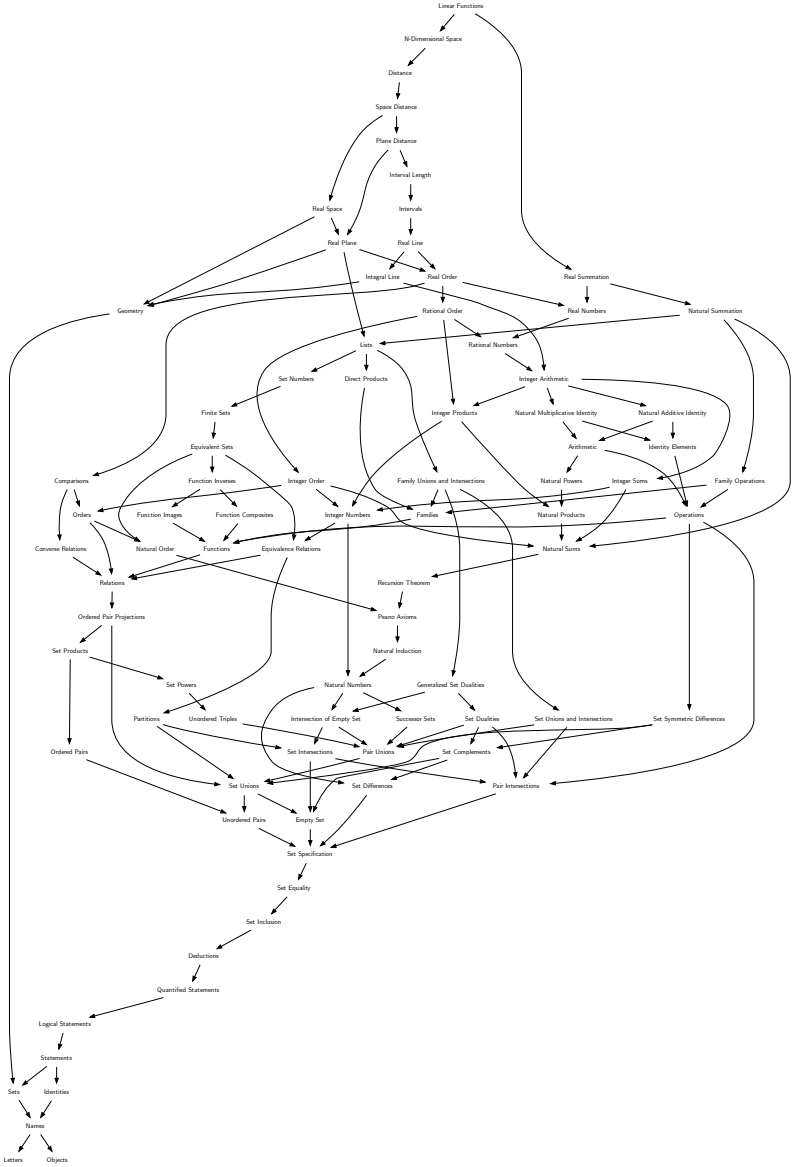
Definition

A function $f : \mathbf{R}^n \to \mathbf{R}$ is *linear* if

1. $f(x + y) = f(x) + f(y)$ for all $x, y \in \mathbf{R}^n$ and
2. $f(\alpha x) = \alpha f(x)$ for all $x \in \mathbf{R}^n$ and $\alpha \in \mathbf{R}$.

There are simple consequences to these conditions. For example, $f(0) = 0$.


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