**from Wolfram MathWorld**

**A relation is any subset of a Cartesian product. For instance, a subset of A×B, called a "binary relation from A to B," is a collection of ordered pairs (a,b) with first components from A and second components from B, and, in particular, a subset of A×A is called a "relation on A." For a binary relation R, one often writes aRb to mean that (a,b) is in R×R. in A×B.**

**A function is a relation that uniquely associates members of one set with members of another set. More formally, a function from A to B is an object f such that every a in A is uniquely associated with an object f(a) in B. A function is therefore a many-to-one (or sometimes one-to-one) relation. The set A of values at which a function is defined is called its domain, while the set f(A) subset B of values that the function can produce is called its range. Here, the set B is called the codomain of f.**

**A map is a way of associating unique objects to every element in a given set. So a map f:A|->B from A to B is a function f such that for every a in A, there is a unique object f(a) in B. The terms function and mapping are synonymous for map.**

**关系**：集合笛卡尔积X◊Y的子集

不一定是X◊Y全集本身

**映射**：强调X中的每一个元素x（任意性）都有Y中的唯一确定的元素y（唯一性）与之对应

关系不一定满足这两个条件：关系中可能不存在第一分量为X中元素x’的序偶；关系中可能同时存在(x,y)和(x,z)两个序偶。

**函数**：和映射一样强调任意性和唯一性，但也强调先后/因果关系（因变量随自变量的变化而变化的规律）,有时候要求两集合为数的集合（强调计算）

**变换**：集合X=Y情况下的映射

**置换**：有限集合上的双射变换

**轮换**：特殊置换

**对换**：特殊轮换，2轮换

**关 系**

**映 射**

**函 数**

**变 换**

**置 换**

**轮 换**

**对换**