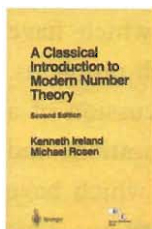


## Springer's Buys at Affordable Price

**B Sury**



*A Classical Introduction to  
Modern Number Theory*  
K Ireland and M Rosen  
2nd edition, Springer, 2004  
Price: Rs.350/-

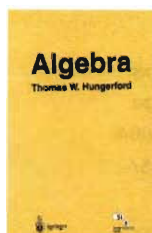
Number theory has made rapid and long strides specially in the 20th century and it was imperative that textbooks introducing this vast material should be written quickly. Texts dealing with specific areas like algebraic number theory, class field theory and analytic number theory appeared, all of which required basic knowledge in modern number theory which was usually recalled rather briefly in these texts. Then there were some texts which were rather elementary. When the first edition of this book appeared in 1980, it bridged the gap between the elementary and the modern advanced works.

Starting with basic algebraic background like unique factorisation in some number rings and the structure of finite fields, the authors go on to develop quadratic, cubic and biquadratic reciprocity laws – one of the main themes in the book. Material on Gauss and Jacobi sums is very useful and connects well with the second theme – that of equations over finite fields. The first edition also included informative and interesting chapters on the Stickelberger relation used in Eisen-

stein's reciprocity law and Dirichlet L-functions. It ended with a chapter on Diophantine equations containing a proof of the first case of Fermat's last theorem for regular primes and a chapter on elliptic curves with a detailed discussion of the curves  $y^2 = x^3 + D$ .

Since the appearance of the first edition, there have been outstanding developments like the solution of Fermat's last theorem. In the second edition, two chapters have been added. The first – chapter 19 – contains a complete proof of Mordell's theorem for elliptic curves over  $\mathbb{Q}$ . The last chapter is a brief, yet fairly complete, survey of the subject which has come to be known as arithmetic geometry. This chapter could be said to represent the third theme of the book. The writing style is easy and apart from historical comments, there are many exercises at the end of each chapter which are fairly easy and serve to complement the material covered.

The book is useful not only to graduate students but even to mathematics undergraduate honours students. It is an outstanding book to learn modern number theory from.

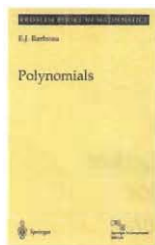


*Algebra*  
Thomas W Hungerford  
Springer, 2004  
Price: Rs.350/-

Here is a book which is 'complete' in all respects and ideal for self-study. Though there are many texts on algebra which have their

various strong points, this one is ideally balanced, as seen by the fact that it is the prescribed graduate text in many universities. It is formal on the one hand – the fairly detailed first chapter on set theory and the last chapter on categories are witness to this. On the other hand, it is not too formal to intimidate the average graduate student. It is complete containing, as it does, not only the study of groups, rings, modules, fields and Galois theory but also of homological algebra, commutative algebra including Hilbert's nullstellensatz and even a chapter on the structure of rings which discusses semisimple rings and division algebras. The treatment is absolutely thorough throughout the book and each section is accompanied by several exercises. In a single volume, there would have been no better way to compile a modern graduate text on algebra suited for teaching as well as for self-study.

This is indeed an excellent and extremely useful book which would be welcomed by all, right from the undergraduate mathematics honours students to graduate students.



*Polynomials*  
E J Barbeau  
Springer, 2004  
Price:Rs.395/-

Among the three books reviewed here, this is the only one which is not a textbook and would be of interest to readers with different backgrounds. This is a book of problems

written somewhat in the style used by Polya and Szego in their two-volume book *Problems in analysis*. The book deals with elementary as well as advanced problems at the same time. The idea is not merely to engender ingenuity but to bring forth techniques which have sprung while trying to solve such problems. Each section begins with a discussion of a theme, some exercises and explorations and then a set of problems many of which have appeared in mathematical competitions. This ends with brief hints for solving the exercises as well as the problems. The hints are sufficient to excite the compulsive problem-solver who, if she fails, can refer to the very last chapter where detailed solutions are given for all exercises, explorations and problems. Students taking part in mathematical olympiads as well as high school and college teachers who would like to enrich their teaching can benefit a lot from this book. The genuine problem-addict can also revel in it. When there is so much criticism about school mathematics curriculum and problem-solving is sought to be encouraged so as to develop independent thinking, a book like this is welcome as it blends the challenge of problem-solving with the concepts and techniques in mainstream mathematics. The topic is central enough to be related to several areas of mathematics like geometry and combinatorics. This book is indeed a pleasure to read, armed with several sheets of paper and a pen.

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