

9th Annual Kansas City Regional MATHEMATICS TECHNOLOGY EXPO

at the Richardson Science Center, Rockhurst University, Kansas City, MO
Friday and Saturday, October 1 and 2, 1999

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 paper and printing for all EXPO mailings. Our thanks also go to the following individuals from Rockhurst for their technical support of the EXPO: Matt Heinrich, Director of Computer Services; Darnell Jones, Support Manager; Bryan Scrivener, Help Desk Manager; and Steve Hoog, Audio/Visual/Multimedia Coordinator.

Registration in the lobby of Richardson Science Center:

Friday, 8:00 a.m. - 1:45 p.m., and Saturday, 8:00 a.m. - 1:00 p.m.

Complimentary continental breakfast:

Available in the registration area both Friday morning (sponsored by Academic Systems) and Saturday morning (sponsored by KAMATYC, and AMATYC). Coffee and tea will be available throughout both days.

Lunches:

Friday and Saturday lunches are both all-you-can-eat buffets for \$6.50 apiece.

Friday's buffet has a variety of items including a deli bar, salad bar, and hot entrees.

Saturday's buffet also has a variety, including "brunch" items, salad bar, and pizza bar.

Lunches were ordered with the pre-registration, but there may be some available for purchase at the registration table.

Technology Display Area located in the Conference Lounge, Room 206

Hands-on Displays of Graphics Calculators & Mathematics Software:

Fri., 10:15 a.m. - 3:30 p.m.; Sat., 8:00 a.m. - 2:45 p.m.

TI-83+, TI-86, TI-89, TI-92+, HP 38G, HP 48G, HP 49G, Sharp EL 9600, Casio Algebra FX 2.0, Academic Systems, TI-Graph Link, Derive for Windows, Mathematica, The Geometer's SketchPad, Gyrographics, Converge, Minitab, Scientific Notebook, plus Internet access.

Textbook, Hardware, and Software Exhibitors:

Fri., 8:00 a.m. - 2:45 p.m.; Sat., 8:00 a.m. - 1:00 p.m. (Not all exhibitors will be present on Saturday.)
Academic Systems, Addison Wesley Longman, Casio, Harcourt Brace, Houghton Mifflin, ITP, JEMware, Mackichan (Scientific Notebook), MAA, McGraw Hill, Minitab, Prentice Hall, Texas Instruments, Wiley

FRIDAY, October 1, 1999

Welcome and Introductions

8:45 a.m. in Room 115

Marian VanVleet, 1999 EXPO Group Chair, Saint Mary College, Leavenworth, KS
William Haefele, Dean of the College of Arts and Sciences, Rockhurst University, Kansas City, MO

SESSION 1

KEYNOTE ADDRESS

8:45 a.m. - 10:00 a.m., Room 115

***Using the World Wide Web for Teaching Mathematics:
What Are We Learning and Where Do We Go From Here?***

Gene Klotz

Swarthmore College, Swarthmore, PA

Director of the Math Forum [<http://forum.swarthmore.edu>],
an online math education community funded in part by NSF.

Works include *A Computer-Communications Forum for Geometry*,
Visual Geometry: A Multimedia Approach, and *The Geometer's SketchPad*.

In this session we will explore the Web with its **virtues** and **challenges**. These **virtues** include communicating/collaborating/sharing, publishing, and help with teaching. The Internet has given us all the opportunity to share our mathematical ideas, teaching examples and materials. Publishing on the Web allows for animated and interactive content and immediately makes available relevant and current real-world materials. Student publication possibilities provide motivation and student 'ownership' of material. And the Web is useful for conveying course materials, homework, and helping us understand how students learn - or fail to learn. The Web also **challenges** us with technical problems, not finding what we want, not providing everything we or our students need in terms of materials or software, and not having equal access. We'll talk about problems with the Web, what's being done, and what we can do.

SESSION 2

Friday, 10:15 a.m. - 11:00 a.m.

2A. ***Computer Mediated Algebra and Reform Mathematics - an Oxymoron or a Real Possibility?***

Room 125 **Martha Haehl, Maple Woods Community College, Kansas City, MO**

The speaker, an author of the *Interactive Math* multimedia project by Prentice Hall, will speak about her experience teaching with *Interactive Math* in Introductory Algebra and Intermediate Algebra. She is taking a reform approach around a predominantly traditional project. She will discuss her concern that computer mediated algebra projects, which have been designed predominantly to teach pencil and paper procedures, may ironically ignore the impact that technology should have on mathematics curriculum. She will outline how she has used *Interactive Math* to free up class time, traditionally spent teaching procedures, to incorporate real-life problems and discovery activities. Her students have to become familiar with the software and tools for *Interactive Math*, use E-mail, search information on the Internet, and use a word processor. The audience does not need any particular technical expertise; however, familiarity with the Internet and computer mediated algebra systems is helpful.

Presenter: Richard Gill, Blue Valley High School, Stilwell, KS

2B. ***Extrapolation Methods in Numerical Analysis on the TI-86***

Room 203 **Daniel Willis, Loras College, Dubuque, IA**

Numerical methods play a central role in the "reform" approach to Calculus teaching and learning. Most Calculus textbooks include some discussion of numerical methods for differentiation, integration, and the solution of differential equations. "Extrapolation" is a standard "trick" that can be used with almost any

numerical method to speed up the convergence of the method. The speaker will give an overview of the theory and application of extrapolation methods on the TI-86 (applicable to any graphing calculator). He will survey the most commonly used numerical methods in Calculus, including numerical differentiation, Riemann sums, Trapezoidal Rule, Midpoint Rule, Simpson's Rule, and Euler's method (for DE's).

President: Carl Anderson, Johnson County Community College, Overland Park, KS

2C. ***Learning Styles, Intelligences, and the Technological Mathematics Classroom***

Room 205 **Julane Crabtree, Johnson County Community College, Overland Park, KS**

This interactive session will focus on using learning styles, Multiple Intelligence Theory and technology in all levels of mathematics. Participants will experience several learning style inventories and will determine ways that these can be incorporated into mathematics. Sample lessons, diskettes and ideas for quick and easy implementation will be provided.

President: Mike Brown, Longview Community College, Lee's Summit, MO

2D. ***Web-based Mathematics Teaching***

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

This talk will cover the speaker's experiences teaching a course in "Web-Based Mathematics Teaching" during the spring intersession, May/June 1999. The course focused on how to create active web pages where the students did more than just read static text. Topics in the course included creating and using java applets, chat rooms, threaded E-mail systems, forms for student feedback, and online quizzes.

President: Richard Delaware, University of Missouri -Kansas City, Kansas City, MO

2E. ***Computer Applications in Precalculus from Dollars to Dial Tones***

Room 306 **William Frank & Mark Adams, Barstow School, Kansas City, MO**

This session will demonstrate two specific applications that can be used in a Precalculus course. The concept of exponential functions is expanded to model an annuity. *Excel* is used to construct a "dynamic" loan payment schedule. The second application uses a shareware program, *Goldwave*, and will use trig functions to model sound. Specific sounds will be modeled, including the touch-tone telephone.

President: George Hurlburt, Cloud County Community College, Concordia, KS

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

SESSION 3

Friday, 11:00 a.m. - 11:45 a.m.

Exhibitors and Technology Display Area

This time is provided especially so that EXPO participants will have a chance to visit the Exhibitors in the lobby of the Richardson Science Center and to visit the Technology Display Area (TDA) located in the EXPO Conference Lounge, Room 206. In the TDA, participants can have hands-on experience with a variety of calculators and software packages that are being used in EXPO presentations. Following each session, extra handouts from sessions will be made available in the Conference Lounge. The Exhibitors area and the Conference Lounge will also be open at other times.

SESSION 4

Friday, 11:45 a.m. - 12:30 p.m.

The three small discussion groups (4A, 4B, and 4C) are not formal talks, but are organized to encourage conversation among EXPO participants about the larger questions of teaching with technology. Each session will be moderated by EXPO Group members, and notes of the discussions will be made available on the EXPO Web site following the EXPO.

NOTE: 4D is a talk, not a discussion.

4A. ***lim (Distance Learning) = Diploma Mill?***

Importance of Money → ∞

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

Distance learning seems to be a "wave of the future." Schools can reach more students. Students have access

to more classes. Tuition money rolls in. But what changes might we anticipate in our students and our classes as the importance of money increases? What will our students lose as a result of the gain in greater access? This discussion will explore these questions about the future of education via distance learning.

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

4B. ***Integrating Learning Strategies With Respect to Technology***

Room 205 **Discussion moderator:** Richard Gill, Blue Valley H.S., Stilwell, KS

Students have different styles by which they can learn. Some are visual, others learn best in a hands-on situation. In addition, recent research into how the brain works has shown that smell, color, lighting, music (the Mozart Effect), food and drink can have a positive or negative effect on learning. How can learning strategies/learning styles be integrated into the classroom along with technology? How does technology fit in the classroom designed to improve student learning? How can technology change attitudes about studying mathematics, improve the classroom environment, promote student achievement, etc? Bring your suggestions and your questions. Share your experiences with alternative learning/teaching styles.

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

4C. ***Differentiating Student Skills With Respect to On-line Courses***

Room 306 **Discussion moderator:** Richard Delaware, University of Missouri - Kansas City, Kansas City, MO

How do we measure, or assess, student skills effectively over the Internet? This includes grading and commenting upon homework, quizzes, other assignments and, of course, exams. We know that one solution for exams is to require students to either come to class for major exams, or go to an approved institution near the student where the exam can be sent and proctored. But how shall we handle other assignments? Are interactive software, or live chat or whiteboard sessions effective? Also, what care need we take to assure us that we are really communicating with the student we think is online? Is personalized feedback the key?

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

4D. ***What Do You Get When You Cross an Internet Mathematics Course With Two Guys and a Monkey?***

Room 302 **Nic LaHue, Tim Chappell, Penn Valley Community College, Kansas City, MO** [A talk, not a discussion]

The most important aspect of our team-taught internet math courses is the team. This talk will focus on the set-up and day-to-day activities associated with running a mathematics class via the internet. The speakers will look at assessment and testing, including weekly journal and discussion assignments, group projects, on-line quizzes and classroom tests. They will also discuss the advantages and disadvantages of teaching as a team. Their experience is with Intermediate and College Algebra.

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

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

LUNCH

12:30 p.m. - 1:45 p.m. in Massman Hall

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

SESSION 5

Friday, beginning at 1:45 p.m.

5A. ***WORKSHOP: Activities/Explorations in Calculus with TI-85/TI-92***

[1 hr. 30 min.]

Room 125 **Martha Goshaw, Piedmont Virginia Community College, Charlottesville, VA**

The presenter will demonstrate activities and explorations she uses for several topics in elementary calculus, including local slope, limits at points of discontinuity, derivative tests, l'Hopital's rule, and Taylor polynomials. This is not a keystroke workshop. The presentation is geared toward college teachers of first year calculus or applied calculus, and high school teachers of AP calculus. The presenter will be using a TI-85 in the presentation, but any graphing calculator can be used by participants.

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

5B. **WORKSHOP: *Integrating Java Into the Mathematics Curriculum*** [1 hr. 30 min.]
Room 203 **Joe Yanik and Chuck Pheatt, Emporia State University, Emporia, KS**
We will describe our latest efforts to facilitate the use of *Java* in the teaching of mathematics. We will demonstrate some sample mathematics activities along with our latest mathematical *Java* components. These components, called *JavaBeans*, can be used by mathematicians to create their own customized *Java* activities.
Presider: David Ewing, Central Missouri State University, Warrensburg, MO

5C. **WORKSHOP: *No HTML, No LaTeX, Just EXP 5.0 for Internet Mathematical Document Preparation*** [1 hr. 30 min.]
Room 205 **Judy Stubblefield, Garden City Community College, Garden City, KS**
Creating mathematical documents for delivery on the Internet is often cumbersome and time-consuming. But with the introduction of a free student viewer, *EXP 5.0* has come to the forefront. This presentation will focus on the ease of learning this mathematical word processor. Not only does *EXP 5.0* contain many of the features inherent in word processors like *Microsoft Word*, it has the added advantage of imbedding graphics images as part of the document. The images can be clip art, scanned from another source, imported from a Texas Instruments graphing calculator, or imported through a digital electronic notepad. Learn how to create a document with full mathematical text and symbols, embed a graphic image, and upload it to a web page. In addition to the software demonstration, see how easy it is to create a web site by taking a "tour" through *Web Course in a Box*. This software package is a web development tool to create materials for a stand-alone Internet course or to supplement an on-campus course. The "whiteboard" feature that comes with this product is especially interesting and its use will be demonstrated.
Presider: George Hurlburt, Cloud County Community College, Concordia, KS

5D. ***Virtual Office Hours and More - Year One of the University of Missouri System Project*** [45 min.]
Room 302 **Richard Delaware, University of Missouri - Kansas City, Kansas City, MO**
This talk will report on the first year of the 4-campus UM project (first discussed at EXPO 1998) to provide live Internet online mathematics tutoring for Algebra through Calculus courses using voice, chat, and especially whiteboard software using a graphics tablet and pen. The goal is to do this as simply and inexpensively as possible, approximating an office visit with an instructor, and to meet student demand primarily during evening and weekend hours. This report will describe the web site we created [www.system.missouri.edu/mathcid/], successes and pitfalls, actual usage statistics, the software used, our rental of tablets to students, how we continue to simplify the process, and more. Software discussed will include: NetMeeting, NetTutor, and Visual Rendezvous. Finally, we'll discuss our future plans, and how new Internet appliances may affect us.
Presider: Joe Kincaid, Peru State College, Peru, NE

5E. ***Panel on Mediated Instruction (also known as Computer Assisted Instruction) - Suggestions, Taboos, Student Attitudes, Retention, and More*** [45 min.]
Room 306

Martha Haehl, Maple Woods Community College, Kansas City, MO
Don Haussler, Kansas City Kansas Community College, K.C., KS
Nic LaHue, Penn Valley Community College, Kansas City, MO
Linda O'Brien, Johnson County Community College, Overland Park, KS

The instructors on this panel have not all used the same software to accomplish their mediated learning, but all have taught with it during the last year. They are from four different colleges. Some use the software on-site, and others via the web. The purpose of this panel is not to compare the different systems used. (There are sessions at the EXPO that demonstrate some of the systems.) The purpose of this session is for the panelists to share what they have learned from their experiences, what they would do the same, what they would do differently. Included will be student attitudes, retention, students for which this mode of instruction is appropriate or inappropriate, testing on computer versus paper tests, other testing concerns and/or suggestions, all computer instruction versus some teacher instruction, surprises, and more.

Panel moderator: Libby Holmgren, Johnson County Community College, Overland Park, KS

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

SESSION 6

Friday, 2:45 p.m. - 3:30 p.m.

6A. *Using Technology to Help Teach Rigor*

Room 302 **Joe Kincaid, Peru State College, Peru, NE**

Teaching mathematical rigor is an important objective in our mathematics curriculum and must be considered whenever technology is placed in the hands of the student. This talk will describe experiences in a precalculus class where the TI-86 calculator was used to enhance teaching of mathematical rigor. Generally, the students are expected to have high technical expertise, but moderate to low technical expertise will be expected of the audience in the EXPO talk. The audience will not be expected to use the calculators during the talk, but should be able to follow the examples presented.

Presenter: Mike Brown, Longview Community College, Lee's Summit, MO

6B. *Mediated Learning - A Demonstration and Follow-up*

Room 306 **John Soptick, Brooks Spies, Don Haussler, Kansas City Kansas Community College, Kansas City, KS**

This presentation will demonstrate on a computer screen an interactive computer-assisted approach to teach students various levels of mathematics. This program, produced by *Academic Systems, Inc.*, was implemented in both on-campus and online courses (for students with Internet access) at KCKCC. Mediated learning, using both software and textbooks, can provide the solution to helping your students succeed in mathematics. Not only will they succeed, but they will come back for the next level. This method provides college-level, interactive multimedia mathematics course materials covering Math Essentials, Elementary Algebra, Intermediate Algebra, and College Algebra. Through overhead transparencies, we will provide you with our experiences from our first year's implementation of mediated learning. This session will show you how to make mathematics work for your students and for you.

Presenter: Libby Holmgren, Johnson County Community College, Overland Park, KS

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

POST - SESSION

Friday, 3:30 p.m.

KAMATYC will be meeting in Room 306. **MOMATYC** will be meeting in Room 302. Both groups plan to adjourn to supper together following the meetings.

Events/Activities in Kansas City

For information about what is happening in the Kansas City area while you are in town for the EXPO, check this website:

www.kansascity.com

SATURDAY, October 2, 1999

Room 206 The Technology Display Area, located in the EXPO Conference Lounge, is OPEN at 8:00 a.m.

SESSION 7
Beginning at 9:00 a.m.

- 7A. *Using the TI Graphing Calculators in Calculus I* [45 min.]
Room 125 **Jim Carlson, Neosho County Community College, Chanute, KS**
This presentation is intended for anyone who is teaching the first course of calculus that covers differentiation and integration up through logarithmic and exponential functions. There will be demonstrations of TI-8x Calculators (for $x \neq 9$) using function evaluation, limits of secant lines, Newton's method, Riemann Sums, Simpson's Rule, and the Trapezoidal Rule. Handouts of the programs will be available.
Presider: Carl Anderson, Johnson County Community College, Overland Park, KS
- 7B. *WORKSHOP: Creating Interactive Web Pages* [1 hr. 45 min.]
Room 203 **Andy Bennett, Kansas State University, Manhattan, KS**
The presenter will cover techniques of building web pages with more interaction than just "follow the link," and he will discuss how to use the web to do more than just provide another mechanism for delivering textual information. Participants will code their own basic applet in *Java*. Level of technical expertise expected of the participants: moderate to advanced. Participants should have some experience with programming in some language. Experience with *Java* is not required or expected.
Presider: Richard Gill, Blue Valley High School, Stilwell, KS
- 7C. *WORKSHOP: Using Scientific Notebook to Enhance the Teaching of Mathematics* [1 hr. 45 min.]
Room 205 **Jonathan Lewin, Kennesaw State University, Marietta, GA**
This workshop will provide an introduction to the reading, writing, computing and Internet features of *Scientific Notebook*. It will demonstrate some of the many opportunities for exciting teaching innovations that are made available by this unique software product (and the way in which it front ends the computer algebra system *Maple* with which it comes bundled). The seminar will demonstrate how an instructor can use *Scientific Notebook* in place of a blackboard to deliver lectures and how lecture notes suitable for true interactive reading can be made available to anyone who has a connection to the Internet. The presenter has conducted workshops all over the U.S.A. and in the Far East, both at conferences and on campuses of high schools, colleges and universities. He has pioneered a system of teaching in which *Scientific Notebook* replaces the traditional blackboard and students receive their lecture materials directly from the world wide web. For the workshop, participants should have a little familiarity with the use of a computer keyboard, a mouse and *Windows*.
Presider: Mike Brown, Longview Community College, Lee's Summit, MO
- 7D. *Joining the World Wide Web Revolution in Math Education*
Room 302 **Gene Klotz, Swarthmore College, Swarthmore, PA** [45 min.]
Whatever your mathematical or teaching interests or level, there are likely to be many rewarding ways for you to be a part of the World Wide Web revolution. The WWW expands the boundaries of the classroom for both teacher and student, and it's exciting to be involved. We'll consider examples of imaginative work that others are doing, and also look at some special opportunities to join ongoing projects. From developing sites and software tools, to involvement with students through mentoring at all levels, to collaborative interdisciplinary projects, there are many possibilities for educators.
Presider: Marian VanVleet, Saint Mary College, Leavenworth, KS
- 7E. *Using Mathematica in a Number Theory Class* [45 min.]
Room 306 **Patrick Mitchell, Southeastern Louisiana University, Hammond, LA**
Number Theory has a large number of questions that are easy to understand; however, the proofs are extremely difficult or unknown at the present time. *Mathematica* is a good tool to use to experiment with these

questions. The presenter will also show some interesting visualizations of some well-known and not-so-well-known theorems.

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

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

SESSION 8

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

8A. *Internet Interacting High School Math Lessons*

Room 125 **David Ewing, Central Missouri State University, Warrensburg, MO**

This session will demonstrate and share several math lessons that allow students to interact with the web. The lessons will cover several high school mathematics topics in grades 8 thru 12 and will use volunteers from the EXPO audience to demonstrate. This presentation goes beyond simply downloading data from the world-wide web.

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

8B. *Using E-mail and Asymetric Toolbook Quizzes Via the Web to Teach Algebra*

Room 302 **Nora Strasser, Friends University, Wichita, KS**

At Friends University, a college algebra course has been developed that uses E-mail to deliver the lessons and web-based quizzes. This talk will be on the success of the course, and what problems occurred. A demonstration of the *Asymetric Toolbook* software and construction of the quizzes will be included.

Presider: Ron Palcic, Johnson County Community College, Overland Park, KS

8C. *Parametrics, Polars, Powers, and Polygons, Part II*

Room 306 **Chuck Ames, retired from Newfane High School, Newfane, NY; Educational Consultant for Sharp Electronics, Tulsa, OK**

This talk will cover some of the basics of generating the roots of complex numbers through parametric and polar equations with the use of regular polygons (as in last year's talk). Then the speaker will continue by demonstrating the powers of complex numbers through a spiral and by generating the conic sections using both polar and parametric equations. He will use the Sharp EL9600 to demonstrate and will have calculators for participants to use during the session.

Presider: 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

Saturday, 11:00 a.m. - 11:45 a.m.

Room 115

INVITED SPEAKER

Susan Holmes

Stanford University, Palo Alto, CA

Visiting Associate Professor of the Statistics Department at Stanford.

Associate Editor of the *Journal of Statistical Software*

Probability by Surprise: Teaching with Paradoxes

In our probability classes, we try to unify the presentation of probability to a heterogenous audience through the interest we have in things that surprise us. Some examples we use include: *The Birthday problem, Say Red, Russian Roulette, de Mere's Problem, Monty Hall*. The tools we've developed are based on discoveries by cognitive psychologists (in particular Tversky and Kahneman) over the last 20 years and have not as yet been used in teaching probability in this country. We include simulation programs, to give students a feel for probability, and animated scenarios, to help motivate,

amuse, and make the material more memorable.

Our project weaves together with applets in an "Introduction to Probability" web-site:
[<http://www-stat.stanford.edu/~susan/surprise/index.html>]

It includes:

links to useful existing calculus material such as explanations of integration and summing rules;
interactive Venn diagrams, probability trees, densities as limits of histograms;
relevant graphical animations written in *Java*;
historical material about probability;
animations and simulations developed specifically for the course; and
lists of team-oriented project ideas that enable the students to try out their new computer simulation skills and compare these results to those of classical probabilistic analyses.

Even high school teachers with no training in probability will find this of interest, and we make available, online, all the class notes complementary to the applets.

President: Marian VanVleet, 1999 EXPO Chair, Saint Mary College, Leavenworth, KS

LUNCH

11:45 a.m. - 1:00 p.m. in Massman Hall

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

SESSION 10

Saturday, Beginning at 1:00 p.m.

- 10A. ***How the Internet Changes Our Probability and Statistics Courses*** [45 min.]
Room 115 **Susan Holmes, Stanford University, Palo Alto, CA**
Teaching introductory probability and statistics in college has changed over the last few years in order to adapt to the changing level of computer literacy of our students. Students today think nothing of spending three hours on the web three times a week reviewing the material covered in class, perusing historical references and playing simulation games in order to get a feel for the answers to very difficult probability problems.
- Whereas previous experiments in using historical references were without success, the fact that students enjoy browsing has wonderful advantages. However, many difficulties have also arisen, and I will mention some of them. For instance, efficiency in terms of the amount of useful material browsed can only be obtained by maintaining lively web repositories from which students are not tempted to stray too much. Also, E-mail has changed the instructor-student relationship. I will discuss the difficulties of the perceived 'anonymity' of e-mail which leads students to waste their time and their instructor's time with e-mail trivia.
President: David Ewing, Central Missouri State University, Warrensburg, MO
- 10B. ***A Reform Approach to Business/Survey Calculus*** [45 min.]
Room 125 **Rick Armstrong, St. Louis Community College at Florissant Valley, St. Louis, MO**
The graphing calculator (*TI-82/TI-83*) is the tool that allows us to offer a "reform" curriculum in our one-semester Survey Calculus course for business majors. Within the context of business applications, our students interpret the derivative as a rate of change and the definite integral as a "totaling" process. Intrinsic to the revised curriculum, graphing calculators allow students to learn each topic from numerical, graphical, as well as symbolic perspectives. By mid-semester, students begin making the interconnections on their own. Student interest, satisfaction, and success in Survey Calculus have all increased. This presentation will focus the speaker's students' methods of solving typical take-home and exam questions.
President: Carl Anderson, Johnson County Community College, Overland Park, KS
- 10C. ***An On-line Algebra Telecourse Using WebCT*** [45 min.]
Room 203 **Shelley Gutierrez, Butler County Community College, El Dorado, KS**
This session will discuss the considerations for putting your mathematics course online. The focus will be

on a brand new Intermediate Algebra Online Telecourse offered at Butler County Community College during the Fall 1999 semester. The speaker will demonstrate the online course development tool, *WebCT*, as well as specific clips of information from her online Intermediate Algebra course syllabus. The speaker will give information about her online discussion group, quizzes, and specific student outcomes for online Intermediate Algebra. Level of expertise expected of students and the EXPO audience: computer literacy with knowledge of the Internet.

Presider: Judy Munshower, Avila College, Kansas City, MO

10D.
Room 205

The Function $z = y^x$ Graphed with Mathematica, Excel, and Graphing Calculators

Elizabeth Appelbaum, Community Liaison for Math - Blue Valley School District [1 hr. 30 min.]

Powers are usually presented as an operation on two variables. Paradoxically, they may be easier to understand viewed in three dimensions with z a function of y and x . Restrict the base y to be positive, so that any real number x can be an exponent. The presenter will show and explain how to make the three-dimensional graph with *Mathematica*. The bizarre behavior near the origin will help students understand why 0^0 is undefined. Cross sections parallel to the y -axis that are of the form $z=y^x$ (power functions). These will be graphed in *Mathematica* and a graphing calculator. Cross sections parallel to the x -axis that are of the form $z=k^x$ (exponential functions). These will be graphed with *Excel* and a graphing calculator. Also, *Excel* and *Mathematica* will be used to make level curves, evoking the three-dimensional graph in two dimensions. Participants will manipulate the graphs, using the software. Graphing calculators will be provided for the session, or use your own if you prefer. The presenter will give the participants diskettes and handouts. No technical expertise is necessary to attend the session.

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

10E.
Room 302

Using The Geometer's SketchPad, Graphing Calculators, and Group Activities to Explore Slope

Brenda Reed, Lincoln University, Jefferson City, MO

[45 min.]

Developmental Algebra college students often struggle with slope, one of the more important concepts developed in a beginning algebra course. In concert with the NCTM and *Crossroads Standards*, in furthering conceptual understanding, and in moving away from a purely algorithmic approach, an integrated approach is being used to explore slope using multiple representations. The speaker explores the slope and y -intercept of related lines on the graphing calculator, looks at the traditional approach to slope, utilizes group activities to explore slope as a rate of change using paper and pencil, and concludes with a *SketchPad* demonstration in which changes in the rise and run and their effect on slope are explored. The *SketchPad* demonstration will be emphasized.

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

SESSION 11

Saturday, 2:00 p.m. - 2:45 p.m.

(Special GIVE-AWAY drawings from TI this hour, for attendees of 11A, 11B, and 11C)

11A.
Room 125

TI-Graph Link - What, How, When, Where, and Why to Use It

Richard Gill, Blue Valley High School, Stilwell, KS

This presentation will be divided into three parts:

- 1) An introduction to what the program can and cannot do
- 2) A description of the process to obtain the program and the necessary hardware
- 3) (The main part) A list of uses for the classroom teacher with examples provided from the speaker's own lesson plans, worksheets, programs, etc. The three main uses for the program are:
 - A) To access programs on the Internet from websites such as *TI*, especially for use with the *CBL*.
 - B) To write programs for the computer in a much more friendly setting than on the calculator itself.
 - C) To generate pictures to use with worksheets, tests, instructions, presentations and also to save student work/data/pictures on the computer.

Individuals using another make of calculator will be able to get ideas for better use of their particular calculator from this presentation. At the end of this session, there will be a drawing for the attendees at this session, for a TI-Graph Link, provided by Texas Instruments.

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

11B. **EXPO Showcase: An Introduction to the TI-89**
Room 302 **Libby Holmgren & Carl Anderson, 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 *TI-89* calculator. This is not a keystroke oriented tutorial, though keystroke handouts will be provided for the examples that are covered in the session and *TI-89* calculators will be provided. This session is intended to inform instructors what the *TI-89* can do so that they will have more knowledge on which to base a decision to allow/disallow or encourage/discourage its use by students. In addition, instructors may discover whether or not they themselves wish to pursue the use of the *TI-89*. At the end of this session, there will be a drawing for the attendees at this session, for a *TI-89*, provided by Texas Instruments.

11C. **Projects for Elementary Statistics Using the TI-83**
Room 306 **Ken Eichman, Blue River Community College, Blue Springs, MO**
The speaker will share some student projects exploring the Central Limit Theorem, confidence intervals, correlation, regression, relationships between measures of central tendency and distribution shapes, standard deviation, etc. For some of these projects, students use programs he has written for the *TI-83*, and for others, students use features inherent in the *TI-83*. Participants with *TI-83s* will be able to download the programs he has written. The speaker will share what worked and what didn't work. Following the presentation, participants will have an opportunity to ask questions and/or to share and discuss their own suggestions and experiences. At the end of this session, there will be a drawing for the attendees at this session, for a *TI-83*, provided by Texas Instruments.
Presider: Judy Munshower, Avila College, Kansas City, MO

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

The 1999 Kansas City Regional Math Technology EXPO Group hopes that you found the EXPO informative and enjoyable. Please be sure to turn in all evaluation forms. See you next year!

1999 MATHEMATICS TECHNOLOGY EXPO Group

Marian VanVleet* (1999 Chair), Saint Mary College, Leavenworth, KS
Carl Anderson*, Johnson County Community College, Overland Park, KS
Andy Bennett*, Kansas State University, Manhattan, KS
Mike Brown, Longview Community College, Lee's Summit, MO
Tim Chappell, Penn Valley Community College, Kansas City, MO
Richard Delaware* (1993 & 1994 Chair), University of Missouri -Kansas City, Kansas City, MO
Ken Eichman* (1997 & 1998 Chair), Blue River Community College, Blue Springs, MO
David Ewing*, Central Missouri State University, Warrensburg, MO
Richard Gill, Blue Valley High School, Stilwell, KS
Libby Holmgren* (1995 & 1996 Chair, 1999 Recording Sec.), Johnson County Community College, Overland Park, KS
Joe Kincaid, Peru State College, Peru, NE
John Koelzer* (1999 Financial Sec.) Rockhurst University, Kansas City, MO
Nic LaHue*, Penn Valley Community College, Kansas City, MO

*EXPO Steering Committee

Events/Activities in Kansas City

For information about what is happening in the Kansas City area while you are in town for the EXPO, check this website:
www.kansascity.com

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www.math.ksu.edu/expo