



## METADATA

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### Abstract

The book develops the theory of groups and addresses readers with no knowledge on this topic and to the students of Mathematics, Physics, Chemistry and to all those who need Group Theory for their work. We give the basic group theory and the group homomorphisms. In the sequel we study the theory of subgroups of a group and especially the cyclic subgroups. We study the normal subgroups and the quotient. We prove the group isomorphism theorems, which play an important role in the classification of groups, and we classify the cyclic groups. We study the direct product of groups and examine when a group can decompose into a direct product of some of its subgroups. In sequel we develop the theory of actions of a group

on a set, we prove the Sylow Theorems and we give some applications in Combinatorial Theory. This theory gives much information about the structure of a group, but also has many applications to other sciences. The classification of finite generated abelian groups is given. We study the normal series of groups and in particular the solvable groups, which play an important role in the theory of the solvability of algebraic equations. We apply the group series to simple groups and to permutation groups. Finally we examine groups of small order and of order the product of two prime numbers. In the appendices, we include the necessary material on Set Theory, Number Theory, Abstract Algebra and Linear Algebra.

