

# Notes on Group Theory

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## 1 Introduction

Group Theory is a field of study under abstract algebra, and this document aims to summarise my notes in studying this topic.

## 2 Basic Concepts and Definitions

## 3 Group Isomorphisms

**Definition 3.1 – Isomorphic Groups** Let  $A$  be a group with operation  $*$  and  $B$  be a group with operation  $\#$ . An isomorphism of  $A$  onto  $B$  is a map  $f : A \rightarrow B$  such that

$$a * b = c \iff f(c) = f(a) \# f(b)$$

i.e. Groups  $A$  and  $B$  are *isomorphic* if there exists a function  $f$  that does this mapping. This means that the two groups  $A$  and  $B$  have the same underlying structure.

## 4 Rings, Fields & Others