Types of Relations on a Set

For a non-empty set A, a relation R on A is categorized as:

1. Reflexive:

If $(a, a) \in R, "a \in A.$

i.e. $aRa, "a \in A$

Is equal to", "is a friend of", "is parallel to", are some of reflexive relations.

2. Symmetric:

If aRb

$\Rightarrow$ $b\ R\ a, "\ a, b\ \in$

i.e. if $(a, b) \in R$

$\Rightarrow$ $(b, a) \in R, "a, b \in A$

"is a friend of", "is parallel to", "is equal to", are some of symmetric relations.

3. Anti-Symmetric:

If aRb and bRa

$\Rightarrow$ $a = b, "a, b \in A$

(If $R \cap R^{-1} =$ Identity, then R is anti-symmetric) "Is divisible by" is an antisymmetric relation.

4. Transitive:

If aRb and bRc

$\Rightarrow$ $a\ R\ c, "\ a, b, c\ \in\ A$

i.e. $(a, b) \in R$ and $(b, c) \in R$

$\Rightarrow$ $(a, c) \in R, "a, b, c \in A$

Is parallel to", "is equal to", "is congruent to" are some of the transitive relation.