

BOOK REVIEW

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A Friendly Mathematics Competition: 35 Years of Teamwork in Indiana
Edited by Rick Gillman, published by Mathematics Association of America,
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“The Friendly Exam” is the popular nickname of an annual undergraduate mathematics competition that began in 1966 at Wabash College, Indiana. The competition has grown in scope from its inception as a college competition to include participation from larger state universities throughout Indiana.

In the opening pages of the book, the history of the competition is synopsised neatly by Paul T. Mielke (a builder of the competition) and extended upon by Rick Gillman (an enthusiastic supporter since being introduced to the competition in 1987 as a faculty member at Valparaiso University). The historical perspective and the tone of presentation combine to offer a valuable addition to the subsequent collection of problems and solutions. As a reviewer, it was evident to me that the competition represented a significant mathematical community event.

The core of the book is a presentation of the “Exams” (#1 to #35) and the solutions for 1966 to 2000 inclusive. The contest is team-based in that teams of three students collaborate upon the questions posed in the contests. Each contest consists of 6 to 8 problems. The presentation of the problems for each exam is preceded in the book by a paragraph identifying the host institution, names of winning team members, and any instructions pertinent to the particular paper. The inclusion of such information reinforces the editorial commitment to sharing a story rather than simply presenting old papers. A total of 43 pages of problems is followed by 130 pages of detailed solutions. Each solution concludes with a statement such as “Look under Algebraic Structures in the Index for similar problems”.

The final segment of the book is entitled Index by Problem Type. Each problem has been classified into one of the forty categories. Some categories such as Arclength with one problem seem unnecessary, particularly, given that a small number of problems have been classified Miscellaneous. However, the Index serves a beneficial role in providing a survey of the content and as a source of problems from particular areas of mathematics. For example, there range from 10 to 33 problems in each of the following categories: Analytic Geometry; Enumeration; Geometry; Integration; Limit Evaluation; Matrix Algebra; Number Theory; Probability; Polynomials; and Real-Valued Functions.

It is hard to identify the level of difficulty of problems. One of the introductory remarks suggests that the level is a notch below the Putnam Contest. A basic working knowledge of calculus and linear algebra appears to be an expectation. Further, some questions address more specific concepts concerning topics in algebra, calculus, or probability. The range and quality of problems and solutions offer a rich resource for undergraduates or senior high school students interested in competitions. The problems are also valuable for high school teachers or university faculty, whether working with such students or simply seeking mathematical problems for solving or sharing with others.

Three problems are provided here to offer a snapshot:

P1975-2. A polygon having all its angles equal and an odd number of vertices is inscribed in a circle. Prove that it must be regular.

P1988-7. A fair coin is tossed ten times. Find the probability that two tails do not appear in succession.

P2000-2. Call a number N *fortunate* if it can be written with four equal digits in some base $b \in \mathbb{Z}^+$.

- (a) Clearly 2222 is fortunate; why is 2000 fortunate?
- (b) Find the greatest fortunate number less than 2000.

The organization of the problems from past contests into a book form is not unusual. In fact, Canadian initiatives such as the Cariboo College Mathematics Contest, the Newfoundland and Labrador Senior High School Mathematics League, and various Canadian Mathematics Competition contests offer such examples. Such books should be encouraged, as they extend the work and efforts of collectives into a broader domain while offering insight into the existence of other initiatives at regional, national, or international levels.

In summary, the Mathematical Association of America should be commended for publishing a collection of problems and solutions. The publication is strengthened by the inclusion of a historical context to supplement the material. *A Friendly Mathematics Competition: 35 Years of Teamwork in Indiana* would be a welcome addition to the shelves of libraries, departmental lounges, or those of the individual problem solvers themselves.