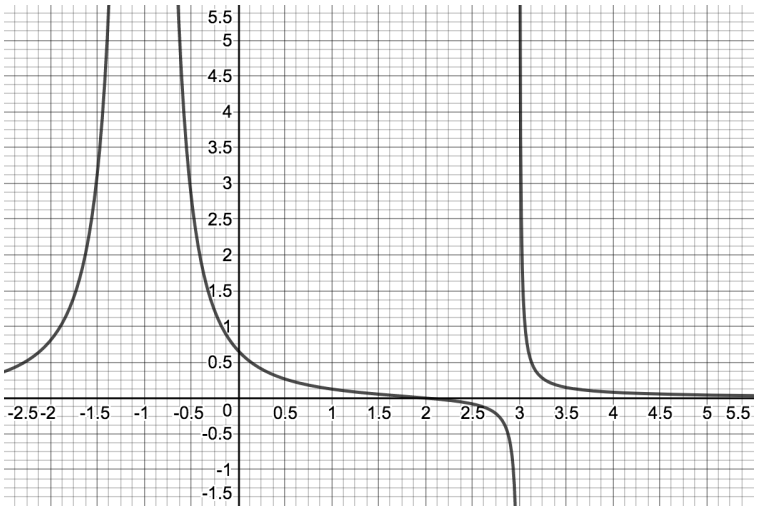
§2.4: Infinite Limits

1.] The graph of the rational functions

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

is given below. Determine the domain of this function and evaluate the following limits.



a.) $\lim_{x\to -1^-} f(x)$ *e.)* $\lim_{x\to 2^-} f(x)$ *i.)* $\lim_{x\to 3^-} f(x)$

b.) $\lim_{x\to -1^+} f(x)$ *f.)* $\lim_{x\to 2^+} f(x)$ *j.)* $\lim_{x\to 3^+} f(x)$

c.) $\lim_{x\to -1} f(x)$ *g.)* $\lim_{x\to 2} f(x)$ *k.)* $\lim_{x\to 3} f(x)$

d.) $f(-1)$ *h.)* $f(2)$ *l.)* $f(3)$

2.] Consider the following rational function:

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

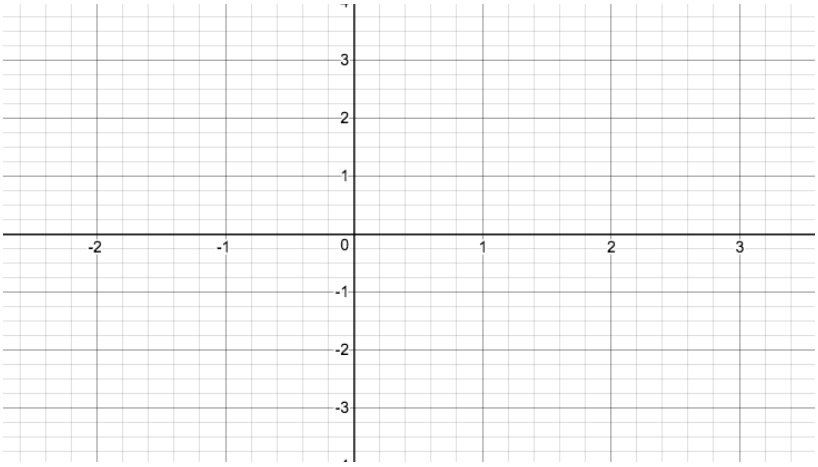
Determine the domain of this function and evaluate the following limits:

(a) $\lim_{x\to 3^-} f(x)$

(b) $\lim_{x\to 3^+} f(x)$

(c) $\lim_{x\to 3} f(x)$

3.] Let $f(x) = \dfrac{x^2 - 4x + 3}{x^2 - 1}$. Determine the domain of $f(x)$ and sketch a graph of $f(x)$ below, indicating all vertical asymptotes.



4.] Sketch a possible graph of the function $f(x)$, indicating all vertical asymptotes, that satisfies the following conditions on the interval $[0, 4]$:

$f(1) = 0$, $f(3) = \text{DNE}$, $\lim\limits_{x \to 3} f(x) = 1$, $\lim\limits_{x \to 0^+} f(x) = -\infty$, $\lim\limits_{x \to 2} f(x) = \infty$, $\lim\limits_{x \to 4^-} f(x) = \infty$