BOOK REVIEWS

ALAN LAW

Elementary Mathematical Models by Dan Kalman,
published the The Mathematical Association of America, 1997
ISBN# 0-88385-707-3, soft cover, 340+ pages.
Reviewed by **Richard Charron**, *Memorial University of Newfoundland, St. John's, Newfoundland.*

Subtitled *Order Aplenty and a Glimpse of Chaos*, this book is intended for post-secondary students who are pursuing a course of study requiring no more mathematics than college algebra. The idea is to embed the rudiments of college algebra into a course whose focus is not algebra itself but rather the use of algebra in model problems common to the sciences, economics and business.

The book starts with basic notions of sequences, recursion, and difference equations to then introduce arithmetic growth models, quadratic growth, geometric growth and ultimately logistic growth models. The models are all presented in a particular context, going from problems dealing with pollution data, consumption of non-renewable resources, on to population growth. As the models are presented, a set of natural questions arises. It is in answering these questions that the usual algebraic techniques are intertwined, covering the usual range of questions from determining the equation of a line, computing slope and intercepts, to quadratic functions and their roots, polynomials, rational functions and their graphs, exponential and logarithmic functions. The book does end with a problem giving a glimpse into the interesting dynamics of the logistic equation.

As the focus of this book is not algebra but rather algebra to assist in answering modeling questions, the instructor/student who prefers a course emphasizing definitions, theorems and techniques will not enjoy this book. Students looking for a litany of worked-out examples will not be entirely satisfied either. Those who teach/learn algebra but prefer to do so in a broader scientific or social context will find the text to be quite interesting. The author does not shy away from the fact that life, data and models are never in agreement and makes a conscientious effort to convey to the reader the importance of understanding the limitations of one's models. On the minus side, the text is a bit verbose. The author admits his guilt in this respect in the introductory remarks indicating he preferred to err in this fashion.

Overall it stands as a recommended text for the subject.

Principles of Mathematical Problem Solving by Martin J. Erickson and Joe Flowers, published by Prentice-Hall, Inc., 1999.
ISBN # 0-13-096445-X, hardcover, 252+ pages.
Reviewed by **Christopher Small**, *University of Waterloo, Waterloo, Ontario.*

Teaching mathematical problem solving is a bit like trying to teach someone to find a light switch in a dark room in the middle of the night. Unlike the tidy presentation of theorem, corollary and lemma that makes up the standard course, training people to be good problem solvers is a very inexact science. Nevertheless, like finding the light switch in a dark room, mathematical problem solving has many rules of thumb to get you through the task.

Principles of Mathematical Problem Solving by Martin J. Erickson and Joe Flowers contains many of the standard rules of thumb, and is pitched at a level for the undergraduate university student possibly preparing for the William Lowell Putnam Competition. While the book requires some mathematical expertise beyond the high school level, the advanced high school student will find much that is useful as well. In many respects, it is similar in academic level and coverage of topics to Loren C. Larson's *Problem Solving Through Problems*. However the overall level of presentation is easier and more suitable for the novice who has little experience with mathematics competitions.

The book explains many standard methods with careful attention to the fundamental arguments. Many examples are well developed, and the problems at the end are judiciously chosen, although many are fairly well known.

It is good to note that the problems have been selected in part because of their elegance. The importance of this cannot be overestimated in providing students with an eye for mathematical beauty and an appreciation for the subject.