

1. Sketch the graph of an example of a function f that satisfies *all* of the given conditions.

(a) $f(0) = 2$

(b) $f(3) = 1$

(c) $\lim_{x \rightarrow 0} f(x) = 1$

(d) $\lim_{x \rightarrow 3^-} f(x) = -2$

(e) $\lim_{x \rightarrow 3^+} f(x) = 4$

(f) $\lim_{x \rightarrow -1^+} f(x) = \infty$

2. Sketch a graph $f(x)$ such that $\lim_{x \rightarrow 3} f(x) = \infty$.

3. (a) Use a calculator and a table of values to determine the limit: $\lim_{x \rightarrow 1^-} x \sec(\pi x/2)$.

(b) Use mathematical reasoning to show that your answer in part (a) is correct.

4. Without using a calculator, determine the (infinite) limit. Explain your reasoning.

(a) $\lim_{x \rightarrow 3^-} \frac{\sqrt{x}}{x-3}$

(b) $\lim_{x \rightarrow 3^+} \frac{\sqrt{x}}{x-3}$

(c) $\lim_{x \rightarrow 3^+} \frac{2-10x}{x-3}$

(d) $\lim_{x \rightarrow 3^+} \ln(x-3)$

(e) Why didn't we ask you to find $\lim_{x \rightarrow 3^-} \ln(x-3)$?

(f) $\lim_{x \rightarrow 0^+} \left(\frac{1}{x} - \ln(x) \right)$