Why

What is the distance between two points in a plane?

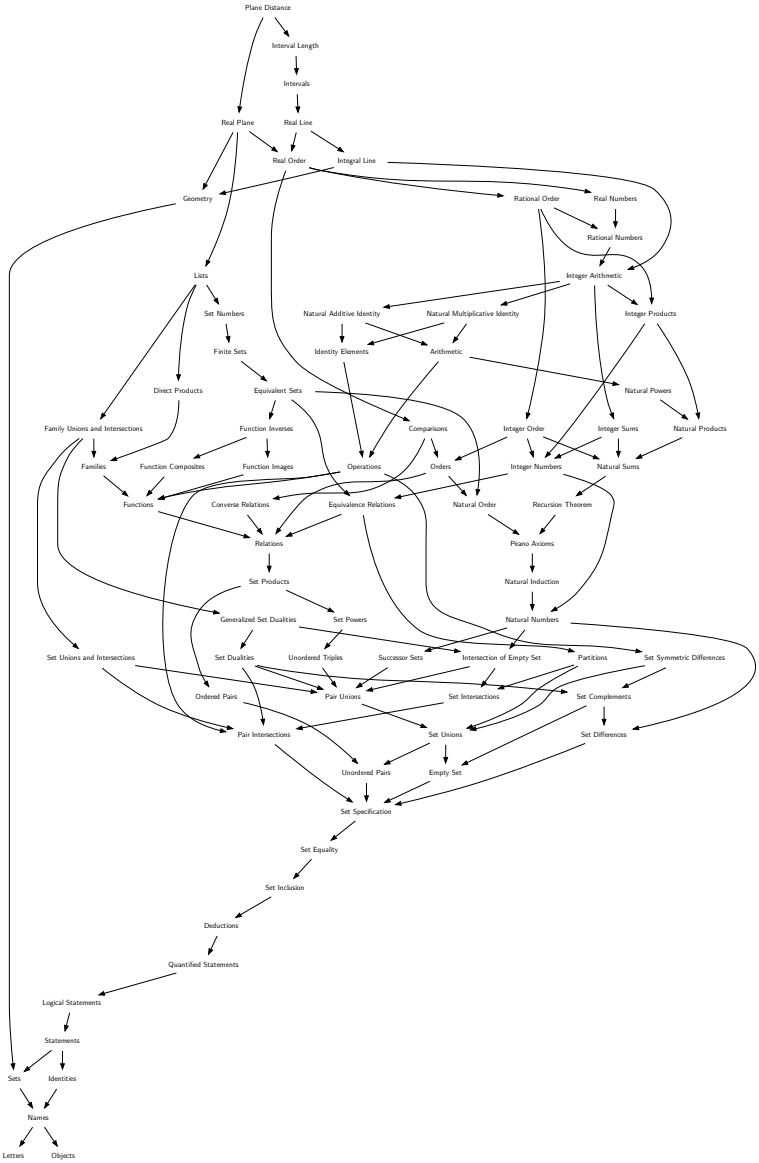
Definition

We define the distance between two points in the plane as the length of the line segment connecting them.[1] In terms of their coordinates $(x_1, x_2), (y_1, y_2) \in \mathbf{R}^2$, the *plane distance* of two points is

$$\sqrt{(x_1 - y_1)^2 + (x_2 - y_2)^2}.$$

This is sometimes referred to as the *Euclidean distance*. We have thus defined a function mapping $\mathbf{R}^2 \times \mathbf{R}^2$ into $\mathbf{R}$.

[1] This intuition will be expanded in future editions.


Plane Distance
Interval Length
Intervals
Real Plane
Real Line
Real Order
Integral Line
Geometry
Rational Order
Real Numbers
Rational Numbers
Integer Arithmetic
Lists
Set Numbers
Natural Additive Identity
Natural Multiplicative Identity
Integer Products
Finite Sets
Identity Elements
Arithmetic
Natural Powers
Direct Products
Equivalent Sets
Comparisons
Integer Order
Integer Sums
Natural Products
Family Unions and Intersections
Function Inverses
Families
Function Composites
Function Images
Operations
Orders
Integer Numbers
Natural Sums
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
Successor Sets
Intersection of Empty Set
Partitions
Set Symmetric Differences
Ordered Pairs
Pair Unions
Set Intersections
Set Complements
Pair Intersections
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