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3 Making the Origin of Mathematical Problems Meaningful: Where Do They Come From?
Jose Contreras, The University of Southern Mississippi
The author describes how he used a problem-posing framework to guide my students in modifying the attributes of a given problem to generate mathematical problems systematically. We generated proof, converse, special, extended, and general problems, as suggested by the framework. We solved most of the problems. As a result of generating problems, students had a better understanding that an origin of mathematical problems is another mathematical problem.

9 Bigger than What? Vocabulary Confuses Work with Negative Integers
Todd Smith, The University of Dayton
The term bigger can generally be used without ambiguity in mathematics and the physical sciences when the term is applied solely to positive integers. Confusion arises however, when the term bigger is applied to negative integers. When comparing two negative integers, does "bigger" mean "greater than" for comparing the values or the absolute values? The answer lies in giving the negative integers a context. For example, would you say that +3 is bigger than -4, and then also say that a $3 credit in the bank is bigger than a $4 debt? While a $3 credit in the bank is better financially than a $4 debt, the context makes this use of the term bigger confusing since a $3 credit won't pay off a $4 debt. Concrete examples are very important when negative integers are introduced to elementary school children, and confusion can be avoided while teaching the concept of negative integers by using the term bigger to compare absolute values whenever there is context. When there is no context, such as comparing two integers on a number line, the term bigger should not be used to mean more positive since its definition is not clear.

13 Manipulatives in Geometry are a TOTAL waste of time – Or are they?
Don Hutchins, Arizona State University
When the word “manipulatives” is mentioned, most high-school teachers’ reaction is negative. This article mentions several types of manipulatives showing some examples of their use. It shows that using manipulatives in the classroom both as demonstrations by the teacher as well as hands-on for students can help to improve understanding in geometry.

18 Increase Student Interest and Achievement with Technology in the Classroom
Douglas Roberts, Franklin Heights High School
When it comes to math and science, Ohio’s students are achieving higher than the national average and are continuing to improve on statewide assessment exams. But Ohio still faces several challenges. Technology in the classroom is one way to meet those challenges by increasing student interest, achievement and collaboration. The author gives advice on incorporating classroom learning systems into the classroom and the potential benefits of doing so.

22 Ohio's Outstanding Mathematics and Science Teachers Devote Their Summer to Professional Growth

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

Project SOAR is a professional development program conducted by the National Museum of the U. S. Air Force, University of Dayton. This summer 43 teachers attended a one-week program plus spring and academic year follow-ups to practice aerospace activities and learn about links to the Ohio Academic Content Standards in Mathematics and in Science. The work includes an online component (*iDiscovery*) through Miami University for discussion of classroom implementation strategies and sharing of creative ideas throughout the school year.

During the sessions teachers completed hands-on projects that included one-sheet paper airplanes, simple kites, balsam wood model planes, and 12 foot hot air balloons. The teachers discussed how to implement the aerospace activities as lessons with various aged students, how to differentiate the lessons and how extension activities can be beneficial. Aerospace projects are of high-interest to students. Middle school students gain practice with mathematics and science skills with aerospace projects that can help attract them to science, mathematics, technology, and engineering careers. This article highlights Project SOAR professional development activities, provides website information to download lesson plans, shares examples of teacher classroom applications, and helps promote aerospace activities as effective choices for engaging students in mathematics and science learning.

28 Using *Excel* to Analyze Sequences: Visualizing Chaos and Modeling

Russell H. Murray, St. Louis Community College – Meramec

Sequences are an important and powerful tool not only for mathematical modeling but for insight into the beauty of mathematics as well. This paper illustrates both modeling of and insight into sequences using Excel spreadsheets. By using an Excel spreadsheet, the behavior of sequences created by the logistic difference equation can be analyzed. In the process of doing so, chaos can be visualized using the Chart Wizard feature of Excel. By using the scrollbar feature of Excel, these sequences can be seen to develop periodic behavior followed by a transition into chaotic behavior in a pseudo-animated fashion. Finally, modeling is explored by adapting the logistic equation to model a hypothetical animal population.

38 Investigating Horizontal Asymptotes and the Graphs of Rational Functions

Dawn Slavens, Midwestern State University, **Marvin Harrell**, Emporia State University

The high school mathematics curriculum includes topics which can be quite challenging for many students. One such topic in a traditional Algebra II course concerns graphing rational functions.

Within the Algebra Standards for grades 9 – 12, all students should “analyze functions of one variable by investigating … zeros, asymptotes, and local and global behavior” (National Council of Teachers of Mathematics, 2000, p. 290). Consistent with this expectation, this article is a classroom activity that allows students to investigate the values of a rational function as the values of x approach negative infinity and as they approach positive infinity. In addition, the students will examine the end behaviors of the graphs of these functions.

This activity is a companion activity to “Investigating Vertical Asymptotes and the Graphs of Rational Functions” that appeared on pages 64-70 in the Autumn 2004 issue of this publication. The authors recommend that the students first complete the activity found in the Autumn 2004 issue; however, this is not a necessary requirement. The activity that follows assumes that students

have access to a graphing calculator and an understanding of polynomials, functions and their graphs, and how to divide polynomials.

47 Going Whole Hog for Math
Rhona Cummings, East Tennessee State University
By incorporating appealing works of children's literature in math lessons, teachers can help their students to associate math with something they already enjoy: being read to. And, because books about pigs are particularly appropriate for reading aloud, they are sure to grab and hold the children's attention.

This article presents primary-level math-related activities focused around four books about pigs. Extension activities are provided to extend the grade level or enrich student learning. Books referenced include: Christelow, E. (1994). *The Great Pig Escape.* New York: Clarion; McPhail, D. (1993). *Pigs Aplenty, Pigs Galore!* New York: Dutton; Plourde, L. (1997). *Pigs in the Mud in the Middle of the Rud*. New York: Scholastic; Teague, M. (1994). *Pigsty.* New York: Scholastic.

51 (Column: Mathematics Contest Corner)
A 15 MINUTE MATHEMATICS CONTEST: Practice For Competition
T. Michael Flick & **Debora Kuchey**, Xavier University

56 Congressional Delegation Party Equity: A Statistical Investigation (Activity)
Bonnie H. Litwiller and **David R. Duncan**, University of Northern Iowa

59 Measurement and Poetry (Activity)
Michelle Lohman, Berry Intermediate School

62 Brown Bag Experiment: A Sampling Activity (Activity)
Michael Krach, Towson University