Why

How do inverse and converse relations interact.

Results

Let R be a relation between X and Y and let S be a relation between Y and Z.

Proposition 1. $(RS)^{-1} = S^{-1}R^{-1}$

Identity relations

Recall that I is the identity relation on X if $x\,I\,y$ if and only if $x = y$.

Proposition 2. *Let R be a relation on X. Let I be the identity relation on X. Then $RI = IR = R$.*

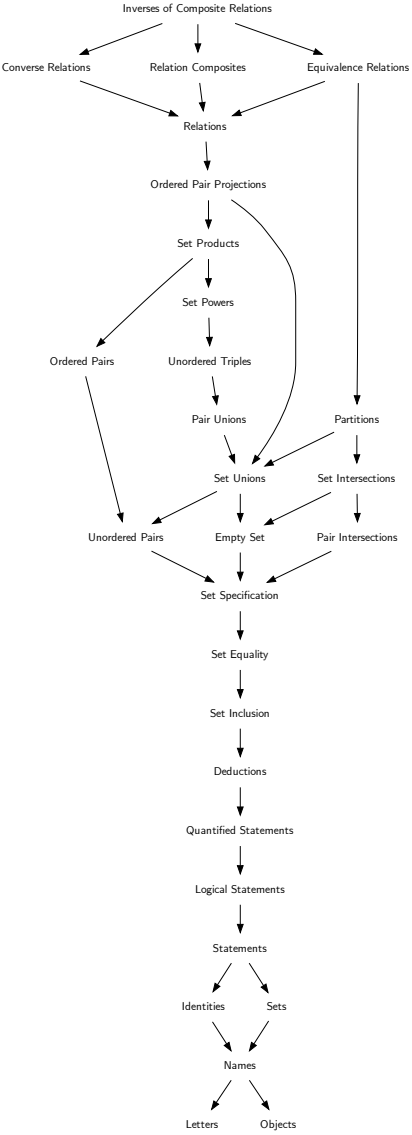
One would like $RR^{-1} \supset I$, $R^{-1}R \supset I$. The father of the son is the father and the son of the father is the son. But the empty relation violates these claims.

Relation properties

Proposition 3. *R is symmetric if and only if $R \subset R^{-1}$*

Proposition 4. *R is reflextive if and only if $I \subset R$*

Proposition 5. *R is transitive if and only if $RR \subset R$.*


Inverses of Composite Relations
Converse Relations
Relation Composites
Equivalence Relations
Relations
Ordered Pair Projections
Set Products
Set Powers
Ordered Pairs
Unordered Triples
Pair Unions
Partitions
Set Unions
Set Intersections
Unordered Pairs
Empty Set
Pair Intersections
Set Specification
Set Equality
Set Inclusion
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects