Why

We can think of a list of two numbers as displacement in the plane, and a list of three numbers as displacement in space. More generally, we can think of a list of n numbers as displacement in $\mathbf{R}^n$. Moreover, we can define algebraic operations on the points in $\mathbf{R}^n$ which have geometric interpretations.

Definition

A *vector* (*real vector*) is a list of real numbers.

Result

For $x, y \in \mathbf{R}^n$, define $x + y$ by

$$(x_1 + y_1, \ldots, x_n + y_n)$$

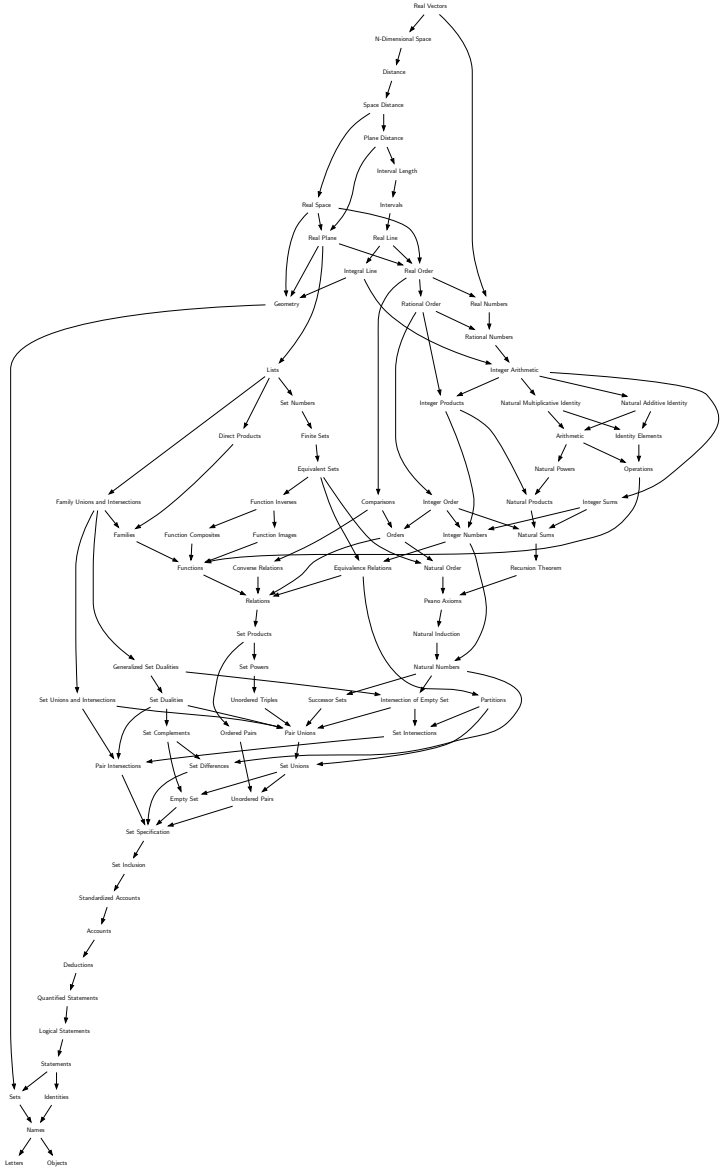
and for $\alpha \in \mathbf{R}$, define $\alpha \cdot x$

$$(\alpha x_1, \ldots, \alpha x_n).$$

Note on terminology

The etymology of the word "vector" is from the Latin "vector," meaning, literally, carrier. This sense is from the interpretation of a vector as indicating a displacement.[1]

[1] Future editions may elide this discussion.


Real Vectors
N-Dimensional Space
Distance
Space Distance
Plane Distance
Interval Length
Real Space
Intervals
Real Plane
Real Line
Integral Line
Real Order
Geometry
Rational Order
Real Numbers
Rational Numbers
Lists
Integer Arithmetic
Set Numbers
Integer Products
Natural Multiplicative Identity
Natural Additive Identity
Direct Products
Finite Sets
Arithmetic
Identity Elements
Equivalent Sets
Natural Powers
Operations
Family Unions and Intersections
Function Inverses
Comparisons
Integer Order
Natural Products
Integer Sums
Families
Function Composites
Function Images
Orders
Integer Numbers
Natural Sums
Functions
Convene Relations
Equivalence Relations
Natural Order
Recursion Theorem
Relations
Peano Axioms
Set Products
Natural Induction
Generalized Set Dualities
Set Powers
Natural Numbers
Set Unions and Intersections
Set Dualities
Unordered Triples
Successor Sets
Intersection of Empty Set
Partitions
Set Complements
Ordered Pairs
Pair Unions
Set Intersections
Pair Intersections
Set Differences
Set Unions
Empty Set
Unordered Pairs
Set Specification
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Sets
Identities
Names
Letters
Objects