FOCUS

THE NEWSLETTER OF THE MATHEMATICAL ASSOCIATION OF AMERICA

Secretary Riley Tells Mathematicians at Baltimore Meeting That "Mathematics Equals Opportunity"

4,000 Attend Joint Meetings

Very simply put, mathematics brought together more than 4,000 mathematicians at the MAA and AMS meeting in Baltimore last month. There many heard Education Secretary Richard W. Riley outline a program for strengthening mathematics education in the next century.

Calling the approach a crusade, he emphasized the importance of improving the quality of math education in grades K-12. "The payoff here affects all levels of society," he noted, "and we cannot afford to give it short shrift." To this end, he

MAA Executive Director Marcia Sward, MAA President-Elect Thomas Banchoff (Brown University), and Secretary of Education Richard Riley (right) after his address about mathematics education.

encouraged the development of a voluntary national test in eighth grade mathematics. "This test," he said, "will give all teachers, parents, and students the knowledge to evaluate achievement and develop challenging course work."

To help students, he asked mathematicians to end the bickering about "what the process for learning is called." Instead, he urged the mathematics community to "break down stereotypes" so that "all teachers teach better mathematics *and* teach mathematics better." As the next century approaches, "it is time to impress upon a nation eager for learning and achievement the importance of advanced study in mathematics," Riley stated. "Mathematics equals opportunity," he concluded. To many

who heard his speech, there could be no more crucial message for parents and students in America.

Elsewhere at the annual meeting, mathematicians heard former *Monthly* editor Herbert Wilf (University of Pennsylvania) speak about "New Views of the Idea of Mathematical Induction"; Marjorie Senechal (Smith College) expound on "The Symmetry Mystique"; Thomas Banchoff (Brown University) talk about "Communications in Visual Mathematics"; Roger E. Howe (Yale University) give the Student Lecture on "Some New and Old Results in Euclidean Geometry."

Attendees could also pick from a dozen other invited addresses and the numerous special and contributed paper sessions. At the MAA book sale, they bought more titles from the MAA than ever before. And outside the convention center and hotels, El Niño worked in their favor. The balmy weather allowed the guests to sample the food, culture and ambiance of the city. ∎

Full text of Riley's address can be found on MAA Online, http://www.maa.org.

FOCUS

More Photos from the 1998 Joint Mathematics Meetings
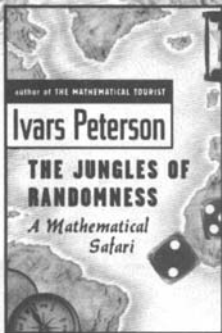
◀ *MAA Secretary Martha Siegel (second from left) gathers with award winners at the Awards Ceremony. Alice T. Schafer (fourth from left) is the MAA's 1997 winner of the Distinguished Service Award to Mathematics.*

Photo: Amy Fabbri

Hoping to generate interest in his newly published book, **Magic Tricks, Card Shuffling, and Dynamic Computer Memories,** *S. Brent Morris literally puts on some magic at the MAA book sale.* ▶

Photo: Amy Fabbri

Educational Materials Task Force Broadens Submission Guidelines

In April 1996, then President Ken Ross appointed a Task Force on Publishing Educational Materials (TFPEM). Its charge was to help stimulate the submission of excellent expository material on collegiate mathematics teaching and learning to MAA publications.

Over the last year and a half, the Task Force worked with the editors of the three MAA journals, FOCUS, MAA Online, and the Notes series toward achieving its goal.

The members of the Task Force were Chair Ed Dubinsky, James W. Daniel (Chair, Council on Publications), Keith J. Devlin (editor, FOCUS), Fernando Gouvêa (editor, MAA Online), Donald E. Hooley (representing *The College Mathematics Journal*), Roger Horn (editor, *American Mathematical Monthly*), Tina H. Straley (editor, MAA Notes), Alan C. Tucker (chair, Council on Education), and Paul Zorn (editor, *Mathematics Magazine*).

When the Task Force began its work, there were perceived, as well as real, policy obstacles to publishing educational material. Actual obstacles such as policy statements were changed through the action of the MAA's Committee on Publications as well as individual editors.

Informal interactions occurred within the collegiate mathematics education community about the interest on the part of MAA editors in receiving good manuscripts related to education. In addition, individuals and research groups were urged to submit manuscripts, and many did.

Mathematics Magazine instituted a concrete change in editorial policy in response to the activities of TFPEM. Through 1995, the magazine's policy (it appears on the inside front cover of every isssue) included the following sentence: "Articles on pedagogy alone, unaccompanied by interesting mathematics, are not suitable." In 1996 the "no pedagogy" sentence was dropped. Paul Zorn, Editor of *Mathematics Magazine*, stated that "Papers with educational content are welcome, but they must meet the same high standards of content, exposition, and general interest as must other submissions to the magazine.

"As with papers on all subjects, educationally focused papers that touch on other subjects, bring in history, or appeal to advanced undergraduates are more likely to be accepted."

The American Mathematical Monthly announced in January 1997 that the "Editorial Board is actively soliciting articles in mathematics education." The publication is especially interested in submissions that encourage communications between mathematicians and mathematics educators, and between the mathematics community and client disciplines; that encourage mathematicians to reflect on their own teaching; and share applicable results from mathematics education research.

The College Mathematics Journal aims to publish articles in the education arena. A small number of such submissions is received and the percentage of those that are of publishable quality is about the same as for the other mathematical articles.

The MAA Notes series has always encouraged the submission of materials that benefit instructors of undergraduate mathematics. Practically everything submitted can be regarded as educational. Therefore, there is no question of how much educational material it will publish.

MAA Online (MAAOL) has a "Teaching and Learning" section which concerns educational materials. In addition, a number of MAAOL's feature articles, news stories, and continuing columns regularly touch on educational issues.

FOCUS publishes educational stories on the basis of newsworthiness, timeliness, long term balance of topics, and perceived interest to MAA members.

The Task Force concluded that considerable progress has been made in publishing educational materials in MAA publications. Articles with educational content now appear to be given the same consideration as articles related to any other aspect of the mathematical profession. All MAA publications have policies and attitudes supporting this position.

"In a sense," said MAA Second Vice-President, Ed Dubinsky, "the ball is now in the court of the mathematical community—to produce interesting, insightful, and informative material, and to submit it to one or another MAA publication." ∎

Proposals Sought for Tensor Grants to Encourage Women and Girls in Mathematics

The Tensor Foundation is offering 10 grants of up to $5,000 each for programs that encourage women and girls in mathematics. Awards will be made in April 1998 for student-centered projects conducted by high school, college, or university mathematics faculty, to begin in the academic year 1998-1999. The deadline for proposals is February 20, 1998.

An announcement containing information about the objectives, evaluation criteria, and submission procedures is available on MAA Online (http://www.maa.org) or from the Member Services and Programs Department, MAA, 1529 18th St. NW, Washington DC 20036; (202)387-5200 or (800) 741-9415. ∎

MAA Contributed Paper Sessions to Be Presented at Mathfest 98

The Mathematical Association of America will hold its annual Mathfest from Wednesday, July 15, 1998 through Saturday, July 18, 1998 in Toronto, Canada.

The complete meetings program will appear in the April 1998 issue of Focus. This announcement is designed to alert participants about the MAA's contributed papers sessions and their deadlines.

Please note that the days scheduled for these sessions remain tentative. The organizers listed below solicit contributed papers pertinent to their sessions; proposals should be directed to the organizer whose name is followed by an asterisk (*).

Sessions generally must limit presentations to ten minutes, but selected participants may extend their contributions up to 20 minutes. Each session room contains an overhead projector and screen; blackboards will not be available.

Persons needing additional equipment should contact, as soon as possible, but prior to April 15, 1998: Donovan H. Van Osdol, Department of Mathematics, University of New Hampshire, Durham, NH 03824, e-mail: dv@math.unh.edu.

Mentoring Mathematics Students

Thursday and Friday afternoons

Why should students choose to major in mathematics? Why should mathematics majors persist and ultimately succeed as mathematicians? Will they stumble on the first "proof" course? How can faculty guide mathematics majors to reach their maximum potential?

If you have had positive experiences attracting students to study mathematics, this session is for you. Please join us and present your good ideas on how to motivate students to persevere and succeed in mathematics.

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The Use of Technology in the Teaching of Applications in Undergraduate Mathematics

Thursday and Friday afternoons

The use of computer programs and calculators have made it much easier to study real world applications in courses ranging from precalculus through Senior level mathematics courses. In this session papers will highlight how the innovative use of technology can be used to aid in the teaching of applications. Papers may cover applications to any subject as well as any level mathematics course.

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Elizabeth Teles
National Science Foundation

Submission Procedures for Contributed Paper Proposals

After you have selected a session to which you wish to contribute a paper, forward the name(s) and address(es) of the author(s), and a one-page summary of your paper to the organizer (indicated with an *).

The summary should enable the organizer(s) to evaluate the appropriateness of your paper for the selected session. Your summary must reach the designated organizer by Monday, March 30. Early submissions are encouraged. The organizer will acknowledge receipt of all summaries. You will receive notification from the organizer by April 13, whether your paper has been accepted. Please note that there will be no published abstracts for this meeting.

Do not forward summaries to the MAA. Send them to the session organizer.

Multimedia and Mathematics Education

Friday and Saturday afternoons

Advances in multimedia have created a new means of applying technology to mathematics education. This includes such things as interactive video, CD-ROM technology, hypermedia, hypertext, expert systems, teleconferencing and virtual reality. Technology is changing the way in which mathematics is being taught. Programs have been developed which integrate this technology into the mathematics curriculum. This session invites papers which discuss applications of multimedia to mathematics instruction, as well as the success and failure of such projects.

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E–mail: sklarr@stjohns.edu
Richard O'Lander
St. John's University
Tingxiu Wang
Oakton Community College

Innovative Ideas for Student-Collected Data

Thursday and Saturday afternoons

The use of real world data collected from experiments or student research to motivate the teaching and learning of mathematics is one of the strong threads that runs through much of the mathematics reform movement. This session invites papers describing experiences using real world data that motivate both the mathematical development and student's appreciation for the utility of mathematics at any level of the curriculum.

Cathy Ann Godbois*
Lancaster Campus, Harrisburg Area Community College
1008 New Holland Avenue
Lancaster, PA 17601
Phone: (717) 295-6137

Fax: (717) 293-8967
E-mail: cagodboi@vm.hacc.edu
Sheldon P. Gordon, State University of New York at Farmingdale

Interactive and Dynamic Visualizations for Precalculus and Calculus

Friday afternoon

Many new applications of technology allow interactive and dynamic visualization that enhance student understanding of concepts in both calculus and precalculus courses. Presentations at this session are invited that discuss and illustrate some of the most recent of these applications such as those using real data collection techniques with calculators, animations, and dynamic software such as Geometer's Sketchpad and Cabri.

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E-mail: mef2@axe.humboldt.edu or
http://www.humboldt.edu/~mef2/

Mathematics Across the Disciplines

Thursday and Saturday afternoons

There is interest in efforts to move mathematics across the curriculum. This session invites papers which describe interdisciplinary activities which integrate mathematics with one or more partner disciplines. Examples may include one activity, one class, one project, one section, one course, or an entire curriculum. It is desirable to offer illustrations of specific activities which are transportable. We welcome participation of colleagues from partner disciplines. (Sponsored by the Committee on the Undergraduate Program in Mathematics).

Duff Campbell*
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E-mail: ad6282@exmail.usma.edu
Jim Rolf, U.S. Military Academy ■

MAA Institute in Mathematics History Invites Applicants for Summer Programs

The MAA's Institute in the History of Mathematics and Its Use in Teaching is accepting applications from college math faculty for its 1998 and 1999 program. The anticipated renewal of funding fron the National Science Foundation will permit the continuation of the institute. Applications are invited from two groups of college mathematics faculty.

First, if you have some knowledge and experience in the history of mathematics and its use in teaching, you are invited to apply to expand your knowledge of the history of mathematics as well as to develop teaching materials using history for undergraduate or secondary school mathematics classes.

Successful applicants will study aspects of the history of mathematics with Judith Grabiner, Steven Schot, Marcia Ascher, and Kim Plofker. They will also spend much of their time working with other college faculty or with high school teachers to develop classroom materials.

The program will be conducted from July 20 to July 31, 1998, but participants will be expected to complete work on the classroom materials during academic year 1998-1999.

Second, if you are a novice in history, but would like to learn more, you are invited to apply to study the history of mathematics with co-directors V. Frederick Rickey and Victor J. Katz. You will also study historiography with Ronald Calinger and participate in seminars on teaching courses in the history of mathematics and using the history of mathematics in teaching mathematics. There will also be time for interaction with the other historians mentioned above.

This program will be conducted in two two-week summer sessions, the first from July 20 to July 31, 1998 and the second during July of 1999. Participants will be connected through an electronic network and will complete projects during the academic year before returning for the second summer session.

Applications are particularly welcome from faculty teaching at small institutions and minority-serving institutions. Applications from faculty who are involved in preparing secondary teachers of mathematics and who will prepare historical classroom materials for use in the secondary classroom are especially encouraged.

Both programs will be conducted in air-conditioned facilities at the Catholic University of America in Washington, D.C. For more information and for application forms check the web page of Professor Rickey at http://www.bgsu.edu/~vrickey/institute/index-inst.html. You may also contact Rickey at rickey@math.bgsu.edu or Katz at vkatz@udc.edu or by mail at the MAA, 1529 18th St. N.W., Washington, DC 20036-1385.

Completed applications are due by March 15, 1998. Applicants will be notified of their acceptance by early April. ■

Preliminary Call for Student Papers for Mathfest 98

The Eleventh MAA Undergraduate Student Paper Sessions will take place at the MAA summer meeting in Toronto, Canada, July 15-18,1998.

The program for the MAA summer meeting will include sessions for student papers. Partial support for travel by students presenting papers will be available on a limited basis. Complete details on submission procedures and applications for travel support will be published in the April issue of FOCUS.

This information will also be available on the MAA home page http://www.maa.org. Students are advised to begin making plans now regarding participation. The deadline for student paper submissions is June 12. Direct all inquiries to Dr. Charles Diminnie via e-mail at charles.diminnie@angelo.edu or by phone at (915)942-2317 EXT 238. ■

MAA Offers Workshops for Mathematicians Who Teach Statistics

Supported by the National Science Foundation, the MAA is conducting a series of faculty development workshops designed for mathematicians who teach courses in introductory statistics but have little formal training in the subject. The goals of these workshops (called Statistical Thinking with Active Teaching Strategies) are to help faculty participants to:

• teach statistical thinking with more data and concepts, less theory and fewer recipes

• explore active learning alternatives to the lecture method in their teaching of statistics

• make effective use of technology in their statistics courses

• use authentic assessment practices in evaluating the work of statistics students

• discover a myriad of print and electronic resources for teaching statistics engender lasting collegial relationships among mathematicians who teach statistics

Workshop participants are expected to cover their own travel costs and to have e-mail accounts. The grant will cover room & board expenses for the summer workshops and will also provide participants with a variety of teaching resources.

A week-long STATS workshop will be held at Emory & Henry College in Emory, VA from June 3-9, 1998. The application deadline is April 1, 1998. For more information and for application forms, please check the web site at http://stats.dickinson.edu/ or contact:

Jane Heckler, STATS Project Registrar, MAA, 1529 Eighteenth Street, NW, Washington, DC 20036-1385; phone (202) 387-5200; fax (202) 483-5450; e-mail: jheckler@maa.org

You may also direct questions to project directors Allan Rossman (rossman@dickinson.edu) and Tom Short (short@monet.vill.edu). ∎

Letter to the Editor

To the Editor:

A Personal Opinion piece from Anne E. Brown and David J. DeVries [FOCUS, October 1997, page 19] urged that mathematicians look to the science of mathematical education. On my part, I have begun to look. To begin with, there was high praise for the "constructivist" philosophy of Piaget. It apparently urges that students construct their own mathematics. It is not clear where this will lead. Perhaps every student will construct his own algorithm for long division. This might lead to a certain confusion, but empower the student. In the words of the Gypsy Baron, "Everything Gauss can do, I can do better."

More seriously, I have studied books by Piaget in which he purports to use category theory. In these books, he does not understand what he is doing!

There was a recent proposal that *Mathematical Reviews* publish reviews of articles in mathematical education. At the time I tested the proposal by analyzing one issue of a journal in the subject. Attached are my three mock reviews from *Educational Studies in Mathematics* (vol. 26, no. 203, 1994), titled "Learning Mathematics Constructivist and Interactionist Theories of Mathematical Development" (edited by Paul Cobb).

1. "Negotiation of Mathematical Meaning and Learning Mathematics," by Jörg Voigt. This paper is an example of the "interactionist" school of thought. For example, it states, "The teacher and the student must negotiate mathematical meanings," and "The teacher began to realize...that the student's strange solutions should not be evaluated as wrong or diverging from the task but only diverging from the teacher's own limited interpretation of the task."

With other such examples, the article continues with a disagreement with Emmanuel Kant and quotes in opposition a 1934 book by C. H. Mead (who was a member of the Department of Philosophy of the University of Chicago). The discussion centers on primary education, with little reference to collegiate education. This article also criticizes constructivism, that is, "mathematical education is constructed by the actor."

2. "Images of Rate and Operational Understanding of the Fundamental Theorem in Calculus," by Patrick W. Thompson. This paper proposes to apply Piaget's constructivism to the topic of its title. After considerable discussion, there is a sketch of a "typical" proof of the Fundamental Theorem of Calculus, followed by the statement, "The problem with the typical proof is not so much in the proof as that it is presented as modeling a static situation...If the students are to understand...then something must be changing." This statement and others fatally confuse motivation with meaning.

3. "Exponential Functions, Rate of Change and the Multiplicative Unit," by Jere Confrey and Erick Smith. The paper starts with the statement "Constructivism is widely used to support reform efforts in mathematical education." Here this constructivism doctrine, going back to Piaget, holds that students must somehow construct in their own minds all (?) the basic notions of mathematics. This article goes on to say, "Our own understanding of mathematics needs to be challenged and reformulated in the light of students' approaches and methods."

The body of the article gives one such example: "An analytic approach to rate of change...rate is a unit per unit comparison." They have two meanings for rate of change, additive rate is dx/dt, multiplicative rate when R is $dx/dt = Rx$. They encourage students to use these with Rx and dx in their mathematical exposition. In other words, they change mathematics to fit the constructive *diagnosis*. The second R is usually called "exponential growth." Calling it "rate of change" results in total confusion.

From these articles I am tempted to conclude that research in mathematical education is not yet grown up.

Saunders Mac Lane, University of Chicago

EMPLOYMENT OPPORTUNITIES

COLORADO

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Department of Mathematics. Tenure-track Assistant Professor position commencing August 17, 1998. Duties include teaching 12 credit hours a semester (primarily undergraduate courses, including mathematics courses for non-majors), continued scholarship and service.

A commitment to a program of scholarship consistent with departmental and institutional goals is essential. Applicant must work effectively in an ethnically and culturally diverse environment and be supportive of K-12 collaboration. A Ph.D. in mathematics in some area of analysis is required, with significant course work or experience in the applications of mathematics. Some classroom teaching experience is required. Teaching interests must be broad enough to support mentoring both upper and lower division students. The applicant also must have a strong interest in teaching upper division applied mathematics or statistics, and possess expertise in the use of computers in teaching or research. To apply send 1) Letter of application, 2) Current curriculum vitae, 3) Copy of transcripts and 4) three letters of recommendation, at least two of which address the candidate's teaching ability and potential, to: Search and Screen Committee, Dept. of Mathematics, University of Southern Colorado, 2200 Bonforte Blvd, Pueblo, CO 81001-4901, (719) 549-2433. Open until position is filled. Screening of applications will begin Feb. 1, 1998. USC IS AN EO/AA EMPLOYER. WOMEN, MINORITIES, AND INDIVIDUALS COVERED BY THE PROVISION OF ADA ARE ENCOURAGED TO APPLY.

PENNSYLVANIA

PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE (PCPS)

Department Chairperson Mathematics, Physics and Computer Science. PCPS is seeking an experienced, energetic leader to chair the Department of Mathematics, Physics and Computer Science. The Department provides required courses in Mathematics, Physics, and Computer Science as part of the recently adopted core curriculum. Statistics is also a required course in two undergraduate majors and in the Graduate Program. Academic minors are also available within the department. The Department has fourteen full-time faculty members.

PCPS offers undergraduate, professional and graduate programs to 2000 full-time students. Baccalaureate or first professional degree programs are available in Biochemistry, Biomedical Writing, Biology, Chemistry, Health Psychology, Medical technology, Microbiology, Occupational therapy, Pharmacology and Toxicology, Physical Therapy, Pharmacy and Physicians Assistant. Five graduate programs offer the Master of Science and Doctor of Philosophy degrees. As of July 1, 1998 PCPS will become the University of the Sciences in Philadelphia.

The College is seeking an individual with a Ph.D. in Mathematics, Statistics or Computer Science. The candidate should have extensive teaching credentials, evidence of scholarly activity in the discipline, and preferably, experience as a department chair. The position requires excellent interpersonal skills, the ability to plan, and the vision to maintain the department as an effective academic unit as the College completes its strategic planning process.

The position is available July 1, 1998. Applications will be accepted immediately. Review of candidates will begin February 15, 1998 and continue until an appointment is made. A curriculum vitae and the names of three references should be sent to: Search Committee - GH 212 Chair, Mathematics, Physics and Computer Science 600 South Forty-third Street Philadelphia, PA 19104-4495.

The Philadelphia College of Pharmacy and Science is an Equal Opportunity/Affirmative Action employer with a strong commitment to racial, cultural and ethnic diversity. Nomina- tions of and applications from women and individual from a broad spectrum of backgrounds are encouraged.

LOUISIANA

LOUISIANA TECH UNIVERSITY
Mathematics and Statistics
The College of Engineering and Science invites applications for possible non-tenure-track positions at the rank of assistant professor commencing Fall 1998. Rank and salary will be commensurate with qualifications. Excellence credentials are required. Teaching duties will be primarily at the freshman and sophomore levels. The Mathematics and Statistics Program offers a B.S. an M.S., and is a major participant in the interdisciplinary Applied Computational Analysis and Modeling Ph.D. program. Please send a letter of application, curriculum vitae, and a list of three professional references to: Dr. James Nelson, Associate Dean for Undergraduate Studies, College of Engineering and Science, Louisiana Tech University, Ruston, LA 71272-0046. Applications will be accepted until April 1, 1998.

Louisiana Tech University is an equal opportunity, affirmative action employer. Women and minorities are encouraged to apply.

NEW YORK

STATE UNIVERSITY OF NEW YORK at Oswego
The Mathematics Department is accepting applications for a tenure track position in mathematics education, effective Fall, 1998. The successful candidate will have a Ph.D. in mathematics education or mathematics, demonstrated interest and experience in teaching mathematics in grades 7-12 and knowledge of the curriculum and culture of American secondary schools. In addition, a scholarly record of research in mathematics education or mathematics and/or grant funded interaction with in-service teachers is expected. Duties include: teaching undergraduate mathematics in a secondary teacher preparation program and a mathematics methods course, supervision and mentoring of student teachers, and outreach and collaboration with inservice mathematics teachers at the middle and secondary level

Rank and salary will be commensurate with experience and qualifications. Review of applications will begin on March 15, 1998; however, they will be accepted until the position is filled. Send letter, curriculum vita, transcripts and three letters of recommendation to: Dr. Margaret W. Groman, Chair, Department of Mathematics, State University of New York College at Oswego, Oswego, New York 13126

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ST. MARY'S UNIVERSITY
Department of Mathematics
Applications are invited for a tenure-track position, subject to final budgetary approval, beginning in the fall 1998 at the assistant professor level. The position requires a Ph.D in statistics with preference given to candidates with experience in biological applications of statistics. Dedication to quality teaching of a variety of undergraduate courses and a commitment to scholarly activity/research are essential. Opportunity exists for interaction with scientists at other universities and biomedical institutions in the San Antonio area.

Send application letter, resume, and three letters of reference by 3/1/98 to: Dr. Eugene Sims, Department of Mathematics, St. Mary's University, San Antonio, TX 78228-8560. St Mary's University is an equal opportunity/affirmative action employer.

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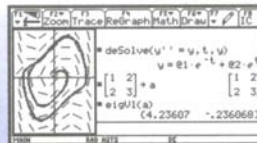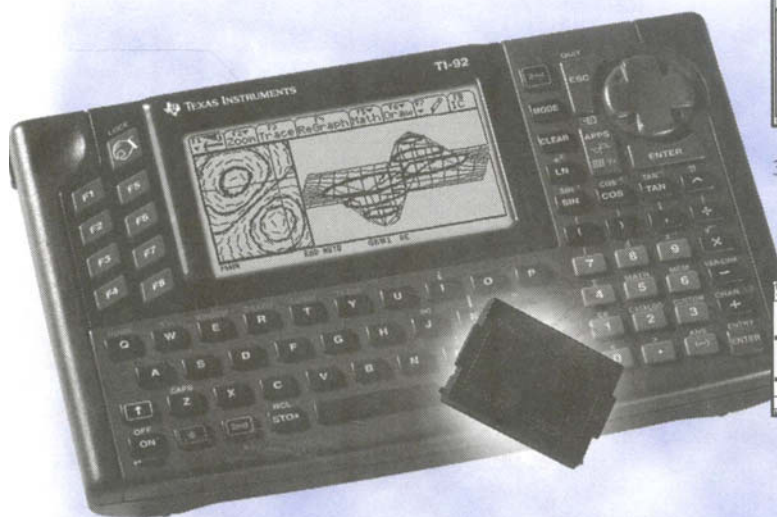

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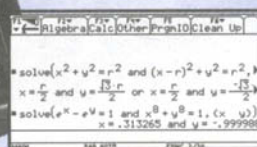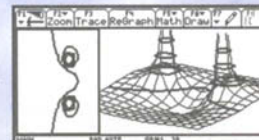
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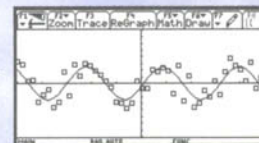
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For more information, call 1-800-TI-CARES or visit web site www.ti.com/calc/docs/92plus.htm.

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