Why

If we have two manifolds, is there product a manifold?

Result

The answer is yes.

Proposition 1. *Let X and Y be manifolds. Then $X \times Y$ is a manifold and $\dim X \times Y = \dim X + \dim Y$.*[1]

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[1]Future editions will include an account.

Product Manifolds

Smooth Manifolds

Smooth Functions — Real Neighborhoods

Smooth Multivariate Functions

Smooth Real Functions — Real Balls

Higher Order Derivatives

Second Derivatives — Partial Derivatives

Real Open Sets — Differentiable Functions — Multivariate Functions

N-Dimensional Space

Real Functions — Distance

Space Distance

Plane Distance

Interval Length

Intervals

Real Space — Real Plane — Real Line — Real Order

Integral Line

Geometry — Real Numbers — Rational Order

Rational Numbers

Lists — Integer Arithmetic

Direct Products — Set Number — Integer Products

Finite Sets — Natural Additive Identity — Natural Multiplicative Identity

Equivalent Sets — Identity Elements — Arithmetic

Family Unions and Intersections — Function Inverses — Comparisons — Integer Order — Integer Sums — Natural Powers

Families — Function Composites — Function Images — Operation — Order — Integer Numbers — Natural Products

Functions — Converse Relations — Equivalence Relations — Natural Order — Natural Sums

Relations — Recursion Theorem

Ordered Pair Projections — 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 Symmetric Differences

Ordered Pairs — Pair Unions — Set Intersections — Set Complements

Pair Intersection — Set Unions — Set Differences

Unordered Pairs — Empty Set

Set Specification

Set Equality

Set Inclusion

Deductions

Quantified Statements

Logical Statements

Statements

Sets — Identities

Names

Letters — Objects