Review of

Circles: A Mathematical View, by Dan Pedoe, The Mathematical Association of America, Washington, D. C., 1995. 144 pp. $18.95(paper). ISBN 0-88385-518-6.

Although it is the simplest of all nonlinear geometric forms, the circle is far from trivial. It is indeed a pleasure that The Mathematical Association of America chose to reprint an update of this classic first printed in 1957. Geometry teaching has been in retreat for many years in the US and that has been a sad (and very bad) thing. It is also puzzling as so many people say that the reason why they cannot do mathematics (i.e. algebra) is that they need to see something in order to understand it. Furthermore, the first mathematical education most children receive contains the differentiation of shapes and their different properties.

Circles and lines as used in geometry are abstractions that are easily grasped, much simpler to many than the abstract generalizations of algebra. One can only hope that this book signals a rebirth in interest in geometry education. Without question, it can be used as a text for that education and would help parent a rebirth. To remedy this modern affliction and make the material available to the current readership, a chapter zero was included. This new chapter is used to introduce the background concepts and terminology that could be assumed when it was first published.

No one can truly appreciate the intellectual achievements of the ancients as summarized by Euclid without doing some of the problems. There is also a stark beauty to a form of mathematics where the tools are a compass, straightedge and a mind. Particularly in the age of calculators and computers. All of the basic, ancient, results concerning circles are covered as well as some very recent ones. The theorems are well presented and complete without being overdone. In keeping with the ancient traditions, pencil, paper, compass and straightedge are the only tools used. A short collection of solved exercises is also included.

Like the books of Euclid, this work will grow old but never dated. It was destined to be a classic when it was first printed and remains so today.

From Erdos to Kiev: Problems of Olympiad Caliber, edited by Ross Honsberger, The Mathematical Association of America, 1995. 250 pp., $31.00(paper). ISBN 0-88385-324-8.

Mathematicians by definition have a love affair with good problems, and this is a collection of the best. While designed to be at a level for mathematical olympiad use, all mathematicians will find something in here that will stretch them. Some are at the level where the solution requires a simple insight, but others may require reaching for your thinking cap. However, all can be solved using arguments considered within the reach of an olympic mathlete. Which is encouraging. It is nice to know that there are young people who can do problems that force me to strain a few neurons. Solutions are included, most of which were created by the editor. The problems are taken from geometry, number theory, probability and combinatorics.

Another high quality entry in the series of problem books by Ross Honsberger, this is a book for all mathematicians, potential olympiads to professionals.

Reviewed by
Charles Ashbacher

Review of

An Introduction to the Smarandache Function, by Charles Ashbacher, Erhus University Press, 1995, 60 pp. (paper), $7.95.
ISBN 1-879585-49-9

This slim volume patently lives up to its title. It does give an introduction to the Smarandache function reaching from its definition all the way to an enumeration and brief discussion of several unsolved problems. Theorems are clearly stated and proofs are always supplied. However, the exposition is relatively lively and informal, lending to this book's readability and brevity. One could get an overview of the topic by skimming this book in an hour or two, skipping the proofs and algorithms. The more diligent reader will spend considerably more time constructing his own examples to illustrate the proofs and test the algorithms.

Chapter one covers basics of the number theoretic Smarandache function, $S(n)$, where n is a positive integer. Included are its definition, 16 theorems and a ready-to-use C++ program for computing values of this function. A background in Number Theory is certainly helpful for approaching this topic, but not absolutely necessary. Just in case, the chapter begins with a one page summary of the idea of divisibility and definitions of the standard arithmetic functions f, s and t. It culminates with a theorem characterizing the range of $S(n)$. The author has considerable experience in computer investigations of this and other topics in number theory and recreational mathematics. In addition to the C++ implementation, he has supplied a UBASIC program, useful for handling extremely large numbers which surpass the maximum allowable integer size of C++.

Chapter two takes up some deeper questions. Topics include iteration and fixed points of the Smarandache function as well as solutions of numerous equations such as the Fibonacci-like relation $S(n+2) = S(n+1) + S(n)$. Various problems are presented and solved. Many other, as yet unsolved, problems are presented. In the latter case the author often furnishes a conjecture along with helpful rationale. The reader is led to the jumping off place, ready for his own foray into unresolved areas of investigation. These conjectures and plausibility arguments are clearly labelled as such and hence distinguishable from the theorems and proofs with which they are interspersed.

This book is not without its niggling errors, mostly typographical and obvious enough as to cause no serious confusion. A few discrepancies in terminology and notation were also noted, probably not uncommon in the literature pertaining to a mathematical topic which is less than 20 years old. As Ashbacher notes in his introductory material, the Smarandache function was created in the 1970's and first published in 1980. In this work, he has given us a bibliography guiding us to works published in the intervening years and provided a good roadmap taking us from the beginnings to the current state of knowledge of his topic.

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