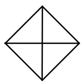


Why

We identified points in $\mathbf{R}^2$ with elements of the plane in a natural way.[1]

Definition

Let $(x, y) \in \mathbf{R}^2$. Then $(r, \theta) \in \mathbf{R}^2$ is the *polar form* or *circular form* of (x, y) if

$$x = r\cos\theta \quad \text{and} \quad y = r\sin\theta.$$

In this case we call r and θ the *circular coordinates* or *polar coordinates*.

Since sin and cos polar coordinates are not unique.

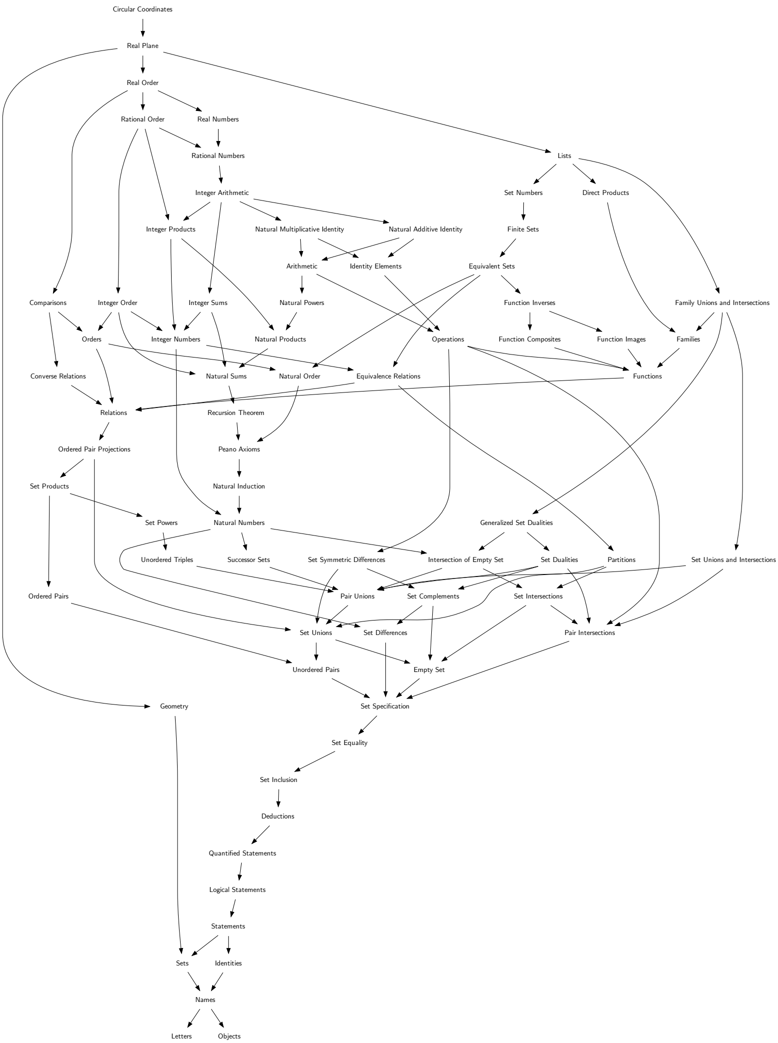
Non-uniqueness

A difficulty with polar coordinates is that there are many elements of $\mathbf{R}^2$ that correspond to the same point in the plane. For example, consider the points

$$(5, \pi/3), (5, -5\pi/3), (-5, 4\pi/3), (-5, -2\pi/3).$$

Each of these specifies the same point in $\mathbf{R}^2$.

[1] Future editions will expand on this in the genetic approach, and likely reference celestial motion.


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