Why

Once we have a notion of distance, we can define a more general notion of convergence.

Definition

Let (X, d) be a metric space and let $(x_n)_{n \in \mathbb{N}}$ be a sequence in X. A *limit* $(x_n)_{n \in \mathbb{N}}$ is an element $x \in X$ for which $d(x, x_n) \to 0$.

Metric Limits

Metrics

Distance

Space Distance — Real Limits

Absolute Value — Plane Distance

Interval Length

Intervals

Real Line — Real Plane — Real Space

Integral Line — Real Order — Real Sequences

Geometry — Real Numbers

Rational Numbers — Sequences

Integer Arithmetic — Direct Products — Set Numbers

Natural Additive Identity — Natural Multiplicative Identity — Finite Sets

Arithmetic — Identity Elements

Integer Products — Natural Powers — Operations — Equivalent Sets

Integer Sums — Natural Products — Family Unions and Intersections — Function Inverses

Integer Numbers — Natural Sums — Families — Function Composites — Function Images

Recursion Theorem — Natural Order — Equivalence Relations — Functions

Peano Axioms — Relations

Natural Induction — Set Products

Natural Numbers — Generalized Set Dualities — Set Powers

Set Dualities — Set Unions and Intersections — Successor Sets — Intersection of Empty Set — Unordered Triples — Partitions

Set Complements — Pair Unions — Set Intersections — Ordered Pairs

Set Differences — Pair Intersections — Set Unions

Empty Set — Unordered Pairs

Set Specification

Set Inclusion

Standardized Accounts

Accounts

Deductions

Quantified Statements

Logical Statements

Statements

Sets — Identities

Names

Letters — Objects