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3 Uncovering Unexpected Mathematical Connections with the "Folded" Triangles Problem

Michael Todd Edwards, John Carroll University; **James Reeder**, University School

The authors describe the transformation of a seemingly straightforward data collection activity, the "Folded Triangles" Problem, into an activity well-suited for mathematical inquiry. By listening to their students' questions regarding the problem, and developing inquiry-based activities that centered around their questions; they uncovered a number of intriguing mathematical results. By allowing students to construct solutions to their own questions, they are provided with opportunities to experience mathematics as a creative enterprise rather than an exercise in mimicry or memorization. Perhaps more importantly, after studying the "Folded Triangles" Problem, many students expressed an increased sense of confidence regarding their ability to tackle mathematics problems having no clear-cut solution.

18 What Can Computational Studies Offer High School Students? Preparing Students for the New Science Frontier

Andrea Karkowski, and **Ignatios Vakalis**, Capital University

Science and technology continue to advance at a rapid rate. For educators, the concern is how to prepare students to enter a workforce where the greatest advances are occurring not within particular disciplines, but at the intersections of disciplines. Computational Studies is science at the intersection of mathematics, science, and computer science. In addition to demonstrating the value of integrating computational studies into high school courses, this article proposes several steps that teachers can take to overcome potential barriers to educating students to be scientists of the future.

24 Two Hundred Years of Mathematics in Ohio

David Kullman, Miami University

The author takes a look at Ohio mathematician's contributions to the field and profession. Biographical sketches for many of the Ohio mathematicians noted in this article may be found on the *Ohio Masters of Mathematics* web site at www.maa.org/Ohio. Teachers are encouraged to use this site actively in their classes and to contact the author with information about other mathematicians who should be featured.

30 Back-To-School Bonanza*!

Karen D. Walton, DeSales University

Mr. Ed Harkins, the 1999 Pennsylvania Mathematics Teacher of the Year, begins the school year by giving his ninth grade honor students two choices as to how much homework they will do during the school year. Choice #1 is 1 second of homework for the first night, 2 seconds for the second night, 4 seconds for the third night, 8 for the fourth night,...doubling the seconds of homework for a total of 30 school nights. Choice #2 is 45 minutes of homework for each of 184 school nights. The choices lead to surprising results that provide a bonanza of mathematics activities such as problem solving, exponents, graphing, patterns, mathematical models, cooperative learning, and graphing calculators. The lesson is an

excellent example of a bonanza of applications of NCTM *Standards* including the topics of Number and Operations, Algebra, Problem Solving, Connections, and Representations.

36 Creative Graphing Techniques

Robert Davidson, Jamie McGill, and Daryl Stephens, East Tennessee State University

The use of graphing calculators is prevalent while studying transformations of different functions. Sometimes students do not completely grasp how transformation rules affect the graph of a function. In this article, the authors discuss a class project in which students use function transformations and restrictions on the domain to draw a picture and learn more about the capabilities of the TI-83 Plus and TI-89 graphing calculators. Three examples – a sailboat on water, a mouse, and a smiling face – are used to illustrate this project.

40 Teaching with Spreadsheets: Explorations from the History of Mathematics

Anthula Natsoulas, University of Toledo

Mathematical topics of convergence and divergence of series of unit fractions, and approximations for pi are presented within a historical context. Spreadsheets are used to conjecture solutions to problems that perplexed mathematicians from ancient to modern times. Included are Zeno's Paradox, and the Harmonic Series and the alternating Harmonic Series. Beginning with the early Egyptians, attempts to find approximations for pi are discussed. The efforts of Bernoulli and his fascination with figurate numbers and the subsequent solutions by Euler and his approximations of pi are developed. Examples of how students at differing levels of mathematical maturity in grades 8 through 12 can use spreadsheets to hypothesize limits or explore divergence are provided. Extensions are provided.

47 The Nice Form of the Equation of a Line

Brad Lautar, North Union High School

This article provides an easier way to introduce students to the equation of a line before introducing the point-slope or slope-intercept forms of a line.

50 Looking at a Meta-Analysis of the Effects of Calculators

Michelle K. Reed, Wright State University

The research study described in this article was a meta-analysis of the effects of calculator use in the classroom. A meta-analysis is a systematic method of analyzing research studies and includes all studies found in the literature on a specific topic that contains the appropriate information. The author of this particular study of the effects of calculators on student achievement and attitudes recommends that calculators be used at all grades K-12, with older students having more access. In addition, calculators should be included during the assessment of problem solving.

54 A Not So Random Walk

T. Michael Flick, Xavier University

This article demonstrates the technique of solving a scaled down version of a complex problem to attain the solution to the complex problem. The problem investigated is "A path is constructed with perpendicular segments of integral lengths so that AB has length n , BC has length $n-1$, CD has length $n-2$, EF has length $n-3$, and so on until the last leg has length 1. AB has length 100 meters and 125 meters respectively, how far are the terminating points from the starting points?"