



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 reflexive if and only if $I \subset R$*

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

