Why

We want to talk about the size of a displacement.[1]

Definition

The *norm* of a vector $x \in \mathbf{R}^2$ is

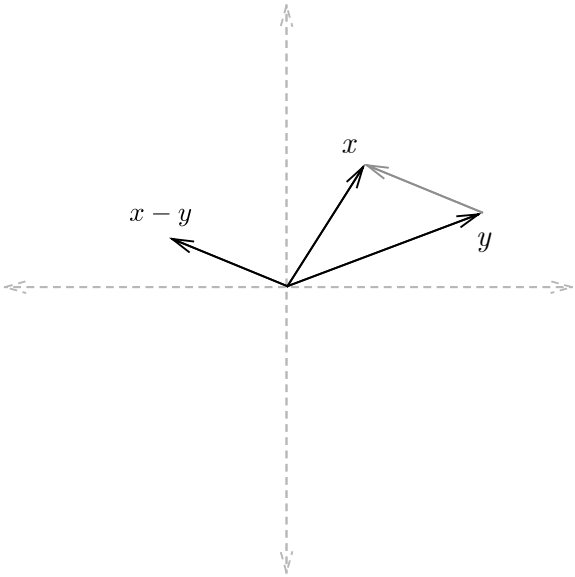
$$\sqrt{x_1^2 + x_2^2}.$$

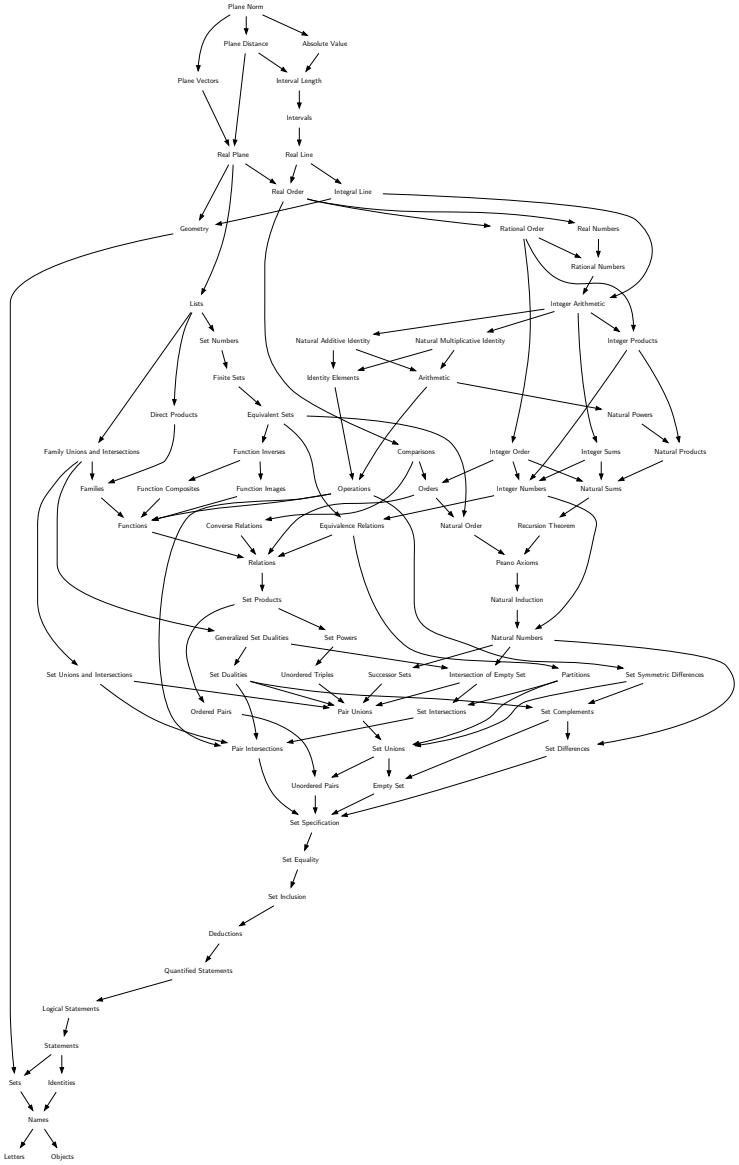
Notation

We denote the norm of x by $\|x\|$. In other words, $\|\cdot\| : \mathbf{R}^2 \to \mathbf{R}$ is a function from vectors in $\mathbf{R}^2$ to real numbers. The notation follows the notation of absolute value, the *magnitude* of a real number, and the double verticals remind us that x is a vector. A warning: some authors write $|x|$ for the norm of x when it is understood that $x \in \mathbf{R}^2$.

[1] Future editions will complete.

Visualization




Plane Norm
Plane Distance
Absolute Value
Plane Vectors
Interval Length
Intervals
Real Plane
Real Line
Real Order
Integral Line
Geometry
Rational Order
Real Numbers
Rational Numbers
Lists
Integer Arithmetic
Set Numbers
Natural Additive Identity
Natural Multiplicative Identity
Integer Products
Finite Sets
Identity Elements
Arithmetic
Natural Powers
Direct Products
Equivalent Sets
Family Unions and Intersections
Function Inverses
Comparisons
Integer Order
Integer Sums
Natural Products
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
Pair Unions
Ordered Pairs
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