

POINTS AND ANGLES

Newsletter of the Metropolitan
Mathematics Club of Chicago



Volume XLII

June 2008

No. 9

The End of High School Math As We Know It

Cathy Seeley, University of Texas at Austin

By PHIL GARTNER

MMC is very pleased to have Cathy Seeley, former President of the National Council of Teachers of Mathematics, kick off our 2008-09 program of speakers. Cathy will explore what it would take to transform the teaching of high school mathematics in every classroom? She will build from elementary and middle school mathematics to create a coherent K-12 math program.

Cathy Seeley has worked for over 35 years in K-12 education as a mathematics teacher, district mathematics coordinator, and state mathematics supervisor. After her return from two years of teaching mathematics (in French) as a Peace Corps volunteer in Burkina Faso from 1999 through 2001, Dr. Seeley was elected to serve a two-year term as President of NCTM, serving from 2004 through 2006. Currently, Cathy Seeley is a senior fellow with the Charles A. Dana Center at the University of Texas, working on state and national policy issues related to school mathematics.

Give yourself a great jump-start into the new school year and enjoy a thought-provoking exploration of what high school mathematics could be. As any of you who have seen Dr. Seeley speak before, she is an outstanding and entertaining presenter.

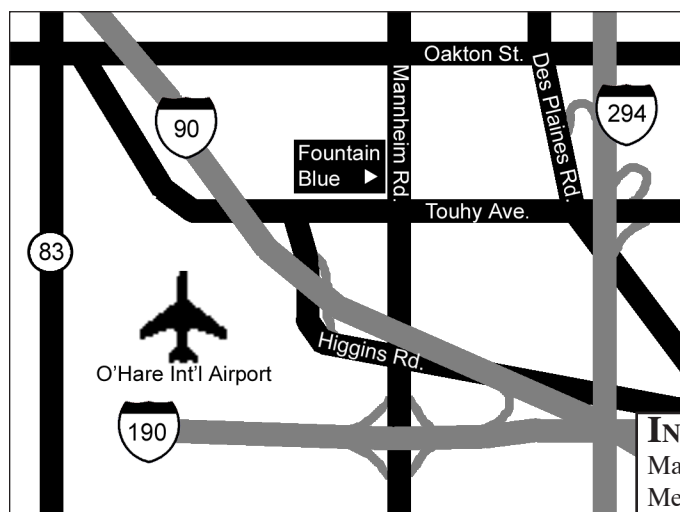
Let's have a great opening turnout and give her a warm Chicago welcome! This will be a fantastic start for what promises to be a very captivating and enjoyable series of speakers this year.

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

Date: Friday, September 5, 2008
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

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Zalman Usiskin on the National Mathematics Advisory Panel Report: Will You Be Teaching Your Great-Grandmother's Algebra?

BY JENNY WEXLER

In his 22nd presentation to MMC, Dr. Zalman Usiskin discussed the report of the National Math Advisory Panel entitled "Foundations for Success." The panel's charge was to examine ways to use research-based methods in teaching with a focus on algebra.

The report lists 45 recommendations, some of which are obvious, such as the need for good teachers. But many of the report's claims are not so obvious and are factually incorrect.

The panel's claims include: math is needed for national prosperity; math is a gatekeeper for college; more math leads to increased earnings; mathematical thinking provides adaptability (Usiskin's comment: "they didn't have my math teacher"); algebra is a gateway to success; low NAEP scores and poor showings on international comparisons result in lots of college remediation; there

is an achievement gap; and, for most of the 20th century, U.S. math was peerless in the broad population and in specific fields such as engineering.

Dr. Usiskin examined these claims by looking at actual data. First, the claim that the U.S. has been peerless in math. The implication is that we were doing great and then suddenly got worse. In 1964-1965, the FIMS study showed that U.S. 13-year olds were behind nine countries and ahead of only one, while 17-year olds were last. In 1981-1982, the SIMS report (with more countries involved) showed the U.S. in the lower middle for 13-year olds and again at the bottom for 17-year olds. This is not an indication of the peerless performance the panel claims existed.

How about the implication that things are getting worse? From 1971 to 2004, the data from a test of Basic Skills shows an increase of 2 years for 9 year olds, while 13-year olds are doing better and 17 year olds are doing about the same. There's no support there for the claim that things just got worse. The 8th grade NAEP scores are up from 1990 to 2008. There's no support there for the idea that things have gotten worse.

The committee suggests that NCTM and such organizations and innovations such as teaching for understanding and use of graphing calculators have hurt math achievement; but now the panel will help improve achievement. Again, the data shows this is not true. The SAT Math scores from 1950 to 2007 show a peak about 1960 when new math was most popular, then a decline

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POINTS AND ANGLES

Volume XLII, Number 9, June 2008

Points and Angles, published nine times per school year, 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. The official club website: [HTTP://WWW.MMCCHICAGO.ORG/](http://www.mmcchicago.org/)

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On Increasing Membership Dues

BY MARY WILTJER

As costs have increased for everyone, MMC has found that it is not excluded from inflation. To continue to offer great programs and opportunities to our members while covering expenses, the MMC Board has approved a change in the cost of membership. A standard one-year membership now costs \$27 (with discounted prices for purchasing two or three years at a time of \$50 and \$70 respectively). The retired membership cost is now \$20 a year, and the first-year teacher membership cost is \$15. A student membership is also \$15, but it will only be given as an electronic membership. Having discussed the options, the MMC Board felt that this was a necessary change. We know no one likes price hikes, but this is the first increase in membership dues in 12 years.

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during which time testing became big and which was followed by more of a decline. SAT scores started to increase in the late 1980's and early 1990's. This is just a few years after the NCTM Standards were published. Again, the results don't show things were great until just recently. Also, they don't support the notion that the NCTM Standards have resulted in a decline in mathematical performance.

Let's look at the claim that the economy depends on math performance. The data shows otherwise. The U.S. economy was extremely strong throughout the 1950's and 1960's but, as noted above, the math performance was poor. The current economy is doing badly but math performance is up. There appears to be no connection in the data.

Another claim was that students are doing worse because large numbers of college students need remedial math (which some colleges take to mean needing course-work before calculus). Note that many more students are attending college than used to attend, and often these additional students (who would not have attended college 50 years ago) are adding to the need or remedial math in college. The same applies in high school. In 1982, 24%

Board Report Meeting of 18 May 2008

BY STEVE VIKTORA

The Board of Directors met on 18 May 2008.

Mary Wiltjer reported a club membership of 548, of whom 58 are students, 48 are retired, 13 are first-year teachers, and 20 are e-members.

At the previous Board meeting Ron Vavrinek reported that the club is financially secure, but some financial issues need to be addressed. In order to improve the financial condition of the organization, the Board decided to increase dues to \$15 for first-year and student members, \$20 for retired members, \$27 for a one-year membership, \$50 for a two-year membership, and \$70 for a three-year membership.

Phil Gartner presented the completed schedule of speakers for next year.

Carol Nenne and Mary Wiltjer announced that the MMC Conference of Workshops will be held 28 January 2009 at the University of Chicago Lab School. They both appealed for speakers to send in proposals.

The Board also decided to broaden the scope of its professional development activities. The plan is to have the Mathematics and Technology Institutes become another series of conferences that will be available through MMC to improve mathematics teaching and learning.

The next meeting of the Board is scheduled for 24 August 2008 at a private home at 4:00 PM. Members of the club are welcome to attend any Board meeting, but please contact Phil Gartner at pgartner@glenbrook.k12.il.us before 17 August if you plan to attend. Because this is a dinner meeting, you would be expected to pay for your meal.

of students didn't take algebra; in 2004 only 5% didn't take algebra. The calculus enrollment went from 10.2% to 33% in the same time frame. What we have is more students going further in math than ever before. When long-time teachers say the students they have aren't as good as before, or not as well-prepared, they're right—the population in algebra, geometry, advanced algebra, and so on includes more students who would never have

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been there before. But these students are there now.

There is good data from the Ohio State Placement Exam showing how well students are prepared. In 1986 only about 10% of the students were placed in calculus. This was before graphing calculators were widely used, so you can't blame them. Actually, the first graphing calculator was introduced by Casio in 1985, but very few were out there by 1986.

There has also been a big increase in two-year college math enrollment. This adds to the numbers showing an increase in remedial math.

The TIMSS report showed that 55% of 12th graders in the U.S. worked 3 hours or more on a typical school day [reported in the New York Times]. In the report "Democracy at Risk," they note that since the U.S. doesn't pay for college, grants have been cut, and loans are more expensive with higher interest, the U.S. has dropped from 1st to 14th in college attendance.

One note of the Panel's report can't be disputed and that is the achievement gap between white and Asian students compared to African-American and Hispanic students. Still, it should be noted that while the performance of all the groups has improved, the gap still exists.

The report discusses the body of material in high school algebra without regard to level, grade, method of organization, and so on. All the topics they list are "old" topics, such as algebra of polynomials, except for fitting models to data. Usiskin noted that their list could have been the algebra course of a century or more ago. Their list for calculus is the list from 50 years ago. They don't even address the workplace and the math needed there.

Lynn Steen in the *Mathematics Teacher* in 2007 noted that we shouldn't only do the math required for calculus, which is what the old algebra did.

There have been five major changes in school algebra over the past half-century. First, skills in mathematical systems (e.g. properties) came in with the new math. The panel didn't seem to like new math, but they seemed to like the teaching of properties.

Second, there has been increasing use of algebra in geometry and increasing use of geometry in algebra. The panel ignores this phenomenon entirely. They also ignore some topics entirely, such as matrices.

A third major change is in graphing technology.

We can deal with functions we never even considered before. The panel only discusses what can be done without calculators.

Fourth, there is now use of data, real-world situations, and modeling. More use of data of more different types is used than ever.

Fifth, there is increasing use of Computer Algebra Systems (CAS). This not yet widespread in the U.S., but it's coming as more schools and students have more access to more technology. Some other countries are using more CAS than the U.S.

The panel leaves out many things. There is no mention of matrices. Statistics and Quantitative Literacy aren't there (except for one mention of "data"). There's nothing about standard deviation, intervals, etc.

The report says that real-world applications has helped students learn about applications, but have not helped students learn basic skills better. Usiskin noted this is not the purpose of doing real problems. The goal of algebra can't be the same now that we are teaching algebra to virtually everyone as it was when algebra was only taught to some.

The panel only mentions what students should know of algebra, not what they can do with algebra. They didn't look for applications. They didn't mention technology, except for a mention of computer-assisted instruction and programming.

They claim that calculators impede automatic skills and hurt computation. Usiskin pointed out that this is way out of date. They ignore studies, they ignore the need for a technological workforce, and they ignore the ACT and SAT. They also don't mention writing at all.

Usiskin pointed out that while there are things to agree with in the panel's recommendations, such as more algebra in 8th grade, there is much to disagree with. For example, they want to change the National Assessment. Of course, we don't know what will happen to this document. It may disappear (like many things that happen in the last year of a president's term). It could have some effect on textbooks if states decide to make use of the report.

Zalman Usiskin's first talk to MMC was in 1969. He has been giving talks to MMC every other year since 1982. He showed us in May 2008 that he still is on top of his form. We thank him for another interesting and incredibly informative presentation.



Attend the FIFTH U.S. Conference on CAS in Secondary Mathematics

Come explore the future of mathematics education!

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- Get classroom tested ideas developed for CAS-enhanced classrooms.
- Learn what other countries are doing with CAS.
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Details, on-line registration, and hotel information available at <http://meecas.org/>. For more information, contact Ilene Hamilton at ihamilton@district125.k12.il.us, Dan Hall at dhall@elmhurst205.org, or Pat Bowler-Johnson at bowlerjp@newtrier.k12.il.us.

Organized by MEECAS (Mathematics Educators Exploring Computer Algebra Systems).



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T³ Regional Conference

June 26 – 27, 2008

Lincoln-Way Central High School, New Lenox

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June 28 – 29, 2008

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MMC Conference of Workshops 2009

Saturday, January 24th at The University of Chicago Laboratory Schools

Upcoming MMC Dinner Meetings

Friday, September 5th—Cathy Seeley

The End of High School Math As We Know It

Friday, October 3rd—Steve West

Discovering Theorems using Cabri 3-D

Friday, November 7th—Ron Lancaster

**Mozart's Dice Game and Other
Beautiful Connections between
Probability, Music, Art, and Drama**

Friday, December 12th—Angela Andrews

**Focusing on the Big Ideas in Mathematics—
Right from the Beginning**

Friday, January 9th—John Diehl

***e, i, 2π, oh!* Come Explore What these
Numbers Can Do**

Friday, February 6th—Tony Peressini

**Comparing Solutions of
the Paper Roll Problem**

Friday, March 13th—Claran Einfeldt

A Math Cursed Life

Friday, May 8th—Nick Jackiw

**Using the Newest (Yet-to-be-Released!) Version
of Geometer's Sketchpad to Improve Learning**

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

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