Why

We can define algebraic operations on the points in $\mathbf{R}^n$ which have geometric interpretations.

Result

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

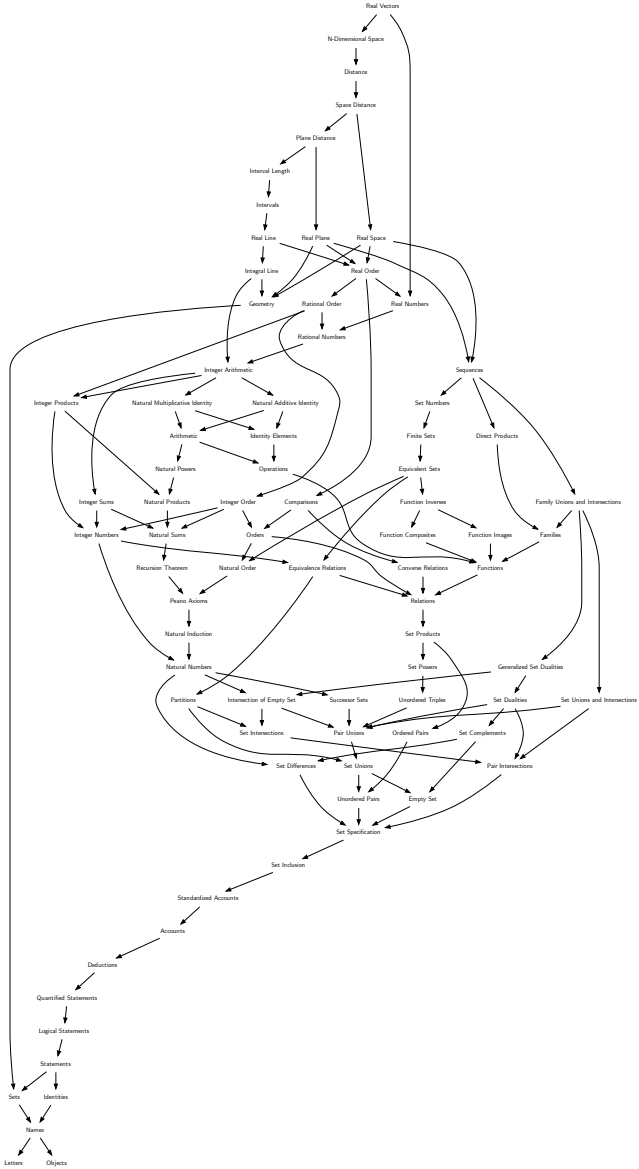
$$(x_1 + y_1, \ldots, x_n + y_n)$$

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

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

Proposition 1. *$\mathbf{R}^n$ is a vector space of dimension n over $\mathbf{R}$ with $+$ and $\cdot$.*

For this reason, we call elements of $\mathbf{R}^n$ *(real) vectors.*


Real Vectors
N-Dimensional Space
Distance
Space Distance
Plane Distance
Interval Length
Intervals
Real Line
Real Plane
Real Space
Integral Line
Real Order
Geometry
Rational Order
Real Numbers
Rational Numbers
Integer Arithmetic
Sequences
Integer Products
Natural Multiplicative Identity
Natural Additive Identity
Set Numbers
Arithmetic
Identity Elements
Finite Sets
Direct Products
Natural Powers
Operations
Equivalent Sets
Integer Sums
Natural Products
Integer Order
Comparisons
Function Inverses
Family Unions and Intersections
Integer Numbers
Natural Sums
Orders
Function Composites
Function Images
Families
Recursion Theorem
Natural Order
Equivalence Relations
Converse Relations
Functions
Peano Axioms
Relations
Natural Induction
Set Products
Natural Numbers
Set Powers
Generalized Set Dualities
Partitions
Intersection of Empty Set
Successor Sets
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