Why

[1]

Definition

A subset $M \subset \mathbf{R}^n$ is a *smooth manifold* of dimension d if for every $x \in M$, there exists a neighborhood V of x in X that is diffeomorphic to an open subset U of $\mathbf{R}^d$. In this case we say that the set is *locally diffeomorphic* to $\mathbf{R}^d$.

A diffeomorphism $\phi : U \to V$ is called a *parameterization* of the neighborhood of V. Its inverse diffeomorphism ϕ^{-1} is called a *coordinate system* (or system of *coordinates*) on V.

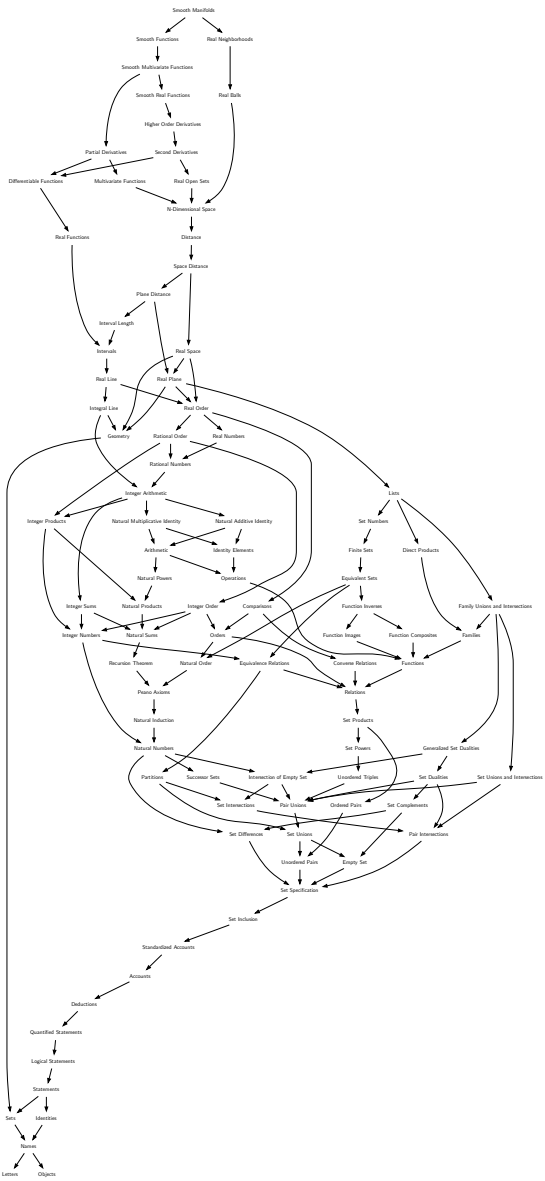
Notation

We denote the dimension of a manifold M by $\dim M$.

Submanifolds

If X and Z are both manifolds in R^n and $Z \subset X$, then we call Z a *submanifold* of X. In particular, X is a submanifold of R^n. Any open set of a manifold X is a submanifold X.[2]

[1] Future editions will include.
[2] Future editions will expand.


Smooth Manifolds
Smooth Functions
Real Neighborhoods
Smooth Multivariate Functions
Smooth Real Functions
Real Balls
Higher Order Derivatives
Partial Derivatives
Second Derivatives
Differentiable Functions
Multivariate Functions
Real Open Sets
N-Dimensional Space
Real Functions
Distance
Space Distance
Plane Distance
Interval Length
Intervals
Real Space
Real Line
Real Plane
Integral Line
Real Order
Geometry
Rational Order
Real Numbers
Rational Numbers
Integer Arithmetic
Lists
Integer Products
Natural Multiplicative Identity
Natural Additive Identity
Set Numbers
Arithmetic
Identity Elements
Finite Sets
Direct Products
Natural Powers
Operations
Equivalent Sets
Integer Sums
Natural Products
Integer Order
Comparisons
Function Inverses
Family Unions and Intersections
Integer Numbers
Natural Sums
Orders
Function Images
Function Composites
Families
Recursion Theorem
Natural Order
Equivalence Relations
Converse Relations
Functions
Peano Axioms
Relations
Natural Induction
Set Products
Natural Numbers
Set Powers
Generalized Set Dualities
Partitions
Successor Sets
Intersection of Empty Set
Unordered Triples
Set Dualities
Set Unions and Intersections
Set Intersections
Pair Unions
Ordered Pairs
Set Complements
Set Differences
Set Unions
Pair Intersections
Unordered Pairs
Empty Set
Set Specification
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Sets
Identities
Names
Letters
Objects