3-1. Definitions

Let \( A \) be a finite set.

A \( \text{of} \ A \) is a \( \text{and} \) function

The set \( \) is called an \( \text{(often \( \text{)\})} \)
We say the \( \) acts on the set

A \( \text{is a} \) together with an operation \( \text{(often multiplication) such that} \)

(i) \( \text{(associative)} \)
(ii) \( \text{(identity)} \)
(iii) \( \text{(inverses)} \)
(iv) \( \text{(closure)} \)

A \( \text{is a} \) whose elements are all

acting on the same (finite) object set.

We say the \( \) acts on the object set

Terminology:

EXAMPLES

For \( \) and \( \) we define \( \text{if and only if} \) for some

Then \( \) is an \( \text{and partitions} \) into equivalence classes, called the \( \text{of} \), under the \( \text{of} \)

EXAMPLE
For , the of is 
The collection of these form the of 

If there is only in the of on , then is 

If and if is on , then is a permutation group. 

EXAMPLES 

Two permutation groups and are ( ) if there is a such that 

Two permutation groups and (acting on object sets and , respectively) are ( ) if 

(i) 

(ii)
Let be a

An of is an of with itself.

The set of all forms a acting on the object set . This is called the of and is denoted by

EXAMPLE

THEOREM