

# POINTS AND ANGLES

Newsletter of the Metropolitan  
Mathematics Club of Chicago



Volume XLII

November 2007

No. 3

## How to Encourage Student Creativity in Mathematics

Tom Oettinger, Reinhardt College, Waleska, Georgia

BY PHIL GARTNER

On Friday, November 2, Tom Oettinger will think the unthinkable and do the impossible. He will explore in a *creative* way that you can't have a number that represents nothing ... or can you? Okay, maybe you can, but you can't have a number less than zero, right? Okay, maybe you can. He will take a historical look at how some of the mathematics we have today took creative thinkers who defied the conventional mathematical wisdom of their day. He will look at how doing the "impossible" has become possible and explore activities we can do to encourage creativity in our own classrooms. Who knows what mathematics is possible in the future that currently has not been discovered?

Tom Oettinger is an associate professor of mathematics at Reinhardt College. He taught high school mathematics for thirty-two years, was one of the developers of Georgia's new integrated high school mathematics curriculum, and is a past president of the Georgia Council of Teachers of Mathematics. He is the NCTM Affiliate Services Representative for the Southern 1 region, serves on the State School Board's K-12 Mathematics Advisory Committee, and conducts frequent teacher workshops focused on understanding and student-centered instruction.

Arrive early to get a good seat, to enjoy some camaraderie with the best math educators in the country, and to whet your appetite with some delicious appetizers compliments of Fountain Blue. Please be sure to reserve your seat(s) by the deadline. It helps Fountain Blue plan the meal preparation, staffing needed, and room set-up.

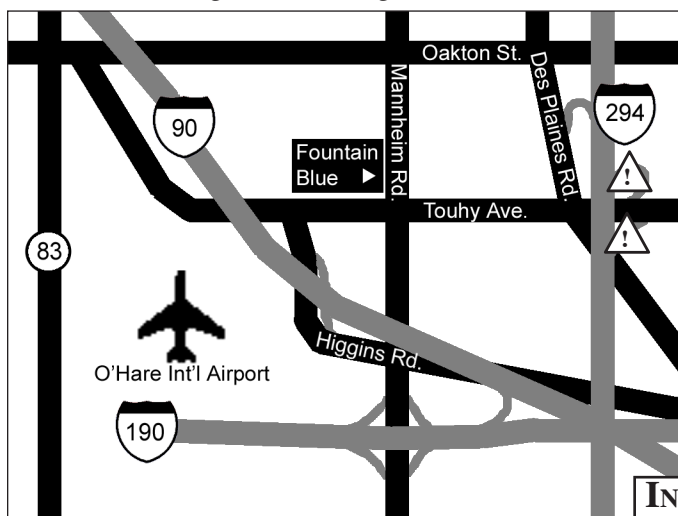
This evening will be a very enjoyable and professionally rewarding experience. You certainly do not want to miss it. We look forward to seeing you there!

**REMEMBER!!** You can earn CPDU credits for attending dinner meetings!

**Date:** Friday, November 2, 2007  
**Time:** 5:30 p.m. Doors Open  
6:00 p.m. Social Hour  
7:00 p.m. Dinner and Talk  
**Place:** Fountain Blue Banquets & Convention Center  
2300 Mannheim Rd.  
Des Plaines, IL  
(847) 298-3636  
**Cost:** Members \$31  
Nonmembers \$37

**RESERVATION DEADLINE**  
Monday, Oct 29, by noon, please!

**TO RESERVE:**  
Call 847-486-4690 or email  
reservations@mmcchicago.org  
Day or night, leave a voicemail.  
Requests for special meals *must* be made  
in advance.



For those of you who come north on I-294 to Fountain Blue, please be aware that the Touhy east and west exits will be closed for a few months. Please exit onto I-190 toward the airport and exit Mannheim Road north during construction.

**From I-294 & Eastbound I-290:**  
Exit at I-190 West to O'Hare; Exit onto North Mannheim Rd.; Take Mannheim Rd. North 2.25 miles.

**Public Transit:**  
Take the CTA Blue Line to the Rosemont Bus Terminal; Take Pace Bus #223; Exit at Touhy Ave. & Lee Rd.; Walk East on Touhy to Mannheim Rd.

**Future Meetings:**  
Dec 7, Jan 11, Feb 8,  
Mar 14 ( $\pi$ ), May 9

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# Points from the Interior

BY CONRAD WAYNE

There has been a big emphasis in recent years in using technology, getting students actively engaged in class and solving more real-life problems. I heartily agree with all three of these recommendations. However, what I've learned from teaching Methods at Chicago State is that good questioning techniques can be easily overlooked. The Methods textbook is Teaching Secondary Mathematics, 7<sup>th</sup> Ed., Pearson Prentice Hall, by Alfred S. Posamentier. After reading the section on classroom questioning techniques, I decided it was time for me, even having been a high school mathematics teacher for 36 years, to pause and think about my questioning techniques. It has also been one of my main areas of concern with my student teachers.

According to Posamentier, one of the most common traps math teachers fall into is asking "chorus response" questions. These are questions that the teacher asks, but does not direct to any particular student. This technique creates two problems: first, in a large class, if a number of

students answer at once, it is hard to understand what any one of them is saying, and second, it lets those students who do not want to answer "off the hook."

Another big issue is wait time after a question is asked before a student is called upon to answer. Posamentier refers to a study done by Mary Budd, a leading researcher in teachers' questioning techniques. She found that most teachers wait less than one second for a response. Her study also found that those teachers who waited at least three seconds were rewarded with more thoughtful responses, increased classroom discussion and more in depth analysis of the problem. If you are going to call on a student, use the following technique: ask the question, pause at least three seconds, and then call on a specific student. Avoid calling a student's name first, as this also lets the rest of the students "off the hook."

There is not time to give an in depth summary of all of Posamentier's suggestions on questioning techniques, but he does list ten types of questions to avoid. I realize I was (and still am) most guilty of what he calls "wrap around questions"—questions such as "The slope of this  
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**June 28–29, 2008**

More information and speaker proposals  
 coming soon to [HTTP://MEECAS.ORG](http://MEECAS.ORG)

## POINTS AND ANGLES

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## Points

CONTINUED FROM PAGE 2

line is what...?”. This type of question has the students thinking the teacher is making a statement of fact until the end of the sentence when, in fact, the teacher is posing a question.

While this column addresses an issue that teachers in all disciplines should be concerned with, I highly recommend this book as a good refresher for experienced mathematics teachers as well as an excellent text for a methods course in teaching high school mathematics. There are eight major units, most of which deal directly with the teaching of mathematics. The second half of the book has 125 different enrichment activities for grades 9–12 mathematics classes. All the details for implementation are included.

One calendar note: January 26, 2008 is the date of the upcoming MMC Conference of Workshops at Lemont High School. Watch for the program booklets which will be mailed to members in early November, as well as be available on line. Remember that you *must* pre-register by the announced deadline in December.

## MMC Problems November, 2007

BY MICHAEL KEYTON

Last month seemed to have sparked some hidden desires to solve problems from several of you. I received several excellent solutions to the first problem. I debated about generalizing the second problem but rejected the idea. Those who wrote me noted that it was quite easy. I'll see if I can redeem myself this month. Algebraic substitutions that seemingly complicate the problem can paradoxically render it simpler. The first problem is the easier one this time just to get started.

1. Solve in the real numbers:

$$\sqrt[4]{1-x} + \sqrt[4]{15+x} = 2$$

2. Solve in the real numbers:

$$\sqrt{\frac{\sqrt{x^2+784+x}}{x}} - \sqrt{x\sqrt{x^2+784-x^2}} = 3$$

### MMC Membership and Change of Address Form

**Mail to:** MMC  
415 S. Ridgeland Ave. #2  
Oak Park, IL 60302

*Make check payable to MMC.*

*Please use a different form for each person.*

**Name** \_\_\_\_\_

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**Phone** \_\_\_\_\_

**School** \_\_\_\_\_

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*Check preferred mailing address above.*

**Change of Address**

**Membership:**     New     Renewal

Choose one:

1 year                      (\$20)                      \_\_\_\_\_

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**Electronic-Only Membership**    *You will receive an email with a direct link to each issue of Points and Angles when it is posted on the web site, often before paper copies are mailed. You will no longer receive Points and Angles by mail.*

## NOTICES & REMINDERS

### Upcoming MMC Events

Friday, November 2<sup>nd</sup>—Tom Oettinger  
**How To Encourage Student  
 Creativity in Mathematics**

Friday, December 7<sup>th</sup>—Jerry Cummins  
**The Past and Future of Mathematics Teaching:  
 Where Have We Been? Where Are We Going?**

Friday, January 11<sup>th</sup>—P.J. Karafiol  
**Exploring Complex Numbers  
 with CAS and Sketchpad**

Saturday, January 26<sup>th</sup>—Lemont High School  
**Conference of Workshops**

Friday, February 8<sup>th</sup>—Michael Keyton  
**The Mystery In Geometry**

Friday, March 14<sup>th</sup> ( $\pi$ )—David Thiel  
**The Mathematics of Las Vegas**

Friday, May 9<sup>th</sup>—Zalman Usiskin  
**Are You Still Teaching  
 Your Grandma's Geometry?**

[HTTP://WWW.MMCCHICAGO.ORG/](http://www.mmcchicago.org/)

Old issues of POINTS AND ANGLES, summaries of talks given at MMC meetings, the MMC Scholarship application, hints and answers for the MMC problems, and more!

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### MATH EDUCATORS EXPLORING COMPUTER ALGEBRA SYSTEMS

#### Upcoming Meetings

November 17<sup>th</sup>—Improving Teaching & Learning of Algebra

February 2<sup>nd</sup>—The Transition to CAS

April 19<sup>th</sup>—Rich Problems Made Richer with CAS

All meetings will be held at York High School,  
 355 W St. Charles Road, Elmhurst. If you plan to attend a  
 meeting, please let us know at [dhall@elmhurst205.org](mailto:dhall@elmhurst205.org)  
 Technology will be available at all meetings for your use.

[HTTP://WWW.MEECAS.ORG/](http://www.meeecas.org/)

  
 (see page 2)

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If you would like a notice or reminder to appear in POINTS AND ANGLES, please email the text you would like to appear to [ilg@chicagomath.org](mailto:ilg@chicagomath.org) no later than the date of the MMC meeting preceding the issue in which you would like it to appear. All notices are subject to editing.

*Your membership renewal date appears in the upper right corner of the label.*

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