LIMIT DEFINITIONS

MINSEON SHIN

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The statement

$$\text{``} \lim_{x \to (Q)} f(x) = (P) \text{''} \tag{1}$$

is defined as

"For every (A), there exists (B) such that if (C) then (D)" $\tag{2}$

using the following tables:

(P)	(A)	(D)
L	$\epsilon > 0$	$|f(x) - L| < \epsilon$
∞	$N > 0$	$f(x) > N$
$-\infty$	$N < 0$	$f(x) < N$

(Q)	(B)	(C)
a	$\delta > 0$	$0 < |x - a| < \delta$
a^+	$\delta > 0$	$0 < x - a < \delta$
a^-	$\delta > 0$	$-\delta < x - a < 0$
∞	$M > 0$	$x > M$
$-\infty$	$M < 0$	$x < M$

For example, the statement

$$\text{``} \lim_{x \to 0^-} \frac{1}{x} = -\infty \text{''}$$

is defined as

"For every $N < 0$, there exists $\delta > 0$ such that if $-\delta < x - 0 < 0$ then $\frac{1}{x} < N$"

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