

# 8th Annual Kansas City Regional MATHEMATICS TECHNOLOGY EXPO

at the Richardson Science Center, Rockhurst College, Kansas City, MO  
Friday & Saturday, October 2 and 3, 1998

## Schedule of Events and Abstracts

*We thank the Kansas City Professional Development Council (KCPDC) for sponsoring many EXPO participants, and Johnson County Community College for funding the paper and printing for all EXPO mailings. Our thanks also go to the following individuals from Rockhurst for their technical support for the EXPO:*

*Matt Heinrich, Director of Computer Services;  
Damien Bowersock, Operations Manager; and Brian Horne, Technical Support Personnel.*

**Registration in the lobby of Richardson Science Center:**  
*Fri., 8:00 a.m. - 2:30 p.m., and Sat., 7:30 am - 11:00 a.m.*

**Complimentary continental breakfast:**  
Available both Friday and Saturday mornings in the registration area.  
Coffee and tea will be available both days in the registration area.

**Lunches:**  
Friday and Saturday lunches are an all-you-can-eat buffet including 2 entrees, pizza bar, salad bar, Chinese bar, dessert and beverage, for \$6.50 apiece. Lunches were ordered with the pre-registration. A few more may be available to purchase at the EXPO registration table.

**Technology Display Area (TDA), located in the EXPO Conference Lounge - Room 206:**  
Hands-on Graphics Calculators: TI-80, TI-82, TI-83, TI-85, TI-86, TI-89, TI-92, Casio-9860G, Sharp-EL9600, & HP-48G.  
Mathematics Software Displays: Converge, Derive for Windows, Excel, Gyrographics, Geometer's SketchPad, Internet Browser, Mathematica, Scientific Notebook  
*Fri., 10:30 a.m. - 3:15 p.m., and Sat., 9:00 a.m. - 11:00 a.m. and 12:00 noon - 2:45 p.m.*

**Textbook, Hardware, and Software Vendors:**  
Addison Wesley Longman, Cogito Learning Media, Inc., HarcourtBrace, HoughtonMifflin, Mathematical Association of America (books), Prentice Hall, Sharp Electronics, Texas Instruments, Visual Works, John Wiley and Sons, WBC McGraw Hill  
*Fri., 10:15 a.m. - 3:30 p.m., and Sat., 8:00 a.m. - 1:00 p.m.*  
(Note: Many vendors will not be here on Saturday, October 3)

**PROGRAM - FRIDAY, October 2, 1998**

**Welcome and Introductions**

9:00 a.m. Friday in Room 115

Ken Eichman, 1998 EXPO Steering Committee Chair, Blue River Community College, Blue Springs, MO  
Fr. Edward Kinerk, S.J., President of Rockhurst College, Kansas City, MO

**SESSION 1**

**KEYNOTE ADDRESS**

*9:15 a.m. - 10:15 a.m.*

**"Beyond Kids in a Candy Store"**

Frank Wattenberg, Montana State University, Bozeman, MT

Author of Calculus in a Real and Complex World, on leave at the NSF, working on The Connected Curriculum Project

For the last few years many of us have felt like kids in a candy store confronted with shelves upon shelves of goodies, as new technologies, each more powerful and less expensive than the last, have presented us with extraordinary opportunities for doing, teaching and learning mathematics. Using the World Wide Web, computer algebra systems, Java Applets, large and real time data sets, and hands-on tools like the TI-CBL, we can create rich learning environments in which students can discover the power and beauty of mathematical thinking and in which the barriers between disciplines, institutions and even cultures are replaced by the synergies of multiple perspectives. In this talk we will look at some exciting examples of ways all this technology is being used and discuss choosing technologies that are most effective and appropriate in different circumstances.

**SESSION 2**

*Friday, 10:30 a.m. - 11:15 a.m.*

2A. **"Differential Equations on the TI-86"**  
Room 125 Daniel Willis, Loras College, Dubuque, IA

The speaker will talk about how he has used the TI-86 to teach differential equations, including first-order equations and systems. The talk will cover: graphical solutions (including "slope fields" and "direction fields"), elementary analysis of the two fundamental methods that it uses (Euler and Runge-Kutta), and applications to dynamical systems (phase plane, equilibrium solutions, nonlinear oscillations, and stability).  
*Presider:* Marian VanVleet, Saint Mary College, Leavenworth, KS

2B. **"Graphing Calculators - They're Tools for Developmental Mathematics, Too"**  
Room 203 Julane Crabtree, Johnson County Community College, Overland Park, KS

Graphing calculators have become widely used in College Algebra and in upper level courses. How can we utilize them in developmental mathematics courses? Since most high school students now come to the community college with some knowledge of the use of these tools, can we now integrate them into the developmental curriculum? This presentation will look at ways to use graphing calculators to enhance learning in Fundamentals of Math, and Elementary and Intermediate Algebra. Included will be activities and demonstrations that you can use in your classroom immediately!  
*Presider:* Martha Eagle, Blue River Community College, Blue Springs, MO

2C. **WORKSHOP: "Calculus II Projects Integrating *Derive*, *Converge*, *Excel*, and *Word*"** [until 12:15 p.m.]  
Room 205 Mike Brown, Longview Community College, Lee's Summit, MO &  
(PC Lab) Ken Eichman, Blue River Community College, Blue Springs, MO

The presenter will give a general introduction to each of the software packages (*Derive*, *Converge*, *Excel*,

and *Word*). Participants will be led through a sample student project. Ideas for additional classroom-tested projects will be demonstrated.

*Presider:* Libby Holmgren, Johnson County Community College, Overland Park, KS

2D. **"Teacher Training: Technology in Math Courses"**

Room 302 John Beem & Ira Papick, University of Missouri - Columbia, Columbia, MO

The use of technology in mathematics courses has been growing across the nation on pre-college levels as well as the college level. At the University of Missouri - Columbia there is extensive use of technology such as graphing calculators and computer software. The need for increased use of technology in teacher training is of special concern because of the new NCTM Standards-based materials. The use of technology in various mathematics courses taken by preservice teachers will be discussed and some examples of the technology will be demonstrated.

*Presider:* Joe Kincaid, Peru State College, Peru, NE

2E. **"Stop, Go, and Actively Engage! College Algebra on Videotape in 1998"**

Room 306 Richard Delaware & Kim Wilcox, University of Missouri - Kansas City, Kansas City, MO

In 1998, as the chosen instructor, Richard Delaware spent 8 months recording a College Algebra course on videotape for the VSI (Video-based Supplemental Instruction) project at UMKC, while Kim Wilcox acted as producer for the project. "Supplemental Instruction" in this sense does not indicate a remedial course, and no content or conceptual richness has been sacrificed. College Algebra is the first mathematics VSI course to be taped; but the VSI concept which has been in place at UMKC since 1992 is attracting national attention because of its success in 3 other taped courses taken by students at UMKC and at 30 other institutions in Missouri. Although video technology is commonplace, the pedagogy is fresh. Students view the tapes in the presence of a trained facilitator, and have control over the flow of information; lectures are stopped, started, and even replayed as needed. When the facilitator pushes the stop button, as cued on the tape, students have \*time\* to work problems, ask questions, make observations, resolve confusions, collect their thoughts, and more. This "time" is rarely available in classrooms today. In this talk, the speakers will discuss further the VSI aspects of the course, the College Algebra content, and how lectures were accommodated in a fairly low-tech manner to the video medium. Lastly, a short portion of the course will be played and discussed.

*Presider:* Cheryl Winter, Blue River Community College, Blue Springs, MO

Room 206 The **Technology Display Area**, located in the EXPO Conference Lounge, is OPEN.

**SESSION 3**

*Friday, 11:30 a.m. - 12:15 p.m.*

The 3 small discussion groups (3A, 3B, & 3C) are not formal talks, but are organized to encourage conversation about the larger questions of teaching mathematics with technology. Session 3D is not a discussion, but rather a talk scheduled at this hour.

3A. **"Technology and Rigor,"**

Room 125 Discussion moderator: Joe Kincaid, Peru State College, Peru, NE

As mathematics education begins to rely more on technology for class demonstrations, student projects and ease of calculations, what is happening to the traditional value placed on mathematical rigor? Is there any effect? If so, in what ways is the effect positive and in what ways is the effect negative? Are there teaching techniques or ideas we can use to help offset the negative effects and emphasize the positive ones?

*Presider:* Marian VanVleet, Saint Mary College, Leavenworth, KS

3B. **“Challenging the Student, not the Calculator”**  
Room 203 Discussion moderator: Tim Chappell, Penn Valley Community College, Kansas City, MO

What effect does the presence of technology in the math classroom have on the way we design daily work, projects, quizzes and tests? How can we motivate students to use technology as a tool and not a crutch? What types of questions or activities will help us focus our students' attention on mathematical concepts? Please feel free to bring some examples of work that you have found successful.

*Presider:* Nic LaHue, Penn Valley Community College, Kansas City, MO

3C. **“New Mathematics Teachers' Readiness for Technology”**  
Room 302 Discussion moderator: Andy Bennett, Kansas State University, Manhattan, KS

Are the new mathematics teachers coming into schools today ready to teach effectively with technology? What can colleges do to better prepare preservice teachers for the modern classroom? How can schools provide a better environment to encourage beginning teachers to use technology appropriately? Come share your experiences and ideas.

*Presider:* David Ewing, Central Missouri State University, Warrensburg, MO

3D. **“Successful First Time Use of the Graphing Calculator in the Classroom?”**  
Room 306 or

**“So you want to use the graphing calculator in your classroom?”**

**Do's and Don'ts to ensure that your first experiences with graphing calculators will be positive”**

(A talk, not a discussion)

Richard Gill, Blue Valley High School, Stilwell, KS

If, for whatever reason, you are now forced/required/desire to begin using graphing calculators in the classroom, but have an aversion and/or lack of confidence when it comes to technology in general, this presentation is for you. Participants will receive detailed, step-by-step explanations of what can go wrong on the graphing calculator and how to avoid such problems. The TI-83 will be used for demonstration, however the general concepts can be transferred to all graphing calculators currently used. Participants will receive sample lesson plans/worksheets which can be used directly in the classroom or modified to suit the needs of the participants. This presentation is particularly aimed at those individuals who have never used the graphing calculator in the classroom, or have very limited experience with graphing calculators. This presentation will help insure that your first lesson plan with graphing calculators (which for most in Algebra would be an exploration with linear or parabolic graphs) will be demonstrated to show the full potential of the graphing calculator as a tool in the classroom. Participants should bring the graphing calculator that they wish to use in the classroom, so that specific questions concerning individual calculators can be discussed.

*Presider:* George Hurlburt, Cloud County Community College, Concordia, KS

Room 206 The **Technology Display Area**, located in the EXPO Conference Lounge, is OPEN.

**LUNCH**

*Massman Hall*

*Friday, 12:15 p.m. - 1:30 p.m.*

**SESSION 4**

*Friday, Starting at 1:30 pm*

- 4A. **WORKSHOP: "Definitions, Programs, and Scripts in Teaching Calculus with the TI-92"**  
Room 125 Thomas Kline, University of Northern Iowa, Cedar Falls, IA [until 3:00 p.m.]

This talk discusses how to write programs or scripts so that once concepts are introduced the TI-92 can give further help in reaching understanding. If right sums, trapezoid rule or similar approximations are used, then once understood the program or script can take over the computations, display the graph, and do comparisons.  
*Presider:* Libby Holmgren, Johnson County Community College, Overland Park, KS

- 4B. **WORKSHOP: "Reform and Standards-Based Teaching in College Algebra"**  
Room 203 John Beem & Sandi Athanassiou, University of Missouri - Columbia, Columbia, MO [until 3:15 p.m.]

Presently, the mathematics department at the University of Missouri-Columbia offers two versions of College Algebra. The first (Math 10A) is a more traditional College Algebra. The second (Math 10B) is a reformed version of College Algebra reflecting the guidelines of the AMATYC Standards. The latter will be the focus of this session. Using an applications driven curriculum, Math 10B is using reformed methods of presentation. This course makes extensive use of technology, including graphing calculators, spreadsheets, and CBL units. Issues related to reform and to the use of technology in College Algebra will also be discussed.  
*Presider:* Mike Brown, Longview Community College, Lee's Summit, MO

- 4C. **WORKSHOP: "A Minitab Guide to Statistics"**  
Room 205 J.S. Huang, Columbia College, Columbia, MO [until 3:15 p.m.]

Inferential statistics is not easy to understand without probability theory. Thanks to the development of statistics software, using *Minitab* to learn and teach statistics concepts including the Central Limit Theorem and inferential statistics is no longer difficult. Simulation will be used to illustrate statistics concepts.  
*Presider:* Ken Eichman, Blue River Community College, Blue Springs, MO

- 4D. **"Mathematical JavaBeans"**  
Room 302 Joe Yanik & Chuck Pheatt, Emporia State University, Emporia, KS [until 2:15 p.m.]

JavaBeans are components that are written in the Java programming language to particular specification that allow them to be used in Visual programming environments. With the right JavaBeans it could be possible for someone to create a complete Java program in a Visual environment using a graphical user interface with little or no programming. In this talk we will give an overview of JavaBeans and demonstrate their use in a Visual environment. We will also report on our latest efforts to develop JavaBeans that could be useful to the mathematical community.  
*Presider:* Nic LaHue, Penn Valley Community College, Kansas City, MO

- 4E. **"Building an On-Line Mathematics Course: Trigonometry"**  
Room 306 Nancy Olson, Johnson County Community College, Overland Park, KS [until 2:15 p.m.]

This demonstration will be about the trigonometry course that the presenter has designed to go on-line Fall 1998. She will share the logistics of building such a course, will demonstrate the software used, and will give an overview of the procedures. She will be connected to the Internet and will show the audience the course she has prepared while discussing why she chose to do things the way she did. There will be time for questions and discussion.  
*Presider:* Joe Kincaid, Peru State College, Peru, NE

Room 206 The **Technology Display Area**, located in the EXPO Conference Lounge, is OPEN.

**SESSION 5**

*Friday, 2:30 p.m. - 3:15 p.m.*

5A. **"Putting Mathematics on Web Pages"**

Room 302 Andy Bennett, Kansas State University, Manhattan, KS

This presentation is a survey of techniques for putting mathematical text (equations, symbols, sub and superscripts, etc.) on web pages. We will discuss what can be done with plain html, with Adobe Acrobat (including how to get TeX fonts right), with IBM's Techexplorer, and the new MathML standard. The presentation will include a variety of material helpful to a broad audience from novices to experienced mathematical web page authors.

*Presenter:* Richard Delaware, University of Missouri - Kansas City, Kansas City, MO

5B. **"Transformations With a Twist, Using Gyrographics"**

Room 306 David Ewing, Central Missouri State University, Warrensburg, MO

Have your students form 3-D objects by teaching 2-D transformations with a twist. This interactive program demonstrates classroom-ready lessons on functional transformations [ $g(x) = a*f(x-h) +k$ ] that form 3-D objects using Gyrographics. Have some mathematical fun while using technology!

*Presenter:* Nic LaHue, Penn Valley Community College, Kansas City, MO

**FRIDAY "POST - SESSION"**

*Friday, 3:30 p.m.*

Room 302 **MOMATYC** meeting. (Kansas affiliate of the American Mathematical Association of Two-Year Colleges)

Room 306 **KAMATYC** meeting. (Missouri affiliate of the American Mathematical Association of Two-Year Colleges)

Note: Members of both **KAMATYC** and **MOMATYC** that are interested in getting together for dinner after the 3:30 meetings will do so.

**PROGRAM - SATURDAY, OCT. 3**

**SESSION 6**

*Saturday, 8:00 a.m. - 8:45 a.m.*

**6A. "Using the TI Graphing Calculators in Statistics"**

Room 125 Timothy Miller, Missouri Western State College, St. Joseph, MO

Graphing calculators can be used to help students visualize statistical concepts. Several programs will be presented that are designed to illustrate and compare the standard probability distributions (binomial, hypergeometric, Poisson, normal, Student's t, chi-square) both graphically and numerically. Also, programs that perform simulations will be discussed. These programs are available for the TI-82, TI-83, TI-85, TI-86 calculators. (Bring your calculators to download copies of the programs.)

*Presider:* Andy Bennett, Kansas State University, Manhattan, KS

**6B. EXPO Showcase: *Scientific Notebook* Demo**

Room 205 Libby Holmgren, Johnson County Community College, Overland Park, KS

This is another in a series of sessions that are presented by members of the Math EXPO Steering Committee to showcase new technology. The purpose of this particular session is to highlight some of the unique characteristics of the *Scientific Notebook* software. This very affordable software allows users to easily enter both text and mathematics in natural notation, without cutting and pasting, importing documents, etc. It also includes the power of symbolic computation and graphing. After the brief demonstration, you'll have time to try out the software yourself, with handouts. You will also get to take with you a FREE multi-user copy of *Scientific Notebook* valid for 30 days.

*Presider:* Marian VanVleet, Saint Mary College, Leavenworth, KS

**6C. "Parametric and Polar Equations with Regular Polygons to Demonstrate DeMoivre's Theorem"**

Room 302 Chuck Ames, recently retired from Newfane High School, Newfane, NY, and now with Sharp Electronics, Tulsa, OK

This talk on parametric and polar equations is geared basically to the Precalculus course level. We'll cover the graphing of regular polygons, cover some rotational and symmetrical symmetries and then delve into the use of these figures to represent, pictorially, the roots of complex numbers. No graphing calculator experience is required of the audience. Sharp EL9600 graphing calculators will be available, and the presenter will be using the same in his demonstrations, but the material is easily worked with any graphing calculator that a participant may have or bring with them.

*Presider:* Carl Anderson, Johnson County Community College, Overland Park, KS

**6D. "Cancer Cells and Other Examples of Exponential Growth"**

Room 306 Elizabeth Appelbaum, Community Liaison for Math Instruction, Blue Valley School District, Stilwell, KS

World population over the centuries - Investments with compound interest - Cancer cells in a tumor. Roughly speaking, these are all examples of exponential growth. As real examples involving life and money, they may be more motivational than the typical textbook example of generic bacteria safely isolated in a Petri dish. For world population, two graphs will be shown: one on a conventional scale, and the other on a logarithmic scale. The data is from a United Nations site on the Internet. The time runs from 1 C. E. projected to 2200 C. E. For cancer cells, a diagram will be shown of how a tumor grows from one malignant cell. The exponential function is a common model for cancerous growth, but the best model is the Gompertz function, which will be discussed.

*Presider:* Ken Eichman, Blue River Community College, Blue Springs, MO

Room 206 The **Technology Display Area**, located in the EXPO Conference Lounge, is OPEN.

**SESSION 7**  
*Saturday, Starting at 9:00 a.m.*

- 7A. **“Mediated Learning: A Solution”** [until 9:45 a.m.]  
Room 125 John Soptick, Charyl Link, & Michele Bach, Kansas City Kansas Community College, Kansas City, KS

This presentation will provide an orientation to the mediated learning approach to instruction in mathematics. Interactive Mathematics is for faculty who are committed to helping students learn mathematics. These college-level, interactive multimedia course materials provide mathematics instruction in a stimulating and challenging environment. Faculty can provide a diverse population of students with a more individualized learning experience. Math faculty from Kansas City Kansas Community College began using this approach Fall 1998 and will share their experiences using this in the classroom and online.  
*Presider:* George Hurlburt, Cloud County Community College, Concordia, KS

- 7B. **WORKSHOP: “Calculus-Based Interdisciplinary Student Projects: From Plan to Action!”** [until 10:45 a.m.]  
Room 203 John Koelzer, Anita Salem, & Paula Shorter, Rockhurst College, Kansas City, MO

At last year's Math EXPO, a presentation was made on plans to develop a series of Interdisciplinary Student Projects involving real-world scientific applications. This development was made possible through a Curriculum and Course Development Grant funded by NSF. The workshop presented this year will give the participants the opportunity to experiment with some of the projects that have been developed under the grant. The projects will include a study of the ozone layer, application of calculus to the detection of edges in a computer image, and concepts of calculus applied to genetics. Also included in the workshop will be presentations and discussions on the rationale for including interdisciplinary projects in mathematics courses. Participants will be encouraged to try out the materials and evaluate their suitability for instructional use.  
*Presider:* John Koelzer, Rockhurst College, Kansas City, MO

- 7C. **WORKSHOP: “Using *Excel* to Teach Elementary Statistics and Probability Courses”** [until 10:45 a.m.]  
Room 205 Atul Roy & James Ellis, Culver-Stockton College, Canton, MO

The use of *Excel* in the teaching of an elementary statistics course makes good sense because most of the students have access to *Excel* or a similar spreadsheet even after finishing the course. We shall demonstrate, simulating random data, doing bivariate calculations, testing hypotheses, and doing probability calculations that are taught in statistics and probability courses.  
*Presider:* Tim Chappell, Penn Valley Community College, Kansas City, MO

- 7D. **“Mathematical Modeling with Computers and Nonstandard Analysis”** [until 9:45 a.m.]  
Room 302 Frank Wattenberg, Montana State, Bozeman, MT

Nonstandard analysis allows us to apply mathematics to real world problems in a concrete and tangible way. Besides being intuitive, the models we construct using nonstandard analysis are amenable to computer-based simulation and the theory behind these models often provides a better representation of both reality and simulation. For example, the usual heat equation implies that heat applied at one point is felt immediately elsewhere, whereas the nonstandard model implies an infinitesimal time lag. The time lag is observed in reality and in computer-based simulations. This talk will begin with a brief and entertaining introduction to nonstandard analysis, and then discuss some models constructed using nonstandard analysis and show how the perspectives of nonstandard analysis can help realize the potential of computers and other technology for teaching and learning mathematics.  
*Presider:* Carl Anderson, Johnson County Community College, Overland Park, KS



7E. "How Calculators Evaluate Trig Functions Using Coordinate Rotations"  
Room 306 Elizabeth Yanik, Emporia State, Emporia, KS

[until 9:45 a.m.]

This talk will describe how calculators evaluate special functions, in particular, trigonometric functions. The CORDIC, Coordinate Rotation Digital Computer, method is an efficient method for calculator computations since it only involves three elementary operations: shifts, comparisons, and additions. This algorithm can also be modified for use in calculating logarithms, exponentials, square roots, and even the elementary operations of floating point multiplication and division.

*Presenter:* David Ewing, Central Missouri State University, Warrensburg, MO

Room 206 The **Technology Display Area**, located in the EXPO Conference Lounge, is OPEN.

#### SESSION 8

*Saturday, 10:00 - 10:45 a.m.*

8A. "Conjectures, Testing and Proving with *Geometer's SketchPad*"

Room 125 Patrick Mitchell, Southeastern Louisiana University, Hammond, LA

*Geometer's SketchPad* is a wonderful tool to use when teaching a geometry class. It allows students to view a large number of examples in a short amount of time. We use this feature to get students to form their own conjectures, test them and hopefully find a way to prove them. Students can discover methods of proving things that can often lead to some surprising results. We shall offer one of these surprising results.

*Presenter:* George Hurlburt, Cloud County Community College, Concordia, KS

8B. "Alternate Office Hours: From Blackboard & Chalk to Internet Whiteboard & Digital Pen"

Room 302 Richard Delaware, University of Missouri - Kansas City, Kansas City, MO

Beginning Fall 1998, the University of Missouri (UM) system is piloting a \$125,000 College Algebra Enhancement project hoping to improve the rate of successful completion of College Algebra by students on the 4 UM campuses. "Success" means passing with an A, B, or C. (At UMKC current success rates are 64% for Fall 96), 59% for Winter 97, 65% for Fall 97. One goal is to increase these to 90% or more.) Several structural and pedagogical changes are planned, but in this talk the speaker will address \*only\* the two most technology-intensive aspects of the Project: The new UM College Algebra Web Site and the innovative use of internet interactive audio and whiteboard software. With the latter such free software, mathematics discussions can be held live and on-line, literally writing equations by hand, sketching figures, etc. with a digital pen or even with an ordinary mouse. These equations and sketches appear immediately on the monitor, mimicking electronically the ideal one-on-one personal interaction of student and instructor on a blackboard in an office. Both parties can write on the same screen, though they may physically be miles apart. Their joint work can be printed at either end, and previously-done work can even be scanned onto the screen for comments. In this talk, this technology will be demonstrated and the current state of the Project will be reported.

*Presenter:* Andy Bennett, Kansas State University, Manhattan, KS

8C. "Using the TI-85 and the TI-92 to Teach Precalculus and Calculus"

Room 306 Martha Clutter, Piedmont Virginia Community College, Charlottesville, VA

The graphing calculator can be an extremely powerful tool in the mathematics classroom, both to expedite problem solving capabilities and to develop and encourage higher level thinking skills. Using a TI-85 and a TI-92, the presenter will demonstrate a variety of activities for incorporating the calculator in the precalculus and calculus classroom.

*Presenter:* Carl Anderson, Johnson County Community College, Overland Park, KS

Room 206 The Technology Display Area, located in the EXPO Conference Lounge, is OPEN.

SESSION 9  
INVITED SPEAKER  
Saturday, 11:00 a.m. - 11:45 a.m.

**“Teaching Math Now That ‘Calculators Can Do It All’ ”**  
Warren Esty,  
Montana State University, Bozeman, MT  
Author of The Language of Mathematics and Precalculus Concepts,  
published in the 1996 NCTM Yearbook on Communication in Mathematics

We must acknowledge that calculators are wonderful and can “do” a lot of what we used to teach students to do. But, even if we fully accept the use of calculators, there still remains a great deal for students to learn about mathematics. This talk discusses concepts that remain fundamental to mathematics and how to teach them, with and without the aid of calculators.

Presider: Ken Eichman, 1998 EXPO Chair, Blue River Community College, Blue Springs, MO

**LUNCH**  
Massman Hall  
Saturday, 11:45 a.m. - 1:00 p.m.

SESSION 10  
Saturday, Starting at 1:00 p.m.

10A. **“Assessing Precalculus Learning Now That ‘Calculators Can Do It All’ ”** [until 1:45 p.m.]  
Room 115 Warren Esty, Montana State University, Bozeman, MT

Calculators can promote learning. But, they require some new types of test questions since they can do many traditional problems, almost regardless of student learning. This talk discusses Precalculus (preparation for calculus); what students should learn; the role of calculators; and primarily, questions that are suitable for exams on which students use graphing calculators, but which nevertheless test what the student learned and not just what the calculator can do.

Presider: Ken Eichman, Blue River Community College, Blue Springs, MO

~~10B. **“Fibonacci, the Golden Ratio, and the Stock Market”**  
Cheryl Jones and LaVonne Kothe, North Kansas City School District, Kansas City, MO~~  
This presentation is not available.

10C. **WORKSHOP: “Emphasizing Applications over Computations using *Derive for Windows*”**  
Room 205 Lisa Townsley-Kulich & Barbara Victor, Benedictine University, Lisle, IL [until 3:00 p.m.]

One of the features of a computer algebra system such as *DERIVE* is that teachers can empower students to solve problems which they might find too difficult to compute manually. The presenters invite participants to use *DERIVE for Windows* to explore a variety of applications from precalculus, calculus, linear algebra and discrete mathematics. A common thread throughout the projects is the level of computation which is required to complete the projects; *DERIVE for Windows* is used to perform the computations which allow students to focus on the applications studied.

Presider: Mike Brown, Longview Community College, Lee’s Summit, MO

**10D. WORKSHOP: "Teaching Without Talking: Mathematics on the Internet"**

Room 302 Tim Chappell, Penn Valley Community College, Kansas City, MO

[until 2:30 p.m.]

How do you relate math strategies to students over the Internet without just converting lecture notes to html? One solution is to create interactive, dynamic online tutorials that guide students through those strategies. These tutorials can be modified in the code to present the material the way you would teach it. Participants will examine current JavaScript tutorials as well as brainstorm future tutorial topics.

*Presider:* Nic LaHue, Penn Valley Community College, Kansas City, MO

**10E. WORKSHOP: "Handheld Statistics in Color! Using Casio's 9850+ Graphing Calculator"**

Room 306 Phillip Embree, Director - Capital City Kumon Center, Centertown, MO

[until 2:30 p.m.]

The presenter will demonstrate statistics in color on the Casio 9850+ graphing calculator. He will include using colors to distinguish graphs of distinct data sets and to distinguish data points from regression lines. Also included will be a demonstration involving hypothesis testing. This is a hands-on how-to workshop. Loaner calculators will be provided.

*Presider:* Donna Bullock, Hickman Mills High School, Kansas City, MO

Room 206 The **Technology Display Area**, located in the EXPO Conference Lounge, is OPEN.

## 1998 MATHEMATICS TECHNOLOGY EXPO

Visit our Math EXPO web site:

<http://www-personal.ksu.edu/~bennett/expo.html>

## 1998 Steering Committee

Ken Eichman (1997 & 1998 Chair)

Blue River Community College, Blue Springs, MO

Carl Anderson & Libby Holmgren (1995 & 1996 Chair)

Johnson County Community College, Overland Park, KS

Richard Delaware (1993 & 1994 Chair)

University of Missouri - Kansas City, Kansas City, MO

Andy Bennett

Kansas State University, Manhattan, KS

David Ewing

Central Missouri State University, Warrensburg, MO

Mike Brown

Longview Community College, Lee's Summit, MO

Joe Kincaid

Peru State College, Peru, NE

Donna Bullock

Hickman Mills High School, Kansas City, MO

John Koelzer

Rockhurst College, Kansas City, MO

Tim Chappell & Nic LaHue

Penn Valley Community College, Kansas City, MO

Marian VanVleet

Saint Mary College, Leavenworth, KS

The 1998 Kansas City Regional Mathematics Technology EXPO Steering Committee hopes that you found the EXPO informative and enjoyable. Please be sure to turn in any evaluation forms. See you next year!

**Kansas City Regional  
MATHEMATICS  
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<http://www-personal.ksu.edu/~bennett/expo.html>