# Ohio Journal of School Mathematics

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OHIO COUNCIL OF TEACHERS OF MATHEMATICS

# Ohio Journal of School Mathematics Abstracts

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3 Correlations and Boxplots in Major League Baseball: Incorporating Graphing Calculator Technology and the Internet in Your Middle/High School Statistics Lessons
**Keary Howard**, SUNY Fredonia

This paper provides lesson and project ideas for middle and high school mathematics teachers looking to incorporate graphing calculator technology and Internet data into their classroom. Applications are generated for classroom teachers searching for an effective way to use real world data in sports and entertainment as the basis for lessons in correlation, regression, boxplots, percentiles, sampling methods, measures of central tendency, and measures of spread. In particular, data obtained from the ESPN.com website is used to explore the correlation between hits and runs in major league baseball via scatterplots and linear regression. Also, boxplots and percentiles are used to help determine the number of runs necessary to 'guarantee' a win in major league baseball.

8 Using Collaboration to Prove Heron's Theorem
**Mark Jaffee**, Lorain Admiral King High School

Many mathematics students are frightened by the idea of constructing a long proof. They often don't know where to start or how to proceed. This article describes how a group of trigonometry or precalculus students can prove Heron's Theorem using collaborative methods and how this process helps them understand that a long, complicated proof is often a number of shorter, simpler proofs connected by logic and algebraic manipulation.

The author explains how he split the class into six groups, assigned each a part of the proof, then worked with the students to construct the entire proof. Representatives from each of the groups were able to present their part of the puzzle and, as a result, the students became more comfortable and actually enjoyed the process. Each of the six tasks and the complete proof is included in the appendix.

15 Mathematics by Inquiry in Slovakia: The Orava Project
**Jerry K. Stonewater**, Miami University

The Slovak Republic began a transformation from Communist-dominated rule to democratic government in 1993 and is now struggling to develop democratic traditions, resulting in dramatic transformations of its major institutions. The U.S. Agency for International Development-funded Orava Project was designed to assist Slovakia in its educational transformation by incorporating democratic concepts and practices into the schools and teacher education programs. This article describes a component of the project in which K-8 Slovakian teachers participated in Standards-based inquiry mathematics workshops designed to demonstrate problem solving and critical thinking outcomes. The article describes these inquiry-based mathematics workshops and discusses the participating teachers' responses to inquiry-based mathematics teaching.

The teachers' written reflections about the workshop indicated that many of them experienced, perhaps for the first time, that inquiry/discovery learning often leads to deeper understanding of the mathematics, leads to new ways for students to integrate and connect new materials to existing knowledge, and opens up new and unexplored mathematical questions. Additionally, teachers experienced first-hand how such activity-based learning integrates seemingly unrelated objectives that appear in the existing curriculum.

## 21 The Mathematics of Election Margins

**Bonnie H. Litwiller** & **David R. Duncan**, University of Northern Iowa

No abstract available.

## 23 Why Do Chinese Students Succeed in Math Class? Two Ohio Teachers Learn a Key Element – Parents!

**Janet M. Herrelko**, University of Dayton

Two Ohio teachers traveled to China to discover and learn what the Third International Mathematics and Science Study found to be successful methods used to teach mathematics to all ages of students. When discussing methodology with Chinese teachers, pedagogy is not the key to graduating successful mathematics students, but parental expectations for academic success was the key factor. Chinese teachers relied upon parental influence to correct student behavior problems and to remediate students with learning disabilities of any type. This was the Chinese way: a cultural expectation that fostered parental responsibility for student academic success. The Ohio Department of Education followed the Chinese model by creating Parent Academies to familiarize parents with the new Ohio Academic Content Standards. Ohio mathematics teachers mastered these new standards and are encouraged to develop practices that welcome parents to partner with teachers to produce successful mathematics students.

## 27 The Use of Computers for Topics in Undergraduate Geometry

**Reza Sarhangi**, Towson University

The purpose of this article is to provide information on the use of software utilities in undergraduate geometry. These utilities also benefit the secondary school mathematics curriculum. The paper introduces the construction of regular polygons, hyperbolic geometry, rigid transformations in the plane, and the symmetry groups of one-dimensional patterns. The article applies these ideas to present patterns in mosaics and other mediums from different cultures.

## 41 Generating Pythagorean Triples

**Homer W. Austin**, Salisbury University

Because students know the Pythagorean theorem from their study of right triangles, Pythagorean triples are familiar to them as lengths of the sides of an integral-sided right triangle. The methods described here enable students to generate Pythagorean triples by factoring even squares. They are then able to construct Pythagorean triples in many different ways by varying the functions they use to produce them. Students are also introduced to the Fermat machine, another mathematical object with which they might want to experiment.

## 45 The Impact of the Teacher in Reform Classrooms

**Michelle K. Reed**, Wright State University

The research study described in this article investigated student achievement and the teachers' role when using a reform curriculum called *Core Plus*. Questionnaires, observations, school data, and student test scores were analyzed to identify teacher variables that are associated with great student achievement. Teacher variables identified include completion of a professional development workshop focused on preparing teachers to teach this particular curriculum and the use of more group and pair work and less teacher presentations.

## 48 A Mathematics Contest Problem Taken to a New Level, (Or What Do Spreadsheets Have to Do With It?)

**T. Michael Flick**, Xavier University

This article takes a specific problem and shows how a teacher can work to a generalized solution using spreadsheets. The specific problem was “Two poles of length 15 feet and 10 feet are placed 125 feet apart. A wire is attached to the top of each pole and pulled tight to the bottom of the other pole. How tall is a third pole that is to be placed so that its top touches the intersecting point of the wires?” The general problem was “If poles are only available in integer lengths from 1 to 20 feet inclusive (and cannot be cut), how many different sets of three poles are possible if all three poles must be of different lengths? What are the lengths of the poles?”