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**PROPERTIES OF A RELATION**

There are three important properties of Relations which are as follows:
• **Reflexive Property:** A relation in which all the elements follow the property A→→A. i.e.
All the elements are related to themselves is known as reflexive relation.
If for all x in set X, the relation G = xRx holds true then G is said to be reflexive otherwise it would be irreflexive.

• **Symmetric Property:** A relation in which all the elements follow the property such that, if A→→B then B→→A is said to be Symmetric relation.
If for all x and y in X, the relation G = xRy = yRx holds true then G is said to be Symmetric otherwise it would be antisymmetric.

• **Transitive Property:** A relation in which all the elements follow the property such that, if A→→B and B→→C then A→→C is said to be Transitive relation.
It is possible that a relation may not have any one of the above mentioned properties, it may have some of these properties or it might agree to all the properties.
A relation on a set A is called an equivalence relation if it has all the above 3 properties, that is, if its reflexive, symmetric and transitive.

**EXAMPLE:** Let B is a set equals to [11, 12, 13, 4, 5] and R be the relation as [(11, 11), (11, 12), (11, 13), (11, 4), (11, 5), (12, 12), (12, 4), (12, 5), (13, 13), (13, 4), (13, 5), (4, 4), (4, 5), (5, 5)]. Find if the relation is reflexive, symmetric and antisymmetric.
**Solution:** The relation R is reflexive, as (11, 11), (12, 12), (13, 13), (4, 4) and (5, 5) are all in R.
R is not symmetric because (11, 12) ϵϵ R but (12, 11) /ϵ⧸ϵ R.
R is antisymmetric as there is no pair (x, y) in R for which (y, x) is also in R, except for (11, 11), (12, 12), (13, 13), (4, 4) and (5, 5).