

## A Word from the Editor

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The editorial board of the *Mathematics Exchange* is pleased to present this latest issue containing four articles. The group of authors has produced a nice collection of papers to be of interest to all undergraduate students of mathematics, and we hope you enjoy the fruits of their labor. We appreciate their effort to disseminate their new discoveries; we also appreciate how they inspire and motivate our readership to follow their example in sharing their love of mathematics. We believe that getting students involved in publishing mathematics is a true milestone in helping them find their (permanent) place in the mathematical community and we are honored and proud to be a part of that endeavor.

The first article explores the mathematics involved in the popular dice game *Cosmic Wimpout*. In particular, the authors compute the expected score for the initial roll, as well as construct a Markov chain model, applying matrix operations to answer questions regarding the duration and probability of the process going through certain states.

The second article investigates some mathematics behind the Shidoku (four-by-four puzzle) and Sudoku (nine-by-nine puzzle) games. The authors present MuPAD programs that perform a Gröbner basis computation for the ideal describing conditions of a Shidoku board or a Sudoku board. This is implemented using three different strategies. The paper also includes a theorem guaranteeing the result of one of the methods.

Article three explores the numerical ranges of complex truncated composition operators induced by analytic mappings of the open unit disk to itself. In particular, the authors investigate the geometric shapes of the numerical range for such operators.

The final article presents explicit calculations of growth functions and growth series of a variety of finitely generated groups, followed by some general results about those measures of growth. The authors also provide a self-contained proof that the growth series of a group is rational if and only if the growth function satisfies a recurrence relation of finite depth.

We hope that you will enjoy reading this issue of the *Mathematics Exchange*. As always, we welcome and encourage ideas on how we can better serve our readers.

*Rich Stankewitz*