Meeting materials from the 2008 Section Meeting, held April 18-19 at Crowne Plaza San Marcos Resort (Tempe, AZ). Originally posted at

http://math.asu.edu/~sws2008/

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Annual Meeting of the Southwestern Section
THE MATHEMATICAL ASSOCIATION OF AMERICA
and
The Spring Meeting of ArizMATYC

April 18 - 19, 2008
8:30 am - 5:00 pm both days

The Arizona State University Department of Mathematics and Statistics is pleased to host the MAA Southwest Sectional Conference. The conference site is the Crowne Plaza San Marcos Resort in Chandler, Arizona.

Conference sessions will cover a wide range of topics.

You will have the wonderful opportunity to network with mathematicians, mathematics educators from Arizona, New Mexico and Texas, and Phoenix metropolitan area high school teachers.

CONFERENCE HIGHLIGHTS

The Banquet

Friday, April 18, 6:30 PM

Keynote Speaker: Lowell Beineke

Indiana - Purdue University, Fort Wayne

Splendor in the Graphs

Graphs often provide insight into the solutions of puzzles and strategies for winning games. We will explore some of the A-B-C's of this topic, looking at such games and puzzles as "Asteroid", "Bridg-It", "Curious Coins", and "Devious Dice".

Conference Agenda with Abstracts

(as of April 15, 2008)

Points of Contact:
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REGISTRATION!

Please help us get an accurate count by pre-registering for the conference by April 7, 2008.

Please use the on-line Registration Form

Walk-up registration is Welcome. However, materials and tickets for the banquet may not be available for late registrations.

Crowne Plaza® San Marcos Resort!

One San Marcos Place • Chandler, AZ 85225 • 480.812.0900 • 800.528.8071

Deadline for registration at the San Marcos is March 28, 2008.

Conference Registration, All Sessions,
and the
Friday Banquet are at the San Marcos Resort

Click here for a link to San Marcos Reservations

Please call (480) 857-4420 to extend rooms beyond the convention dates.

Room Rate: $122.00 single or double + tax

Transportation options from the airport are through
Super Shuttle (1-800-BLUE-VAN) for about $22 per person one way
or by taxi for about $35.

Annual Meeting
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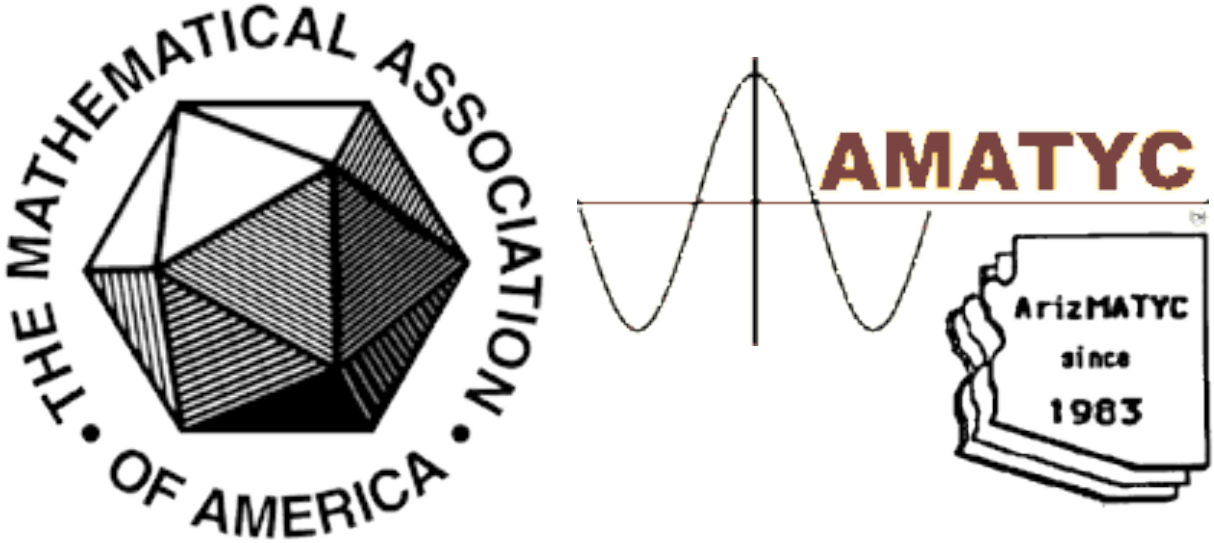

And

The Spring Meeting of ArizMATYC

at

Arizona State University

April 18 -19, 2008

The Banquet

Friday, April 18, 6:00 PM

San Marcos Resort Ballroom

Lowell Beineke, Keynote Speaker

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Organizing committee:

Michael Oehrtman (Section Co-Chair), Arizona State University
Terry Turner (Section Co-Chair), Arizona State University

The MAA Southwestern Section meeting is supported by:

The Department of Mathematics and Statistics, Arizona State University
Door prizes are provided by
Texas Instruments

MAA Southwestern Sectional Annual Meeting
Friday, April 18, 2008

TIME	EVENT/PRESENTER	ROOM
8:00 AM - 9:00 AM	***Continental Breakfast***	***Cibola***
8:00 AM - 5:30 PM	***Exhibits/Books Sales***	***Tunney***
8:00 AM - 5:00 PM	***Registration***	
9:00 AM - 10:00 AM	***Welcoming Remarks***	***Cibola***
10:00 AM - 12:30 PM	***ATF Meeting*** Joe Rody, ASU, Director FYM, ASU	***Swanson***
11:00 AM - 11:30 AM	***A Beginning Graduate Transition-to-Proof Course*** Annie Selden, Mathematical Sciences, NMSU, Professor; John Selden, NMSU, Professor	***Cibola***
11:00 AM - 11:30 AM	***The Development of Covariational Reasoning in a College Algebra Course*** Kevin Moore, ASU, CRESMET; Stacey Bowling, ASU, CRESMET	***Robinson***
11:30 AM - 12:00 PM	***Speaking with Meaning in a College Algebra Course*** Dr Phillip G. Clark, ASU, CRESMET, Faculty; Kevin Moore, ASU, CRESMET	***Cibola***
11:30 AM - 12:00 PM	***College Algebra Redesign: A Research Study on Infusing Conceptual Activities and Technology In the Classroom*** April Ström, Scottsdale CC, Faculty	***Robinson***
12:00 PM - 12:30 PM	***A Quick Look at the TI-nspire*** John Losse, Scottsdale CC, Faculty; Bob Barefoot, Scottsdale CC , Adjunct Faculty	***Cibola***
12:00 PM - 12:30 PM	***What Is A Math Circle, Anyway?*** Nathan Carlson, U of A, PostDoc	***Robinson***
12:30 PM - 2:00 AM	***Lunch on your own***	
1:00 PM - 2:00 PM	***MAA Section Business Meeting***	***Cibola***
2:00 PM - 2:30 PM	***ConcepTests For College Algebra: A Means For A More Interactive Classroom*** David O. Lomen, U of A; Daniel McGee, UPR-Mayaguez, Faculty;	***Cibola***
2:00 PM - 2:30 PM	***A Dynamically Embedded Growth Model*** Stan Russell, Pima CC, Professor, Retired	***Robinson***
2:00 PM - 2:30 PM	***A Second-Order Directional Derivative Test for Classifying the Critical Points of Functions*** Frank J. Attanucci, Scottsdale CC, Faculty	***Swanson***
2:30 PM - 3:00 PM	***Let the Equations Speak: Conceptual Understanding in Algebra*** Deborah Hughes-Hallett, U of A, Professor	***Cibola***
2:30 PM - 3:00 PM	***The Cryptanalysis of Double Column Transposition*** Dr. John S. Jeffries, New Mexico Highlands University, Faculty	***Robinson***
2:30 PM - 3:00 PM	***Origami and mathematics education: an overview and a workshop*** Marta Pecuch-Herrero, ASU Math and Stats, Faculty	***Swanson***
3:00 PM - 4:00 PM	***ArizMATYC Business meeting*** Shay Cardell, President, ArizMATYC	***Cibola***
3:00 PM - 3:30 PM	***The 2:1 Centroid Concurrency*** Alvin Swimmer, ASU Math and Stats, Professor Emeritus	***Robinson***
3:00 PM - 4:15 PM	***Calculators Aren't Just Calculators Anymore: A Look at TI-Nspire*** Stuart Moskowitz,Humboldt State University,Arcata, Ca	***Swanson***
3:30 PM - 4:00 PM	***How to Motivate Students to Learn by Using Software*** Beth Firebaugh, Hawkes Learning Systems,	***Robinson***
4:00 PM - 5:15 PM	***Miniworkshop: Problems with Algebra and Problems for Algebra*** William McCallum, U of A, Director, Institute for Mathematics and Education	***Cibola***
4:00 PM - 5:15 PM	***Developmental Math Program Roundtable*** Kathryn Kozak, Coconino CC, Faculty	***Robinson***
4:15 PM - 5:15 PM	***Enhancing the Learning Experience with Enhanced WebAssign*** John Ward, Cengage Learning	***Swanson***

MAA Southwestern Sectional Annual Meeting
Saturday, April 19, 2008

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8:00 AM - 9:00 AM	***Continental Breakfast***	***Cibola***
8:00 AM - 5:30 PM	***Exhibits/Books Sales***	***Tunney***
8:00 AM - 5:00 PM	***Registration***	
9:00 AM - 9:30 AM	***Proof Trees and Weak Achievement Games: (Tic-Tac-Toe on Steroids)*** Nandor Sieben, NAU Math and Stats, Professor (Visting at ASU); Glenn Hurlburt, ASU Math and Stats, Professor	***Cibola***
9:30 AM - 10:00 AM	***Distributed Algorithms For Planar Graphs*** Andrzej Czygrinow, ASU Math and Stats, Professor; Glenn Hurlburt, ASU Math and Stats, Professor	***Cibola***
10:00 AM - 10:30 AM	***Relaxed Graph Pebbling*** Ben Hester, ASU Math and Stats, Graduate Student; Glenn Hurlburt, ASU Math and Stats, Professor	***Cibola***
10:30 AM - 11:00 AM	***Graphs With Erdös-Ko-Rado Property*** Vikram Kamat, ASU Math and Stats, Graduate Student; Glenn Hurlburt, ASU Math and Stats, Professor	***Cibola***
10:30 AM - 11:00 AM	***A Study of the Correlation between Reading Skills and the Process of Solving Word Problems through an Analysis of Stanford Achievement Test Reports in Grades 6 to 11*** Sandra Villa, UTEP, Teacher, Graduate Student	***Robinson***
11:00 AM - 1:00 PM	***Lunch on your own***	
11:30 AM - 12:00 PM	***A Monte Carlo Algorithm for Multivariate Extreme Outlier Identification*** Shafiu Jibrin, Math and Stats, NAU, Faculty; Ryan Sharp, Raytheon Missile Systems, Operations Research	***Cibola***
11:30 AM - 12:00 PM	***Precalculus and Calculus Readiness Tests at NAU*** Katie Louchart, Math and Stats, NAU, Faculty	***Robinson***
11:30 AM - 12:00 PM	***Interactive Precalculus and Calculus Applets with Mathematica 6*** Charles E. Oelsner, Central New Mexico Community CollegeFaculty	***Swanson***
12:00 PM - 12:30 PM	***Discovering the Truth About the Sampling Distribution of Means*** Murray H. Siegel, Central Arizona College, Faculty	***Cibola***
12:00 PM - 12:30 PM	***Power Questions as an Inquiry Learning Tool*** Tim Sanders, President, mathleague.org	***Swanson***
2:00 PM - 2:30 PM	***Physical Manipulatives for Visualizing Concepts in Three Dimensions*** David O. Lomen, U of A; Daniel McGee, UPR-Mayaguez, Faculty;	***Cibola***
2:00 PM - 3:15 PM	***Online Technology Tools for Our Business Math Courses.*** Gabriel Mendoza, Math, El Paso CC: Valle Verde Campus, Faculty	***Robinson***
2:00 PM - 2:30 PM	***Rolling Parameterized Curves Along the x-Axis and a Connection Between Parabolas and Catenaries*** Frank J. Attanucci, Scottsdale CC, Faculty	***Swanson***

THE FOLLOWING LISTING IS SORTED BY THE PRESENTER'S LAST NAME.

A Second-Order Directional Derivative Test for Classifying the Critical Points of Functions

In this paper I extend the idea of a directional derivative to develop a second-order directional derivative test for classifying the critical points of functions of one, two, or three independent variables. For functions of two independent variables: $z = f(x,y)$, my approach will be an alternative to the Second Derivative Test presented to most students studying multivariable calculus for the first time. Even for functions of three independent variables: $w = f(x,y,z)$, the test readily lends itself to a visual representation of the problem. Finally, for functions of two and three variables, I suggest (new?) ways of proceeding graphically should the second-order directional derivative test be inconclusive.

Frank J. Attanucci, Scottsdale CC, Faculty; Friday, 2:00 - 2:30, Swanson

Rolling Parameterized Curves Along the x-Axis and a Connection Between Parabolas and Catenaries

Imagine "rolling" a circle or an ellipse along the x-axis. Why not a parabola, or some other "suitably-shaped" planar curve? In this paper, we derive mathematical equations for animating the rolling of a large class of parameterized curves along the x-axis. We then apply our result to a parameterization of the parabola: $x^2 = 4py$. Finding parametric equations for the trajectory of its focus F, we show that when the parabola rolls along the x-axis (in such a manner that its vertex touches the origin during the rolling), the trajectory of the focus of the rolling parabola lies along the graph of the catenary: $y = p\cosh\left(x/p\right)$

Frank J. Attanucci, Scottsdale CC, Faculty; Saturday, 2:00 - 2:30, Robinson

What Is A Math Circle, Anyway?

For a year I worked with a group of junior high students calling themselves a Math Circle. But it occurred to me I had no idea what a Math Circle actually is. After attending an inspiring talk by Paul Zeitz of the University of San Francisco, I decided to investigate. As opposed to an average math club, a Math Circle, roughly speaking, is a forum through which junior high and high school students can interact with professional mathematicians. Originating in Russia and Eastern Europe, the concept has caught fire in the U.S. in the past decade. Typically the focus is on problem-solving skills and preparation for competition. Some may be exclusive based on talent, and some may include teachers (so-called Teachers' Circles), but the only real requirement it seems is the interaction between the students and the mathematicians. This talk will be an overview, the result of preliminary explorations, and my own experiences working with the West Junior High Math Circle in Lawrence, Kansas and the Tucson Teachers' Circle.

Nathan Carlson, U of A, PostDoc; Friday, 12:00 - 12:30, Robinson

Speaking with Meaning in a College Algebra Course

The purpose of this research is to describe the emergence of the sociomathematical norm of speaking with meaning (Carlson, Clark, & Moore, In Press), delineate how a college algebra instructor helped enable this emergence, and demonstrate how it can be used as a tool to make inferences about students' progress and shortcomings in the classroom. Speaking with meaning has the dual nature of being both a sociomathematical norm regarding what constitutes sufficient mathematical participation as well as being a tool that can be used in the classroom to elicit such participation. Our analysis showed that attention by the teacher to student responses helped enable the students to speak more meaningfully. In the case of this college algebra course the students were able to explain functions in terms of inputs and outputs. Thus, in this class, to speak with meaning about functions means to couch responses about functions in terms of input and output.

Our analysis also uncovered that students were unable to speak about changing rates of change meaningfully (i.e. a normative way of speaking about changing rates of change in the classroom) which led to probing from the instructor. As a result of this questioning, it was revealed that when dealing with two quantities changing in tandem, the students had difficulty with identifying and remaining attentive to the quantities changing in tandem.

Dr Phillip G. Clark, ASU CRESMET, Professor; Kevin Moore, ASU, CRESMET;
Friday, 11:30 – 12:00, Cibola

Distributed Algorithms For Planar Graphs

In this talk we will outline the graph-theoretic approach to distributed algorithms. We will focus on algorithms for planar graphs and describe very fast approximation algorithms for classical problems in graph theory like for example the maximum matching problem. In addition, we will show how lower bounds for distributed complexity can be obtained from purely graph -theoretic results.

Andrzej Czygrinow, Professor, Glenn Hurlburt, ASU Math and Stats, Professors
Saturday, 09:30 - 10:00, Cibola

How to Motivate Students to Learn by Using Software

Discover the benefits of using interactive software in teaching and learning mathematics. Hawkes Learning Systems promotes grade improvement and motivates students to learn by providing tutorials, unlimited practice, helpful feedback provided by artificial intelligence, and mastery-based homework. Come see a demonstration of our state-of-the-art test generator, online gradebook and student courseware! Plus, there will be a drawing at the end of the presentation, in which one lucky attendee will win a MP3 multimedia player!

Beth Firebaugh, Hawkes Learning Systems, Friday, 3:00 - 3:30, Robinson

Relaxed Graph Pebbling

Many graph parameters, such as chromatic number, clique number, cover number, and matching number, can be formalized as combinatorial optimization problems. Telaxing the constraints of these problems to allow non-integer-valued variables creates fractional graph parameters, which themselves can be interpreted combinatorially. Interestingly, graph pebbling has a similar fractional variant, with its own combinatorial interpretation. In graph pebbling, a configuration of pebbles is placed on the vertices of a graph G. A pebbling move removes 2 pebbles from a vertex v, which contains at least 2 pebbles and places 1 pebble on a neighbor of v. So 1 pebble is lost in the transfer. The t-pebbling number of G, denoted $\pi_t(G)$, is equal to the smallest integer k such that, no matter how k pebbles are distributed to the vertices of G, for every vertex v, there is some sequence of pebbling moves that places t pebbles on v. The fractional pebbling number of G is defined by $\hat{\pi}(G)=\lim_{t\to\infty}\pi_t(G)/t$. Thus, in some sense, $\hat{\pi}(G)$ is the average number of pebbles necessary per solution. We calculate the fractional pebbling numbers of certain very simple graphs and show that, in fact, for any graph G, $\hat{\pi}(G)=2^{diam(G)}$. Like other graph parameters with fractional variants, it would be nice if graph pebbling could be formulated as an integer optimization problem, as this would provide an upper bound on its complexity. However, no such formulation is known.

Ben Hester, Graduate Student, Glenn Hurlburt, ASU Math and Stats, Professor
Saturday, 10:00 - 11:00, Cibola

Let the Equations Speak: Conceptual Understanding in Algebra

Why do our students - even those who have passed college algebra with flying colors - often have trouble with the algebra in later courses? In this talk, we will analyze the kind of algebraic knowledge that is required in calculus, statistics, economics and the sciences; this analysis suggests that students need a better understanding of algebraic procedures than many currently have. We will discuss possible implications and approaches to address the problem.

Deborah Hughes-Hallett, U of A, Professor; Friday, 2:30 - 3:00, Cibola

The Cryptanalysis of Double Column Transposition

Classical cryptography is a great source of varied examples of applied mathematics that can be used to educate, entertain, and inspire our students. Double column transposition is one such example. It was an encryption method that was used as late as World War II. In this paper, it is shown how basic results from probability and permutations can be combined with multiple anagramming to break double column transposition.

Dr. John S. Jeffries, New Mexico Highlands University, Faculty; Friday, 2:30 - 3:00, Robinson

A Monte Carlo Algorithm for Multivariate Extreme Outlier Identification

This talk presents a probabilistic algorithm for finding extreme outliers in large multivariate data set. The algorithm is based on the semidefinite coordinate directions algorithm for identifying necessary linear matrix inequality constraints in semidefinite programming. It has a preprocessing step that reduces the size of the data before the outliers are found. We show an application of the method to data obtained from NASA.

Shafiu Jibrin, Math and Stats, NAU, Faculty;
Ryan Sharp, Raytheon Missile Systems, Operations Research; Saturday, 11:30 – 12:00, Cibola

Graphs With Erdös-Ko-Rado Property

One of the more recent generalizations of the Erdös-Ko-Rado theorem de nes the EKR property for graphs in the following manner: for a graph G, vertex $v \in G$ and some integer $r \geq 1$, denote the family of independent r-sets of $V(G)$ by $J^{(r)}(G)$ and the subfamily $\{A \in J^{(r)}(G): v \in J^{(r)}(G)\}$ by $J_v^{(r)}(G)$, called a star. Then, G is said to be r-EKR if no intersecting subfamily of $J^{(r)}(G)$ is larger than the largest star in $J^{(r)}(G)$. In this talk, we will present a result of Holroyd, Spencer and Talbot which states that if $r, k, n \geq 1$ and $1 \leq k \leq n$, then P_n^k, the k^{th} power of the path on n vertices, is r-EKR. We will conclude by making a few preliminary observations about complete r-partite graphs, some 3-regular bipartite graphs and trees.

Vikram Kamat, Graduate Student; Glenn Hurlburt, ASU Math and Stats, Professor
Saturday, 10:30 - 11:00, Cibola

Developmental Math Program Roundtable

This roundtable will discuss the pros and cons of housing developmental math classes in the math department or a separate developmental program. Participants are asked to bring any research they know on the two options.

Kathryn Kozak, Coconino CC, Faculty; Friday, 3:45 - 5:00, Robinson

ConcepTests For College Algebra: A Means For A More Interactive Classroom

ConcepTests - usually short multiple choice questions, have been developed for calculus, statistics, most of the sciences, and now for precalculus and algebra. The instructor presents a question and gives a short time for students to reason and vote. After this vote they interact with each other for a longer time and then vote again.The instructor then orchestrates a classwide discussion on the way (or ways) the students used to obtain the correct answer (or answers). ConcepTests may be used with or without technology - examples will be given.

David O. Lomen, U of A; Daniel McGee, UPR-Mayaguez, Faculty
Deborah Moore-Russo, SUNY Buffalo; Dennis Ebersole, Northhampton CC, Faculty
Friday, 2:00 - 2:30, Cibola

Physical Manipulatives for Visualizing Concepts in Three Dimensions

We have developed physical manipulatives to help students with the task of visualizing mathematical concepts in three dimensions. Examples of their use with vectors, curves, planes, and surfaces will be given. Also some results will be given from UPR-Mayaguez comparing the exam scores of students using these manipulatives with those not using them.

David O. Lomen, U of A; Daniel McGee, UPR-Mayaguez, Faculty
Deborah Moore-Russo, SUNY Buffalo; Dennis Ebersole, Northhampton CC, Faculty
Saturday, 2:00 - 2:30, Swanson

A Quick Look at the TI-nspire

The latest calculator from TI allows the integration of graphing, geometry, computer algebra, spreadsheet and word processing into a single "document". We will demonstrate as much of this as we can.

John Losse, Scottsdale CC, Faculty; Bob Barefoot, Scottsdale CC , Adjunct Faculty
Friday, 12:00 - 12:30, Cibola

Precalculus and Calculus Readiness Tests at NAU

Readiness Tests were administered in all precalculus and calculus classes for fall 2007 and spring 2008. A brief description of the tests' development and history will be given. General results, overall student and instructor reactions, and the future of the exams will be discussed.

Katie Louchart, Math and Stats, NAU, Faculty; Saturday, 11:30 – 12:00, Robinson

Miniworkshop: Problems with Algebra and Problems for Algebra

Most university mathematics instructors are familiar with the common difficulties students have with algebraic manipulation and the common mistakes they make. We often prescribe drill problems as a remedy to solve these problems. Although that can be part of the answer, we also need problems that encourage students to be mindful manipulators—to look at the structure of algebraic expressions and equations, make strategic choices about how they will manipulate them, and understand the purpose of and reasoning behind the manipulations they perform. We will start with a brief presentation of the issues and some examples, and then participants will work on writing problems to encourage mindful manipulation.

William McCallum, U of A, Director, Institute for Mathematics and Education
Friday, 3:45 - 5:00, Cibola

Online Technology Tools For Our Business Math Courses

Gabriel Mendoza, El Paso CC: Valle Verde Campus, Faculty; Saturday 3:45 - 5:00, Robinson

The Development of Covariational Reasoning in a College Algebra Course

This presentation describes the emerging understandings and covariational reasoning behaviors of eight students in a reformed college algebra course. This research was situated in the context of a larger project to redesign the curriculum and instruction for a large-enrollment college algebra course. The primary goal of this redesign effort was to build students' understanding of, and ability to use, central concepts of precalculus by taking a covariational approach to teaching ideas of variable, rate of change, function, function composition, function inverse, and exponential growth. Student behaviors are analyzed using Carlson's (Carlson et al, 2003) covariation framework. Furthermore, the problem solving behaviors of the subjects are discussed. Initial results suggest the students' covariational reasoning abilities may be influenced by the students' abilities to develop a mental image of a contextual situation.

Kevin Moore, ASU, CRESMET; Stacey Bowling, ASU, CRESMET, Friday,11:00 - 11:30, Robinson

Interactive Precalculus and Calculus Applets with Mathematica 6

Interactive visualizations can enliven presentations and promote an active learning environment in the classroom. They can also provide homework exercises and effective activities for online courses. This presentation will demonstrate the interactive and dynamic capabilities of Mathematica 6 with examples from precalculus and calculus. Examples will include visualizations of slope fields, area under a curve, the area function, behavior of rational functions with asymptotes and modeling with trigonometric functions. Exercises that utilize the applets will also be explored. The offerings of the Wolfram Research Mathematica Demonstrations Project will be shown.

Charles E. Oelsner, Central New Mexico CC, Faculty; Saturday, 11:30 – 12:00, Swanson

Origami and mathematics education: an overview and a workshop

In recent years, there has been a significant increase in the number of applications of origami to science, technology, and education, in addition to mathematical research in origami. Origami is being used as an auxiliary tool for teaching mathematics in several countries and at many different levels, from elementary school to college. In this talk I will present an overview of current use of origami as well as concrete examples that participants in the workshop will be able to fold. Origami paper will be provided.

Marta Pecuch-Herrero, ASU Math and Stats, Faculty, Friday, 2:30 - 3:00, Swanson

A Dynamically Embedded Growth Model

A nonlinear dynamic system is presented where x and y are environmental states interacting with population growth variable z. Analysis reveals regions of instability where the environmental states begin to oscillate unboundedly as the population state undergoes intervals of wild intermittent behavior, leading ultimately to extinction. The foregoing example is intended to motivate the following: We note that the exponential and the logistic models, in spite of their simplicity, are important both mathematically as well as in application. However, they do not address the fact that nothing "really" endures (in time) without major changes if not actual extinction. What models can we identify which: (i) address this fact, (ii) are relatively "simple", and (iii) exhibit "important" mathematical features?

Stan Russell, Pima CC, Professor, Retired; Friday, 2:00 - 2:30, Robinson

Power Questions as an Inquiry Learning Tool

This workshop will give a hands-on introduction to Power Questions, a test format used in some math competitions, and show how they can be used in the classroom to promote discovery-based learning and development of problem solving skills, as well as an appreciation for the process of actually doing mathematics. Participants will learn what Power Questions are and how they develop mathematical reasoning and problem solving abilities both in the context of math competitions and in classrooms. They will learn how to use Power Questions effectively to encourage inquiry and discovery in their students, and will learn some techniques for turning standard lectures at any level into discovery-based Power Questions.

Tim Sanders, President, mathleague.org; Saturday, 12:00 - 12:30, Swanson

Proof trees and weak achievement games: (tic-tac-toe on steroids)

In an achievement game two players alternately mark the cells of a board using their own colors. The first player (the maker) tries to mark the cells of one of many goal configurations, the second player (the breaker) tries to prevent this. We present a game tree search algorithm used to find winning strategies in this game. We also show how to create a simple presentation of the winning strategy.

Nandor Sieben, NAU Math and Stats, Professor (Visting at ASU)
Glenn Hurlburt, ASU Math and Stats, Professor
Saturday, 09:00 - 09:30, Cibola

A Beginning Graduate Transition-to-Proof Course

As students progress through the undergraduate and graduate mathematics curricula, they are increasingly asked to demonstrate their knowledge of mathematics by constructing their own original proofs in courses like Real Analysis and Abstract Algebra. But many upper-level undergraduates have a variety of difficulties in constructing proofs ˆ something that has been documented in the mathematics education research literature (e.g., Harel & Sowder, 1998; Weber, 2001). That is one rationale for introducing transition-to-proof courses at the sophomore level. However, not all universities and colleges have such courses, preferring instead to use a course in discrete structures or linear algebra to serve that purpose. Whatever the situation with regard to having, or not having, a designated transition-to-proof course, it appears to be widely believed by faculty that a significant number of entering mathematics graduate students have trouble constructing proofs. Therefore, we have been developing, and are now studying, a course called Understanding and Constructing Proofs for such graduate students. The course is conducted in an inquiry-based, very modified Moore Method way. This talk will describe the course and our experiences to date.

Annie and John Selden, Mathematical Sciences, NMSU, Professors; Friday, 11:00 - 11:30,Cibola

Discovering the Truth About the Sampling Distribution of Means

If students are to successfully understand inferential statistics, it is vital that they have a profound understanding of the nature of the sampling distribution. Specifically they must comprehend the determination of the expected value and standard error of a sampling distribution as well as the result of the Central Limit Theorem. Many students in a high school or college introductory statistics class (including those taking Advanced Placement Statistics) do not have the mathematical background of limits and distributions, to understand the derivation of these concepts. Consequently students tend to memorize the results leading to a less than satisfactory understanding of inference. Such a rote approach to knowledge can be boring. To overcome this problem, simulations combined with a "discover with data" approach in this activity, provides students with a venue to discover the concepts associated with the sampling distributions. The graphing calculator is used in this demonstration but standard statistical software works equally as well.

Murray H. Siegel, Central Arizona College, Faculty; Saturday, 12:00 - 12:30, Cibola

College Algebra Redesign: A Research Study on Infusing Conceptual Activities and Technology In the Classroom

This project aims to redesign a large southwestern university's College Algebra course in ways that research suggests will improve students' understanding, success rates, and motivation to take additional mathematics. The College Algebra Redesign (CAR) project also addresses Arizona's shortage of mathematics teachers through a novel training and mentoring of mathematics majors to serve as apprentice course instructors. The course redesign incorporates curriculum and teaching techniques that research has shown to be more effective in prompting the reasoning abilities necessary for success in future mathematics courses. This presentation provides an overview of the research project for studying the effectiveness of the course materials relative to student success. Initial data collected from pre- and post-test assessments, clinical interviews and classroom observations will be presented.

April Ström, Scottsdale CC, Faculty; Friday, 11:30 – 12:00, Robinson

The 2:1 Centroid Concurrency

Sometime between 300 and 200 BC, Archimedes discovered that the centroid of every triangle T, is at the intersection of the medians and it divides each median in the ratio 2:1. In 565 AD Euler discovered that the line segment connecting the orthocenter to the circumcenter of any (non-equilateral) triangle T, is also divided by the centroid in the ratio 2:1. In 2004 AD, Apostol and Mnatsakanian discovered that the line segment joining the incenter to the 1- dimensional center of mass (i.e. the center of mass of the boundary) of any non-equilateral triangle T, is also divided by the centroid in the ratio 2:1. I will show that these 5 examples are included, for each non-equilateral triangle T in an infinite family of easily determined and simply described line segments that are all concurrent at the centroid and each one is divided by it, in the ratio 2:1. Time permitting, I will also show that this 2:1 centroid concurrency is just a special case of two other classical theorems of elementary geometry.

Alvin Swimmer, Faculty; Friday, 3:00 - 3:30, Robinson

A Study of the Correlation between Reading Skills and the Process of Solving Word Problems through an Analysis of Stanford Achievement Test Reports in Grades 6 to 11

The purpose of this research is to document the correlations between reading skills and the mathematics performance, in particular on word problem solving. This research was carried out at a private school in El Paso, Texas. The sample population consists of fifty-eight students currently enrolled from sixth to eleventh grade. This study considers the Stanford Achievement Test scores imparted in March 2006. The Stanford Achievement Test is a multiple-choice assessment that facilitates educators to find out what students know and are able to do at the end of a school year. Six out of the fifty-eight students' problem solving sessions were recorded when solving four word problems chosen from the textbook. Results show that reading skills are correlated to mathematics but these correlations are not strong as one may think. Also, results from the student problem-solving sessions reveal that students may read and understand word problems having a high reading score yet they may have problems decoding and setting them up. This indicates that there may be another set of skills for student success in mathematics problem solving than the reading skills.

Sandra Villa, UTEP, Teacher, Graduate Student; Saturday, 12:00 - 12:30, Robinson

Invitation to Exhibit

The Arizona State University Department of Mathematics and Statistics is pleased to host the ***MAA Southwest Sectional Conference***, **April 18-19, 2008**, at the Tempe Inn at Apache in Tempe, Arizona. The conference will include sessions on a wide range of topics: content mathematics, undergraduate mathematics education, and preK-12 mathematics education of pre-service teachers, as well as technology use in mathematics classrooms.

We are looking for many exhibitors whose products, technology and software directly benefit constituents of our conference.

Exhibitors and Sponsors have the following options:

Exhibitor 1 ($100) the basic exhibit space, includes **one** 3' x 8' table*****

Exhibitor 2 ($200) the secondary exhibit space, includes **two** 3' x 8' tables*****

Exhibitor Presentation ($125) for an hour long presentation. This is in addition to the costs for Exhibitor 1 or Exhibitor 2 packages.

Breaks ($100 x number of breaks contributing to) This is a contribution separate from the previous three options (indicate the number of breaks contributing to).

The registration deadline for Exhibitors is **February 29, 2008** on a ***space available*** basis. To register, simply complete the **Exhibitor Agreement** attached and email it to terry.turner@asu.edu. If you are paying with check/money order, please attach it to your form and mail to:

MAA Southwestern Sectional Meeting
ATTN: Mary Sabel
Department of Mathematics and Statistics (1804)
Arizona State University
Tempe, AZ 85287-1804

Exhibitors must indicate on the agreement the need for access to an electrical outlet (outlets are limited). The exhibit area does have wireless internet access available for display needs. Please indicate the need on the agreement

For meeting content information, please contact Michael Oehrtman (oehrtman@math.la.asu.edu) or Terry Turner (terry.turner@asu.edu).

*****Exhibitor tables covered upon request.

Click on the appropriate field to enter your information – then print the completed form

MAA Southwest Sectional Meeting

April 18-19, 2008

Exhibitor / Sponsor Agreement

SPONSOR/EXHIBITOR INFORMATION (Please type or print clearly)

Corporation / Agency _____

Contact _____

Last Name *First* *Title*

Address _____

City _____ State _____ Country _____ Zip Code _____

Daytime Telephone _____ E-mail Address _____

Include Area Code, and Country Code if outside of U.S. *Required For Exhibitor Confirmation*

Mobile Telephone _____ Fax Number _____

Name(s) of Exhibitor/Sponsor Representative(s) who will attend: _____

DESCRIPTION OF MATERIAL/PRODUCTS/SERVICES TO BE EXHIBITED:

EXHIBITOR PACKAGES

- ☐ **Exhibitor 1** ($100)
- ☐ **Exhibitor 2** ($200)
- ☐ **Presentation** ($100)

Total Due 0

SPONSORSHIP PACKAGES

☐ **Breaks** ($100 x ___breaks)

Total Due 0

EXHIBITOR SET-UP REQUIREMENTS

- ☐ Will need access to an electric outlet
- ☐ Will need table(s) covered & skirted
- ☐ Will need *Wireless* Internet Access

FORM OF PAYMENT (Please Check One) AGREEMENT CANNOT BE PROCESSED WITHOUT PAYMENT

☐ Check/Money Order (Payable to: ASU) Check/M.O. # _____

☐ Credit Card Number _____ Type _____ Expiration Date _____

Cardholder Name _____ Signature _____

☐ Purchase Order # _____ (Purchase Order must specify registrant name(s) and amount).

AGREEMENT AUTHORIZATION

Name _____

Title _____

Signature _____

Date

NOTE: ASU and MAA shall not be liable for any damages or loss of goods, wares, merchandise or other property which may be sustained by an exhibitor. Furthermore, each exhibitor shall be liable for any damages or loss of goods, wares, merchandise or other property which may be sustained by ASU, the hosting facility, or MAA.

Exhibitor cancellations are accepted through March 21, 2008 and must be sent via e-mail to terry.turner@asu.edu.

A $75.00 Processing fee will be assessed for cancellations. No refunds will be given after March 21, 2008.

The Registration deadline for Exhibitors/Sponsors is February 29, 2008 on a SPACE AVAILABLE basis.

Please complete all sections of this form (one form per Sponsor/Exhibitor) and mail or fax to:

MAA Southwestern Sectional Meeting
ATTN: Mary Sabel
Department of Mathematics and Statistics (1804)
Arizona State University
Tempe, AZ 85287-1804

Reset Form

Click on the appropriate field to enter your information – then print the completed form

MAA Southwest Sectional Meeting

April 18-19, 2008

CONFERENCE REGISTRATION FORM

Registration Information

PLEASE TYPE OR PRINT CLEARLY

Last Name _____ First _____ Middle _____

E-mail _____

Special Needs* If you have any special needs that require assistance to fully participate in this conference, please specify your needs below:

☐ Vegetarian or other special diet*

☐ I will need transportation from the Hotel*

Organization _____

Address _____

City _____ State _____ Zip _____

Phone _____ FAX _____

*We will do our best to accommodate your needs, but cannot make any guarantees for requests received after March 30.

Registration Fees

REGISTRATION DEADLINE extended to April 7, 2008

MEALS AND MATERIALS ARE NOT GUARANTEED FOR REGISTRATIONS SUBMITTED AFTER THE DEADLINE

CONFERENCE REGISTRATION		# tickets
General Registration	$15	
Retirees & Students*	$ 5	
FRIDAY NIGHT BANQUET (each)	$36	
Registration Total	$ 0	

PLEASE SELECT ALL THAT APPLY

☐ MAA member

Faculty member at a college or university with highest mathematics degree offered.

☐ Associate ☐ Bachelors ☐ Masters ☐ Doctorate

☐ Business, Industry, Government

☐ High school teacher

☐ Undergraduate student

☐ Graduate student

☐ Retiree

*TO QUALIFY FOR THE STUDENT RATE, STUDENTS MUST BE CURRENTLY ENROLLED, AND SUBMIT A PHOTOCOPY OF THEIR VALID STUDENT ID WITH THEIR REGISTRATION.

Payment Information

PAYMENT, INCLUDING PURCHASE ORDERS, MUST BE RECEIVED WITH REGISTRATION FORMS

☐ Check ☐ Money Order ☐ Purchase Order # _____ Amount $ _____

A $30 fee will be assessed for returned checks

Purchase Orders must indicate registrant's name

Make Checks Payable to: ASU

Mail Checks to: Department of Mathematics
Attn: Mary Sabel
Arizona State University
P.O. Box 871804
Tempe, AZ 85287-1804

Registrant Name _____ Signature _____

NOTE: No registration will be processed without payment or Purchase Order. All substitutions must be submitted via e-mail to Mary.Sabel@asu.edu by March 30, 2005. Cancellations prior to March 30, 2005 will be charged a $5 cancellation fee. There is no refund for cancellations postmarked after March 30, 2005.

Reset Form