Infinite Limits

By $\lim_{x \to a^+} f(x) = \infty$ we mean a x approaches a from the right hand side in the domain f(x) increases without bound. By $\lim_{x \to a^+} f(x) = -\infty$ we mean a x approaches a from the right hand side in the domain f(x) decreases without bound.

We have a similar interpretation for $\lim_{x \to a^-} f(x) = \infty \text{or} -\infty$ only now we approach a from the left hand side.

Formally by $\lim_{x \to a^+} f(x) = \infty$ we mean given any number M there exists a number δ such that f(x) > M whenever a < x < a + δ .

Similar interpretation for $\lim_{x \to a^-} f(x) = \infty$ we mean given any number M there exists a number δ such that f(x) > M whenever a - δ < x < a .

Formally by $\lim_{x \to a^+} f(x) = -\infty$ we mean given any number M there exists a number δ such that f(x) < M whenever a < x < a + δ .

Similar interpretation for $\lim_{x \to a^-} f(x) = -\infty$ we mean given any number M there exists a number δ such that f(x) < M whenever a - δ < x < a .