Why

Definition

Let A be a set and let $\leq$ be an order[1] on A.

An *upper bound* for $B \subset A$ is an element $a \in A$ so that $b \leq a$ for all $b \in B$. A set is *bounded from above* if it has a least upper bound. A *least upper bound* for B is an element $c \in A$ so that c is an upper bound and $c < a$ for all other upper bounds a.

Proposition 1. *If there is a least upper bound it is unique.*[2]

We call the unique least upper bound of a set (if it exists) the *supremum*.

Properties

We denote the supremum of a set $B \subset A$ by $\sup A$.

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[1]To be defined in future editions, but understood in the usual way. See Natural Order or Integer Order or Rational Order etc.

[2]Proof in future editions.

Least Upper Bounds

Real Order

Real Numbers

Rational Numbers

Integer Arithmetic

Natural Additive Identity

Natural Multiplicative Identity

Arithmetic

Identity Elements

Integer Products

Natural Exponents

Operations

Integer Sums

Natural Products

Functions

Integer Numbers

Natural Sums

Equivalence Relations

Recursion Theorem

Peano Axioms

Relations

Natural Induction

Cartesian Products

Natural Numbers

Set Powers

Partitions

Intersection of Empty Set

Successor Sets

Unordered Triples

Set Intersections

Pair Unions

Ordered Pairs

Set Unions

Set Differences

Pair Intersections

Empty Set

Unordered Pairs

Set Specification

Set Inclusion

Standardized Accounts

Definitions

Accounts

Deductions

Quantified Statements

Logical Statements

Statements

Identities

Sets

Names

Objects

Letters