

1.1 Limit

A real valued function f is said to ^{tend to} a limit l as x approaches c if, given any $\epsilon > 0$, $\exists \delta > 0$ such that

$$|f(x) - l| < \epsilon, \text{ when } 0 < |x - c| < \delta$$

In symbols, we write

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

Example 2.1 Evaluate

$$(a) \lim_{x \rightarrow c} \frac{1}{x} = \frac{1}{c}, \text{ if } c > 0$$

$$(b) \lim_{x \rightarrow c} x^2 = c^2$$

$$(c) \lim_{x \rightarrow 2} \frac{x^3 - 4}{x^2 + 1} = \frac{4}{5}$$

Solution (a) Let $f(x) = \frac{1}{x}$ for $x > 0$