

# 1 | The Limit Notation

## 1.1 | Single-Sided Limits

["What is  $y$  approaching when  $x$  approaches  $a$  from the right (+)?"] Right Single-Sided Limit  $\{\lim_{x \rightarrow a^+} f(x)\}$   
 ["What is  $y$  approaching when  $x$  approaches  $a$  from the left (-)?"] Left Single-Sided Limit  $\{\lim_{x \rightarrow a^-} f(x)\}$   
**Watch!** If both the left and right single-sided limit exists and is the same, the Double-Sided Limit exists.

## 1.2 | Double-sided Limits

["What is  $y$  approaching when  $x$  approaches  $a$ ?"] This exists only if  $\lim_{x \rightarrow a^-} f(x) = \lim_{x \rightarrow a^+} f(x)$  [Left Single-Sided Limit]  $\{\lim_{x \rightarrow a} f(x)\}$  **Vocab!** When the Double-Sided Limit does not exist, it is called **DOES NOT EXIST!**. It is not! *undefined*