

GRAPHS AND LIMITS

1. Sketch a graph of the function, then use the graph to help find the limits.

$$\text{a) } f(x) = \begin{cases} -x & \text{if } x < 0 \\ x & \text{if } x > 0 \end{cases}$$



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

c) Is $f(0)$ defined?

2. Sketch a graph of the function, then use the graph to answer questions about the limits of the function.

$$\text{a) } f(x) = \begin{cases} (x + 1)^2 & \text{if } x \leq 0 \\ x^2 + 1 & \text{if } x > 0 \end{cases}$$



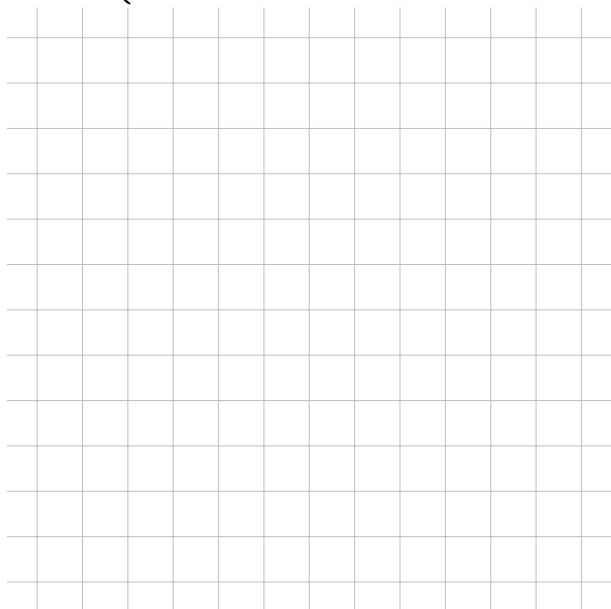
b) $\lim_{x \rightarrow -1} f(x) =$

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

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

3. Sketch a graph of the function, then use the graph to answer questions about the limits of the function.

$$a) f(x) = \begin{cases} 1 - x & \text{if } x < 1 \\ (x - 2)^2 & \text{if } x \geq 1 \end{cases}$$



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

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

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

4. The altitude of a model rocket (in meters) t seconds after launch is given by

$$h(t) = \begin{cases} 40t^2 & \text{if } t \leq 2 \\ 160 + 160(t - 2) - 4(t - 2)^2 & \text{if } t > 2 \end{cases}$$

a) Why do you think this is a piecewise function?

b) Sketch a graph of the rocket's height for $t \geq 0$.



c) Is $h(t)$ continuous? Should it be continuous?