

BOOK REVIEWS

John Grant McLoughlin

New Mexico Mathematics Contest Problem Book

By Liong-Shin Hahn, published by the University of New Mexico Press, 2005.
ISBN 0-8263-3534-9, paperbound, 216 pages, US\$29.95.

Reviewed by **Catherine Haines**, *Western Technical & Commercial School, Toronto, ON.*

The *New Mexico Mathematics Contest Problem Book* by Liong-Shin Hahn, a retired professor from the University of New Mexico, comprises 166 problems. Many, but not all, of them originally appeared in the annual New Mexico Mathematics Contest. The main body of the book is organized according to the type of mathematics involved, while an appendix gives actual examination papers from 1990 to 1999, when Professor Hahn was in charge of setting them. The first round of the contest is for all secondary students, and the second round is for the top 15% from the first round. The questions in the second round may be extensions of those in the first round.

The first chapter is divided into two sections: the first containing problems in number theory and algebra, and the second containing problems in geometry and combinatorics. Detailed solutions for all problems follow in the second chapter, which is similarly divided into two sections. Analogous problems are grouped together to help the reader to explore more than one aspect of a topic. The solutions are presented clearly, with flashes of humour, and include generous commentary. The author often provides multiple solutions, inviting the reader to learn new strategies and to compare the efficiency and directions of different approaches, and he also encourages the reader to see if it is possible to generalize the problem.

A typical example is a problem showing that no three lattice points can form an equilateral triangle. There are four given solutions: the “brute force solution” (using the distance between points and understandable by any secondary student), a trigonometric solution, a solution using a determinant, as well as “the slick solution”, a reductio proof that does not involve any higher methods but does require insight. This is one of a series of related problems concerning lattice points.

Students will find this a good book to work through. Alternatively, one can easily pick out a group of questions on a certain topic, such as magic squares. Since the solutions are separated from the problems, there is no danger of accidentally seeing the solution to a problem. The problems are arranged progressively within each topic so that the earlier problems are more approachable. While working through the problems, the student can expect to develop problem-solving skills.

The problems in this book can be accessed by any secondary student. There is no need to know calculus. Although some solutions use trigonometry (not necessarily known at this level), other methods of solution are given.

A further pair of appendices comprise four calculus competitions and their solutions. This book would make excellent contest practice, say for the Canadian Open, and could be used by teachers as a source of interesting problems for enrichment.

The Contest Problem Book VII:

American Mathematics Competitions 1995–2000 Contests

Compiled and augmented by Harold Reiter, published by the Mathematical Association of America, 2006.

ISBN 0-88385-821-5, paperbound, 200 pages, US\$43.95.

Reviewed by **John T. Siggers**, retired, Thompson Rivers University, Kamloops, BC.

From the MAA literature, “The American Mathematics Competitions are intended for everyone from the average student at a typical school who enjoys mathematics to the very best student at the most special school”. This latest publication from the MAA bears out this philosophy. It contains a brief history of the American Mathematics Competitions since 1950, the contests from 1995 to 2000, solutions to each of these contests, a selection of 23 other challenging problems with solutions, and a classification by topic of all the contest problems in the book.

The brief history discusses the reasons for the various changes made during the last 50 years. This is invaluable for those who design local area school contests. It addresses the problems of student interest and participation, along with contest difficulty level. It also considers the time constraints when writing the contest in an individual school setting. The recent change to AMC 10 and AMC 12 has allowed more flexibility with respect to the topics covered and the difficulty levels of questions.

The 23 additional problems were not deemed to be appropriate for short multiple choice solutions, but are an excellent source of problems for mathematics clubs or a “Problem of the Month”. The classification section is excellent for those wishing multiple choice resources or ideas on a specific topic.

This book is ideal as a resource for the classroom teacher, an academic prize, a mathematics contest prize, material for a mathematics club, and/or a source of ideas for mathematics contest problems. With its dimensions of 23 cm × 15 cm × 1 cm, it is easily carried and ideal for those tediously long train or airline trips.

It is a “must-have” publication for those involved with high school mathematics contests.