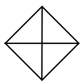


Why

We want fractions.[1]

Definition

Consider $\mathsf{Z} \times (\mathsf{Z} - \{0_{\mathsf{Z}}\})$. We say that the elements (a, b) and (c, d) of this set are *rational equivalent* if $ad = bc$. Briefly, the intuition is that (a, b) represents a over b, or in the usual notation "a/b". So this equivalence relation says these two are the same if $a/b = c/d$ or else $ad = bc$.

Proposition 1. *Rational equivalence is an equivalence relation on* $\mathsf{Z} \times (\mathsf{Z} - \{0_{\mathsf{Z}}\})$.

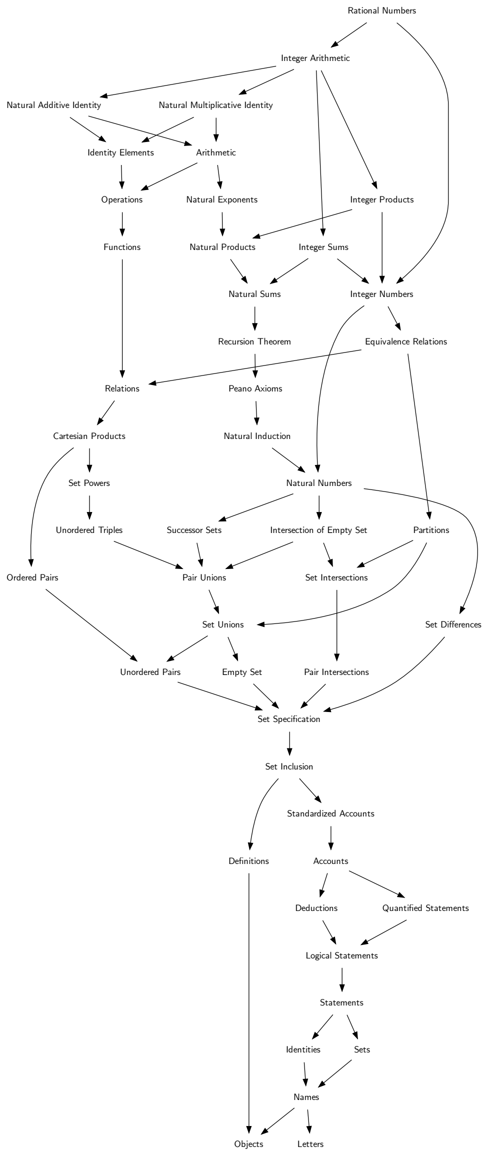
We define the *set of rational numbers* to be the set of equivalence classes (see *Equivalence Classes*) under ratioanl equivalence on $\mathsf{Z} \times (\mathsf{Z} - \{0_{\mathsf{Z}}\})$. We call an element of the set of ratioanl numbers a *rational number* or *rational.* We call the set of rational numbers the *set of rationals* or *rationals* for short.

Notation

We denote the set of rationals by Q.[2] If we denote rational equivalence by $\sim$ then $\mathsf{Q} = (\mathsf{Z} \times (\mathsf{Z} - \{0_{\mathsf{Z}}\}))/ \sim$.

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

[2] From what we can tell so far, Q is a mnemonic for "quantity", from the latin "quantitas".


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