tell you about

$x - \sqrt{x^2 + x}$ for large values of x ?

(b) What does a table say?

(c) Find $\lim_{x \rightarrow \infty} \left(x - \sqrt{x^2 + x} \right)$ analytically

(this is challenging).



SUMMARY OF CURVE SKETCHING

LESSON 3.5



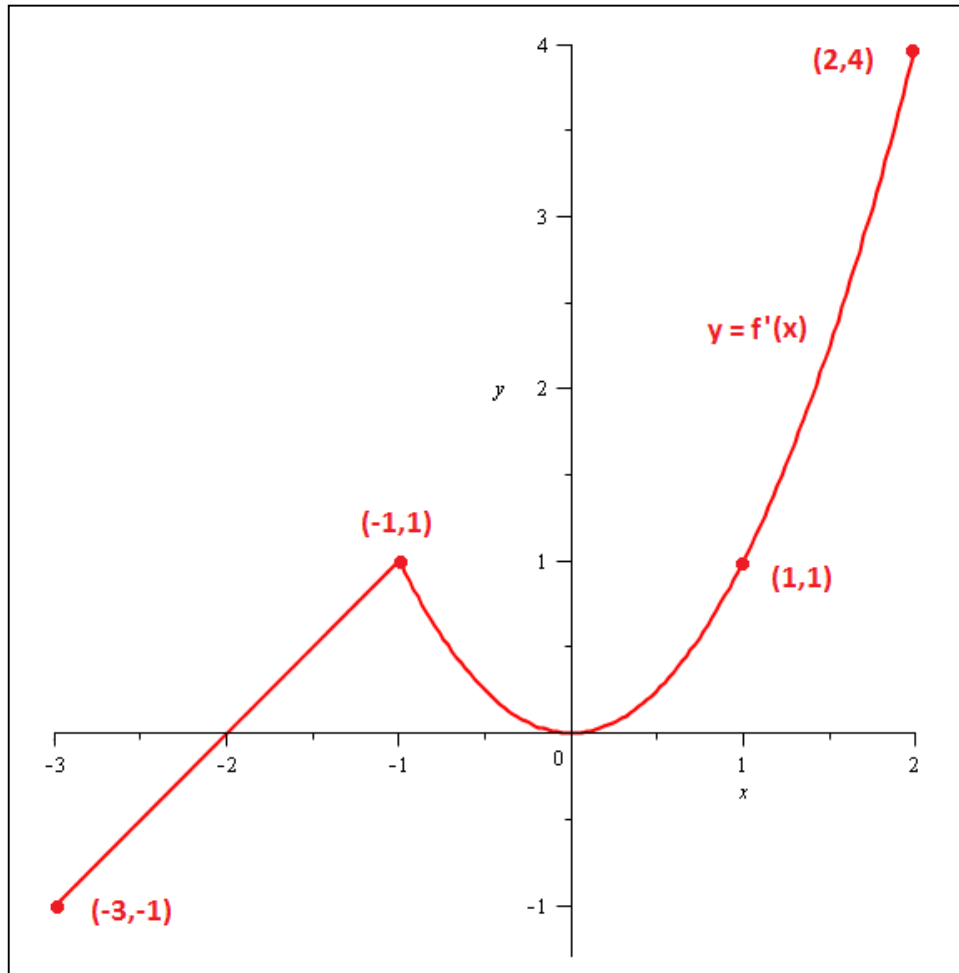
PROBLEM

Carry out a **full analysis** of the function. In other words, study the **first derivative** (intervals of increase/decrease, extreme values), the **second derivative** (concavity, points of inflection), and any other pertinent characteristics (asymptotes, cusps, etc.). Also, provide a freehand sketch based on your findings.

$$(a) \quad y = \frac{2x}{x-1}$$

$$(b) \quad f(x) = 2 - x - x^3$$

PROBLEM



The graph of f' on $[-3, 2]$ is shown.

- Where is f increasing/decreasing?
- Where are the critical numbers of f ? Which ones correspond to minima? Maxima? Neither?
- Where does f have an inflection point?
- Where is f concave upward? Downward?
- Sketch a graph for f'' .
- Sketch a graph for f .