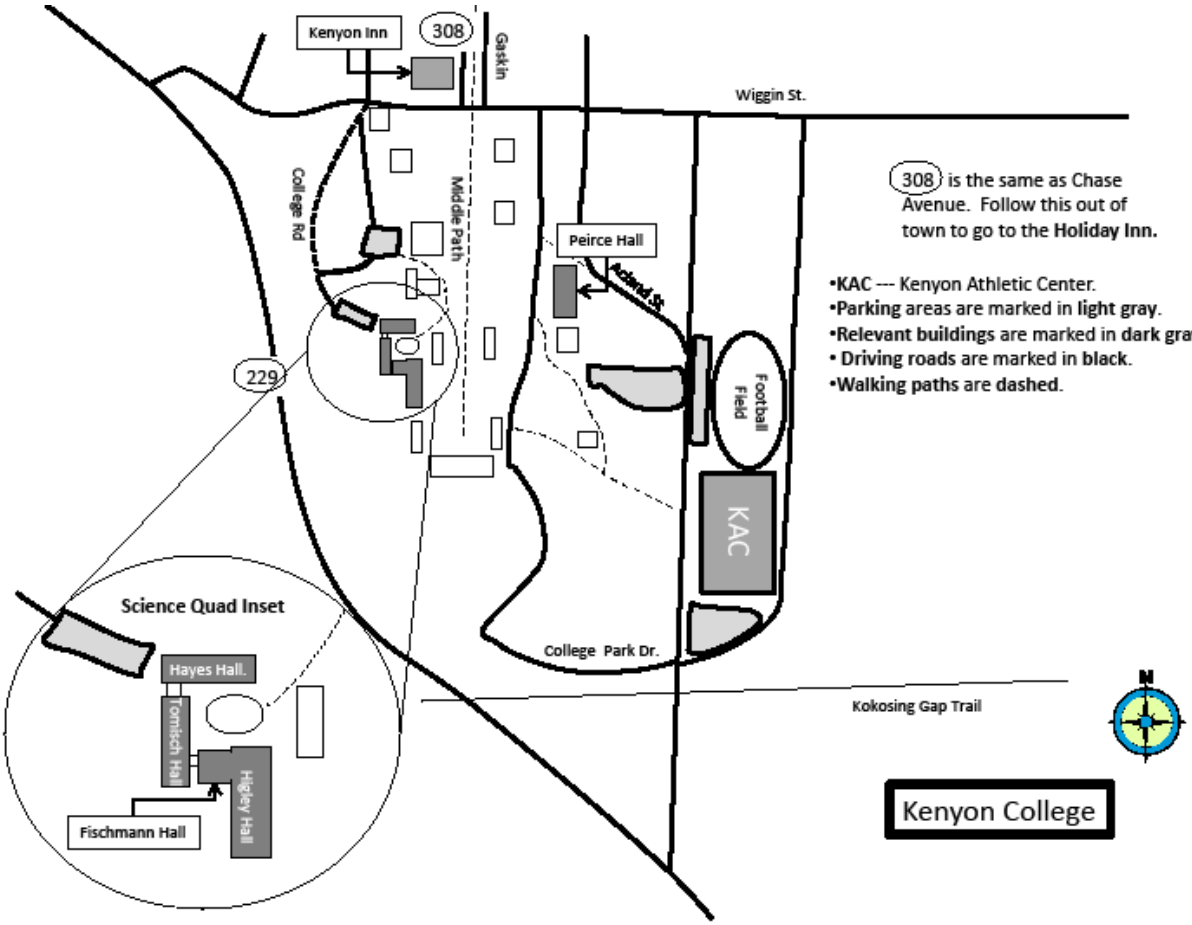
Program of Activities
For the 94rd Annual Meeting of the

Mathematical Association of America

Ohio Section

Fall 2009
Kenyon College
Gambier, Ohio
October 30-31, 2009


Kenyon Inn
308
Gaskin
Wiggin St.
College Rd
Middle Path
Peirce Hall
Acland St
229
Football Field
KAC
Science Quad Inset
Hayes Hall.
Tomlinson Hall
Higley Hall
Fischmann Hall
College Park Dr.
Kokosing Gap Trail
N
Kenyon College
308 is the same as Chase Avenue. Follow this out of town to go to the Holiday Inn.
•KAC --- Kenyon Athletic Center.
•Parking areas are marked in light gray.
•Relevant buildings are marked in dark gray.
• Driving roads are marked in black.
•Walking paths are dashed.

MAA Ohio Section

Program

Friday, October 30

Noon-4:00	Registration	Kenyon Athletic Center (KAC) Lobby
11:30-12:00	Nominating Committee	KAC 205
12:00-1:00	Committee Meetings:	
	CONCUR	KAC 103
	CONSACT	KAC 205
	CONSTUM	KAC 223
	CONTEAL	KAC 230
	Centennial Committee	KAC Lobby
1:00-4:00	Vendor and Book Exhibits	KAC Multipurpose Room
1:15-1:30	Welcome & Announcements	KAC Theater
1:30-2:30	Invited Address: **"Mathematics in Biomedical Research"** *Tom LaFramboise, Case Western Reserve University School of Medicine*	KAC Theater
2:30-3:00	Break	KAC Multipurpose Room
3:00-4:00	Invited Address: **"Recent Results in Projectile Motion and a Plug for Experimental Mathematics"** *Ed Packel, Lake Forest College*	KAC Theater
4:20 – 5:55	**Contributed Paper Sessions**	Tomisch Hall 101, 103, 203
4:50 – 5:55	Executive Committee Meeting	Hayes Hall 215
6:00- 6:30	Social Time	Fischmann Hall Lobby
6:45-8:00	Banquet	Peirce Hall Pub
8:10-9:00	After-Dinner Talk: **"Lagrange, Symmetry and Space"** *Judith Grabiner, Pitzer College*	Peirce Hall Pub

Saturday, October 31

8:00-10:15	Registration	Higley Hall Lobby
8:00-10:15	Vendor and Book Exhibitions	Fischmann Hall Lobby
8:00-8:50	Continental Breakfast	Higley Hall Lobby
8:05-8:40	Executive Committee meeting continuation (if necessary)	Hayes Hall 215
8:50-8:55	Announcements	Higley Hall Auditorium
8:55-9:55	Invited Address: **"Mental Imagery in Mathematics"** *Judy Holdener, Kenyon College*	Higley Hall Auditorium
9:55-10:15	Break	Higley Hall Lobby
10:25-11:40	**Contributed Paper Sessions**	Tomisch Hall 101, 103, 203
11:50-12:50	Invited Address: **"It's All for the Best: Optimization in the History of Science"** *Judy Grabiner, Pitzer College*	Higley Hall Auditorium
12:50	**Closing Remarks**	Higley Hall Auditorium

Abstracts of Invited Addresses

Friday

Speaker: Tom LaFramboise
Title: *Mathematics in Biomedical Research*
Abstract: Every undergraduate mathematics student becomes acquainted with a wide array of mathematical applications in sciences such as physics, chemistry, biology, and economics. Indeed, rigorous mathematical training is a requirement for most science majors. Traditionally, however, there has been a disconnect between the academic worlds of mathematics and biomedicine. This is beginning to change. Largely driven by the recent completion of the federally-funded Human Genome Project, the last several years have seen an explosion of genomic data, and a corresponding need for quantitative methods to analyze and interpret the data. In this talk, we provide a brief overview of the burgeoning field of computational genomics. We also give several vignettes demonstrating the contributions that mathematicians, statisticians, and computer scientists can make (and have made!) to advances in human health and disease treatment

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Speaker: Ed Packel
Title: *Recent Results in Projectile Motion and a Plug for Experimental Mathematics*
Abstract: Recently developed results on projectile motion with linear resistance will be discussed along with the surprising role played by *Mathematica* in the discovery process. These results include several new formulas involving the Lambert W function and a general theorem about real analytic functions. In particular, symbolic solutions are found for the range of a projectile and the launch angle that maximizes the range.

Speaker: Judy Grabiner
Title: *Lagrange, Symmetry,and Space*
Abstract: In 1806, Joseph-Louis Lagrange read a memoir proving Euclid's parallel postulate to the Académie des Sciences in Paris, but stopped, saying, as the story goes, said, "I have to think about this some more." We'll look at Lagrange's (still unpublished) Paris manuscript on this subject, and place this activity in the context of his mathematical career. We also look at how the ideas in this manuscript are related to Lagrange's philosophy of mathematics, Newtonian mechanics, Leibniz's Principle of Sufficient Reason, and the fine arts. Finally, we reflect on what this episode tells us about eighteenth-century – and modern – attitudes toward geometry and space

Saturday

Speaker: Judy Holdener
Title: *Mental Imagery in Mathematics*
Abstract: In the mid 1950's, French mathematician Jacques Hadamard wrote about the significant role mental images play in the creation of mathematics. His writings were based not only on his own experiences, but also on the experiences of Carl Friedrich Gauss, Hermann von Helmholtz, Henri Poincaré and other renowned mathematicians and theoretical physicists. I am no Gauss, but as an artist and a mathematician, I, too, find that imagery plays a significant role in mathematical thought. Furthermore, I believe mental imagery can play a critical role in the teaching of mathematics. By sharing mental images with our students, I believe we can make the mathematics classroom a more inclusive place. In my talk, I will speak about my use of imagery in the mathematics classroom, providing concrete examples along the way.

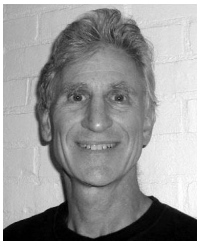
Speaker: Judy Grabiner
Title: *It's All for the Best: Optimization in the History of Science*
Abstract: Many problems, from optics to economics, can be solved mathematically by finding the highest, the quickest, the shortest – the best of something. This has been true from antiquity to the present. Why did people start looking for such explanations, and how did we come to conclude that we could productively do so? Scientific examples will include problems from ancient optics, and more modern questions in optics and classical mechanics, drawing on ideas from Newton's and Leibniz's calculus and from the Euler-Lagrange calculus of variations. A surprising role will also be played by philosophical and theological ideas, including those of Leibniz, Maupertuis, MacLaurin, and Adam Smith.

Brief Biographies of Invited Speakers

Tom LaFramboise, Case Western Reserve University School of Medicine

Tom LaFramboise earned his B.S. from the University of Michigan at Ann Arbor and his Ph.D. from the University of Illinois at Urbana-Champaign, both degrees in pure mathematics. After a year as Visiting Assistant Professor at Kenyon College, he spent several years as Assistant and Associate Professor in the mathematics department at Marietta College. During this time, he was active in the Ohio MAA and Project NeXT. In 2002, Tom rashly decided to turn his back on tenure to retrain in biostatistics, earning a Master‘s degree at the Harvard School of Public Health, which led to a postdoctoral position in cancer genomics in at the Dana-Farber Cancer Institute and the Broad Institute of Harvard/MIT. He joined the Genetics department at the Case Western Reserve University School of Medicine in 2006 – his third consecutive nation-wide job search that landed him in Ohio – where he is once again an Assistant Professor without tenure. His research is devoted to understanding the molecular changes that lead to cancer initiation, progression, and metastasis. He lives with his wife and two children in Shaker Heights, outside of Cleveland.

Ed Packel, Lake Forest College



Ed Packel did his undergraduate work at Amherst College and received a Ph.D. in Mathematics (functional analysis) from M.I.T. in 1967. Since 1971 he has taught at Lake Forest College, where he served as department chair from 1986 to 1996. His research interests have oscillated among functional analysis, game theory, social choice theory, information-based complexity, and the use of technology (primarily *Mathematica*) in teaching. An early interest in *Mathematica* has resulted in a fruitful collaboration with Stan Wagon that includes a *Mathematica* laboratory textbook ("Animating Calculus") and, for the past 15 years, teaching the Rocky Mountain *Mathematica* summer workshops in Colorado. Packel's recreational enthusiasms have somehow gravitated towards sports where low numbers are good—namely, competitive distance running and golf.

Judy Grabiner Pitzer College

Judith Victor Grabiner was born in Los Angeles, California, in 1938. She received her B.S. in Mathematics, with General Honors, from the University of Chicago in 1960, her M.A. in the History of Science from Radcliffe College, and Ph.D. in the History of Science from Harvard in 1966. Her thesis advisors were I. Bernard Cohen and Dirk J. Struik. She is a member of both Phi Beta Kappa and Sigma Xi. She was a Sigma Xi Society National Lecturer in 1988-90. Judith has been co-president of the West Coast History of Science Society, and Chair of the Southern California section of the Mathematical Association of America.

She is a member of the AMS, the MAA, the History of Science Society, the British Society for the History of Mathematics, the Canadian Society for the History and Philosophy of Mathematics, and the Scottish 18th-Century Studies Society. She has held a Woodrow Wilson Fellowship, an American Council of Learned Societies Fellowship, and two National Science Foundation fellowships. She has taught at Harvard, UC Santa Barbara, California State

University, Dominguez Hills, UCLA, Pomona College, and the University of Leeds, England. She now teaches at Pitzer College, one of the Claremont Colleges in Claremont, California, where she is the Flora Sanborn Pitzer Professor of Mathematics. She has been a Visiting Scholar at the University of Leeds, England; University of Edinburgh, Scotland; Cambridge University, England; The Australian National University; and the University of Copenhagen, Denmark.

Among the many awards Judith has received are three Carl Allendoerfer Awards (for the best article in the *Mathematics Magazine*, 1984, 1988, 1996), and three Lester Ford Awards (for the best article in the *American Mathematical Monthly*, 1984, 1998, 2005). She won the Outstanding Professor Award at California State University, Dominguez Hills, in 1975. In 2002, she won the Award for Distinguished College or University Teaching from the Southern California Section of the MAA. In 2003, she won the national Deborah and Franklin Tepper Haimo Award for Distinguished College or University Teaching of the Mathematical Association of America.

Judith has published many articles about the history of mathematics, and some about other aspects of the history of science, including ―Effects of the Scopes Trial‖ (with Peter D. Miller) and several articles about Artificial Intelligence. She is the author of *The Origins of Cauchy's Rigorous Calculus* (M.I.T. Press, 1981), which was reprinted by Dover in 2005. She is also the author of *The Calculus as Algebra: J.-L. Lagrange, 1736-1813* (Garland, 1990). Her CV reveals that she has published over thirty-five book reviews, and given 35 talks at national and international meetings. She has just published a course based on her liberal-arts teaching experience for The Teaching Company. The course is called "Mathematics, Philosophy, and the 'Real World'".

Judy Holdener, Kenyon College

Judy Holdener received her Ph.D. at the University of Illinois-Urbana in 1994 and joined Kenyon's Mathematics Department in 1997, after spending three years at the U.S. Air Force Academy in Colorado Springs, CO. Although her current research interests reside primarily in the areas of algebra and number theory, she has been known to work in other areas when an intriguing question arises ... especially if the question is accessible to undergraduates. Judy has collaborated with students on research projects relating to algebra, number theory, dynamical systems, and mathematical biology, and their work has culminated in research publications and presentations at national math conferences. In 2007, Judy was awarded the John B. McCoy Banc One Distinguished Teaching Chair at Kenyon, and in 2003 she was awarded Kenyon's Tomisch Science Award as well as the Board of Trustees Junior Teaching Award. She was awarded the 2008 Ohio Section Award for Distinguished College or University Teaching. Judy was a national Project NExT fellow (a green dot) in 1995-96. Currently she is the Chair of the Mathematics Department at Kenyon.

Contributed Paper Sessions

Friday, October 30

Time	Tomisch 101 Session Chair Phil Blau	Tomisch 103 Session Chair David Singer	Tomisch 203 Session Chair Tom Dence	Notes
4:20-4:35	***Four-digit Year Numbers with Interesting Properties*** Abstract #1 Leo Schneider John Carroll University	***Adding Py to a Mathematics Course*** Abstract #2 Robert Van Camp Marietta College	***The Sum of a Common Series from Calculus*** Abstract #3 Thomas P Dence Ashland University	
4:40-4:55	***Using Alpha to Study Iterated Integrals*** Abstract #4 Thomas Hern Bowling Green State University - Main	***On Characters and a Conjecture by Huppert*** Abstract #5 Thomas Wakefield Youngstown State University	***The beta-Levy Distribution*** Abstract #6 Charles N Lowe Alfred A Akinsete Marshall University	
5:00-5:15	***A Curve in a Triangle*** Abstract #7 Gordon Swain Ashland University	***Logarithms and Supercharacters*** Abstract #8 Benjamin A Otto Bowling Green State University - Main	***Report on the Revision of Ohio's Math Standards*** Abstract #9 Brad Findell Ohio Dept of Education	
5:20 – 5:35	***Introducing Greatest Prime Factor Sequence Graphs*** Abstract #10 Thomas J Cuchta Affiliation: Marshall University	***A Blended Multisite Distance Workshop in Mathematics Using Inquiry, Technology and Collaboration*** Abstract #11 Laurie A Dunlap The University of Akron	***Getting Students to Read the Textbook*** Abstract #12 Matthew Menzel Marietta College	
5:40-5:55	***Rush versus Pass: Modeling the NFL*** Abstract #13 John T Holodnak Ohio Northern University	***Mathematical Beauty*** Abstract #14 David E Meel Bowling Green State University - Main	***How (Johann) Bernoulli Solved (Jacob) Bernoulli's Differential Equation*** Abstract #15 Adam E Parker Wittenberg University	

Contributed Paper Sessions

Saturday, October 31

Time	Tomisch 101 Session Chair Cathy Stoffer	Tomisch 103 Session Chair Bill Higgins	Tomisch 203 Session Chair Brad Findell	Notes
10:25- 10:40	***An Alternative Approach to Assessing Calculus for Business Majors*** Abstract #16 Jerry C Obiekwe The University of Akron	***Implementation of web-based skill tests for Precalculus, Calculus I and Calculus II*** Abstract #17 Lynne C Yengulalp University of Dayton	Feedback Session Draft of Ohio Math Standards	
10:45- 11:00	***The OCTM State Tournament of Mathematics - What is it and how do you get involved?*** Abstract #18 Cathy Stoffer Ashland University	***Sampling and Measurement Errors Due to Overlapping Between Interviewer Workload and the Sampling Units*** Abstract #19 Deniz Akdemir Ohio Northern University	Feedback Session continued	
11:05- 11:20	***GeoGebra and Sage: Free and Open Source Mathematics Software*** Abstract #20 Darren D Wick Ashland University	***Can one load the dice to get a prescribed distribution for the sum?*** Abstract #21 MB Rao University of Cincinnati	Feedback Session continued	
11:25- 11:40	***The Sound of the Irrational*** Abstract #22 Boris Kerkez Ashland University	***Why I am enjoying retirement!*** Abstract #23 Thomas E Price The University of Akron	Feedback Session Continues	

Abstracts of Contributed Papers

Friday 4:20 – 4:35

Four-digit Year Numbers with Interesting Properties

Leo Schneider
John Carroll University
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Abstract #1: To paraphrase the well-known exchange between S. Ramanajuan and G. H. Hardy, "The year was yyyy. That is not a particularly interesting number." "Ah, but it is because …". Let's look at a couple recent years, and see why the numbers of those years are interesting.

Adding Py to a Mathematics Course

Robert Van Camp
Marietta College
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Abstract #2: A survey of the Python programming language will be given with specific examples related to Mathematics. The role of Python in a Mathematics course will be examined. Is Python a valid alternative to *Mathematica*?

The Sum of a Common Series from Calculus

Thomas P Dence
Ashland University
tdence@ashland.edu

Abstract #3: Most likely every calculus book in the world illustrates series convergence with a standard test using the same series, but no mention is ever made as to what the series converges to - but I'll show you what it does converge to.

Friday 4:40 – 4:55

Using Alpha to Study Iterated Integrals

Thomas Hern
Bowling Green State University - Main
hern@wcnet.org

Abstract #4: We use Wolfram Alpha to demonstrate an example where order of integration matters and the multiple integral does not exist. We also encounter two dimensional limits and level curves. Alpha is web based. No software other than a browser is needed. An advantage for student use.

On Characters and a Conjecture by Huppert

Thomas Wakefield
Youngstown State University
tpwakefield@ysu.edu

Abstract #5: In the late 1990s, Bertram Huppert conjectured that if G is a finite group and H a finite nonabelian simple group such that the sets of character degrees of G and H are the same, then G is isomorphic to the direct product of H and an abelian group. We will introduce character theoretic results with the goal of presenting arguments that allow for progress in the verification of Huppert's Conjecture for many large sporadic simple groups.

The beta-Levy Distribution

Charles N Lowe #7
Marshall University
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Alfred A Akinsete
Marshall University
akinsete@marshall.edu

Abstract #6: The Levy Distribution has been found useful in the areas such as finance and spectroscopy. We discuss in this work, the beta generalization of the Levy distribution, referred to as the beta-Levy distribution (BLD). The probability density function and its corresponding cumulative distribution function are obtained. Various statistical properties of this distribution are also discussed, including for example the moments and hazard rate function. Parameter estimation for the BLD is discussed using the method of the maximum likelihood estimation (MLE).

Friday 5:00 – 5:15

A Curve in a Triangle

Gordon Swain
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Abstract #7: For any triangle we define the set of points that satisfy a certain "proportionality condition" then prove that these points form a parabola. We also show that every parabola satisfies the same "proportionality condition" and look at some historical origins of the idea.

Logarithms and Supercharacters

Benjamin A Otto
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Abstract #8: Supercharacters and Kirillov functions are two constructions designed to mimic the irreducible characters of groups. It is known that the introduction of a logarithm-like alteration can improve the latter functions. The main point of this talk is that none of a class of alterations (including the logarithm and its approximations) has any affect on the supercharacters.

Report on the Revision of Ohio's Math Standards

Bradford R. Findell
Mathematics Initiatives Administrator -Ohio Department of Education
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Abstract #9: The revision of Ohio's mathematics standards was formally launched in July 2009 with the inaugural meeting of the Mathematics Advisory Committee, which includes representatives of various mathematics organizations in Ohio as well as other key constituencies. John Prather, Ohio University-Eastern, is representing the Ohio Section of the MAA. The Advisory Committee provides guidance and feedback to the Ohio Department of Education (ODE) staff and the grade-band working groups that will be producing the revised documents. The State Board of Education is required to adopt revised standards by June of 2010.

The revised mathematics standards will be structured so that each grade and course focuses in depth on a small number of big ideas. The intent is to overcome the "mile-wide-inch-deep" characterization of the U.S. mathematics curriculum. The draft outline and revised standards draw on several sources: (1) the curriculum standards from high-achieving countries; (2) the ***Curriculum Focal Points*** (National Council of Teachers of Mathematics, 2006), which identifies three big ideas for each of Pre-K through Grade 8; and (3) the draft **College and Career Readiness Standards for Mathematics**, released in July 2007 as part of the Common Core State Standards Initiative.

For strong alignment with the Common Core State Standards Initiative, the Mathematics Advisory Committee and the Mathematics Working Groups have adopted the following strategy for high school mathematics:

Describe the college and career-ready mathematical expectations of high school graduates, making certain that the expectations do not merely repeat middle grades content.

Organize that content into course sequences, drawing on Ohio's Program Models for Mathematics.

Name the courses and course sequences.

Additional meetings of the Mathematics Advisory Committee and the Mathematics Working Groups are scheduled for September and October in order to have draft standards completed by the end of October 2009. At the Fall Meeting of the Ohio Section of the MAA, a contributed paper session on Friday evening will provide an overview of the draft standards. On Saturday, MAA members will have an opportunity to engage in the draft documents and provide feedback.

Friday 5:20 – 5:35

Introducing Greatest Prime Factor Sequence Graphs

Thomas J Cuchta
Marshall University
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Abstract #10: In 2006, Caragiu and Sheckelhoff introduced greatest prime factor sequences: if x_0 is a prime number, and for natural numbers a and b, $x_{n+1} = gpf\left(a \cdot x_n + b\right)$ where $gpf\left(x\right)$ is the greatest prime factor function. In their paper, a conjecture that is supported by computational evidence is made: all such sequences are ultimately periodic. They studied the sequences themselves, and showed that for a=1 and b arbitrary, all inputs are ultimately periodic. In this talk, we will review Caragiu and Sheckelhoff's work and examine a new graph-theoretical approach to gpf-sequences that yields a perspective on global properties. This talk will be accessible to a general audience.

A Blended Multisite Distance Workshop in Mathematics Using Inquiry, Technology and Collaboration

Laurie A Dunlap
The University of Akron
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Abstract #11: A blended distance learning workshop was conducted at The University of Akron for in service mathematics teachers of grades 8 – 12. Multipoint interactive video conferencing was utilized to deliver interactive sessions between the university and five locations in northeast Ohio. The "TI-Nspire" calculator and course management system "Springboard" were used in the workshop. The goals of this workshop focused on deepening content knowledge, integrating technology, using inquiry, and peer collaboration. Initially, participants experienced frustration with this new environment, but this faded after three meetings. The results indicate that the goals of the workshop were achieved at a high level and that using the blended distance delivery, as opposed to face-to-face delivery, did not seem to lessen the amount of learning accomplished by participants.

Getting Students to Read the Textbook

Matthew Menzel
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Abstract #12: For many mathematics courses, the value to students of reading the textbook before class is apparent. The challenge for instructors is to find creative ways to "encourage" students to do so. For two courses at different levels, we will look at pedagogical approaches that were employed, as well as student participation and reaction to the approaches.

Friday 5:40 – 5:55

Rush versus Pass: Modeling the NFL

John T Holodnak
Ohio Northern University
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Abstract #13: This study utilizes innovative methods to conclude whether rushing or passing yards is a superior indicator of a football team's overall strength. Measures of rushing and passing efficiency are used in three sports ranking models to compare their effectiveness in NFL game prediction: the Keener (1993) ranking model, the Massey (1997) Least Squares model, and the Govan et al. (2009) Offense-Defense model. The Keener model is an application of the Perron-Frobenius Theorem, the Massey model uses the theory of least squares, and the Offense-Defense model relies on the Sinkhorn-Knopp Theorem. It is shown that, when input into these models, passing efficiency yields higher game prediction accuracy than rushing efficiency. Further study also reveals that the degree of correlation between passing efficiency and score differences is stronger than that between rushing efficiency and score differences.

Mathematical Beauty

David E Meel
Bowling Green State University - Main
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Abstract #14: In this talk, we will explore the world of art and how mathematical art can resonate in the eye of the beholder. Examples of various mathematical art pieces will be examined and discussions of how others can construct such objects will be discussed. Inspired from found objects presented in the MAA Focus issues and ranging from the careful renderings of mathematical artists, we will explore the world of beauty surrounding pieces of mathematical art and how they can enhance our environment and challenge our students to think harder about connections.

How (Johann) Bernoulli Solved (Jacob) Bernoulli's Differential Equation

Adam E Parker
Wittenberg University
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Abstract #15: In December 1695, Jacob Bernoulli proposed a problem in *Acta eruditorum* that is now known as Bernoulli's Differential Equation. In different places, Leibniz and Johann Bernoulli are both credited with solving this differential equation. We'll unravel who contributed what to the solution, and show that Johann actually had two methods, one of which doesn't appear to be taught much anymore.

Saturday 10:25 – 10:40

An Alternative Approach to Assessing Calculus for Business Majors

Jerry C Obiekwe
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Abstract #16: Course level assessment has become a prevalent theme in colleges and universities across this nation. Essentially, you are required to continuously provide additional evidence that students are learning what they are supposed to be learning. All the major stakeholders such as the legislators and the accrediting agencies, have vested interest in this idea; consequently mandates it for institutions of higher learning. For example, many institutions of higher learning are requiring their instructional personnel to submit assessment reports at the end of each semester for each course that they teach. As much as course level assessment is related to student learning, it also relates to institutional effectiveness. Institutional effectiveness also relates to performance funding. Course level assessment in a convergent subject like mathematics is ascertaining the proficiency level of students in the stated learning outcomes. This can be accomplished by way of different approaches because of the open-endedness of the definition of assessment. However, it is required that the method of assessment be valid, that way the results emanating from it can be considered authentic. One such method is the use of mathematics vocabulary. Much of the research in mathematics vocabulary has been on K-12, and very little in higher education. This study will present how the use of mathematics vocabulary and literary approach can be employed in the assessment of calculus for business majors. Implications to teaching and learning will also be discussed.

Implementation of web-based skill tests for Pre-calculus, Calculus I and Calculus II

Lynne C Yengulalp
University of Dayton
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Abstract #17: I will describe a team project that I was involved with at the University of Kansas. The team established a framework for administering web-based skill tests to more than 2000 pre-calculus and calculus students at the University of Kansas using the online testing software MapleTA. I will talk about how student, instructor, technology and process factors all influenced the design of the testing system. I will also explain our method of analyzing the large amount of data gathered from the system to make conclusions about the learning of the students, the merit of the exam itself and behavior patterns of test takers.

Saturday 10:45 – 11:00

The OCTM State Tournament of Mathematics - What is it and how do you get involved?

Cathy Stoffer
Ashland University
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Abstract #18: The Ohio Council of Teachers of Mathematics conducts a mathematics tournament for Ohio high school students on the last Saturday in February each year. The tournament is conducted at test sites around the state of Ohio, many of which are colleges or universities. Close to 2000 high school students have participated in any given year. We will look at some of the tournament problems and results from past years. This is also an invitation for you to get involved in some aspect of the tournament, from reviewing the tournament questions, to becoming a site director, to helping to grade the students' answers.

Sampling and Measurement Errors Due to Overlapping Between Interviewer Workload and the Sampling Units

Deniz Akdemir
Ohio Northern University
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Abstract #19: A detailed investigation of the sources, magnitude and impact of errors is necessary to identify how survey design and procedures may be improved and how resources allocated more efficiently among various aspects of the survey operation. A very common practice in surveys is to select groups of elements together (cluster sampling) instead of independent selection of elements (simple random sampling). In these cases, many times, a proportion of the measurement variance which is due to interviewers is reflected to some degree in the sampling variance calculations. In this talk, we discuss the decomposition of the total variance into sampling and measurement variance for two commonly used data collection and sample designs that involve some overlapping between interviewer workload and the sampling units.

Saturday 11:05 – 11:20

GeoGebra and Sage: Free and Open Source Mathematics Software

Darren D Wick
Ashland University
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Abstract #20: GeoGebra and Sage are powerful, multi-platform software applications that are useful in the classroom, for research, and beyond. We discuss their development and give a brief overview of their capabilities.

Can one load the dice to get a prescribed distribution for the sum?

MB Rao
University of Cincinnati
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Abstract #21: If two regular six-sided dice are fair, the distribution of the sum of the numbers on the top faces has a nice structural pattern. Conversely, if we specify a distribution for the sum, is it possible to load the dice so that the distribution of the sum is the one that is prescribed? We will address this question in the talk.

Saturday 11:25 – 11:40

The Sound of the Irrational

Boris Kerkez
Ashland University
bkerkez@ashland.edu

Abstract #22: In this talk, we will investigate various techniques for transforming numbers into musical notes. In particular, we will focus on the irrational numbers and the sounds their digits produce according to various number-to-sound mapping techniques. As a demonstration of this approach, we will take a listen at several compositions produced in this manner, including the sound of irrational numbers such as pi, e, and $\sqrt{2}$.

Why I am enjoying retirement!

Thomas E Price
University of Akron (retired)
tom@sitextools.com

Abstract #23: After retiring I began using some of the skills I developed as a mathematics teacher to do some writing and consulting. In this talk I will describe a few of the projects I have done, some I am doing, and others I hope to do. I will discuss the reasons I enjoy what I am doing.

Notes

Acknowledgements

The Ohio Section would like to thank the faculty, staff, and students of the Mathematics Department at Kenyon for their efforts in hosting this meeting. Special thanks go to Carol Schumacher and Judy Holdener as co-chairs of the local arrangements committee for volunteering Kenyon to host the Fall 2009 meeting on short notice.

Announcement of Spring 2010 Section Meeting

The Ohio Section of the Mathematical Association of America will hold its annual Spring meeting on **April 16-17, 2010**, at Kent State University. The Invited speakers for that meeting are: Dr. Ivars Peterson, Director of Publications for Journals and Communications for the MAA; Dr. Karen Parshall, University of Virginia; Dr. John Oprea, Cleveland State University; and Dr. Mark Miller, Marietta College. More details, including submission information for contributed talks from faculty and students, will be forthcoming in the Spring edition of the Ohio Section newsletter and also on the Ohio Section web site, **www.maa.org/ohio.**