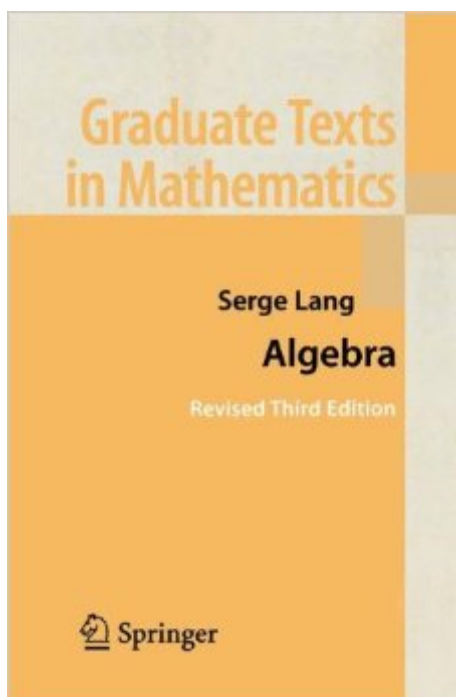


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# Algebra (Graduate Texts In Mathematics)



## Synopsis

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."

## Book Information

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## Customer Reviews

As others have said, this is not a book to begin learning algebra, but is a necessary book for most students to have on their shelves. Why is that? Basic topics are discussed from scratch in this book from the most advanced possible viewpoint. Hence few can learn them here for the first time, but no one can graduate to professional status without eventually arriving at this perspective. In particular the categorical point of view is simply essential to a research mathematician to acquire at some point, and Lang uses it here from the beginning, while Dummitt and Foote place it in appendix II, after page 800. So Lang's goal seems not to introduce basic algebra, but to provide essential algebraic facts not found elsewhere, and to give them all from a professional's perspective. This is probably a third book on algebra in today's world, and that is assuming the student is pretty good.

The only current book I know of out there that is really aimed at students and also written by a top professional is Artin. If you can, begin with Artin, then read Dummitt and Foote for topics Artin omits, then read Lang to see how you should view the same material and find things Dummitt and Foote left out. Then you are ready to do research with these tools. For instance one of our research professors tells his students the prerequisite for working in algebraic number theory is to become comfortable with algebra at the level of Lang. But our course in PhD prelim preparation for algebra will probably use Dummitt and Foote, just because it is a more feasible book for the students to read at that stage. Attempts to use Lang in the past have been disastrous.

Lang's algebra book is one of the best algebra books available today. I agree with what most other readers have said. Namely, this shouldn't be your first foray into the subject, the proofs are often terse and take a good amount of time to absorb and there is a conspicuous lack/obscurity of examples. To cite an example, he gives a non-singular projective group variety as an example of a certain group. I shall not give an example of a terse proof. Let's just say that it suffices to note that whenever he says something is 'obvious', the non-expert reader should be prepared to scribble on 4-5 sheets of paper if she wishes to understand why it's 'obvious'. The core matter (groups, rings, fields, modules) is the same as that you'd find in any other book. As far as topics are concerned, there are just too many fascinating topics in Algebra to cover in one book - even in one like Lang. He covers a fairly wide assortment of topics though. For instance, he covers most of the commutative algebra one would find in Atiyah-Macdonald. He also has a chapter and half on Algebraic Geometry which provides a good preparation for a treatment of schemes like that in Hartshorne Chapter 2,3. His section on Galois theory is detailed and even gets into Galois Cohomology. His chapter on Valuations gets into the theory of Local Fields, but only just. The chapters on multilinear algebra and representation theory are fairly detailed. I talk about the section on Homological Algebra later. Regarding category theory, Lang likes to phrase his definitions in the language of category theory for a reason. It's much much better this way. Category theory is an elegant way of describing some commonly occurring themes in Mathematics, particularly algebra.

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