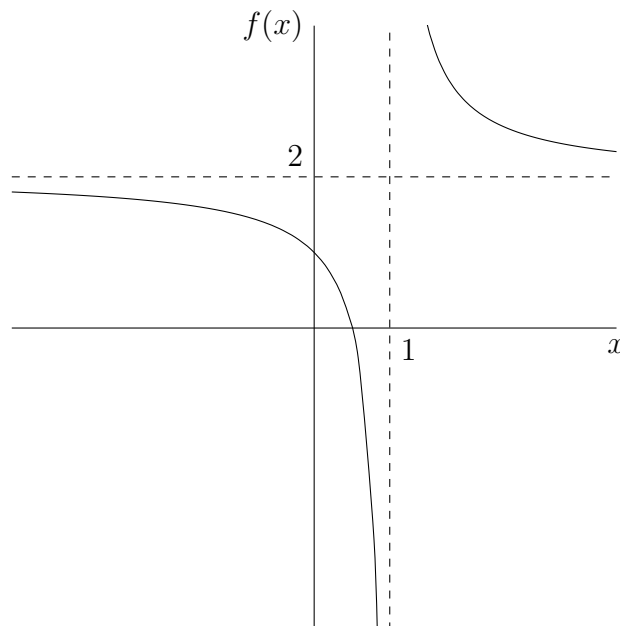


Instructions Please write your name in the upper right-hand corner of the page. Write complete sentences to explain your solutions.

1. Write down a function $f(x)$ whose graph looks like the picture. The key features of the picture are that $\lim_{x \rightarrow 1^+} f(x) = \infty$, $\lim_{x \rightarrow 1^-} f(x) = -\infty$, $\lim_{x \rightarrow \infty} f(x) = 2$, and $\lim_{x \rightarrow -\infty} f(x) = 2$. Explain the reasoning for your choice of $f(x)$.



2. The TI-89 calculator says that $\lim_{x \rightarrow 1} \left(\frac{1}{x-1} - \frac{2}{x^2-1} \right) = \frac{1}{2}$. Supply a computation that confirms this value. (Suggestion: combine the fractions with a common denominator and simplify.)

3. Find a number c such that $\lim_{x \rightarrow \infty} \left(\sqrt{x^2 + cx} - x \right) = 3$.