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- 3 Editorial: Neural Associations through Mathematical and Contextual Connections
Ed Laughbaum, The Ohio State University

This article is a call for teachers to make and use connections to every new concept or skill taught. A rationale based in research by neuroscientists on basic brain function is proposed. The purpose is to create long-term memory with improved recall.

- 8 Using Algebra Fact Families to Solve Equations
Martin V. Bonsangue, Gerald E. Gannon, Kathy Lewis, California State University, Fullerton

Students in first-year algebra are familiar with the traditional methods used to solve equations. These approaches, often called balancing and un-doing, are usually based on taken action upon an equation, such as “adding 3 to both sides.” However, students may become confused when the problem appears in a less recognizable form, such as $11 = 2 - 3x$. In this article we present a third method for solving equations building on the students’ past experiences with arithmetic fact families. In this method, the student is not acting upon or “doing” anything to the equation. Rather, the equation is simply recognized as being in the form of a sum, difference, product, or quotient, and then is replaced with a different, but equivalent, form that moves the student along toward a solution. Using Algebra Fact Families gives the student a dependable tool in solving any equation, since an equation can always be viewed as a relationship between three terms and one operation. Perhaps most importantly, students can move away from the practice of balancing equations, in which the student must take action upon the equation, and move towards an understanding of nature of the equation itself based on its form.

- 15 Ohio Automobile License Plate Mathematics
Vincent Fiordalis II, University School
William Fiordalis, Lake Highland Preparatory School

While traveling around the great state of Ohio, have you ever really noticed the auto license plates and wondered about the myriad of mathematical possibilities presented on each and every one of them? Alpha-numeric patterns are unique to every plate. By looking more closely at the arrangements of numbers and letters we can unlock the hidden mathematics within. The Ohio Bureau of Motor Vehicles has successfully provided for an original tag assignment different for each motor vehicle registered by placing number-letter combinations in distinct patterns. Upon investigating these possibilities, in a systematic manner, we can unlock these patterns and learn about their many mathematical variations and possibilities. Read about how a recent sixth grade math class project: to assemble a centennial school "one-of-a-state" license plate collection, resulted in discovering more mathematics than the students realized was possible.

- 21 Left and Right with a Graphing Calculator
Alfinio Flores, Emily Gustafson, University of Delaware

Students count how many letters they can write in 30 seconds with their right hand, then with their left hand. They use a graphing calculator to display a scatterplot of their data, describe its shape,

and determine lines of best fit of the total set of data as well as for the two subgroups of left- and right-handed students. The overall trend is different from the trend for each of the two subgroups. Plotting data for dominant vs. non-dominant hand gives a more consistent display.

25 Mathematics Curriculum for Students in Rural Areas

Rick Anderson, Patti Jo Davis, Eastern Illinois University

A strong mathematical education is necessary for all students, including students in rural areas. In this paper we outline characteristics of mathematics education specific to students in rural areas. Then we discuss a framework of rigor and relevance for designing mathematics curricula. A rigorous mathematics curriculum consists of tasks with higher-level cognitive demands and mathematical problem solving. A relevant mathematics curriculum connects mathematics with the real life of students and their interests. A Pre-Algebra unit on speed for middle school students illustrates the framework. In the unit students investigate speed with a moving robot and airplanes in flight.

31 Breaking the Curve

Amanda Dahlman, Jesse DePinto, Kyle Kremer, & Joe Plattenburg Kettering Fairmont High School

Imagine you are up to bat in a major league baseball game. Why would you rather face a pitch with a smaller break? Would you know that curvature helps to explain why? Would you even know what curvature means? In this paper we derive a model for the path of a pitch based on actual data from MLB.com's GameDay™ feature. Then, employing our model, we analyze the curvature and break of the pitch.

36 How “Smart” is the Interactive Whiteboard for Ohio Mathematics Teachers?

Alyssa M. Hoslar, Strongsville High School
Daniel J. Brahier, Bowling Green State University

One of the newest forms of technology available to teachers and students is called an interactive white board (IWB). IWB's are whiteboards that are connected to a computer that allow the teacher and students to interact with the board by manipulating images on the screen with the touch of a finger or stylus. A mini-study was conducted to determine how Ohio's mathematics teachers are using this technology. Through e-mail, interviews, and observations information was gathered, and patterns of IWB use and effects were identified. Although IWBs appear to have positive effects on student learning, there are problems that need to be worked out, such as professional development of teachers on how to use the technology effectively. Suggestions are provided for future research in this area.

43 Analyzing Dollar Cost Averaging

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

46 From Guess and Check to Strategic Problem Solving ([Mathematics Contest Corner](#))

T. Michael Flick & Debora Kuchey Xavier University

49 Get Ready, Get Set, Tessellate! ([Activity](#))

Michael Krach, Towson University

52 Function Transformation Primer ([Activity](#))

Ed Laughbaum, The Ohio State University