

POINTS AND ANGLES

Newsletter of the Metropolitan
Mathematics Club of Chicago

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Club of
Chicago



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The Current State of School Mathematics

Zalman Usiskin

By RICH RUKIN

School mathematics in the United States is in a unique era. The No Child Left Behind act has increased the amount of testing of children to unprecedented levels. There exist perhaps a greater number of substantially different curricula published commercially than ever before. More powerful and less expensive technology continues to dazzle and tease us with its potential for engaging and heightening student learning. Some algebra is being taught at earlier and earlier grades and there continues to be a push for students to know more statistics. This talk tries to make sense out of all this, separating the rational from the irrational, the positive from the negative.

Zalman Usiskin is professor of education at the University of Chicago and director of the University of Chicago School Mathematics Project. He is interested in all aspects of mathematics education, with particular emphasis on matters related to curriculum, instruction, and testing; international mathematics education; the history of mathematics education; and educational policy. He is currently directing the development of the 3rd edition of the UCSMP curriculum for middle schools and high schools. He is one of the principle investigators in the NSF-supported Center for the Study of Mathematics Curriculum and a member of two committees of the Mathematics Association of American that deal with the preparation of teachers. He received the Max Beberman Award from ICTM in 1981, the Glenn Gilbert National Leadership Award from the National Council of Supervisors of Mathematics in 1994 and a Lifetime Achievement Award from the NCTM in 2001. He was a member of the MMC Board of Directors from 1970 to 1973 and in 1984 received the first MMC Distinguished Life Member Award ever given. Since 1982 he has been invited to speak at the May MMC meeting of each even-numbered year. This meeting marks the 20th time he has been invited to speak at MMC and the 21st time he has spoken – one time he gave a talk on the spur of the moment when the speaker did not show.

The Wright Group/McGraw-Hill is sponsoring wine for the meeting.

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

Date: Friday, May 5, 2006
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, May 1st, by noon, please!
To RESERVE:
Call Evanston Math Department at
(847) 424-7600 or
email: reservations@mmcchicago.org
Requests for special meals must be made
in advance.



From Southbound 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.
From Northbound I-294:
Exit at West Touhy Ave.; Take Touhy Ave. to
Mannheim Rd.; Turn right on Mannheim Rd.
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.

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Points from the Interior

BY JOHN DIEHL

Greetings! I hope you will be able to attend our May 5 meeting. Once again, our own Zal Usiskin presents an informative and entertaining talk on The Current State of School Mathematics. More details are available in another article.

It is often said that the passage of time is relative. It seems to take a long time for Christmas to arrive when you are a young child, much less as an adult. Some people claim that it is simply because one year represents 1/7 of your entire life when you are 7, but 1/70 of your life when you are 70. Similarly, the hours seem to pass quickly during an enjoyable pastime, but very slowly during an unpleasant task.

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John McConnell Conference Treasurer	North Park University	2005-2006

I can say this for certainty – the past year as MMC president has passed very, very quickly. (I know, some of you will suggest that maybe I'm very very old!) Seriously, it has been a privilege to be in the position. I hope you have enjoyed our program and meals.

The monthly meetings, Saturday workshop, and other MMC activities cannot happen without the efforts of many dedicated persons and I would like to say thank you to all of them.

Thanks to our past-president Gwen Zimmermann, and president-elect Rich Rukin. I could not have done the job without their assistance. Thank you to Ron Vavrinek and Mary Wiltjer for working at the check-in table at every dinner. Further thanks to Ron for his hard work as treasurer, and to Mary, as well as Carol Nenne and John McConnell for the great Saturday workshop. Thanks to Kristen Clegg for her work on Points and Angles. Our scholarship chair, Phil Gartner, did an outstanding job this year. We appreciate the efforts of Steve Viktora as treasurer and of Martin Funk as webmaster. Thanks Jenny Wexler for the many, many things you do. George Pryjma always helps as historian as does Paul Christmas with publicity. Thank you board members Ilene Hamilton, Ray Klein, and Harlan Goldberg.

Of course, I also wish to thank all of our dinner speakers, including our own Kristen Clegg and Robin Levine-Wissing. Finally thanks to all of our members who attend our meetings and help make this such a fine organization. I have enjoyed the opportunity to be in this leadership position.

If Archimedes Had a TI-84...Seeing Old Problems Through New Eyes

John Jensen

presented to MMC on 3/10/2006

BY PHIL GARTNER

John Jensen got everyone thinking how the history of mathematics would be different if some of the greats like Archimedes had access to the powerful calculating technology that we take for granted today. With some Texas Instruments representatives in the audience, John joked that he had originally titled his talk, "If Archimedes Had an HP-38...", but decided he should change it since TI was giving away free stuff at the end of the evening. He also quipped that he only was using a TI-83+ calculator (not a TI-83 +1 as indicated in the title).

His talk's purpose was two-fold. It exposed the visual and investigative power of technology in working some of history's classic problems and it revealed the rich human history of mathematical discoveries that has all too often been neglected.

The first example was Archimedes' work with inscribed and circumscribed polygons about a circle of ever-increasing numbers of sides to approximate the value of π . With Pi Day approaching he felt this was quite timely. While Archimedes likely spent countless months doing involved calculations by hand (without the benefit of Arabic numerals or algebraic conventions we have today to aid our work), John was able to use a simple program, entered right on the home screen of the calculator, in order to approximate the value using the same procedure. Essentially, the program calculated the perimeters of the inscribed and circumscribed polygons. With each click of enter, the perimeters for polygons of twice the number of sides was given. Whereas Archimedes toiled for countless months to approximate π with a 96-gon, the calculator shows the value converging at 2π (the sum of the two perimeters) within seconds.

Then John took another look at the problem by running the program again but with a counter, k . He stored the number of sides in L_1 and the perimeter in L_2 . Looking at the stat plot, a logistic function was fit to the data nicely. The carrying capacity would be 2π .

John moved to L'Hospital and he told the story of how he learned from Bernoulli. L'Hospital's Rule for which he gets 100% credit in today's Calculus books was likely the work of Bernoulli and purchased by L'Hospital. In this instance, the limit as $x \rightarrow 1$ for the rational expression $\sin(\pi x)/(x^2-1)$ was explored by looking at the graphs of the numerator and denominator separately at the value of 1 (where both are zero). John used the zoom feature

repeatedly to hone in on the point (1,0). After enough zooms, the curves look like lines. He found slopes (on a square screen) by counting the pixels. Every curve has local linearity. L'Hospital's Rule was confirmed by looking at the slopes at $x = 1$, which is the derivative used in his rule.

For an additional example, John looked at the point (1, e) on the function $y = e^x$. Using the zoom feature and counting pixels once again, a remarkably accurate approximation of e was attained.

The discussion then moved on to the mathematician Maclaurin who is best known for his work on series. While Maclaurin toiled with treacherous calculations by hand, the trusty calculator made quick work of a sample problem. The calculator provided graphs of equations that approximate the sine curve.

John closed with Gauss. He recounted the classic story of a 7 year-old Gauss adding the integers 1 through 100 in little time as he ingeniously paired them from the ends to get 50 pairs adding to 101 for a total sum of 5050. But his life was much more than this event. For instance, by the age of fourteen, Gauss conjectured a formula for the count of primes less than a number, a . He found that as $a \rightarrow \infty$, the number was asymptotic to $\frac{a}{\ln a}$. This was quite a feat—to work with large primes let alone bind the number of primes less than a given number—given his age and the limited tools for calculation. John demonstrated how quickly such a problem could be investigated using a program to generate primes and the graphing feature. He generated the number of primes less than 150 and displayed the results as a scatter plot (number of primes vs. a). Then Gauss's functions were graphed which neatly framed the data.

John delivered a talk filled with great mathematics, good humor, and some great biographical information on the mathematicians upon whom he focused. With each mathematician, John presented a picture of the man and some interesting anecdotes about his life and his place in the history of mathematics. He stressed that educators need to share the human side of these mathematicians with their students. The concept of looking at old problems through the lens of technology and history made for a fascinating journey. If only the giants of mathematics from past centuries like Archimedes could have been so fortunate to have a TI-84!

MMC Problems of the Month: February 2006

For some reason, I have a great fondness for trigonometric identities. Could it be that proof is connected with them? Here are a few.

$$(1) \sin(61^\circ) + \sin(47^\circ) - \sin(25^\circ) - \sin(11^\circ) = \cos(7^\circ)$$

$$(2) \text{ If } A + B + C = 90^\circ, \text{ then } \tan(A) \tan(B) + \tan(B) \tan(C) + \tan(C) \tan(A) = 1$$

$$(3) 2\cos(A) \cos(B) \cos(A+B) + \sin^2(A+B) = \cos^2(A) + \cos^2(B)$$

Michael Keyton

IMSA

Board Report
Meeting of 16 February 2006

The Board of Directors held its third meeting of the 2005-2006 academic year on 16 February 2006.

Mary Wiltjer reported a club membership of 607, of whom 13 are first year members, 44 are retired members, 53 are student members, and 2 are life members.

Ron Vavrinek submitted a treasurer's report indicating that the club is in good financial shape; the Board approved his report unanimously.

Gwen Zimmermann thanked the members of the Elections Committee, Paul Christmas, Harlan Goldberg, Ilene Hamilton, and Bill Roloff, for preparing the slate of candidates. She also reported that the MMC would host a meeting for new teachers in April at Hinsdale Central High School.

Rich Rukin reported that his committee has finished about two-thirds of the schedule for 2006-2007.

The next meeting of the Board is scheduled for 24 May 2006. Members of the club are welcome to attend any Board meeting, but please contact John Diehl at jdiehl@hinsdale.86.org to learn the location of this meeting before 15 May if you plan to attend. Because this is a dinner meeting, you would be expected to pay for your meal.



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2 year (\$35) _____

3 year (\$50) _____

1st year teacher _____

retired (\$10) _____

student _____

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Speaker Fund _____

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NOTICES & REMINDERS

WE NEED YOU! VOLUNTEER!!

Volunteer to help at the NCTM Regional Meeting
in Chicago September 20-22, 2006

It takes great people like you to make the conference
a success!

Contact either Gwen Zimmermann
(gzimmerm@hinsdale86.org) or
Laura DiMarco (ldimarco@hinsdale86.org)
for more information. (or phone 630.570.8421)

[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,
job openings and people looking for jobs, and more!

Don't Miss The Last Meeting of the School Year!

May 5th

Zalman Usiskin

The Current State of School Mathematics

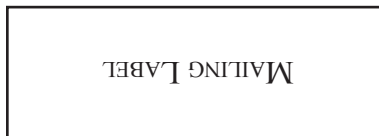
NCTM ANNUAL MEETING

April 26 -29

St. Louis, Missouri

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