

### One-to-one , onto and invertible functions

1) **One -to-one (injective):** a function  $F:A \rightarrow B$  is said to be one-to-one if different elements in the domain ( $A$ ) have distinct images.

Or If  $F(a) = F(a') \Rightarrow a = a'$

2) **Onto (surjective):**  $F:A \rightarrow B$  is said to be an onto function if each element of  $B$  is the image of some element of  $A$ .

$\forall b \in B \quad \exists \quad a \in A : F(a) = b$

3) **Bijection (One-to-one correspondence)**

$F:A \rightarrow B$  is invertible if its inverse relation  $f^{-1}$  is a function  $F:B \rightarrow A$

$F:A \rightarrow B$  is invertible if and only if  $F$  is both one-to-one and onto

$F^{-1} : \{(b,a) \mid (a,b) \in F\}$

