**Overview**

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**1 Relations and Functions**

In mathematics, relation defines the relationship or connection between two sets of information.

**1.1 Types of Relations**

* Empty Relation
* Universal Relation
* Identity Relation
* Inverse Relation
* Reflexive Relation
* Symmetric Relation
* Transitive Relation
* Equivalence Relation

Amongst all these, our main focus will be on

Reflexive, Symmetric and Transitive

Reflexive:

Symmetric: If , then .

Transitive: If and , then

**1.2 Types of Functions**

Depending upon their nature, functions can be of 2 types

* One – One: A function is said to be One – One if each and every element in has a unique image in .
* Many – One: A function is said to be Many – One if each and every element in doesn’t have a unique image in .

To check whether a function is One – One or Many – One, we will check whether the function is monotonic or not, that is whether the function is strictly increasing or decreasing.

We can do so, by simply differentiating the function. If the derivative (1’st) of the function that is , is greater than 0 or less than 0, then it is said to be monotonic. If it becomes equal to zero, then its not monotonic and hence it will also be One – One. Else it will be many one.