



## Kentucky Council of Teachers of Mathematics

October 2005



### Message from the President

The school year is well underway, and we are all busy attending to the needs of our students. In the midst of this business, I invite you to think about encouraging your colleagues to become members of KCTM. "Why should I join KCTM?" they might ask. The focus of KCTM is the improvement of mathematics education for all students in Kentucky. This is partially realized through our annual state conference and through KCTM's input to the Kentucky Department of Education.

If you have not already done so, register for the 2005 KCTM annual conference - November 4-5 at North Laurel high school in London, Kentucky. Please take the time to check our website - [www.kctm.org/conference.html](http://www.kctm.org/conference.html) - for information about registration. Last years conference was a success because you chose to get involved! We are counting on you! Direct any comments or questions to our Conference Co-Chairperson, Maggie McGatha ([maggie.mcgatha@louisville.edu](mailto:maggie.mcgatha@louisville.edu)).

As most of you are aware, the Kentucky Department of Education is continuing the process of reviewing, organizing, prioritizing, clarifying, and aligning the content and performance standards for the assessment system. The KCTM Board has given input to this process by submitting examples that exemplify the high school Core Content for mathematics assessment. Thanks go to those who worked on these examples: Lori Durham, Amy Herman, Beth Noblitt, Mike Waters, Kathy Bulmer, and Charma Leveridge. For the latest draft of the Core Content for mathematics assessment, go to the Kentucky Department of Education website:

[www.education.ky.gov/KDE/Default.htm](http://www.education.ky.gov/KDE/Default.htm).

To learn more about the new Core Content for assessment, come to our fall conference on November 5. There will be formal and informal discussion sessions about essential mathematics instruction for Kentucky students.

Respectfully yours,  
Gina Foletta  
KCTM President  
[foletta@nku.edu](mailto:foletta@nku.edu)



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### Presidential Awards for Excellence in Mathematics and Science Teaching

The White House rolled out the red carpet last week to honor the recipients of the 2004 Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST). Considered the nation's highest honor for science and math educators, this year's awards went to 95 elementary teachers. Each awardee received a \$10,000 gift from the National Science Foundation and an all expense-paid trip to Washington D.C. for a week-long celebration of events and professional development activities.

"This award recognizes the contributions that teachers make to America's legacy of progress by encouraging young people to study and understand math and science," wrote President George W. Bush in a letter to all awardees. "With a strong foundation in these critical subjects, today's students will be able to better compete and succeed in the 21st century workforce."

The 2004 Presidential Awardee for Kentucky is Cynthia Woods of Walker Elementary in Monticello, KY.

#### And Congratulations to the 2005 State Finalists:

Paula Cissell  
Beaumont Middle School  
Lexington, KY

Tracie Catlett  
Ballard High School  
Louisville, KY

Jennifer Terry  
North Oldham High School  
Goshen, KY

The 2006 Presidential Award nominations are currently open for science and math teachers in grades P-6. Public, private, and parochial school teachers can be nominated by anyone except themselves. For information about the 2006 program, or to read more about the previous winners, go to [www.paemst.org](http://www.paemst.org). Four PAEMST winners were selected to testify before the U.S. House of Representatives Science Committee.

Submitted by  
Ann Bartosh  
KDE



## Taxicab Geometry

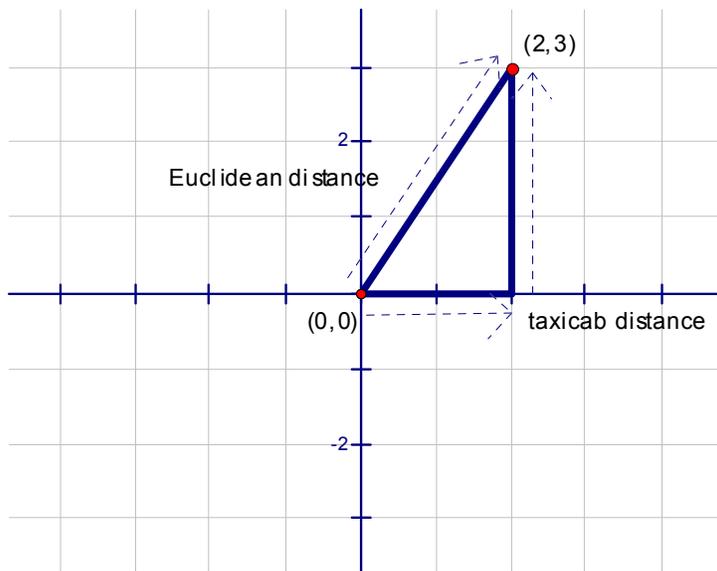


I recently gave an assignment to my Mathematics for Middle Grades Teachers class at Northern Kentucky University in which the students explore taxicab geometry. This assignment gave the students the opportunity to explore a non-Euclidean geometry in an accessible way. The students also compared this new geometry to the Euclidean geometry to which they are accustomed. I found this assignment to be a great learning experience and eye-opener for the students. Most of them had never been exposed to a non-Euclidean geometry. The project was also fun for me; for it gave me the opportunity to see my students experience new mathematics.

### Taxicab Geometry Assignment

#### Part I.

Consider the two points  $(0,0)$  and  $(2,3)$  on the Cartesian plane. If you can travel only horizontally or vertically (like a taxicab in a city where all the streets run North-South and East-West), the distance you have to travel to get from the origin to the point  $(2,3)$  is 5. This is called the taxicab distance between  $(0,0)$  and  $(2,3)$ . If, on the other hand, you travel from the origin to  $(2,3)$  in a straight line, the distance you travel is called the Euclidean distance from  $(0,0)$  to  $(2,3)$ . We often just call the Euclidean distance the distance.



Taxicab distance can be measured between any two points, whether "on a street" or not.

- On graph paper, plot the following points. Sketch the Euclidean distance from A (2,3) to the given B. Sketch the taxicab distance from A (2,3) to the given B. Find the Euclidean distance and taxicab distance from (2,3) to the following points.
  - B(7,9)
  - B(-3,8)
  - B(2,-1)
  - B(6,5.4)
  - B(-1.24,3)
  - B(-1.24, 5.4)
- Which is usually greater, taxicab or Euclidean distance? Can they be equal? If so, in what cases?
- Find a formula for the taxicab distance between two points  $P_1(x_1, y_1)$  and  $P_2(x_2, y_2)$ . Call the distance  $T(P_1, P_2)$ . The formula should work whether  $P_1$  or  $P_2$  is entered first.

## Part II.

- Find as many geoboard pegs as possible that are at a Euclidean distance 5 from (5,5)
  - Find as many geoboard pegs as possible that are at a taxicab distance 5 from (5,5).

Record your findings for parts a and b on graph paper or dot paper. You may want to use different colors for your Euclidean results and taxicab results.

- Explain why the answers to #5 b are located on what may be called a *taxi-circle*.
- The number  $\pi$  is the ratio of the circumference of a circle to its diameter. In Euclidean geometry,  $\pi = 3.14159\dots$  Find the value of *taxi- $\pi$* . Explain your process and show your work.

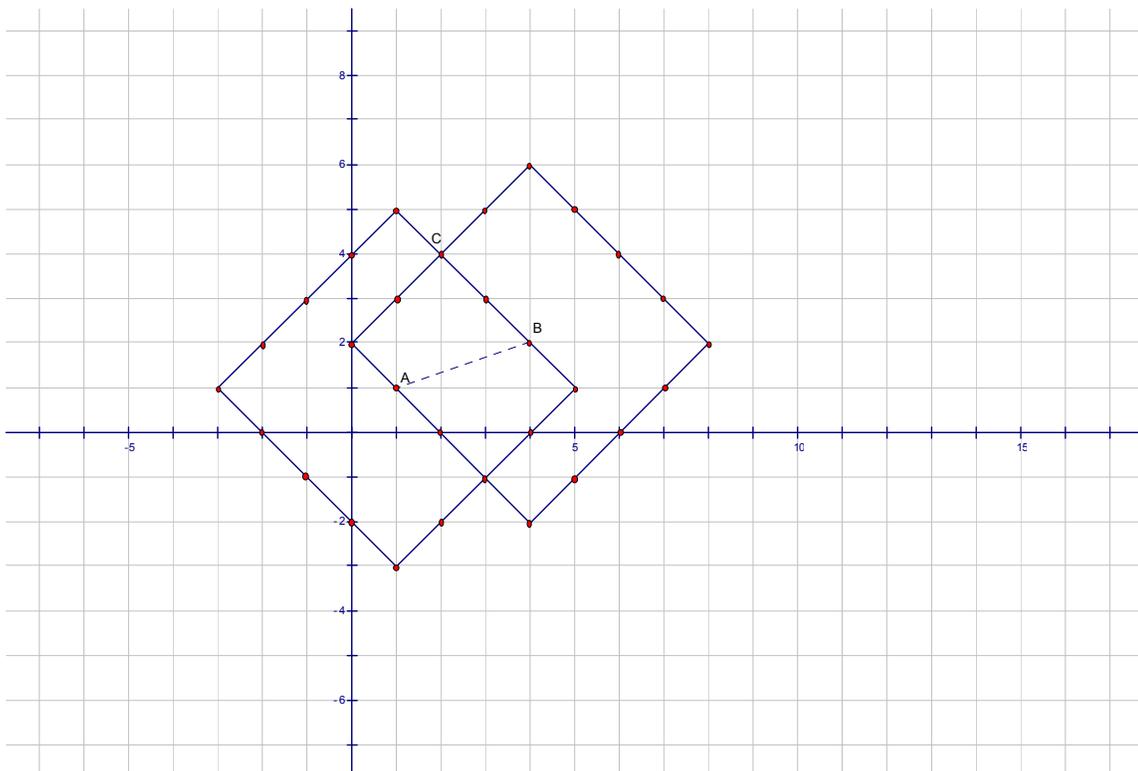
**Part III.**

6. In Euclidean geometry, for three points  $A$ ,  $B$ , and  $C$  we always have  $AB + BC \geq AC$ .

This is called the *triangle inequality*. Does this work in taxicab geometry? In other words, do we have  $T(A,B) + T(B,C) \geq T(A,C)$ ? If so, in what cases do we have equality?

**Part IV.**

7. a. If three points  $A$ ,  $B$ , and  $C$  are plotted so that, in taxicab distances  $AB = BC = CA$ , the points are said to form a *taxi-equilateral triangle*. Sketch a taxi-equilateral triangle. Explain a method you can employ to sketch taxi-equilateral triangles. Hint: The figure below may help.



- b. Sketch a taxi-equilateral triangle that is also an isosceles triangle in Euclidean geometry. Justify your work.
- c. Sketch a taxi-equilateral triangle that is also a scalene triangle in Euclidean geometry. Justify your work.

**Submitted by:**  
**Beth Noblitt**  
**KCTM Vice President - College**



**Opportunity for Your Students:  
The Carter G. Woodson Math and Science Institute  
Berea College**

The goal of the Woodson Institute is to help high school students recognize and develop their potential to excel in mathematics and the sciences and to encourage them to pursue college degrees in these fields. The institute provides an environment designed to nourish students' interests in math and science, motivate them to achieve far beyond their expectations, and support their belief in themselves and their abilities.

Students participate in a six-week summer session on the Berea College campus. They have the opportunity to live as a college student and be involved in a broad range of classes and activities, including:

- An interdisciplinary core curriculum which provides an introduction to the excitement and methodology of scientific research. Each student will be involved in one of four courses, Life Science, Physical Science, Earth and Space Science, or Creative Problem Solving in Mathematics;
- Communications technology, for student research, presentations, and independent study. Students will learn to use such technology as Internet-connected multimedia computers, graphing calculators, video cameras and editing boards, digital cameras, as well as computer modeling and desktop publishing software;
- A supportive environment in which students have opportunities, both structured and unstructured, to define their personal and cultural values and to understand and appreciate people whose lives and history are different from their own;
- A career and college planning component, and preparation for the ACT and SAT;
- Intensive career, academic, and personal counseling;
- Field trips to explore careers, post secondary opportunities, science research sites, and culturally enriching activities.

During the following academic year, Berea College staff continue to provide services for these students, in order to build on the skills developed in the summer curriculum and help students be more successful in their high school courses. Students may enroll for a second, and possibly a third, summer session before high school graduation.

Woodson Institute is funded through the U.S. Department of Education to serve students from Appalachian Kentucky. Berea College provides private funding for a small number of students, all African American, from the remainder of Kentucky and the southeastern United States.

**For more information contact:**

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 Woodson Institute  
 Berea College  
 Box 2212,  
 Berea, KY 40404

**Submitted by:**

Sara White  
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## Meet Us in St. Louis!!

at the

**NCTM 2006 Annual Meeting and Exposition, April 26-29, 2006**

where we will be

**“Asking Questions - Generating Solutions”**

- Learn** More than 1,000 presentations will help teachers better meet the needs of all students. Wednesday's program highlights the linking of research and practice, while Saturday's focus on closing the achievement gap. We hope you can attend all these days.
- Share** You can exchange ideas and build a network with colleagues from around the world. Volunteering some time and energy on a Committee is another great way to share your expertise and build this network (see online volunteer form from the NCTM website).
- Experience** You can peruse the latest products and services, and talk with the experts who produce them in the NCTM Exhibit Hall.
- Develop** You can enhance your professional development and expand your library with books and CDs from the NCTM Bookstore.
- Explore** You can follow in the footsteps of Lewis & Clark and discover the many historic sites and activities that St. Louis has to offer.

Visit [www.nctm.org/meetings/stlouis](http://www.nctm.org/meetings/stlouis) for the most up-to-date information.

***Submitted by:***

***Jane T. Barnard & Lynda M. Plymate, Publicity Co-Chairs  
 2006 NCTM Annual Conference & Exposition***

**Your HELP is Also Needed as a Volunteer!  
 NCTM 2006 Annual Meeting and Exposition  
 April 26-29, 2006**

In fact, we're going to need 600-800 volunteers to host this great professional opportunity for folks from around the country and the world. Make plans to attend and arrange your schedule so that you can volunteer some time, energy, or expertise. You can choose to volunteer for several hours, a half day, or even a full day. And to identify you as a Volunteer VIP, you will receive a distinctive T-shirt made especially for volunteers. Volunteers also pay NCTM-member rates for the meeting even if not a member. Please share this invitation to volunteer with your colleagues as well as your professional mathematics friends in other states.

You can fill out the online Volunteer Form at <http://www.nctm.org/meetings/stlouis/volform.htm>  
Please identify the committee(s) on which you would like to serve.

- **Hospitality:** Staffs the Hospitality Desk during the Annual Meeting hours; offers attendees information on and directions to local services, sites, events, facility.
- **Meeting Rooms:** Checks meeting rooms between presentations; places "Session Full" signs outside of meeting rooms; clears meeting rooms after presentation.
- **Speaker Support:** Staffs the speaker check-in support desk and welcome speakers.
- **NCTM Bookstore:** Assists staff to unpack, sort, and display NCTM materials; supports staff in assisting Bookstore customers during exhibit hours; helps box the remaining materials at the end of the meeting .
- **Publicity:** Assist at Member News Release, Press Room or to hand out the *Daily News* in the mornings.
- **Special Events:** Assist with special entertainment events.
- **Special Needs:** On-site assistance with individuals with special needs; assist with special needs equipment
- **Signs:** Arranges for presentation signs to be placed outside each meeting room and changes signs as needed.
- **Student Hosts:** Recruit and train students to work as helpers at the Annual Meeting.
- **Technology:** Staffs and assists in the Cyber Café and/or computer workshop labs.
- **Student Exhibits:** Set-up and breakdown the exhibits. Assist students during exhibit hours.



## Free Software

eSchool News had an article on this concept-mapping software. NASA and the US Dept of Defense paid for research. The software Inspiration uses similar graphic organizers. But this one is free! To access the software go to

<http://cmap.ihmc.us/download/>



## News from Affiliates

### LCTM

The Lexington Council of Teachers of Mathematics is currently taking membership for its organization. Treasurer, Carmen Rader Bowles at 701 E. Main Street, Lexington, KY 40502, is collecting membership fees of \$8. Members may attend the LCTM "March Madness" PD at no charge and will receive monthly newsletters along with the dues. Won't you join today?

The LCTM Treasurer, and noted author, Evelyn Christensen, has set up an author website at [echristensen.atspace.com](http://echristensen.atspace.com).

It is the hope of LCTM, that teachers will take a look at it sometime! Feel free to sign up for the free book drawing and to pass that opportunity on to other math teachers and friends!

Submitted by:

Natalee Mauney Feese

Fayette County Public Schools



## KCTM Board Meeting Minutes

May 14, 2005

### Members Present:

Gina Foletta

Susan Collins

Lori Durham

Ann Bartosh

Beth Noblitt

Peg Darcy

Donna Farmer

Billie Travis

Mike Waters

Maggie McGatha

### 2005 Conference Report - Maggie McGatha & Donna Farmer

Maggie encouraged the group to begin distributing the speaker forms at workshops this summer. The form is currently available on-line.

A school map and menu were passed out.

The MESA dinner will be in the Library at the school.

Possible concerns: only one computer lab will be available on Saturday and the registration location may need to be changed to the library.

Arrangements have been made for a local student organization to assist with the Friday set-up and to serve as guides on Saturday.

A computer tech person and custodian have been arranged. KCTM will be paying them their daily rate directly.

Written directions to the hotel and school will be posted on the web.

Peg has information on Event Insurance and will look into getting the insurance now.

*Will the event insurance cover the custodian and Tech Person??*

We need to be proactive finding vendors that will sell products (manipulatives, children books, t-shirts, jewelry) on site.

Vendor letters need to be sent early.

A motion was made by Peg and seconded by Billie to approve the following menus and room rates. Motion passed.

Ann will contact *Kentucky Teacher* and *Inside Kentucky Schools* about an article covering the MESA dinner.

### NCTM Delegate Assembly Report - Maggie McGatha

Two resolutions were discussed. One was concerning student registration. The second resolution allows each caucus the opportunity to send one resolution to the delegate assembly without pre-submission.

The motion passed the assembly but NCTM will still need to pass the resolution.

The Eisenhower National Clearing house is closing out their merchandise. Maggie will request free resources (post-its, pens, etc.) to distribute at the conference and MESA banquet.

Next year NCTM - St. Louis

Affiliate Leaders Conference - Denver and Atlanta this year.

#### Nominations Committee Report - Beth Noblitt

Beth has a contact list of Kentucky schools and has sent an e-mail to each school advertising for nominations. Beth will share a list of the nominations received at the August Board Meeting.

Offices accepting nominations this year are as follows: Treasurer, Vice President Elementary, and Vice President College

The appropriate VP's will be sent the appropriate contact lists for future use. Each VP is being asked to send out a speaker form to each school and advertise the conference.

#### Standing Committees Updates

##### Article VI

##### Standing Committees

##### The current by-laws:

The standing committees of KCTM shall be: (1) Committee on State High School Math Contest, (2) Committee on Junior High Math Bowl, (3) Committee on Publicity, (4) Committee on Membership, (5) Committee on Awards, (6) Committee on Nominations, (7) Committee on Conferences, and (8) Committee on Publications.

##### The proposed by-laws:

The Standing Committees of KCTM shall be: (1) Committee on Budget (2) Committee on Membership (3) Committee on Awards (4) Committee on Nominations (5) committee on Conferences and (6) Committee on Publications, both electronic and print.

A motion to accept the changes to the by-laws was made by Maggie. Seconded by Lori. Motion passed.

#### KDE Report - Ann Bartosh

House Bill 93 passed. Up to \$8 million dollars for mathematics achievement may be coming soon.

Cynthia Wood is the Presidential Awardee for this past year. In addition to a trip to Washington D.C , awardees this year also received an IPOD and a week at Disney World with their families.

9 applications were received this year for the Presidential award. This year will recognize a

teacher from grades 7-12.

The Core Content Advisory Committee will be meeting this June. They will be using the old core content but looking toward the new core content.

NASA and the Challenger Center will be bringing in a decommissioned nuclear submarine to Northern Kentucky and the Louisville Science Center inquiry week is in July.

3 Math Academies have been awarded for this summer:

Power Standards and End of Course Assessments for Algebra I, Geometry, and Algebra II have been written but are not yet available for preview.

### **KY Core Content Examples**

An Ad-hoc committee meeting has been planned for Friday, June 3<sup>rd</sup> 1:00-4:00 to write sample questions for inclusion into the new core content.

Peg made a motion to give the examples generated at the meeting board approval. Lori seconded the motion. Motion passed.

**Submitted by:**

**Susan Collins**

**KCTM Secretary**