Why

We are constantly thinking of the R^2 as points of a plane.[1]

Discussion

We commonly associate elements of R^2 with points on a plane. (see Geometry).

Principle 1 (Line Sets)**.** *Given a plane, there exists a set of its (infinite) lines.*

Principle 2 (Real Plane Correspondence)**.** *Let L be the set of lines of a plane. Then $\cup L$ is the set of points of the plane. There exists a one-to-one correspondence mapping elements of $\cup L$ onto elements of R^2.*

For this reason, we sometimes call elements of R^2 *points*. We call the point associated with $(0, 0)$ the *origin*. We call the element of R^2 which corresponds to a point the *coordinates* of the point.

Visualization

To visualize the correspondence we draw two perpendicular lines. We then associate a point of the line with $(0, 0) \in \mathsf{R}^2$. We can label it so. We then pick a unit length. And proceed as usual.[2]

Given that we have identified a plane with R^2 in this manner, we call $(x, y) \in \mathsf{R}^2$ the *coordinates* of the point it corresponds to. Many authors refer to this identification as a *Cartesian coordinate system* (or *Rectangular coordinate system*, *x-y coordinate system*).

[1] Future editions will modify this sheet.

[2] Future editions will expand this.

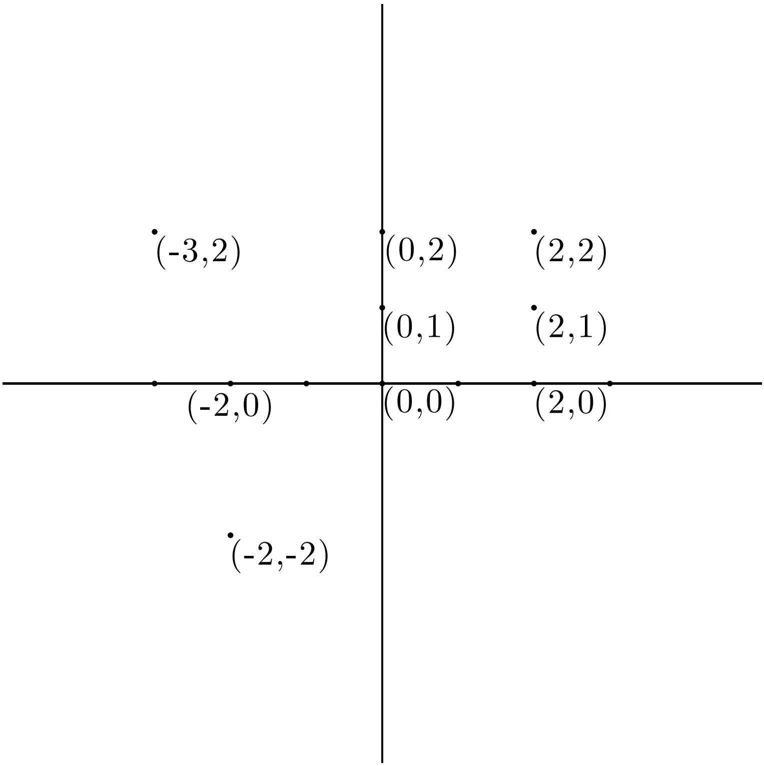
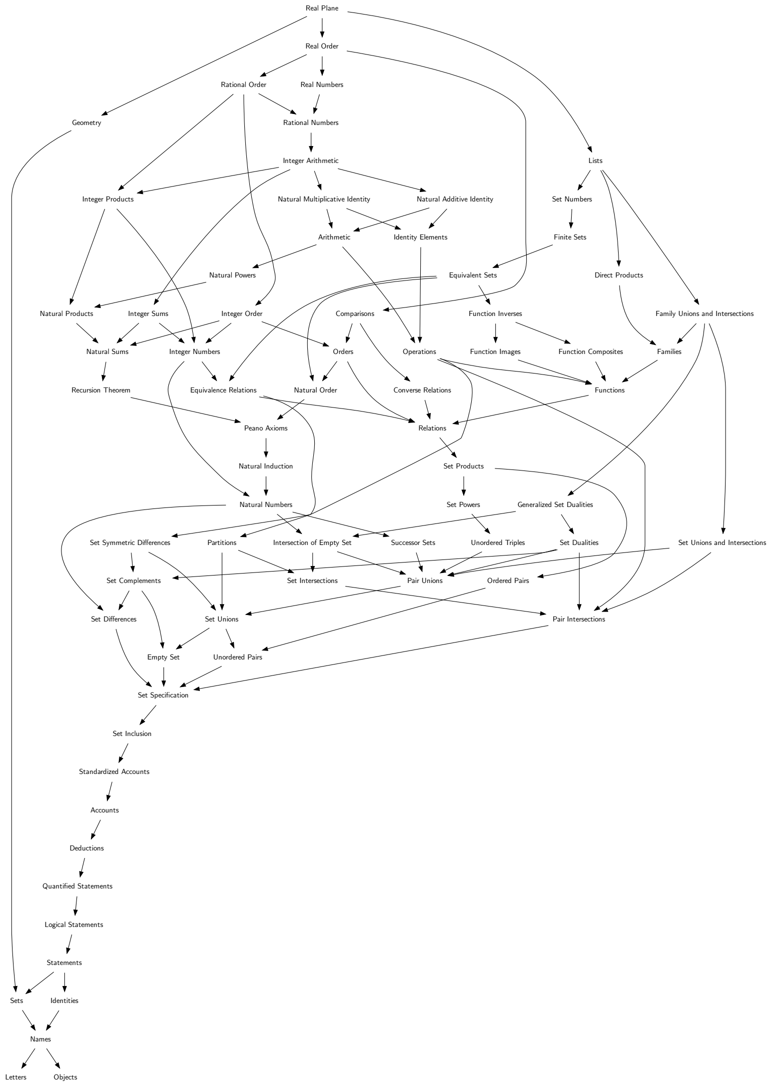


Figure 1: The real plane


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