Why

Toward defining the length of a subset of real numbers, we start by defining the length of an interval.

Definition

The *length* of an interval is the difference of its endpoints: the larger less the smaller.

Notation

Let a, b be real numbers which satisfy the relation $a < b$. The length of (a, b), $[a, b]$ $[a, b)$ and $(a, b]$ is, in each case, $b - a$.

For example, the length of the interval $(0, 1)$ is 1.

Interval Length

Intervals

Real Line

Real Order

Real Numbers   Rational Order

Integral Line   Rational Numbers

Integer Arithmetic   Natural Fractions

Natural Multiplicative Identity   Natural Additive Identity   Integer Products

Identity Elements   Natural Arithmetic

Natural Powers   Integer Sums   Integer Order

Operations   Natural Products   Integer Numbers   Comparisons

Functions   Equivalence Relations   Natural Sums   Orders   Converse Relations

Recursion Theorem   Natural Order   Relations

Peano Axioms   Ordered Pair Projections

Natural Induction   Set Products

Natural Numbers   Set Powers   Ordered Pairs

Partitions   Intersection of Empty Set   Successor Sets   Unordered Triples

Set Intersections   Set Symmetric Differences   Pair Unions

Pair Intersections   Set Complements   Set Unions

Set Differences   Empty Set   Unordered Pairs

Geometry   Set Specification

Set Equality

Set Inclusion

Deductions

Quantified Statements

Logical Statements

Statements

Sets   Identities

Names

Letters   Objects