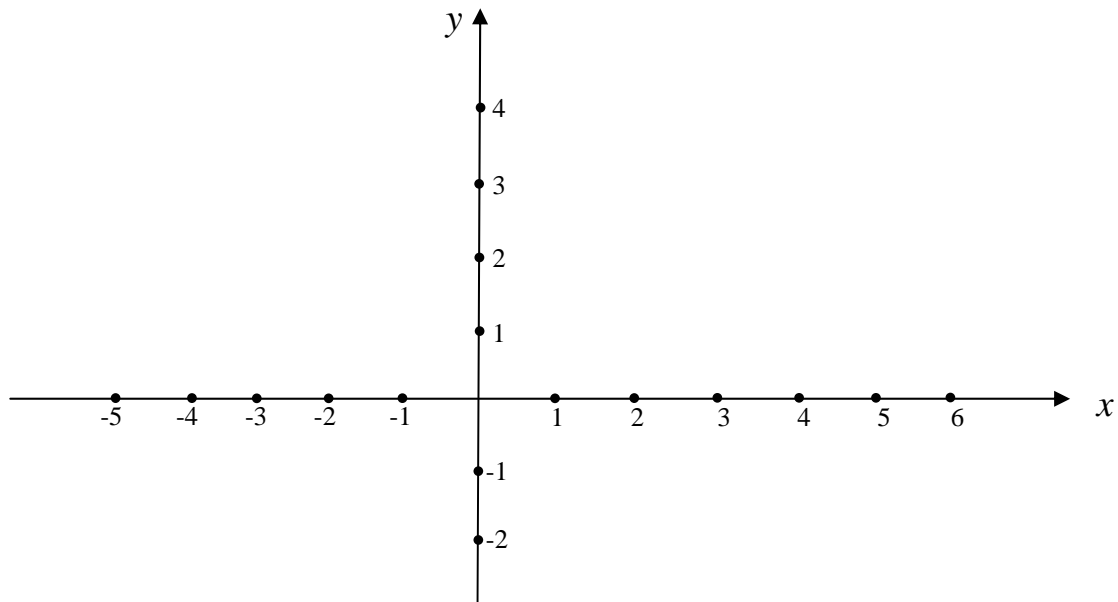


(1) (7 -points) Sketch the graph of an example of a function f that satisfies the following conditions:

- i) $\lim_{x \rightarrow (-3)^-} f(x) = 3$, ii) $\lim_{x \rightarrow (-3)^+} f(x) = -1$, iii) $f(-3) = 1$
iv) $\lim_{x \rightarrow 2} f(x) = \infty$, v) $\lim_{x \rightarrow 4^-} f(x) = -\infty$, vi) $\lim_{x \rightarrow 4^+} f(x) = 2$



(2) (6-points) If $\lim_{x \rightarrow 1} \frac{x^2 + 5kx + 7k + 11}{x^2 + 11x - 12}$ exists, then find the value of k and the value of the limit.

- (3) **(6-points)** Use limits to determine whether there is a hole or a vertical asymptote at $x = -2$ for the graph of $f(x) = \frac{2x}{x^2 - 4} - \frac{1}{x^2 + 5x + 6}$

[You must use limits to justify your answer].

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- (4) **(6-points)** Evaluate $\lim_{x \rightarrow 1^-} \frac{|x^2 + 2x - 3|}{3 - \sqrt{4x + 5}}$

- (5) (7 points) If $\lim_{x \rightarrow 2^-} f(x) = L$ and the inequality $9 - 3x \leq \frac{f(x)}{x^2 + 1} \leq -2 + 3x$ is valid for all x near to 2 from the left, find the value of L .

- (6) (8-points) Use the graph of $f(x) = \frac{x}{x-1}$ to find the largest possible value of δ such that if $|x-2| < \delta$, then $\left| \frac{x}{x-1} - 2 \right| < 0.1$.
 [Do not use a calculator and write your Answer as a rational number $\frac{p}{q}$]

