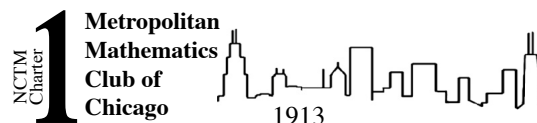


# POINTS AND ANGLES

Newsletter of the Metropolitan  
Mathematics Club of Chicago



Volume XXXVII

January 2003

No. 5

## Good Things Happen When You Do The Math Right

Richard Rukin, Evanston Township High School

BY SIMONETTE URBAIN

Let us as mathematics educators begin the New Year with a resolution: we promise to teach our students to do the math right. Rich Rukin firmly believes that by paying attention to correct detail, proper language, and thinking long term we can help students learn better and retain their learning better. As Albert Einstein once said, "Everything should be made as simple as possible, but no simpler." Rich believes that we should heed the words of Einstein. As teachers we often try to make things simpler and easier in the short run which often has unintended consequences down the road.

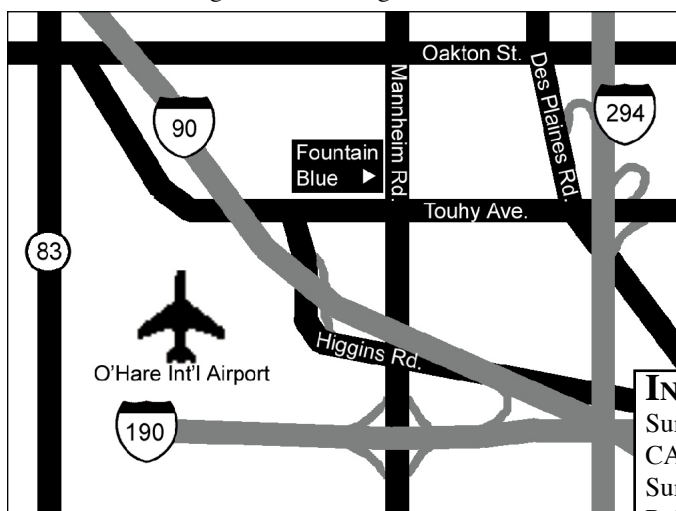
Rich Rukin has been teaching mathematics at Evanston Township High School since 1976 and has coached the math team since its inception in 1977. Rich was the head coach of the Chicago Area All-Star Team from 1980 to 1990 and has authored math contests for several organizations and math leagues. Rich has received many accolades: he has won the Edyth May Sliffe award twice, the Alfred Kalfus Founder's award, and Evanston Township High School teacher excellence award. He received his undergraduate degree from Northwestern and his MA from Northeastern Illinois University. Rich has also been very active in the mathematics community as a speaker and workshop leader for ICTM and NCTM. He also co-authored three textbooks for McDougal-Littell.

Rich Rukin is certainly one of our very own. He has been an MMC member since 1976 and served as a board member for 12 years. Please join us as Rich Rukin shares with us his experiences and insights on how good things can happen when you do math right.

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

**Date:** Friday, January 17, 2003  
**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 \$29  
Nonmembers \$35

**RESERVATION DEADLINE**  
Friday, January 10, by noon, please!  
**TO RESERVE:**  
Call 847-295-1068 or  
email bowlerjp1234@msn.com  
(Pat Bowler-Johnson)  
Day or night, leave a message on machine.



**From Southbound I-294 &  
Eastbound I-290:**

Exit at I-190 East to O'Hare; Exit onto  
North Mannheim Rd.; Take Mannheim  
Rd. North 2.25 miles.

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**Public Transit:**

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Bus Terminal; Take Pace Bus #223; Exit  
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Touhy to Mannheim Rd.

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### Future Meetings:

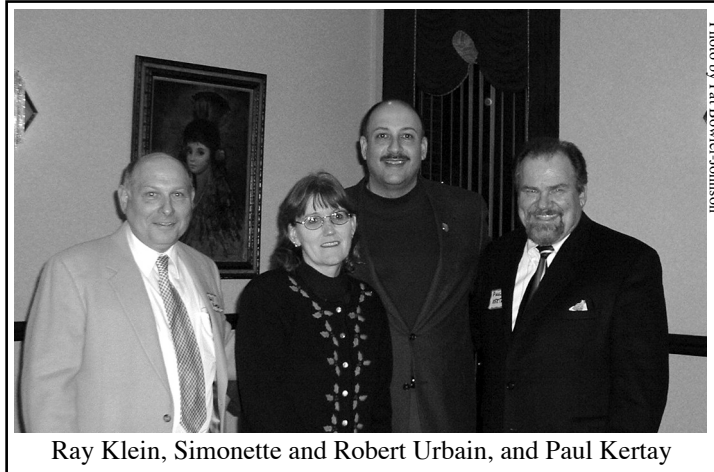
February 7, March 14 ( $\pi$  day), May 9

# The TI-89, CAS, and Algebra 1: Do They Fit?

Ray Klein and Paul Kertay, Glenbard West High School

BY BILL ROLOFF

On December 13, 2002 we had Ray Klein and Paul Kertay talking to us about their experiences using the TI-89 with their Algebra 1 classes at Glenbard West High School. They started with explaining why they have done this. First, algebra is much more than simply pushing symbols around. Using a CAS allows students to explore with deeper meaning just what they are doing when they learn algebra. Their second reason for using the TI-89 comes from the NCTM principles that technology is essential in teaching and learning mathematics, and that students must learn math with understanding. Paul and Ray are interested in technology empowered learning. They



Ray Klein, Simonette and Robert Urbain, and Paul Kertay

Photo by Pat Bowler-Johnson

do not use the calculator to replace thinking by their students. Their actions are supported by research undertaken by Bernhard Kunstler from Austria and Ian Forbes from Scotland. In addition, in the November Math Teacher, an article cites research that says that the computation skills of students does not go down with the use of computer algebra systems. Using a CAS with algebra students leads to an increase in higher thinking skills and applications. This leads to their third reason: now that

we have hand-held CAS machines, it is time to meet the challenge they pose to us head-on. The CAS is not going to go away. Paul and Ray believe that hand-held CAS machines are the next step in the evolution of teaching math. They stressed that we must be careful to not misuse CAS—that technology must be used appropriately, and that if schools do use CAS machines, they must use them throughout their curriculum.

A number of teachers from Glenbard West and their feeder schools came together for a week in the summer of 2001 to learn the power of the TI-89 and to plan how to adjust their curriculum in order to best utilize the power of these calculators. They wanted to use the calculator to pose “what if” and “why did that happen” questions to their students. They also wanted to use the calculators to develop the problem solving skills and higher order thinking skills of their students.

SEE TI-89 CAS, PAGE 3

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## POINTS AND ANGLES

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Points and Angles is the official publication of the Metropolitan Mathematics Club of Chicago. Founded in 1913, the Metropolitan Mathematics Club is the National Council of Teachers of Mathematics' first affiliate.

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## TI-89 CAS

CONTINUED FROM PAGE 2

They wanted their students to learn concepts numerically, graphically and symbolically. They also found they needed to rethink how they taught and assessed their students.

That summer, the group of teachers developed worksheets that have three parts. The first part is simply a number of problems that the students will enter into their calculator, solve, and write the answer. The second part asks the students to write out several sentences explaining what the calculator was doing to solve those problems. Finally, the back side of the worksheet had practice problems for the students to do without the calculator. For example, if students are learning to expand binomials, the idea is that they will learn the pattern for themselves by seeing what the CAS returns for the answer. They then have to explain it in their own words, then practice what they learned on their own. They have found that this approach gives them more time to explore other topics that are often left out of the algebra 1 curriculum.

Paul and Ray make heavy use of the Symbolic Math Guide, a TI-89 application you can download at <http://education.ti.com/us/product/tech/89/apps/appslst.html>. The SMG allows students to solve equations as they would if they were solving them on paper, but it shows students when they made a mistake, and allows them to go back and correct it. They demonstrated how one could use the SMG to solve  $3x+9=19$ . The students need to tell the calculator exactly what they want it to do. After each step is completed, students can either continue with the next step, or go back and make corrections.

If you are interested in learning more about the use of a CAS in your own classroom, there will be a meeting of SEECAS (Secondary Educators Exploring Computer Algebra Systems) on January 11, 2003 at 9:00 am at Glenbrook South High School in Glenview. On June 21 & 22, 2003, there will be a USACAS conference, also at Glenbrook South. Paul and Ray may be contacted at [paul\\_kertay@glenbard.org](mailto:paul_kertay@glenbard.org) and at [raymond\\_klein@glenbard.org](mailto:raymond_klein@glenbard.org).

Thanks to Ray Klein and Paul Kertay for an interesting and thoughtful evening!

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*MMC would like to thank Ray Klein and Paul Kertay for generously donating their honorarium to the scholarship fund.*

## Chicago Area AP Statistics (CAPS)

presents

a Workshop for Teachers

on the Morning of February 8

at the Oak Brook Marriott

## Was Pinkerton Right?

Chris Olsen,

George Washington High School,  
Cedar Rapids, IA

In the latter half of 1861, a “phony war” took place in Washington and Virginia. Three individuals with Illinois connections, Abraham Lincoln, Allan Pinkerton, and George McClellan—President, Soldier, Spy—had significant roles in the American Civil War. The Soldier and the Spy became involved in the task of espionage, estimating Rebel troop strength in Virginia. The resulting severe overestimation of Confederate strength and resulting failure of McClellan to press the War to an early conclusion is regarded as one of the most spectacular intelligence failures of the War.

The historical blame for the overestimation falls variously on Pinkerton (who, the story goes, was incompetent as a spy) and/or McClellan (who, the story goes, should have recognized that Pinkerton was incompetent). A statistical data analysis of primary sources, however, presents a different picture of Pinkerton’s espionage efforts. Using McClellan’s wartime papers from the Library of Congress, as well as data from surviving Confederate muster rolls, Pinkerton’s estimation methodology can be reconstructed and his “failures” reevaluated.

For more information or to register,  
contact Stephanie Casey at  
[SCasey@d113.lake.k12.il.us](mailto:SCasey@d113.lake.k12.il.us)

## Editor's Notes

It has been reported that a number of members were receiving their issues of Points and Angles specially packaged by the US Postal Service after some machine-handling issues caused damage. In response, the address space on the back of each issue has now been rotated so that the folded edge will feed through the machine,

reducing the likelihood of future issues being damaged. If you have any problems with the condition of this or any future issue, please send an email to greenspani@eths.k12.il.us

Also, as a printing error disorganized the summary of the November talk, it appears below in its entirety.

# Making Sense of Mathematics

Randall Charles, San Jose State University

BY HARLAN GOLDBERG

The pre-dessert conversation at our table was strange.

It went something like this:

“Who’s talking tonight?”

“Randy Charles. Can you please pass the sugar?”

“Who?”

“Randy Charles. He’s a major league player in the problem-solving field. Cream, please.”

“What’s his topic?”

“I don’t know! Is there any decaf left?”

“He’s big into Abbott and Costello.”

“Why?”

While I was trying to make sense out of this conversation, Randy began to speak, and immediately answered the previous question: Abbott and Costello can help drive home the point of how important it is to “keep the compass focused on sense making...”

“Because?”

He continued, “...if math can make sense to our students (and teachers!), then everything else, i.e., understanding, will fall in place.”

What followed was a presentation that could help contribute to the elimination of the “I don’t give a darn” attitude that some people have towards math.

Randy’s message about how to make sense of math comes with three basic recommendations:

- **Emphasize representation and connections.**

Certainly Bud Abbott and Lou Costello have different ideas of what borrowing, loaning and owing means (from the “Buck Privates” video). The connections were short-circuited—maybe Lou should have drawn a picture to help him see why he was out \$40!

Randy elaborated that if a picture or diagram is what makes sense to students, then why not present concepts in that fashion if it will facilitate understanding. He followed with an example involving the formation of an equation that expresses the relation between feet and yards, a concept confusing to students and some teachers alike. A simple diagram (representation) allowing for the formulation of a pattern can ultimately lead to an

algebraic connection. Algebra does not have to be, as one student claimed, “the intense study of the last three letters of the alphabet!”

- **Start with what makes sense to kids.**

In another video, it certainly was obvious that Lou’s concept of dividing 28 by 7 didn’t match Bud’s idea of division, even though Lou was not only able to show why  $28 \div 7 = 13$ , but also check it by showing  $13 \times 7 = 28$ . Maybe, if Bud had just drawn a picture... What makes sense can help develop the idea, and the understanding of the concept will follow.

- **Each day, articulate the skills and understanding you want the kids to have.**

Bud poses a situation: Lou is 40 years old and in love with a 10 year old girl—he’s four times her age. In 5 years he’d be only three times her age and in 20 years he’d be only twice her age! Lou is worried—“If I wait much longer she’ll pass me up!” Clearly, there’s an “age-old” skill missing here.

Whether a primary student needs to divide with fractions or an algebra student needs to interpret slope, if a diagram helps make sense and paves the way to understanding, then use it! The math must be taught for understanding, so it is not enough to just teach the skills.

*We cannot teach math for understanding unless we understand the math we are teaching!*

Randy’s hope for us today is that we catch on to his message and that we can start pitching it in our classrooms tomorrow.

Overhead at the table:

“So, what’s Randy’s message?”

“That all kids can make sense of mathematics, naturally.”

“Naturally?”

“Naturally!”

“ALL kids can make sense of mathematics.”

“Now, *you’re* making sense!”

# Points from the Interior

BY PAT BOWLER-JOHNSON

With the start of 2003, most of us will make at least one New Year's resolution. For some of us, our resolutions focus on improving our physical selves—resolving to run, lift weights, or stretch. There are, however, other “exercises” that we could do to provide a feeling of contentment. Exercising your mind to attain a healthier life and a healthier attitude is just as important as physical exercise. Take some moments for tranquil thought, get some extra hours of sleep, or read a book or an article. Watch a movie or explore a topic that has always interested you. We all need to explore the world around us to broaden our horizons.

One of my resolutions is to explore the use of Computer Algebra Systems in the classroom. With our ever-changing world of technology, we are always confronted with new ways in which these components will impact the field of mathematics. I hope that one of your resolutions will be to continue to explore technology and its impact on our profession.

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**Bring a colleague who has never been to MMC before and get a discount!**

**\$5 off a non-member dinner**

— OR —

**\$7 off a member dinner with purchase of a new membership**

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Valid only at the MMC Meetings on January 17, February 7, March 14 (π day), and May 9

Expires May, 2003. Limit one (1) coupon per member.

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Evanston, IL 60202

*Make check payable to MMC.*

*Please use a different form for each person.*

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**Membership:**     New                     Renewal

Choose one:

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2 year                                    (\$35)                    \_\_\_\_\_

3 year                                    (\$50)                    \_\_\_\_\_

1<sup>st</sup> year teacher                    } (\$10)                    \_\_\_\_\_

retired                                    }

student                                    }

**Donations:**

Scholarship Fund                    \_\_\_\_\_

Speaker Fund                                    \_\_\_\_\_

**Total amount of check:** \_\_\_\_\_

*Check preferred mailing address above.*

**Change of Address**

If you have any questions, e-mail  
wiltjerm@eths.k12.il.us

## NOTICES & REMINDERS

### MMC Scholarship

The Metropolitan Mathematics Club of Chicago is offering \$1,000 in scholarships for high school students who plan a career in the teaching of mathematics. The selected students, their parents and their sponsoring teachers will also be invited to the May MMC meeting at which time the scholarship recipients will be honored.

Details on the scholarship, as well as the scholarship application form, can be found on the MMC website:

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

**Application Deadline: March 17, 2003**

If you would like a notice or reminder to appear in Points and Angles, please email the text you would like to appear to [greenspani@eths.k12.il.us](mailto:greenspani@eths.k12.il.us) no later than the date of the MMC meeting preceding the issue in which you would like it to appear.

### Speakers Wanted

### ICTM 2003

Interested in speaking at ICTM 2003  
in Chicago at the Palmer House Hilton?

Contact Bob & Simonette Urbain  
at [ictm2003@aol.com](mailto:ictm2003@aol.com)

### THE 2003 CHICAGO AREA ALL-STAR MATH TEAM TRYOUTS

Thursday, February 27, 2003, 4 – 10 pm (with a dinner break) at Evanston Township High School

For more information (including new D-Team information), see <http://www.trica.com/caasmt/>

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

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