Basic Mathematics By Serge Lang

This is a second edition of Lang's well-known textbook. It covers all of the basic material of classical algebraic number theory, giving the student the background necessary for the study of further topics in algebraic number theory, such as cyclotomic fields, or modular forms. "Lang's books are always of great value for the graduate student and the research mathematician. This updated edition of Algebraic number theory is no exception."—-MATHEMATICAL REVIEWS

This is a short text in linear algebra, intended for a one-term course. In the first chapter, Lang discusses the relation between the geometry and the algebra underlying the subject, and gives concrete examples of the notions which appear later in the book. He then starts with a discussion of linear equations, matrices and Gaussian elimination, and proceeds to discuss vector spaces, linear maps, scalar products, determinants, and eigenvalues. The book contains a large number of exercises, some of the routine computational type, while others are conceptual.

"Linear Algebra" is intended for a one-term course at the junior or senior level. It begins with an exposition of the basic theory of vector spaces and proceeds to explain the fundamental structure theorem for linear maps, including eigenvectors and eigenvalues, quadratic and hermitian forms, diagnolization of symmetric, hermitian, and unitary linear maps and matrices, triangulation, and Jordan canonical form. The book also includes a useful chapter on convex sets and the finite-dimensional Krein-

Milman theorem. The presentation is aimed at the student who has already had some exposure to the elementary theory of matrices, determinants and linear maps. However the book is logically self-contained. In this new edition, many parts of the book have been rewritten and reorganized, and new exercises have been added.

??:Analysis in Euclidean space, 1975

Now in its fourth edition, the first part of this book is devoted to the basic material of complex analysis, while the second covers many special topics, such as the Riemann Mapping Theorem, the gamma function, and analytic continuation. Power series methods are used more systematically than is found in other texts, and the resulting proofs often shed more light on the results than the standard proofs. While the first part is suitable for an introductory course at undergraduate level, the additional topics covered in the second part give the instructor of a gradute course a great deal of flexibility in structuring a more advanced course.

For many years, Serge Lang has given talks on selected items in mathematics which could be extracted at a level understandable by those who have had calculus. Written in a conversational tone, Lang now presents a collection of those talks as a book covering such topics as: prime numbers, the abc conjecture, approximation theorems of analysis, Bruhat-Tits spaces, and harmonic and symmetric polynomials. Each talk is written in a lively and informal style meant to engage any reader looking for further insight into mathematics.

The aim of this book is to illustrate by significant special

examples three aspects of the theory of Diophantine approximations: the formal relationships that exist between counting processes and the functions entering the theory; the determination of these functions for numbers given as classical numbers; and certain asymptotic estimates holding almost everywhere. Each chapter works out a special case of a much broader general theory, as yet unknown. Indications for this are given throughout the book, together with reference to current publications. The book may be used in a course in number theory, whose students will thus be put in contact with interesting but accessible problems on the ground floor of mathematics.
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SL2(R) gives the student an introduction to the infinite dimensional representation theory of semisimple Lie groups by concentrating on one example - SL2(R). This field is of interest not only for its own sake, but for its connections with other areas such as number theory, as brought out, for example, in the work of Langlands. The rapid development of representation theory over the past 40 years has made it increasingly difficult for a student to enter the field. This book makes the theory accessible to a wide audience, its only prerequisites being a knowledge of real analysis, and some differential equations.
Moritz's 'Memorabilia Mathematica' inspired this work, but this one differs in that sources are limited to mathematicians of the 20th century. Useful to researchers to facilitate a literature search, to writers

who want to emphasize or substantiate a point, and to teachers, students, and other readeres who will have their appetite for the subject whetted by the 83 quotes. -- Book News, Inc.

Serge Lang was an iconic figure in mathematics, both for his own important work and for the indelible impact he left on the field of mathematics, on his students, and on his colleagues. Over the course of his career, Lang traversed a tremendous amount of mathematical ground. As he moved from subject to subject, he found analogies that led to important questions in such areas as number theory, arithmetic geometry, and the theory of negatively curved spaces. Lang's conjectures will keep many mathematicians occupied far into the future. In the spirit of Lang's vast contribution to mathematics, this memorial volume contains articles by prominent mathematicians in a variety of areas of the field, namely Number Theory, Analysis, and Geometry, representing Lang's own breadth of interest and impact. A special introduction by John Tate includes a brief and fascinating account of the Serge Lang's life. This volume's group of 6 editors are also highly prominent mathematicians and were close to Serge Lang, both academically and personally. The volume is suitable to research mathematicians in the areas of Number Theory, Analysis, and Geometry.

This fifth edition of Lang's book covers all the topics traditionally taught in the first-year calculus sequence. Divided into five parts, each section of A FIRST COURSE IN CALCULUS contains examples and applications relating to the topic covered. In addition, the

rear of the book contains detailed solutions to a large number of the exercises, allowing them to be used as worked-out examples -- one of the main improvements over previous editions.

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At last: geometry in an exemplary, accessible and attractive form! The authors emphasise both the intellectually stimulating parts of geometry and routine arguments or computations in concrete or classical cases, as well as practical and physical applications. They also show students the fundamental concepts and the difference between important results and minor technical routines. Altogether, the text presents a coherent high school curriculum for the geometry course, naturally backed by numerous examples and exercises.

The companion title, Linear Algebra, has sold over 8,000 copies The writing style is very accessible The material can be covered easily in a one-year or one-term course Includes Noah Snyder's proof of the Mason-Stothers polynomial abc theorem New material included on product structure for matrices including descriptions of the conjugation representation of the diagonal group

??:Basic algebra. -- ??: W. H. Freeman, 1974

If someone told you that mathematics is quite beautiful, you might be surprised. But you should know that some people do mathematics all their lives, and create mathematics, just as a composer

creates music. Usually, every time a mathematician solves a problem, this gives rise to many oth ers, new and just as beautiful as the one which was solved. Of course, often these problems are quite difficult, and as in other disciplines can be understood only by those who have studied the subject with some depth, and know the subject well. In 1981, Jean Brette, who is responsible for the Mathematics Section of the Palais de la Decouverte (Science Museum) in Paris, invited me to give a conference at the Palais. I had never given such a conference before, to a non-mathematical public. Here was a challenge: could I communicate to such a Saturday afternoon audience what it means to do mathematics, and why one does mathematics? By "mathematics" I mean pure mathematics. This doesn't mean that pure math is better than other types of math, but I and a number of others do pure mathematics, and it's about them that I am now concerned. Math has a bad reputation, stemming from the most elementary levels. The word is in fact used in many different contexts. First, I had to explain briefly these possible contexts, and the one with which I wanted to deal.

This solutions manual for Lang's Undergraduate Analysis provides worked-out solutions for all problems in the text. They include enough detail so that a student can fill in the intervening details between any pair of steps.

This text in basic mathematics is ideal for high school or college students. It provides a firm foundation in basic principles of mathematics and thereby acts as a springboard into calculus, linear algebra and other more advanced topics. The information is clearly presented, and the author develops concepts in such a manner to show how one subject matter can relate and evolve into another.

In 1988 Shafarevich asked me to write a volume for the Encyclopaedia of Mathematical Sciences on Diophantine Geometry. I said yes, and here is the volume. By definition, diophantine problems concern the solutions of equations in integers, or rational numbers, or various generalizations, such as finitely generated rings over Z or finitely generated fields over Q. The word Geometry is tacked on to suggest geometric methods. This means that the present volume is not elementary. For a survey of some basic problems with a much more elementary approach, see [La 9Oc]. The field of diophantine geometry is now moving quite rapidly. Out standing conjectures ranging from decades back are being proved. I have tried to give the book some sort of coherence and permanence by em phasizing structural conjectures as much as results, so that one has a clear picture of the field. On the whole, I omit proofs, according to the boundary conditions of the encyclopedia. On some occasions I do give

some ideas for the proofs when these are especially important. In any case, a lengthy bibliography refers to papers and books where proofs may be found. I have also followed Shafarevich's suggestion to give examples, and I have especially chosen these examples which show how some classical problems do or do not get solved by contemporary in sights. Fermat's last theorem occupies an intermediate position. Al though it is not proved, it is not an isolated problem any more.

Arakelov introduced a component at infinity in arithmetic considerations, thus giving rise to global theorems similar to those of the theory of surfaces, but in an arithmetic context over the ring of integers of a number field. The book gives an introduction to this theory, including the analogues of the Hodge Index Theorem, the Arakelov adjunction formula, and the Faltings Riemann-Roch theorem. The book is intended for second year graduate students and researchers in the field who want a systematic introduction to the subject. The residue theorem, which forms the basis for the adjunction formula, is proved by a direct method due to Kunz and Waldi. The Faltings Riemann-Roch theorem is proved without assumptions of semistability. An effort has been made to include all necessary details, and as complete references as possible, especially to needed facts of analysis for Green's functions and the Faltings metrics.

This book is intended as a basic text for a one year course in algebra at the graduate level or as a useful

reference for mathematicians and professionals who use higher-level algebra. This book successfully addresses all of the basic concepts of algebra. For the new edition, the author has added exercises and made numerous corrections to the text. From MathSciNet's review of the first edition: "The author has an impressive knack for presenting the important and interesting ideas of algebra in just the "right" way, and he never gets bogged down in the dry formalism which pervades some parts of algebra."

This is a textbook for pre-service elementary school teachers and for current teachers who are taking professional development courses. By emphasizing the precision of mathematics, the exposition achieves a logical and coherent account of school mathematics at the appropriate level for the readership. Wu provides a comprehensive treatment of all the standard topics about numbers in the school mathematics curriculum: whole numbers, fractions, and rational numbers. Assuming no previous knowledge of mathematics, the presentation develops the basic facts about numbers from the beginning and thoroughly covers the subject matter for grades K through 7. Every single assertion is established in the context of elementary school mathematics in a manner that is completely consistent with the basic requirements of mathematics. While it is a textbook for pre-service elementary teachers, it is also a reference book that school teachers can refer to for explanations of well-known but hitherto unexplained facts. For example, the sometimes-puzzling concepts of percent, ratio, and rate are each given a treatment that is down to earth and

devoid of mysticism. The fact that a negative times a negative is a positive is explained in a leisurely and comprehensible fashion.

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In Sublime Failures, David Martyn argues that a return to Kant's latent "Sadianism" helps to confront the unresolved question of agency -- or how to formulate an ethic after the deconstruction of the subject -- in cultural studies theory. Acknowledging allegations of Kant's "empty formalism" and even of his proximity to a certain Sadianism, Martyn argues that Kant's ethics are valid not despite but because of their similarity to those of Sade. In close readings that address the historical and material conditions of the composition of their work, Martyn argues that the efforts of Kant and Sade to totalize

systems -- of ethics, philosophy, pleasures, crimes -- must fail, but that the failure leads to important insights about ethics. The book offers philosophical and rhetorical analyses of the two authors' major works, and focuses on two related thematic fields: the economy of the gift and the materiality of writing. Stories of giving and thievery in Sade are read in tandem with Kant's elaborations about what is and is not "given" to us in the phenomenal world, and Kant's digressions on the challenges of writing a critique of pure reason are correlated with Sade's depictions of the crime of writing. A reinterpretation of the Kantian sublime then allows for an alignment of these two paradigms by showing how writing and the "gift" invalidate the teleological premises of traditional ethics. The book concludes with a critique of Lacan's essay, "Kant with Sade, " which provides an occasion to assess questions of gender, "race, " and cultural alterity.

This book is meant as a text for a first-year graduate course in analysis. In a sense, it covers the same topics as elementary calculus but treats them in a manner suitable for people who will be using it in further mathematical investigations. The organization avoids long chains of logical interdependence, so that chapters are mostly independent. This allows a course to omit material from some chapters without compromising the exposition of material from later chapters.

This basic text for a one-year course in algebra at the graduate level thoroughly prepares students to handle the algebra they will use in all of mathematics. The author assumes that students have a basic familiarity

with the language of mathematics "i.e.: sets and mapping, integers, and rational numbers." The text was thoroughly revised and enhanced in response to reviewers' comments and suggestions. Designed to improve students' retention and comprehension, the text is divided into four parts. The first introduces the basic notions of algebra. The second covers the direction of algebraic equations, including the Galois theory, and the final two parts cover the direction of linear and multilinear algebra.

Algebra, as a subdiscipline of mathematics, arguably has a history going back some 4000 years to ancient Mesopotamia. The history, however, of what is recognized today as high school algebra is much shorter, extending back to the sixteenth century, while the history of what practicing mathematicians call "modern algebra" is even shorter still. The present volume provides a glimpse into the complicated and often convoluted history of this latter conception of algebra by juxtaposing twelve episodes in the evolution of modern algebra from the early nineteenth-century work of Charles Babbage on functional equations to Alexandre Grothendieck's mid-twentieth-century metaphor of a ``rising sea'' in his categorical approach to algebraic geometry. In addition to considering the technical development of various aspects of algebraic thought, the historians of modern algebra whose work is united in this volume explore such themes as the changing aims and organization of the subject as well as the often complex lines of mathematical communication within and across national boundaries. Among the specific algebraic ideas

considered are the concept of divisibility and the introduction of non-commutative algebras into the study of number theory and the emergence of algebraic geometry in the twentieth century. The resulting volume is essential reading for anyone interested in the history of modern mathematics in general and modern algebra in particular. It will be of particular interest to mathematicians and historians of mathematics. The present volume is a text designed for a first course in analysis. Although it is logically self-contained, it presupposes the mathematical maturity acquired by students who will ordinarily have had two years of calculus. When used in this context, most of the first part can be omitted, or reviewed extremely rapidly, or left to the students to read by themselves. The course can proceed immediately into Part Two after covering Chapters o and 1. However, the techniques of Part One are precisely those which are not emphasized in elementary calculus courses, since they are regarded as too sophisticated. The context of a third-year course is the first time that they are given proper emphasis, and thus it is important that Part One be thoroughly mastered. Emphasis has shifted from computational aspects of calculus to theoretical aspects: proofs for theorems concerning continuous 2 functions; sketching curves like x e-X, x log x, xlix which are usually regarded as too difficult for the more elementary courses; and other similar matters. This new, revised edition covers all of the basic topics in calculus of several variables, including vectors, curves, functions of several variables, gradient, tangent plane,

maxima and minima, potential functions, curve integrals, Green's theorem, multiple integrals, surface integrals, Stokes' theorem, and the inverse mapping theorem and its consequences. It includes many completely worked-out problems.