bijection

Canonical name	Bijection
Date of creation	2013-03-22 11:51:35
Last modified on	2013-03-22 11:51:35
Owner	mathcam (2727)
Last modified by	mathcam (2727)
Numerical id	16
Author	mathcam (2727)
Entry type	Definition
Classification	msc 03-00
Classification	msc 83-00
Classification	msc 81-00
Classification	msc 82-00
Synonym	bijective
Synonym	bijective function
Synonym	1-1 correspondence
Synonym	1 to 1 correspondence
Synonym	one to one correspondence
Synonym	one-to-one correspondence
Related topic	Function
Related topic	Permutation
Related topic	InjectiveFunction
Related topic	Surjective
Related topic	Isomorphism2
Related topic	CardinalityOfAFiniteSetIsUnique
Related topic	CardinalityOfDisjointUnionOfFiniteSets
Related topic	AConnectedNormalSpaceWithMoreThanOnePointIsUncountable2
Related topic	AConnectedNormalSpaceWithMoreThanOnePointIsUncountable
Related topic	Bo

Let X and Y be sets. A function $f\colon X \to Y$ that is one-to-one and onto is called a *bijection* or *bijective function* from X to Y.

When $X = Y$, f is also called a *permutation* of X.

An important consequence of the bijectivity of a function f is the existence of an inverse function f^{-1}. Specifically, a function is invertible if and only if it is bijective. Thus if $f : X \to Y$ is a bijection, then for any $A \subset X$ and $B \subset Y$ we have

$$f \circ f^{-1}(B) = B$$
$$f^{-1} \circ f(A) = A$$

It easy to see the inverse of a bijection is a bijection, and that a composition of bijections is again bijective.