

POINTS AND ANGLES

Newsletter of the Metropolitan
Mathematics Club of Chicago



Volume XXXIX

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New Tools for Mathematics Teaching: An Old Dog Learns New Tricks

BY JOHN DIEHL

Be sure to attend our November meeting. Uri Treisman will join us and present his talk "New Tools for Mathematics Teaching: An Old Dog Learns New Tricks". Uri plans to share his quest to improve his teaching. He has turned to technology friends to help him create tools to do things that forever plagued his best efforts to help students learn beautiful mathematics. He states that the unexpected results were simultaneously exhilarating and humbling. Uri plans to share lessons learned and some new resources for teachers and teacher leaders.

Uri Treisman is professor of mathematics and director of the Charles A Dana Center at the University of Texas at Austin. For his work on minority student high achievement in mathematics, he was named a MacArthur Fellow in 1992. In December 1999, he was named as one of the outstanding leaders of higher education in the 20th century by the magazine Black Issues In Higher Education.

Professor Treisman serves as the executive director of the Texas Center for Mathematics Educator Development and of the Texas Office for the Education of Homeless Youth and Children. He is a founding board member of AVID and of the National Center for Public Policy in Higher Education. Professor Treisman currently chairs the Chancellor's Advisory Board for Mathematics in NYC and the Advisory Board of the Urban Mathematics Leadership Network. He serves as the Chief Juror for a Department of Defense-sponsored study of mobility in military families and its effects on their children's education.

Uri Treisman is active in creating support structures for volunteer-based and community based organizations. He served as the vice-chair of the Governor's Commission for Volunteerism and Community Service under Texas Governors Richards and Bush. In all his work, he is an advocate for equity and excellence in education for all children. His presentation will certainly provide us with ideas for teaching, learning, and equity.

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

Date: Friday, November 12, 2004

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, November 8, by noon,
please!

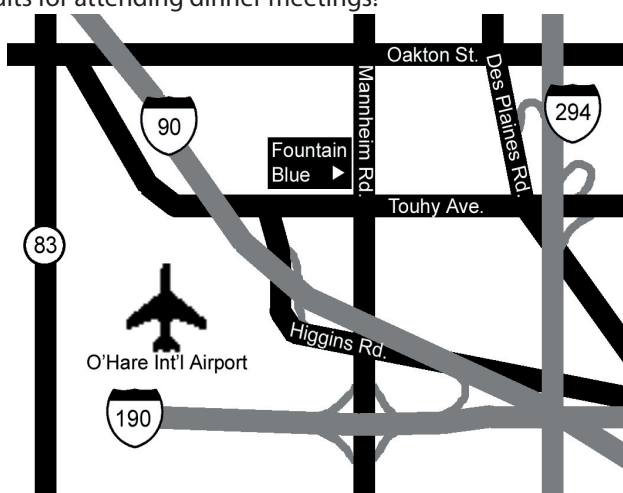
To RESERVE:

Call Lee Ann Swanson at

(630) 570-8421 or

email: lswanson@hinsdale86.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.

Future Meetings:

December 10, January 14, February 11,

March 11, May 13

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Points from the Interior

BY GWENN ZIMMERMANN

By the time this reaches you, the presidential election will have been decided (we hope!). What a wonderful opportunity to discuss the mathematics behind an election – an opportunity to help students connect mathematics to applications. Students can explore the idea of apportionment or the “fairness” of the Electoral College against the popular vote. In particular, the election provides a wonderful context to discuss the mathematics of polling – among other statistical ideas. And it is the content of statistics that I ask you to consider.

As mathematics teachers, we naturally believe all mathematics content is important. However, in the age of technology and exponentially increasing data, it is imperative that we recognize the increasingly critical role that statistics will play in our students’ lives. Whether through television, radio, the World Wide Web, newspapers, or billboards, students are bombarded with statistical claims and data displays numerous times a day. Consider public opinion polls. They are frequently used and often influence the opinion of others. New medicines and health choices tout the effectiveness and the chance of side effects. We

have a professional obligation to help our students become informed citizens and consumers by helping them develop an understanding of data analysis and probability. We need to teach students how to use statistics, and we must also show them how statistics can be misused.

At the college level, statistics has become central to many majors and recognized as vital to many careers. The dramatic increase in the number of students enrolling in AP Statistics provides further evidence of the increased interest by both students and colleges of the application-driven content. As teachers, we need to recognize and appreciate the investigatory process that guides statistical study. The study of data analysis is a perfect complement to problem-based learning and inquiry-based instruction. Students begin with a problem, design a plan to collect appropriate data, analyze the data using graphical and numerical methods, and then interpret the analysis as it relates to the original problem.

Maybe part of the reason statistics is not covered in great depth is a lack of training and content knowledge of statistics by teachers. Furthermore, an understanding of statistics requires some knowledge of probability – another mathematical content area often neglected. Frequently, the study of probability at the high school level is delayed until students reach Algebra 2 or Precalculus, thus, many students never receive more than a cursory glance of the topic. Even when probability is covered, it focuses on applying mathematical rules and properties rather than approaching probability from a more frequentist point of view. That is, our curriculum emphasizes the theoretical probability rather than providing students with the opportunities to simulate situations and observe what happens over the long run (as more frequently occurs in real life).

The study of statistics cannot wait until high school. Data analysis can begin as early as K-2. Students have an innate curiosity about other children and what better way to tap into their curiosity than to collect data (e.g., such as the number of siblings or the number of pets in a household) and display this data in pictographs. In middle school, students should begin to develop the concepts of central tendency, and in high school they can further develop these ideas as well as concepts of variability and sampling distributions to estimate population measures. We are all well aware that there is a limited amount of time to teach a seemingly limitless amount of material. However, if what we teach our students is to be meaningful and applicable, we cannot relegate statistics and probability to the backburner. We must ensure that our mathematics curriculum includes these topics. As mathematics teachers who take pride in preparing students for whatever their future may hold, we must work to ensure statistical literacy for all our students as statistics is definitely in their future.

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Why Do ARML?

With all the contests and activities my students are already involved in, I often find myself in the odd position of convincing them to try something whose value, to me, speaks for itself. What follows is a condensed version of the reasons I give students for doing ARML and a short description of what ARML is.

What is ARML?

ARML is a nationwide math contest that takes place at three sites (Penn State, University of Iowa, and San Jose State) over the first weekend after Memorial Day. Most teams, including Chicago's, are regional teams: like sports "traveling teams," they are composed of strong students from schools across an entire region.

Chicago's teams, the Chicago Area All-Star Math Teams (CAASMT), are selected at an evening tryout contest on March 3 at Evanston Township High School. Students do 24 problems given in pairs; each pair has a separate time limit, and a student's score is the total number of problems correct. A "good" score for the team is anything 9 or 10; typically the cutoff for the top 30 students is around 10-12. An additional 30 students, primarily underclassmen, are selected based on tryout participation, score, and a coach's recommendation. The teams practice four times (weekday evenings) through the spring before traveling to Iowa in June.

How is ARML different from other math contests?

As a contest, ARML's problems are harder, unusual, and, on the whole, a little more interesting: rather than testing students' recall of obscure theorems and ideas, they generally require that students put together two or more ideas. ARML includes a "Power Problem" consisting of a series of related problems that students must solve, with justification; the quality of their proofs, not just the correctness of numerical answers, is an important part of the team score on this section. Recent "Power" contests have discussed subsequences of the Fibonacci sequence, combinatorics and scoring of Olympic events, grouping of students into cliques according to axioms, and unusual numerical relationships in triangles.

A short answer would be: "Because the math is cool."

Lots of math is cool. Why do CAASMT?

Although practicing with CAASMT is a significant commitment—not just the four evenings, but time spent working on problem sets in between practices—it is also rewarding in a way that "ordinary" math team practices may not be. Top students from each school are challenged by top students from other schools, and material that may be an "objective" of a typical school-based practice is often just a starting point for a CAASMT practice. Although knowing obscure theorems and tricks won't guarantee a good ARML score, we do try to expose students to new ideas and methods that may prove useful, and

so CAASMT participants often find they do substantially better in later math contests.

So the second answer is "Because you'll get better at doing math."

From a coach's perspective, having a student in CAASMT means that the student can bring back ideas, theorems, and problems to the rest of the team. Most teams with regular CAASMT participants find that their younger students learn a great deal from these "experts."

So the third answer is "Because the other students will learn from you."

Finally, and not insignificantly, the practices and trip are a lot of fun. Students get a fair amount of time just to meet and socialize with other math students from across the Chicago area and across the country. While at practices and the contest, students often find out about (and are spurred to pursue) opportunities to study math over the summer and through the year, some of which are genuinely life-changing. For many CAASMT participants, ARML was just the beginning of an adventure they hadn't really anticipated when they came to tryouts.

How do you know all this stuff? You're just a coach.

I'm a coach but, in 1987 and 1988, I was also a participant. And I've watched my students grow from the experience. If you encourage your students to do ARML, their growth will impress you.

Okay. So where do I sign them up?

The most important thing is for them to come to the tryout on March 3, from 4 to about 10 pm (there is a dinner break!). The second most important thing is for them to practice some ARML-style problems. To that end, two complete tryouts are available on my webpage, <http://www.wpcp.org/karafiolp/ARMLD>. That page also contains more information about the D ("Developmental") team, a PDF version of the coaches' recommendation form, and links to information about summer programs.

PAUL KARAFIOL WAS A MEMBER OF THE CHICAGO AREA ALL-STAR MATH TEAMS WHEN HE WAS A STUDENT AT KENWOOD ACADEMY. HE CURRENTLY TEACHES MATHEMATICS AT WALTER PAYTON COLLEGE PREP IN CHICAGO, WHERE HE COACHES MATH TEAM, AS WELL AS COACHING THE DEVELOPMENTAL "D" TEAM FOR THE CHICAGO AREA ALL-STAR MATH TEAMS. MORE INFORMATION ABOUT THE CHICAGO AREA ALL-STAR MATH TEAMS CAN BE FOUND AT [HTTP://WWW.CHICAGOARML.ORG/](http://www.chicagoarml.org/)

MMC Problem Set 3, Nov. 2004

During the last two months, I have given a couple of problems, one from geometry and the other a combination of geometry and algebra. The problems for this month are classic algebra problems that seem to be lacking sufficient information. You might have noticed that no answers are supplied for the problems. If you send me an email with your answer (and optional solution), I will tell you if you are correct. (Play with the logic of this statement!) [keyton@imsa.edu]

(1) While driving to Springfield with my colleague Don, listening to the baseball playoffs, and discussing geometry (what else would one talk about on a trip of 3+ hours?), he observed a constant series of evenly spaced poles along the highway (the number is unimportant, though it was a prime). (Secondary question; in what direction were we traveling?) Starting and ending midway between two poles, he counted the number passed during the next minute. I replied that there was a strange coincidence in that our speed (in mph) was exactly equal to ten times the number of counted poles. How far was it between two consecutive poles?

(2) While we were going to Springfield, another colleague John, who did not attend the ICTM convention, was rowing on the Chicago River. (Is this really advisable?) He has the incredible ability to row for long periods at the same rate, which he calls "crew's control." After rowing upstream for a mile (he was counting poles and solving equations as in (1)), he passed a toy boat floating downstream. Shortly later, 5 minutes, he saw a small girl standing on the bank crying about her lost boat, so he turned around and rowed downstream until he overtook the toy boat. If he caught up with the toy boat exactly where he started his journey and if it took him exactly one hour after he turned the boat around, what is the rate of the river?

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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.mmccchicago.org/>

Correspondence may be directed to the editor:

Kristen Clegg
517 Wildflower Way
Streamwood, IL 60107

Once again, MMC is sponsoring a \$1000 scholarship to a graduating high school senior who intends to become a mathematics teacher. Students must be sponsored by a current member of MMC. The application should be sent along with an official school transcript, a letter of recommendation from the sponsoring teacher, and an essay explaining why he or she wants to become a mathematics teacher. The application and guidelines are posted on the web site at www.mmccchicago.org. The winning student and his or her parents will be invited to the May 2005 dinner meeting to receive the award.

All materials are due by March 18, 2005 and should be sent to:

Bill Roloff
Lake Park High School
500 W. Bryn Mawr
Roselle, IL 60172

MMC Dinner Coupon

\$5 off a dinner for New Attendees

— or —

**\$7 off a dinner for New Attendees
who join MMC**

_____ name _____ date used

Valid only at the MMC Meetings on November 12, December 10, 2004 and January 14, 2005.
Expires January, 2005. Limit one (1) coupon per person.

MMC Membership and Change of Address Form

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

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Membership:	New	Renewal	
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Check preferred mailing address above.

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NOTICES & REMINDERS

THE 2004 CHICAGO AREA ALL-STAR

MATH TEAM TRYOUTS

Thursday, March 3, 2004

4 – 10 pm (with a break for dinner)

at Evanston Township High School

All interested high school students welcome.

The teams compete in the national ARML contest at the Iowa City site on June 5.

For more information about the tryouts, the team, or coaching opportunities, visit the

Chicago ARML web site at [HTTP://WWW.CHICAGOARML.ORG/](http://www.chicagoarmml.org/) or email Coach Isaac Greenspan at ilg@chicagoarmml.org

Mark the Date

Saturday, January 29th

in your assignment notebook!

MMC Conference
of Workshops

at Francis W. Parker School in Chicago
(in the Lincoln Park neighborhood)

NCTM Annual Conference

Philadelphia, Pennsylvania

April 21-24, 2004

If you would like a notice or reminder to appear in POINTS AND ANGLES, please email the text you would like to appear to kristenclegg@comcast.net 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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