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.

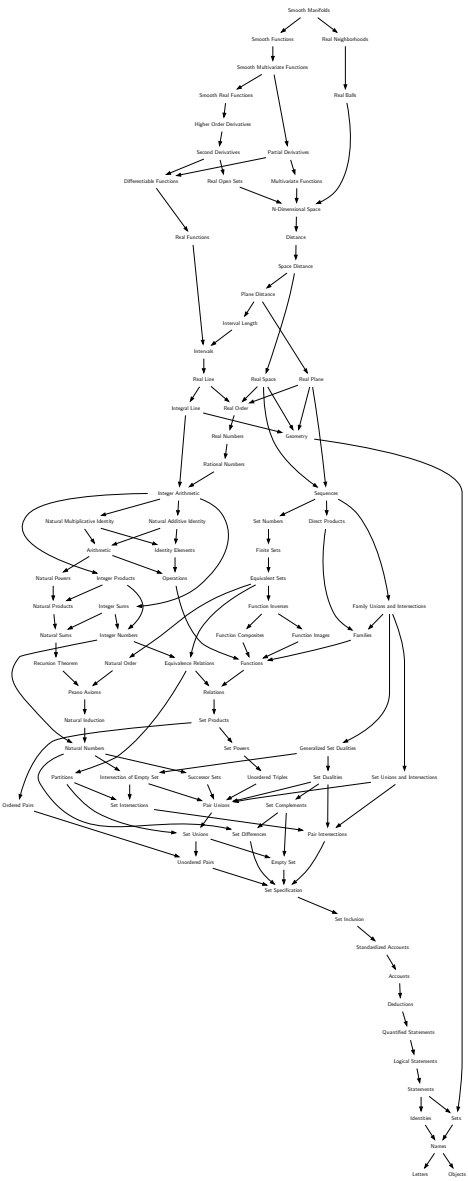
Notation

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