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Algebra II - Alexey L. Gorodentsev 2017-02-12 This book is the second volume of an intensive "Russian-style" two-year undergraduate course in abstract algebra, and introduces readers to the basic algebraic structures – fields, rings, modules, algebras, groups, and categories – and explains the main principles of and methods for working with them. The course covers substantial areas of advanced combinatorics, geometry, linear and multilinear algebra, representation theory, category theory, commutative algebra, Galois theory, and algebraic geometry – topics that are often overlooked in standard undergraduate courses. This textbook is based on courses the author has conducted at the Independent University of Moscow and at the Faculty of Mathematics in the Higher School of Economics. The main content is complemented by a wealth of exercises for class discussion, some of which include comments and hints, as well as problems for independent study.

A Course in the Theory of Groups - Derek J.S. Robinson 2012-12-06 " A group is defined by means of the laws of combinations of its symbols," according to a celebrated dictum of Cayley. And this is probably still as good a one-line explanation as any. The concept of a group is surely one of the central ideas of mathematics. Certainly there are a few branches of that science in which groups are not employed implicitly or explicitly. Nor is the use of groups confined to pure mathematics. Quantum theory, molecular and atomic structure, and crystallography are just a few of the areas of science in which the idea of a group

as a measure of symmetry has played an important part. The theory of groups is the oldest branch of modern algebra. Its origins are to be found in the work of Joseph Louis Lagrange (1736-1813), Paulo Ruffini (1765-1822), and Evariste Galois (1811-1832) on the theory of algebraic equations. Their groups consisted of permutations of the variables or of the roots of polynomials, and indeed for much of the nineteenth century all groups were finite permutation groups. Nevertheless many of the fundamental ideas of group theory were introduced by these early workers and their successors, Augustin Louis Cauchy (1789-1857), Ludwig Sylow (1832-1918), Camille Jordan (1838-1922) among others. The concept of an abstract group is clearly recognizable in the work of Arthur Cayley (1821-1895) but it did not really win widespread acceptance until Walther von Dyck (1856-1934) introduced presentations of groups.

Finite Groups - Daniel Gorenstein 2007 "The Classification Theorem is one of the main achievements of 20th century mathematics, but its proof has not yet been completely extricated from the journal literature in which it first appeared. This is the second volume in a series devoted to the presentation of a reorganized and simplified proof of the classification of the finite simple groups. The authors present (with either proof or reference to a proof) those theorems of abstract finite group theory, which are fundamental to the analysis in later volumes in the series. This volume provides a relatively concise and readable access to the key ideas and theorems underlying the study of finite simple

groups and their important subgroups. The sections on semisimple subgroups and subgroups of parabolic type give detailed treatments of these important subgroups, including some results not available until now or available only in journal literature. The signalizer section provides an extensive development of both the Bender Method and the Signalizer Functor Method, which play a central role in the proof of the Classification Theorem. This book would be a valuable companion text for a graduate group theory course."--Publisher's website

Category Theory in Context - Emily Riehl 2017-03-09
Introduction to concepts of category theory — categories, functors, natural transformations, the Yoneda lemma, limits and colimits, adjunctions, monads — revisits a broad range of mathematical examples from the categorical perspective. 2016 edition.

Mathematics and Its History - John Stillwell 2020-11-07
This textbook provides a unified and concise exploration of undergraduate mathematics by approaching the subject through its history. Readers will discover the rich tapestry of ideas behind familiar topics from the undergraduate curriculum, such as calculus, algebra, topology, and more. Featuring historical episodes ranging from the Ancient Greeks to Fermat and Descartes, this volume offers a glimpse into the broader context in which these ideas developed, revealing unexpected connections that make this ideal for a senior capstone course. The presentation of previous versions has been refined by omitting the less mainstream topics and inserting new connecting material, allowing instructors to cover the book in a one-semester course. This condensed edition prioritizes succinctness and cohesiveness, and there is a greater emphasis on visual clarity, featuring full color images and high quality 3D models. As in previous editions, a wide array of mathematical topics are covered, from geometry to computation; however, biographical sketches have been omitted. Mathematics and Its History: A Concise Edition is an essential resource for courses or reading programs on the history of mathematics. Knowledge of basic calculus, algebra, geometry, topology, and set theory is assumed. From reviews of previous editions: "Mathematics and Its History is a joy to read. The writing is clear, concise and inviting. The style is very different from a traditional text. I found myself picking it up to read at the expense of my usual late evening thriller or detective novel.... The author has done a wonderful job of tying together the dominant themes of undergraduate mathematics." Richard J. Wilders, MAA, on the Third Edition "The book...is presented in a lively style without unnecessary detail. It is very stimulating and will be appreciated not only by students. Much attention is paid to problems and to the development of mathematics before the end of the nineteenth century.... This book brings to the non-specialist interested in mathematics many interesting results. It can be recommended for seminars and will be enjoyed by the broad mathematical community." European Mathematical Society, on the Second Edition

A Friendly Introduction to Group Theory - David Nash 2016-08-17
This book is an attempt at creating a friendlier, more colloquial textbook for a one-semester course in Abstract Algebra in a liberal arts setting. The textbook covers introductory group theory -- starting with basic notions and examples and moving through subgroups, quotient groups, group homomorphisms, and isomorphisms.

A Course in Finite Group Representation Theory - Peter Webb 2016-08-19
This graduate-level text provides a thorough grounding in the representation theory of finite groups over fields and rings. The book provides a balanced and comprehensive account of the subject, detailing the methods needed to analyze representations that arise in many areas of mathematics. Key topics include the construction and use of character tables, the role of induction and restriction, projective and simple modules for group algebras, indecomposable representations, Brauer characters, and block theory. This classroom-tested text provides motivation through a large number of worked examples, with exercises at the end of each chapter that test the reader's knowledge, provide further examples and practice, and include results not proven in the text. Prerequisites include a graduate course in

abstract algebra, and familiarity with the properties of groups, rings, field extensions, and linear algebra.

Representation Theory of Finite Groups - Benjamin Steinberg 2011-10-23
This book is intended to present group representation theory at a level accessible to mature undergraduate students and beginning graduate students. This is achieved by mainly keeping the required background to the level of undergraduate linear algebra, group theory and very basic ring theory. Module theory and Wedderburn theory, as well as tensor products, are deliberately avoided. Instead, we take an approach based on discrete Fourier Analysis. Applications to the spectral theory of graphs are given to help the student appreciate the usefulness of the subject. A number of exercises are included. This book is intended for a 3rd/4th undergraduate course or an introductory graduate course on group representation theory. However, it can also be used as a reference for workers in all areas of mathematics and statistics.

Basic Abstract Algebra - P. B. Bhattacharya 1994-11-25
This book provides a complete abstract algebra course, enabling instructors to select the topics for use in individual classes.

An Introduction to the Theory of Groups - Paul Alexandroff 2013-07-24
This introductory exposition of group theory by an eminent Russian mathematician is particularly suited to undergraduates. Includes a wealth of simple examples, primarily geometrical, and end-of-chapter exercises. 1959 edition.

A First Course in Abstract Algebra - John B. Fraleigh 2003*

Problems in Group Theory - John D. Dixon 2007-01-01
265 challenging problems in all phases of group theory, gathered for the most part from papers published since 1950, although some classics are included.

Symmetry - R. McWeeny 2013-09-03
Symmetry: An Introduction to Group Theory and its Application is an eight-chapter text that covers the fundamental bases, the development of the theoretical and experimental aspects of

the group theory. Chapter 1 deals with the elementary concepts and definitions, while Chapter 2 provides the necessary theory of vector spaces. Chapters 3 and 4 are devoted to an opportunity of actually working with groups and representations until the ideas already introduced are fully assimilated. Chapter 5 looks into the more formal theory of irreducible representations, while Chapter 6 is concerned largely with quadratic forms, illustrated by applications to crystal properties and to molecular vibrations. Chapter 7 surveys the symmetry properties of functions, with special emphasis on the eigenvalue equation in quantum mechanics. Chapter 8 covers more advanced applications, including the detailed analysis of tensor properties and tensor operators. This book is of great value to mathematicians, and math teachers and students.

Group Theory - W. R. Scott 2012-05-23
Here is clear, well-organized coverage of the most standard theorems, including isomorphism theorems, transformations and subgroups, direct sums, abelian groups, and more. This undergraduate-level text features more than 500 exercises.

Group Theory and Its Application to Physical Problems - M. Hamermesh 1964

A Course on Finite Groups - H.E. Rose 2009-12-16
Introduces the richness of group theory to advanced undergraduate and graduate students, concentrating on the finite aspects. Provides a wealth of exercises and problems to support self-study. Additional online resources on more challenging and more specialised topics can be used as extension material for courses, or for further independent study.

A Course on Group Theory - John S. Rose 1994-01-01
Text for advanced courses in group theory focuses on finite groups, with emphasis on group actions. Explores normal and arithmetical structures of groups as well as applications. 679 exercises. 1978 edition.

Contemporary Abstract Algebra - Joseph Gallian 2016-01-01
CONTEMPORARY ABSTRACT ALGEBRA, NINTH EDITION provides a solid introduction to the traditional topics in abstract algebra while

conveying to students that it is a contemporary subject used daily by working mathematicians, computer scientists, physicists, and chemists. The text includes numerous figures, tables, photographs, charts, biographies, computer exercises, and suggested readings giving the subject a current feel which makes the content interesting and relevant for students. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

A Course on Group Theory - John S. Rose 2013-05-27
Text for advanced courses in group theory focuses on finite groups, with emphasis on group actions. Explores normal and arithmetical structures of groups as well as applications. 679 exercises. 1978 edition.

Schaum's Outline of Group Theory - B. Baumslag 1968-06-22
The theory of abstract groups comes into play in an astounding number of seemingly unconnected areas like crystallography and quantum mechanics, geometry and topology, analysis and algebra, physics, chemistry and even biology. Readers need only know high school mathematics, much of which is reviewed here, to grasp this important subject. Hundreds of problems with detailed solutions illustrate the text, making important points easy to understand and remember.

Group Theory in a Nutshell for Physicists - A. Zee 2016-03-29
A concise, modern textbook on group theory written especially for physicists Although group theory is a mathematical subject, it is indispensable to many areas of modern theoretical physics, from atomic physics to condensed matter physics, particle physics to string theory. In particular, it is essential for an understanding of the fundamental forces. Yet until now, what has been missing is a modern, accessible, and self-contained textbook on the subject written especially for physicists. Group Theory in a Nutshell for Physicists fills this gap, providing a user-friendly and classroom-tested text that focuses on those aspects of group theory physicists most need to know. From the basic intuitive notion of a group, A. Zee takes readers all the way up to how theories based on gauge groups could unify three of the four

fundamental forces. He also includes a concise review of the linear algebra needed for group theory, making the book ideal for self-study. Provides physicists with a modern and accessible introduction to group theory Covers applications to various areas of physics, including field theory, particle physics, relativity, and much more Topics include finite group and character tables; real, pseudoreal, and complex representations; Weyl, Dirac, and Majorana equations; the expanding universe and group theory; grand unification; and much more The essential textbook for students and an invaluable resource for researchers Features a brief, self-contained treatment of linear algebra An online illustration package is available to professors Solutions manual (available only to professors)

Finite Group Theory - I. Martin Isaacs 2008
The text begins with a review of group actions and Sylow theory. It includes semidirect products, the Schur-Zassenhaus theorem, the theory of commutators, coprime actions on groups, transfer theory, Frobenius groups, primitive and multiply transitive permutation groups, the simplicity of the PSL groups, the generalized Fitting subgroup and also Thompson's J-subgroup and his normal p-complement theorem. Topics that seldom (or never) appear in books are also covered. These include subnormality theory, a group-theoretic proof of Burnside's theorem about groups with order divisible by just two primes, the Wielandt automorphism tower theorem, Yoshida's transfer theorem, the ``principal ideal theorem'' of transfer theory and many smaller results that are not very well known. Proofs often contain original ideas, and they are given in complete detail. In many cases they are simpler than can be found elsewhere. The book is largely based on the author's lectures, and consequently, the style is friendly and somewhat informal. Finally, the book includes a large collection of problems at disparate levels of difficulty. These should enable students to practice group theory and not just read about it. Martin Isaacs is professor of mathematics at the University of Wisconsin, Madison. Over the years, he has received many teaching awards and is well known for his inspiring teaching and lecturing. He received the University of Wisconsin Distinguished Teaching Award in 1985, the Benjamin Smith

Reynolds Teaching Award in 1989, and the Wisconsin Section MAA Teaching Award in 1993, to name only a few. He was also honored by being the selected MAA Polya Lecturer in 2003-2005.

Finite Group Theory - M. Aschbacher 2000-06-26
The book provides the basic foundations for the local theory of finite groups, the theory of classical linear groups, and the theory of buildings and BN-pairs.

Complexity and Randomness in Group Theory - Frédérique Bassino 2020-06-08
This book shows new directions in group theory motivated by computer science. It reflects the transition from geometric group theory to group theory of the 21st century that has strong connections to computer science. Now that geometric group theory is drifting further and further away from group theory to geometry, it is natural to look for new tools and new directions in group theory which are present.

A Course in Group Theory - J. F. Humphreys 1996
Each chapter ends with a summary of the material covered and notes on the history and development of group theory.

A Course in the Theory of Groups - Derek Robinson 1996
"An excellent up-to-date introduction to the theory of groups. It is general yet comprehensive, covering various branches of group theory. The 15 chapters contain the following main topics: free groups and presentations, free products, decompositions, Abelian groups, finite permutation groups, representations of groups, finite and infinite soluble groups, group extensions, generalizations of nilpotent and soluble groups, finiteness properties." —-ACTA SCIENTIARUM MATHEMATICARUM

Introduction to Abstract Algebra - Benjamin Fine 2014-07-01
This textbook will help bring about the day when abstract algebra no longer creates intense anxiety but instead challenges students to fully grasp the meaning and power of the approach. Topics covered include:; Rings; Integral domains; The fundamental theorem of arithmetic; Fields; Groups; Lagrange's theorem; Isomorphism theorems for groups; Fundamental theorem of finite abelian groups; The simplicity of An for n5; Sylow theorems; The Jordan-Hölder theorem; Ring isomorphism theorems; Euclidean domains; Principal ideal domains; The fundamental theorem of algebra; Vector spaces; Algebras; Field extensions: algebraic and transcendental; The fundamental theorem of Galois theory; The insolvability of the quintic

Groups and Characters - Larry C. Grove 2011-09-26
An authoritative, full-year course on both group theory and ordinary character theory--essential tools for mathematics and the physical sciences One of the few treatments available combining both group theory and character theory, Groups and Characters is an effective general textbook on these two fundamentally connected subjects. Presuming only a basic knowledge of abstract algebra as in a first-year graduate course, the text opens with a review of background material and then guides readers carefully through several of the most important aspects of groups and characters, concentrating mainly on finite groups. Challenging yet accessible, Groups and Characters features: * An extensive collection of examples surveying many different types of groups, including Sylow subgroups of symmetric groups, affine groups of fields, the Mathieu groups, and symplectic groups * A thorough, easy-to-follow discussion of Polya-Redfield enumeration, with applications to combinatorics * Inclusive explorations of the transfer function and normal complements, induction and restriction of characters, Clifford theory, characters of symmetric and alternating groups, Frobenius groups, and the Schur index * Illuminating accounts of several computational aspects of group theory, such as the Schreier-Sims algorithm, Todd-Coxeter coset enumeration, and algorithms for generating character tables As valuable as Groups and Characters will prove as a textbook for mathematicians, it has broader applications. With chapters suitable for use as independent review units, along with a full bibliography and index, it will be a dependable general reference for chemists, physicists, and crystallographers.

Problems on Mapping Class Groups and Related Topics - Benson Farb 2006-09-12
This book contains 23 papers of open problems and directions about mapping class groups and

related topics. The papers focus on aspects deeply connected with geometric topology, combinatorial group theory and surrounding areas.

Adventures in Group Theory - David Joyner 2008-12-29
Featuring strategies for solving the puzzles and computations illustrated using the SAGE open-source computer algebra system, the second edition of Adventures in Group Theory is perfect for mathematics enthusiasts and for use as a supplementary textbook.

Group Theory and Physics - S. Sternberg 1995-09-07
This textbook, based on courses taught at Harvard University, is an introduction to group theory and its application to physics. The physical applications are considered as the mathematical theory is developed so that the presentation is unusually cohesive and well-motivated. Many modern topics are dealt with, and there is much discussion of the group SU(n) and its representations. This is of great significance in elementary particle physics. Applications to solid state physics are also considered. This stimulating account will prove to be an essential resource for senior undergraduate students and their teachers.

Chemical Applications of Group Theory - F. Albert Cotton 1991-01-16
Retains the easy-to-read format and informal flavor of the previous editions, and includes new material on the symmetric properties of extended arrays (crystals), projection operators, LCAO molecular orbitals, and electron counting rules. Also contains many new exercises and illustrations.

A First Course in Group Theory - Bijan Davvaz

A Course on Group Theory - John S. Rose 1978-06-29
Advanced study focuses on finite groups and the idea of group actions. Chapters divided between normal and arithmetical structure of groups. 1978 edition.

Regular Algebra and Finite Machines - John Horton Conway 2012-01-01
A world-famous mathematician explores Moore's theory of experiments, Kleene's theory of regular events and expressions, Kleene algebras, the differential calculus of events, factors and the factor matrix, and the theory of operators. Additional subjects include context-free languages, communicative regular algebra, axiomatic questions, and logical problems. Solutions to problems. 1971 edition.

Group Theory - Mildred S. Dresselhaus 2007-12-18
This concise, class-tested book was refined over the authors' 30 years as instructors at MIT and the University Federal of Minas Gerais (UFMG) in Brazil. The approach centers on the conviction that teaching group theory along with applications helps students to learn, understand and use it for their own needs. Thus, the theoretical background is confined to introductory chapters. Subsequent chapters develop new theory alongside applications so that students can retain new concepts, build on concepts already learned, and see interrelations between topics. Essential problem sets between chapters aid retention of new material and consolidate material learned in previous chapters.

Group Theory and Quantum Mechanics - Michael Tinkham 2012-04-20
This graduate-level text develops the aspects of group theory most relevant to physics and chemistry (such as the theory of representations) and illustrates their applications to quantum mechanics. The first five chapters focus chiefly on the introduction of methods, illustrated by physical examples, and the final three chapters offer a systematic treatment of the quantum theory of atoms, molecules, and solids. The formal theory of finite groups and their representation is developed in Chapters 1 through 4 and illustrated by examples from the crystallographic point groups basic to solid-state and molecular theory. Chapter 5 is devoted to the theory of systems with full rotational symmetry, Chapter 6 to the systematic presentation of atomic structure, and Chapter 7 to molecular quantum mechanics. Chapter 8, which deals with solid-state physics, treats electronic energy band theory and magnetic crystal symmetry. A compact and worthwhile compilation of the scattered material on standard methods, this volume presumes a basic understanding of quantum theory.

Number Theory - George E. Andrews

2012-04-30
Undergraduate text uses combinatorial approach to accommodate both math majors and liberal arts students. Covers the basics of number theory, offers an outstanding introduction to partitions, plus chapters on multiplicativity-divisibility, quadratic congruences, additivity, and more

Introduction to Representation Theory - Pavel I. Etingof 2011
Very roughly speaking, representation theory studies symmetry in linear spaces. It is a beautiful mathematical subject which has many applications, ranging from number theory and combinatorics to geometry, probability theory, quantum mechanics, and quantum field theory. The goal of this book is to give a ``holistic'' introduction to representation theory, presenting it as a unified subject which studies representations of associative algebras and treating the representation theories of groups, Lie algebras, and quivers as special cases. Using this approach, the book covers a number of standard topics in the representation theories of these structures. Theoretical material in the book is supplemented by many problems and exercises which touch upon a lot of additional topics; the more difficult exercises are provided with hints. The book is designed as a textbook for advanced undergraduate and beginning graduate students. It should be accessible to students with a strong background in linear algebra and a basic knowledge of abstract algebra.

Groups and Symmetry - Mark A. Armstrong 2013-03-14
This is a gentle introduction to the vocabulary and many of the highlights of elementary group theory. Written in an informal style, the material is divided into short sections, each of which deals with an important result or a new idea. Includes more than 300 exercises and approximately 60 illustrations.