Limits

Andrew Taylor

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1 Limits

Definition 1. *Let a_n be a sequence. The limit of a_n is A if and only if for all $\epsilon > 0$ there exists a natural number N such that*

$$|a_n - A| < \epsilon$$

for all $n > N$.

We write this as

$$\lim_{n\to\infty} a_n = A$$

and say the sequence a_n converges to A.

Definition 2. *Let f be a real-valued function and let a be a real number. The limit of f as x approaches a is L if and only if for all $\epsilon > 0$ there exists a $\delta > 0$ such that*

$$|f(x) - L| < \epsilon$$

for all

$$0 < |x - a| < \delta$$

We write this as

$$\lim_{x\to a} f(x) = L$$