Date.....

Combining Relations:

Let $A = \{1,2,3\}$, $B = \{1,2,3,4\}$

$R_1 = \{(1,1),(2,2),(3,3)\}$ $\quad$ $R_2 = \{(1,1),(1,2),(1,3)(1,4)\}$

$R_1 \cup R_2 = \{(1,1),(2,2),(3,3),(1,2),(1,3),(1,4)\}$

$R_1 \cap R_2 = \{(1,1)\}$

$R_1 - R_2 = \{(2,2),(3,3)\}$

$R_2 - R_1 = \{(1,2),(1,3),(1,4)\}$

$R_1 \oplus R_2 = \{(1,2),(1,3),(1,4),(2,2),(3,3)\}$

$R \circ S = \{(1,0),(1,1),(2,1),(2,2),(3,0),(3,1)\}$

$R = \{(1,1),(1,4),(2,3),(3,1),(3,4)\}$ $\quad$ R from $\{1,2,3\}$ to $\{1,2,3,4\}$

$S = \{(1,0),(2,0),(3,1),(3,2),(4,1)\}$ $\quad$ S from $\{1,2,3,4\}$ to $\{0,1,2\}$

Inverse of Relation

$R^{-1} = \{(1,1),(4,1),(3,2),(1,3),(4,3)\}$

Equivalence relation: Reflexive, Symmetric & transitive.
Partial order relation: Reflexive, Antisymmetric & transitive.