Infinite Limits

$f(x) = 1/(x-1)$

x	$1/(x-1)$
0.8	-5
0.9	-10
0.99	-100
0.999	-1000
0.9999	-10000

← High Increments

$f(x) = 1/(x-1)$

$x \to 1^-$

↓

$f(x) = -\infty$

$x \to 1^-$

↑

This is $-\infty$ as x approaches 1 from the left and $f(x)$ becomes a very large negative number.

x	$1/(x-1)$
1.2	5
1.1	10
1.01	100
1.001	1000
1.0001	10000

← High Increments

$f(x) = 1/(x-1)$

$x \to 1^+$

$f(x) = \infty$

$x \to 1^+$

↑

This is ∞ as x approaches 1 from the right and $f(x)$ becomes a large positive number.

Since the two one-sided limits are not in agreement, then $\lim_{x \to 1} \frac{1}{x-1}$ do not exist.

Infinite Limit

$$\lim_{x \to 0^-} \frac{1}{x^4} = \infty$$

x	$1/x^4$
-1	1
-0.5	16
-0.1	10000
-0.01	1×10^8
-0.001	1×10^{12}

$$\lim_{x \to 0^-} \frac{1}{x^4} = \infty$$

x	$1/x^4$
1	1
0.5	16
0.1	10000
0.01	1×10^8
0.001	1×10^{12}

$$\lim_{x \to 0^+} \frac{1}{x^4} = \infty$$

Since Both Sides Agree,

$$\lim_{x \to 0} \frac{1}{x^4} = \infty$$