

Asymmetric relation

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In [mathematics](#), an **asymmetric relation** is a [binary relation](#) on a set X where:

- For all a and b in X , if a is related to b , then b is not related to a .^[1]

In mathematical notation, this is:

An example is the "[less than](#)" relation $<$ between [real numbers](#): if $x < y$, then necessarily y is not less than x . The "less than or equal" relation \leq , on the other hand, is not asymmetric, because reversing $x \leq y$ produces $y \leq x$ and both are true. In general, any relation in which $x R x$ holds for some x (that is, which is not [irreflexive](#)) is also not asymmetric.

Asymmetry is not the same thing as "not [symmetric](#)": the less-than-or-equal relation is an example of a relation that is neither symmetric nor asymmetric. The empty relation is the only relation that is ([vacuously](#)) both symmetric and asymmetric.

A relation is asymmetric if and only if it is both [antisymmetric](#) and [irreflexive](#)

From https://en.wikipedia.org/wiki/Asymmetric_relation