Limits

- \( \lim_{x \to a} f(x) = L \) if \( \forall \varepsilon > 0 \exists \delta > 0 \) such that \( 0 < |x - a| < \delta \implies |f(x) - L| < \varepsilon \)

A function is continuous at \( x = a \) if \( \lim_{x \to a} f(x) = f(a) \).

Existence of \( \lim_{x \to a} f(x) \) if and only if \( \lim_{x \to a^+} f(x) = \lim_{x \to a^-} f(x) \).

For a function \( f(x) \) to be continuous at \( x = a \), the following conditions must be satisfied:
1. \( f(a) \) is defined.
2. \( \lim_{x \to a} f(x) \) exists.
3. \( \lim_{x \to a} f(x) = f(a) \).

For any \( x \to a \), \( f(x) \to L \) if and only if \( \lim_{x \to a} f(x) = L \).

For any \( x \to a \), \( f(x) \to L \) if and only if \( \lim_{x \to a} f(x) = L \).