The function \( f \) has limit \( L \) as \( x \) approaches \( a \), denoted
\[
\lim_{x \to a} f(x) = L,
\]
means that we can make \( f(x) \) as close to \( L \) as we like by making \( x \) sufficiently close to \( a \), but not equal to \( a \).

The function \( f \) has a right-hand limit \( L \) as \( x \) approaches \( a \), denoted
\[
\lim_{x \to a^+} f(x) = L,
\]
means we can make \( f(x) \) as close to \( L \) as we like by taking \( x \) sufficiently close, but not equal, to \( a \) and \( x \) to the right of \( a \).

The function \( f \) has a left-hand limit \( L \) as \( x \) approaches \( a \), denoted
\[
\lim_{x \to a^-} f(x) = L,
\]
means we can make \( f(x) \) as close to \( L \) as we like by taking \( x \) sufficiently close, but not equal, to \( a \) and \( x \) to the left of \( a \).