Ohio Journal of School Mathematics

Spring 2002 *Number 45*

OHIO COUNCIL OF TEACHERS OF MATHEMATICS

Ohio Journal of School Mathematics Abstracts

Spring 2002 **Number 45**

This paper presents a graphical approach to (vertical) parabolas as (the graph of) the product of two linear functions. Relationships between the graphical behavior of the parabolas and the linear functions are established observing graphical patterns. Proofs of these claims are included. A suggested extension to the product of three (and hence more) linear functions concludes the paper.

In response to national recommendations for the training of mathematics teachers and Ohio's new teacher licensure standards, Miami University has designed a new curriculum for prospective middle grades teachers with a concentration in mathematics. The core of the program includes six mathematics content courses designed to deepen students' understanding of mathematical ideas that are fundamental to effective teaching in the middle grades.

Although differentiated instruction is not a new idea, the differentiation movement has taken center stage as a means of meeting the needs of all students in the classroom. This article focuses on one strategy, tiered lessons, that can be used in a differentiated classroom. A tiered lesson is a differentiation strategy that addresses a particular standard, key concept, and generalization, but allows several pathways for students to arrive at an understanding of these components, based on the students' interests, readiness, or learning profiles. Specific guidelines for developing a tiered lesson as well as an example are included.

This paper examines a search for a solution to a rich problem that only requires knowledge of simple divisibility rules and the technique of using an organized list. It contains a discussion of how students determined whether this solution was the only solution to the problem. It also presents a computer program written in *Mathematica 4.1* that produces the only solution to the problem.

31 Lessons in Mathematics, Marketing, and Much More...
Virginia L. Keen, Bowling Green State Univ.; **Roxanne Ward**, Washington Local School District

At a time when teachers are asked to integrate content and incorporate school-to-work activities, one suggestion comes from a third-grade class and their experiences with what represents "high finance" for them - running a real school store. A major strength of the school store lies in its ability to support the six NCTM Principles (**Equity, Curriculum, Teaching, Learning, Assessment, and Technology**) and several of the standards set out in the *Principles and Standards for School Mathematics* (NCTM, 2000). A school store offers many opportunities for developing deeper understandings of mathematics, but, as evidenced in the Greenwood Elementary third-grade class of Mrs. Ward, other areas of the curriculum are integrated into the successful operation of a school store (e.g., language arts, art, citizenship). The possible tasks made "authentic" through the employment of this complex teaching and learning tool are limited only by the teacher's creativity and the support of the school community.

36 Discovering Mathematics with Real-World Problem Solving Experiences by Collaborating with Business
Donna Huber, Mid-Ohio Educational Service Center

Mathematics/science teams of teachers collaborate with local businesses developing problem-solving activities that correlate with Ohio Proficiency outcomes. Students in grades 5 through 8 discover mathematics in the real-world context of the business environment. The problem solving activities can be shared with other schools and business partners via distance learning technology.

40 Minimizing Assembly Line Costs
Charles Emenaker, **Debbie Woods,** University of Cincinnati - Raymond Walters College

Minimizing production costs is a primary concern in industry. One facet of minimizing production costs is minimizing assembly line costs. This project, patterned after an actual industrial problem, requires students to design the floor plan for an assembly line and determine the minimum number of fork truck operators needed to supply the workstations. The problem allows for multiple solutions and group work. The problem is accessible to students with a wide range of mathematical abilities and is excellent for sharpening critical thinking skills.

49 What Do You Mean by Average?
Cynthia Barb, Kent State University

While students need to practice the mathematical operations that are used to find measures of central tendency (mean, median and mode) and measures of dispersion (range, variance and standard deviation), the *conceptual* understanding is equally important for them to learn. The National Council of Teachers of Mathematics' *Principles and Standards for School Mathematics* (2000) recommends a strong development of the data analysis and probability strand across all grade levels, building on understanding as student's progress. The focus is on understanding and problem solving rather than simple calculations on sets of data. Consider using non-routine problems to reinforce the conceptual ideas of measures of central tendency and some of the creative solutions students used to solve them.

While it is useful to compare group means to obtain a general impression of how the groups compare, a deeper analysis also asks how a randomly selected score from the first group compares to a randomly selected score from the second group. This article considers a number of cases in which this comparison leads to markedly different probabilistic results.