Definition 3.70. [23X] *A relation R between elements of A is said to be:*

- ***reflexive*** *if xRx for any $x \in A$;*
- ***irreflexive*** *or* ***anti-reflexive*** *if $\neg xRx$ for any $x \in A$;*
- ***symmetric*** *if xRy implies yRx for any $x, y \in A$;*
- ***antisymmetric*** *if aRb and bRa imply $a = b$, for any $a, b \in A$;*
- ***trichotomous*** *if for all $x, y \in A$ one and exactly one of xRy, yRx and $x = y$ holds;*
- ***transitive*** *if xRy and yRz imply xRz, for any $x, y, z \in A$.*

A relation R between elements of A and elements of B is said to be:

- ***injective*** *(also called left-unique) if xRy and zRy imply $x = z$, for any $x, z \in A, y \in B$;*
- ***functional*** *(also called right-unique) if xRy and xRz imply $y = z$, for any $x \in A, y, z \in B$; such a binary relation is called a "partial function" (see also [1YR], [01P]);*
- ***total*** *(also called "left-total") if for any $x \in A$ there is a $y \in B$ such that xRy;*
- ***surjective*** *(also called "right-total") if for any $y \in B$ there is a $x \in A$ such that xRy.*