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.

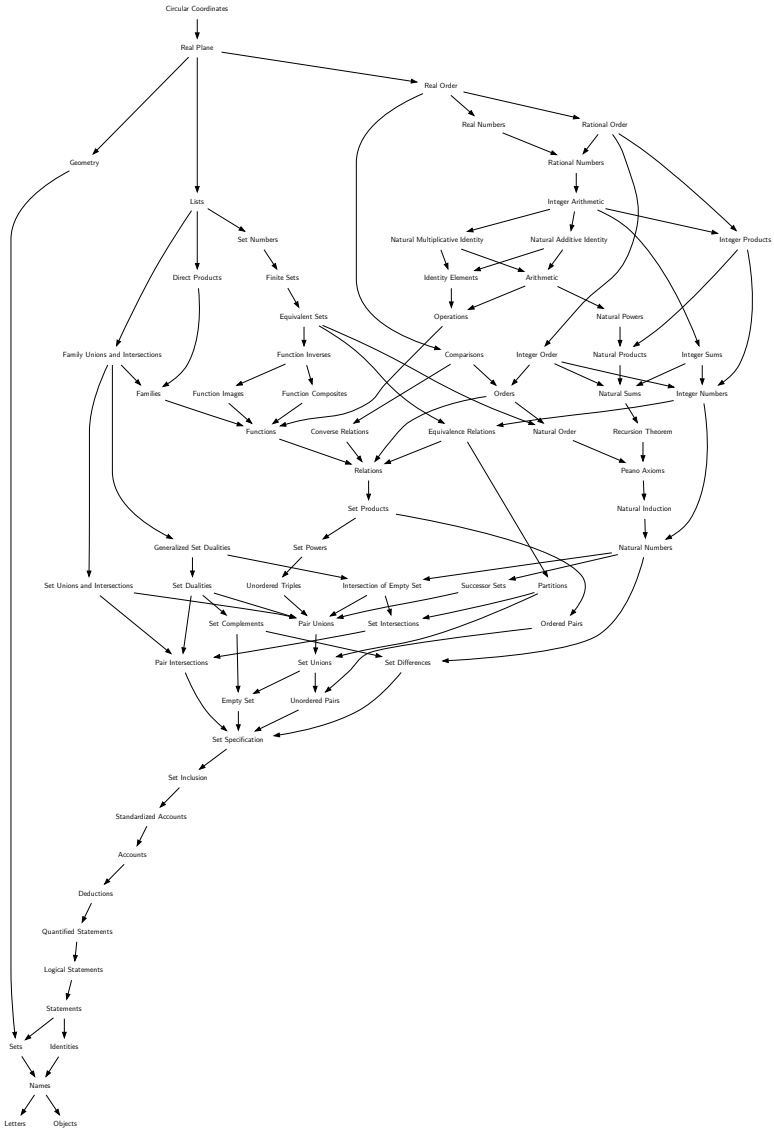
Non-uniqueness

A difficult 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
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