### Why

[1]

### Definition

A *convex set* contains every closed line segement between any two points. Every affine set is convex.

#### Notation

Let $x$ and $y$ in $\mathbf{R}^n$. We can express the closed line segment between $x$ and $y$ as

$$\{x + a(y - x) \mid 0 \leq a \leq 1, x, y \in \mathbf{R}^n\}.$$

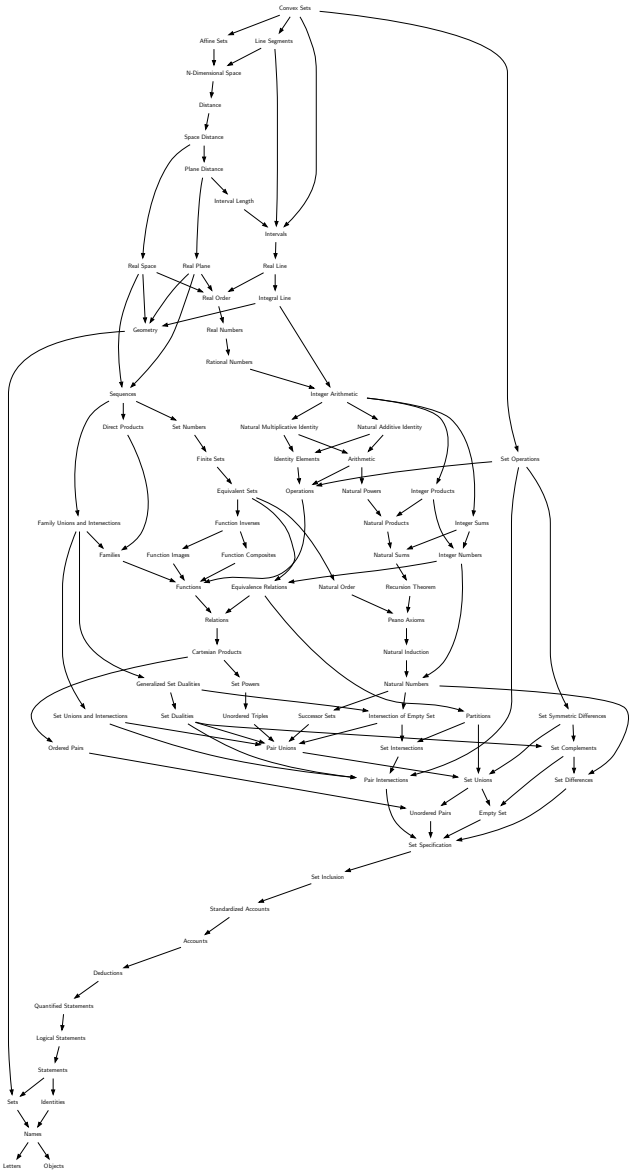
Notice that $x + a(y - x) = (1 - a)x + ay$.

**Prop. 1.** *Every affine set is convex.*

**Prop. 2.** *The intersection of a family of convex sets is convex.*

**Prop. 3.** *The translate of a convex set is convex. The scalar multiple of a convex set si convex.*

[1] Future editions will include.


Convex Sets
Affine Sets
Line Segments
N-Dimensional Space
Distance
Space Distance
Plane Distance
Interval Length
Intervals
Real Space
Real Plane
Real Line
Real Order
Integral Line
Geometry
Real Numbers
Rational Numbers
Sequences
Integer Arithmetic
Direct Products
Set Numbers
Natural Multiplicative Identity
Natural Additive Identity
Finite Sets
Identity Elements
Arithmetic
Set Operations
Equivalent Sets
Operations
Natural Powers
Integer Products
Family Unions and Intersections
Function Inverses
Natural Products
Integer Sums
Families
Function Images
Function Composites
Natural Sums
Integer Numbers
Functions
Equivalence Relations
Natural Order
Recursion Theorem
Relations
Peano Axioms
Cartesian 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 Symmetric Differences
Ordered Pairs
Pair Unions
Set Intersections
Set Complements
Pair Intersections
Set Unions
Set Differences
Unordered Pairs
Empty Set
Set Specification
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Sets
Identities
Names
Letters
Objects