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 $(x_n)_{n \in \mathbf{N}}$ be a sequence in X. A *limit* $(x_n)_{n \in \mathbf{N}}$ 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 — Sequences

Rational Numbers — Set Numbers — Direct Products

Integer Arithmetic — Finite Sets

Natural Additive Identity — Natural Multiplicative Identity

Arithmetic — Identity Elements — Equivalent Sets — Function Inverses — Family Unions and Intersections

Integer Sums — Integer Products — Natural Powers — Operations — Comparisons — Function Images — Function Composites — Families

Integer Numbers — Natural Products — Equivalence Relations — Converse Relations — Orders — Functions

Natural Sums — Relations — Natural Order

Recursion Theorem

Peano Axioms

Natural Induction — Set Products

Set Powers — Generalized Set Dualities

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

Set Intersections — Pair Unions — Ordered Pairs — Set Complements

Set Differences — Set Unions — Pair Intersections

Unordered Pairs — Empty Set

Set Specification

Set Inclusion

Standardized Accounts

Accounts

Deductions

Quantified Statements

Logical Statements

Statements

Sets — Identities

Names

Letters — Objects