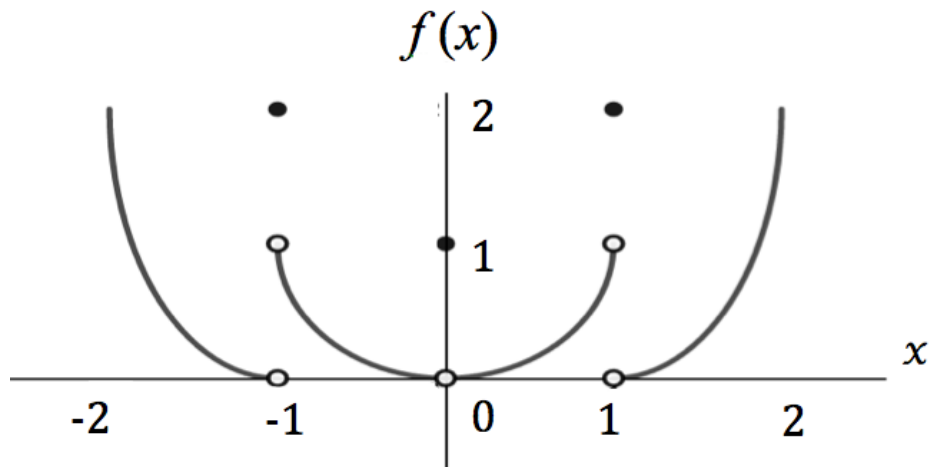


## Creating Limit Windows with Index Cards – Class Handout

Use the function  $f(x)$  to answer the problems below. For each problem, answer the question, and also record notes about any observations you make while using the index cards to evaluate various limits.



**Example 1:** Use the index cards to evaluate the  $\lim_{x \rightarrow 0^+} f(x)$  and  $\lim_{x \rightarrow 0^-} f(x)$ .

**Example 2:** Use the index cards to evaluate the  $\lim_{x \rightarrow 0} f(x)$ .

1. What is the value of  $f(0)$ ? Is this the same or different from  $\lim_{x \rightarrow 0} f(x)$ ? What is different about how we use the cards to evaluate the limit in Example 1 and how we evaluate the function at 0?
2. How is the process of finding the limit in Example 1 different from the process found in Example 2? How do the index cards show the difference?
3. Use cards to evaluate  $\lim_{x \rightarrow 1^+} f(x)$ .
4. Use cards to evaluate  $\lim_{x \rightarrow 1^-} f(x)$ .
5. Use cards to evaluate  $\lim_{x \rightarrow 1} f(x)$ .
6. What is the same or different about using the cards to evaluate  $\lim_{x \rightarrow 1} f(x)$  and  $\lim_{x \rightarrow 0} f(x)$ ?
7. Use cards to evaluate  $\lim_{x \rightarrow -1^+} f(x)$ .
8. Use cards to evaluate  $\lim_{x \rightarrow -1^-} f(x)$ .
9. Use cards to evaluate  $\lim_{x \rightarrow -1} f(x)$ .
10. Use cards to evaluate  $\lim_{x \rightarrow \frac{1}{2}} f(x)$ . You will need to estimate the approximate location of  $1/2$  on the graph as well as estimate the value of the limit. How is this limit the same or different from the one in Example 1?