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]

[1] Future editions will modify this sheet.

[2] Future editions will expand this.

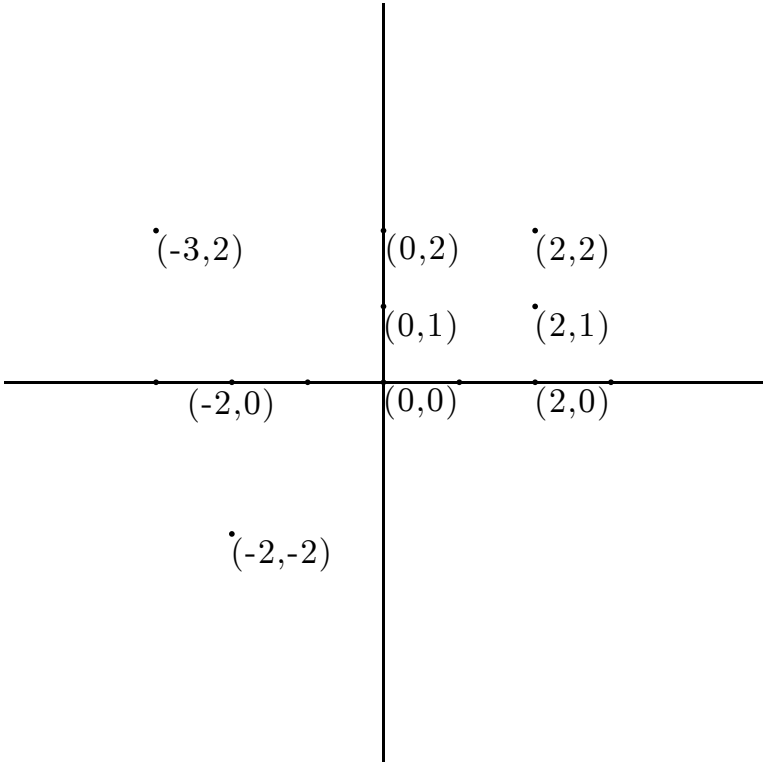
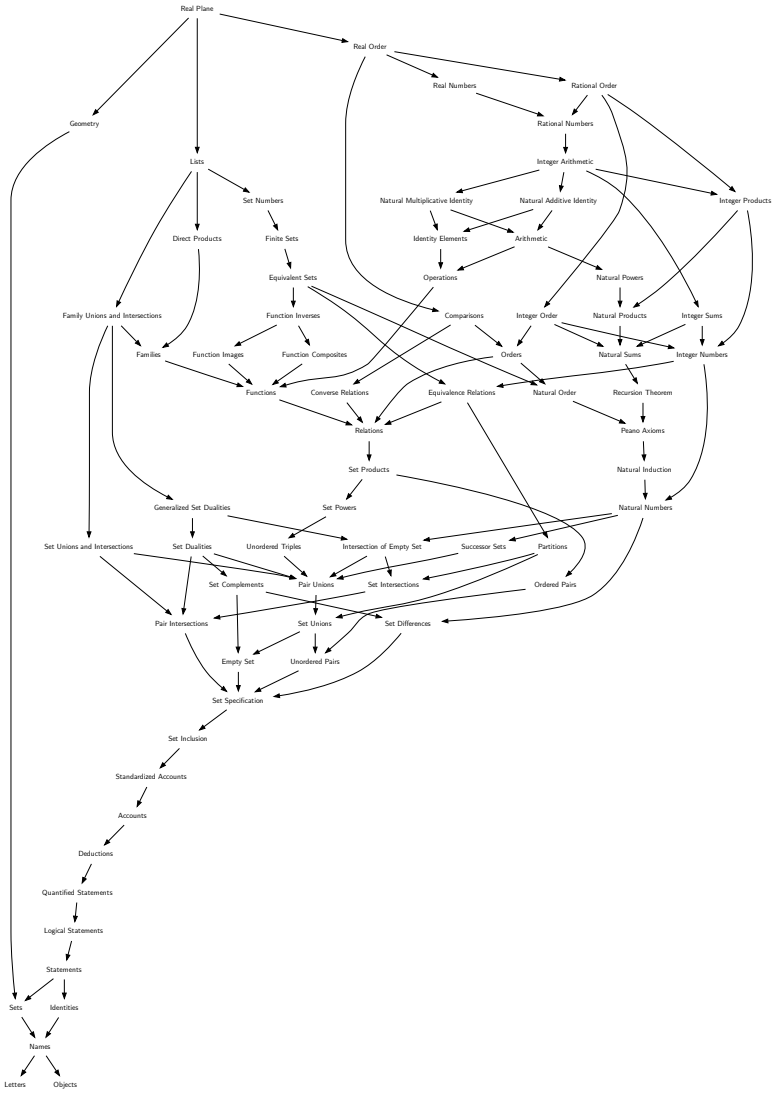


Figure 1: The real plane

Given that we have identified a plane with $\mathbf{R}^2$ in this manner, we call $(x, y) \in \mathbf{R}^2$ 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*).


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