

There are more than one type of limits. There is the traditional limit:

$$\lim_{x \rightarrow c} f(x)$$

which simply is read as the limit of the function  $f(x)$  as  $x$  approaches  $c$ . There are more than just this first type, however.

**Types** We define  $\lim_{x \rightarrow c}$  to be:

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

which should be read as: *the limit of  $f(x)$  as  $x$  approaches  $c$  is equal to the limit of  $f(x)$  as  $x$  approaches  $c$  from the right side and equal to the limit of  $f(x)$  as  $x$  approaches  $c$  from the left side.* If  $\lim_{x \rightarrow c^+} f(x) \neq \lim_{x \rightarrow c^-} f(x)$ , we say that the limit of  $f(x)$  at  $c$  must not exist. Let's take a look at a graph:

