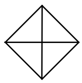


Why

We are constantly thinking of the real numbers as the points of a line.[1]

Discussion

We commonly associate elements of the real numbers (see Real Numbers) with points on a line (see Geometry).

Principle 1 (Point Sets). *Given a line, there exists a set of its (infinite) points.*

Principle 2 (Real Line Correspondence). *Let P be the set of points for a line. There exists a one-to-one correspondence mapping elements of P onto elements of R.*

For this reason, we sometimes call elements of the real numbers *points*. We call the point associated with 0 the *origin*.

Visualization

To visualize the correspondence we draw a line. We then associate a point of the line with the $0 \in \mathsf{R}$. We can label it so. We then pick a unit length. We associate the points a unit length away from zero with $1 \in \mathsf{R}$ (on the right) and $-1 \in \mathsf{R}$ (on the left). We do the same for two and 2 and -2, 3 and -3, and then we say that we could continue the process indefinitely. We can visualize the image in Figure 1.

[1] Future editions will modify this sheet.

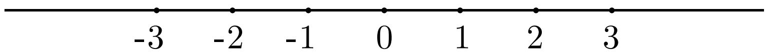
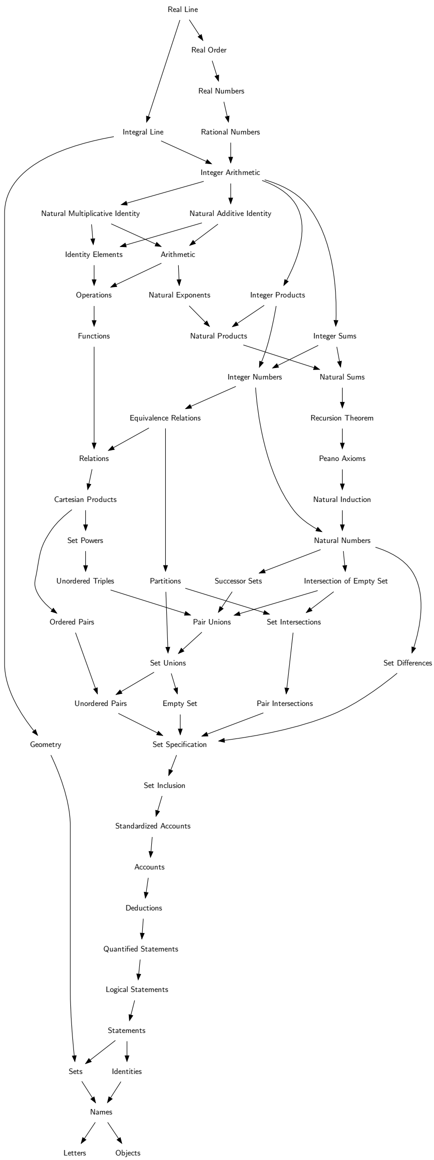


Figure 1: The real line


Real Line
Real Order
Real Numbers
Integral Line
Rational Numbers
Integer Arithmetic
Natural Multiplicative Identity
Natural Additive Identity
Identity Elements
Arithmetic
Operations
Natural Exponents
Integer Products
Functions
Natural Products
Integer Sums
Integer Numbers
Natural Sums
Equivalence Relations
Recursion Theorem
Relations
Peano Axioms
Cartesian Products
Natural Induction
Set Powers
Natural Numbers
Unordered Triples
Partitions
Successor Sets
Intersection of Empty Set
Ordered Pairs
Pair Unions
Set Intersections
Set Unions
Set Differences
Unordered Pairs
Empty Set
Pair Intersections
Geometry
Set Specification
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Sets
Identities
Names
Letters
Objects