## Algebra (2nd Edition)

## ALGEBRA <br> Michael Artin

## Synopsis

Algebra, Second Edition, by Michael Artin, provides comprehensive coverage at the level of an honors-undergraduate or introductory-graduate course. The second edition of this classic text incorporates twenty years of feedback plus the authorâ ${ }^{\text {TM }}$ own teaching experience. This book discusses concrete topics of algebra in greater detail than others, preparing readers for the more abstract concepts; linear algebra is tightly integrated throughout.

## Book Information

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## Customer Reviews

Since there is currently only one other review, which I find very inaccurate, I will throw in my 2 cents.First of all, I disagree about the readability of Artin's book. I found the presentations crystal clear, and in particular the proofs are very readable. Artin avoids clever tricks when a straightforward approach is available and does a good job explaining the reasoning behind proofs. There are also enough examples to illustrate the concepts presented.Second, the exercises in Artin are excellent. They provide a way to become familiar with the definitions and techniques in the chapter, as well as illustrate some interesting applications of the material. There are some easy exercises, and some very difficult ones. I'm not sure what more you could ask for.As far as Dummit and Foote goes, I agree that it is an excellent text. However, I would prefer Artin as an introductory text, since it is a gentler introduction to all the abstraction. Dummit and Foote is a better for a course beyond an introduction, and also serves as a better reference. Anyway, Artin covers a different set of topics than more "standard" texts such as Dummit and Foote, such as plane symmetries and linear groups.Overall, I think Artin's book is an excellent introduction to abstract algebra. In fact, the
two semester course using Artin that I took (taught by the man himself), was one of the best academic experiences of my life.

I used this book in an advanced algebra course in which the students learned on their own with minimal guidance from the professor and discussed the assigned readings and homework once a week. I found this book difficult for self-learning. Artin aims for concision in his proofs, making the reader prove some things on his own. This is not necessarily bad, and is often very helpful for the student's learning. But it can be tough and frustrating if you need a hint, or get lost in a proof. In other words, it's perfectly good to leave steps for the reader, provided that the reader can actually fill in the gaps. For that reason, I think this book is best used as a supplement to a professor's lectures, rather than for self-learning. This book does a good job of condensing the material, and the theorems are easy to find, so it is useful when reviewing. I like the topics in the book. One of the aims of this book is to introduce the reader to the various applications of algebra. To this end Artin includes not only the typical algebra material, but also symmetry and imaginary quadratic fields. Unfortunately I found the second edition worse than the first edition in its chapters on fields. Artin took out many examples in the first edition, for reasons I don't know. The chapter on fields is full of definitions and theorems, but in my mind it doesn't elucidate the main ideas and themes effectively. I think Dummit and Foote is much better at explaining basic Galois theory. The exercises, though, are very good. Overall, this is a challenging book; when used effectively in a well-taught course (for example, see Benedict Gross's excellent free online videos on algebra), it should prove to be very rewarding.

Cheaper version printed in India (nothing wrong with that). Warning: the book does not include the last chapter on Galois Theory, so this version is shorter (482 pages instead of 543 pages in the regular 2nd edition). Too bad. Other than that, a good bargain.

Giving up in disgust in chapter 5. This is annoying because in terms of the content this text is exactly hat I wanted. But as a person studying by myself, it is fatally flawed.I am up to chapter 5 and find the proofs irritatingly ambiguous and terse. It is fine to leave gaps for the student to fill in, but you should say you are leaving a gap, not leave the student to wonder.And there are no errata posted online. So every student will struggle with every typo and error.And as a final insult to the self learner, there are no answers to any of the problems. So zero feedback.Example: he frequently uses the word 'or' to mean "That is" but he also uses it to me "as another possibility". The hapless student is left to
guess which meaning is intended.A specific example of this "get the student to guess" game is the proof of Lemma 5.1.29 "a $3 \times 3$ orthogonal matrix $M$ with determinant 1 has an eigenvalue equal to $1^{\prime \prime}$. In this proof he uses a variable ' $t$ ' with no explanation of where it came from. He simply states $\operatorname{det}=(\mathrm{M}-\mathrm{I})^{\wedge} \mathrm{t}=\operatorname{det}(\mathrm{M}-\mathrm{I})$. For all t ? For some t ? Is it a misprint (perhaps it should be T for transpose???)? What should be a simple proof turns into a significant waste of time.So, a waning: This book may be bad for your blood pressure. Not just because of the outrageous price.

I'm pretty happy with this book, though it's not perfect by any means. It doesn't seem suitable for self-study for a "first course" in abstract algebra, but there's one saving grace. This text is used in conjunction with the "modern algebra" offering online at MIT's open courseware site. Using the text in conjunction with the video lectures is actually quite effective, even for a first course. The book covers a lot of ground and as a result the proofs and examples are terse and require substantial effort to follow. As the lecturer in the MIT courseware says, "Artin will challenge you." That's something of a good thing and something of a bad thing. At times the student has to fill in some rather wide gaps.For an introduction that is much more gentle and approachable, get Pinter's book. For a second book that is much less expensive, get Judson's book. If you want all the gory details, get Dummit and Foote.I give Artin a mild recommendation, but I go with four stars because of the book's utility with available online material.

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