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Undergraduate Algebraic Geometry (London Mathematical Society Student Texts)



Synopsis

Algebraic geometry is, essentially, the study of the solution of equations and occupies a central position in pure mathematics. This short and readable introduction to algebraic geometry will be ideal for all undergraduate mathematicians coming to the subject for the first time. With the minimum of prerequisites, Dr Reid introduces the reader to the basic concepts of algebraic geometry including: plane conics, cubics and the group law, affine and projective varieties, and non-singularity and dimension. He is at pains to stress the connections the subject has with commutative algebra as well as its relation to topology, differential geometry, and number theory. The book arises from an undergraduate course given at the University of Warwick and contains numerous examples and exercises illustrating the theory.

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Customer Reviews

It is difficult to see who this book is aimed at. Perhaps the extremely gifted undergraduate who can fill in sketchy, incomplete, difficult proofs, but has also taken courses? My professor (a topologist)

even had a difficult time presenting the material as-is and solving the exercises, as very few examples were given, hence it was unclear exactly what was required for a satisfactory proof of the questions as stated. Reid, probably in an effort to save space, delegates difficult steps of proofs to the reader by declaring them "obvious," making the book practically unreadable to the average undergraduate student. The notation is used strangely and the typesetting is awkward. The proof of the 27-lines theorem is interesting and a decent capstone for the introductory subject. However, I did not feel as though I had deepened my knowledge of algebraic geometry as a result, only having learned the bare minimum to approach one useless (albeit entertaining) theorem. If you have to use this book I recommend buying another one to supplement the background knowledge and to figure out how to complete the proofs.

Sent as gift. A much needed informative book for math major

Disclaimer: I picked up this book from my university library unaware of its intended purpose (it's very short). I had previously taken a course in geometry and while I admit that it did not warrant such an undertaking (my course text being Pressley's differential geometry), the first section immediately snatched my attention with some familiar topics in number theory, topology and algebra; however, this section was completely irrelevant with respect to the subsequent chapters in the text seeing as the author described it as a cultural introduction that was not logically part of this course. In hindsight, I suppose it was an attempt at conveying what will be expected from this course, which is a lot (and then some). While there are several notable books on algebraic geometry at the graduate level, very few are directed towards undergraduate students. This book easily fills the void with a broad range of topics covering plane conics, cubic curves & group law, Noetherian rings, Hilbert's basis theorem, Zariski topology and functions on varieties, where it seems the author is constantly vying for your attention as you move from one thought-provoking section to the next. The material is rigorous but the book presents clear, concise definitions that cut through all the fluff that is found in too many undergraduate texts. The topics are organized into three distinct chapters spread over several pages of propositions, facts, examples and some pretty interesting (and no doubt comical) remarks. Nullstellensatz (Hilbert's zeros theorem) is discussed in great detail and the author establishes the proof by first stating an important result from commutative algebra that you will come back prove to later on in the section. The Nullstellensatz proof is divided into two segments, which allow readers to appreciate the strong geometric content in certain aspects of the proof. In this regard (and to the

credit of the author), this book is very forgiving in presenting intrinsically difficult proofs and other meaningful results as part of a short, targeted study of algebraic geometry that allow unstudied readers to arrive at precisely those conclusions that the author had originally intended. However, I would assume that a lot of supplementary material is required to reinforce these notions. While a decent textbook on the subject can only serve to benefit an undergraduate student in actually getting somewhere with this book, I would nevertheless recommend it to any math major.

I picked this up as a self study entry point into the subject. Its a short read, but not terse at all, just a bit less formal than the more rigorous graduate level texts (I consider this book ambitious since this is generally considered a graduate level topic). Rather than throwing several complicated ideas at you and leaving it up to you to make sense of it all, it dives straight to the conclusions of what the author considers most important ideas. While some commutative algebra is an obvious prerequisite, I found myself having to backtrack a bit and take some detours into projective geometry. This text isn't intended to get you far, its just a starting point, and a great one at that considering its undergraduate level audience.

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