

1. Sketch the graph of a single function f that satisfies all of the following conditions.

(a) $\lim_{x \rightarrow -3} f(x) = 1$

(e) $f(0) = -2$

(b) $f(-3) = -2$

(f) $\lim_{x \rightarrow 2} f(x) = 0$

(c) $\lim_{x \rightarrow 0^-} f(x) = 2$

(g) $f(2) = 0$

(d) $\lim_{x \rightarrow 0^+} f(x) = -2$

2. Sketch the graph of a single function f that satisfies all of the following conditions.

(a) $\lim_{x \rightarrow -3} f(x) = \infty$

(d) $\lim_{x \rightarrow -\infty} f(x) = 0$

(b) $\lim_{x \rightarrow 2^-} f(x) = -\infty$

(e) $\lim_{x \rightarrow \infty} f(x) = 1$

(c) $\lim_{x \rightarrow 2^+} f(x) = \infty$

3. Identify the discontinuities of the following functions. For each discontinuity you find, tell *where* it is, *why* it is a discontinuity, and *whether* or not the discontinuity is removable.

Your answers to the *why* question should be one of the following: (1) $f(a)$ is not defined, (2) $\lim_{x \rightarrow a} f(x)$ does not exist, or (3) $\lim_{x \rightarrow a} f(x) \neq f(a)$.

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

(b) $f(x) = \frac{3 - \sqrt{x}}{x - 9}$

(c) $f(x) = \frac{x - 7}{|x - 7|}$