

POINTS AND ANGLES

Newsletter of the Metropolitan
Mathematics Club of Chicago



Volume XL

December 2005

No. 4

What is a Straight Line?

BY RICH RUKIN

We all know what a straight line looks like in the Euclidean plane. We know its properties and its quirks. But what if we try to draw a straight line on something different from a plane, such as a cylinder, a cone, a sphere or a torus? We are familiar with the volumes and surface areas of these objects but the idea of drawing lines on them is not something most students investigate. We will see to what extent Euclid's geometry applies in unfamiliar settings and have some real surprises.

Phil Mallinson came to America in 1969 to work for Outward Bound in Colorado. In high school he specialized in modern languages. His undergraduate degree is in law. But eventually he came to his senses and attained mathematical respectability at the University of Washington. He has taught in independent schools in Vermont, Seattle and New Hampshire and has been teaching at Phillips Exeter Academy for eleven years.

Don't Forget to Register for the
MMC Conference of Workshops

Saturday, January 28, 2006
Hinsdale Central High School
Hinsdale, Illinois

Almost 100 Session
Covering PreK-16

Program and Registration Form are avail-
able on the MMC Website.

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

Date: Friday, December 9, 2005

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

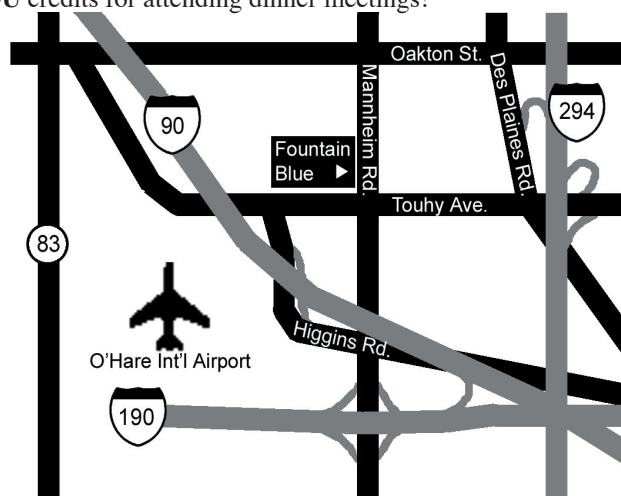
Cost: Members \$31
Nonmembers \$37

RESERVATION DEADLINE

Monday, December 5, 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.

Future Meetings:

January 13, February 10, March 10,
May 5

INSIDE...

Points From The Interior	2
MMC Contest	3-5
Board Report	6
By-Laws	6
NCTM Regional Meeting	7
Membership Form	7

Points from the Interior

BY JOHN DIEHL

I hope you enjoyed the November talk on simulation by Alan Rossman. I hope you are able to attend our December 9th meeting. December usually brings an extra special meal. I'm sure that Phil Mallinson will be an engaging speaker.

It's hard to believe it is December already! (Well, actually it's not December as I write this, but it will be when you read this – you get what I'm trying to do, right?) December brings a very busy time, but also a different type of busy, as we have a break from the usual school routine. I know that every one of you deserves the break, and I wish you a wonderful holiday season with friends or family.

Just in case you have some extra time, or believe (as I do) that you deserve to give a gift to yourself, here's a

thought: read one of the many fine books about mathematics. Read it just for the enjoyment of the topic, no paper to write, no test, no time limits.

Here are a few suggestions to consider:

The Golden Ratio: The Story of Phi, the World's Most Astounding Number, Mario Livio
In Code: A Mathematical Journey, Sarah Flannery
The Lady Tasting Tea, How Statistics Revolutionized Science in the Twentieth Century, David Salsburg
Mathematics The Science of Patterns, Keith Devlin
Once Upon a Number, The Hidden mathematical Logic of Stories, John Paulos
An Imaginary tale, The Story of $\sqrt{-1}$, Paul Nahin
To Infinity and Beyond, Eli Maor
The Number Sense, How the Mind creates Mathematics, Stanislas DeBaene
The Story of Numbers, How Mathematics Has Shaped Civilization, John McLeish
Where Mathematics Comes From, How the Embodied Mind brings Mathematics Into Being, George Lakoff & Rafael Nunez

Now I know what some people would say about a math book as a gift, or reading a math book during vacation, but some people would go for it. Don't worry, I'm asking for some Superman DVDs and a Playstation game, too.

Thanks for all that you do! Enjoy the break! Hope to see you on the 9th!

MMC BOARD OF DIRECTORS		Term
John Diehl President	Hinsdale Central High School, Hinsdale	2004-2007
Rich Rukin President-Elect	Evanston Township High School, Evanston	2005-2008
Gwen Zimmermann Past President	Hinsdale Central High School, Hinsdale	2003-2006
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John McConnell Conference Treasurer	North Park University	2005-2006

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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.mmcchicago.org/>

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 Streamwood, IL 60107
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MMC Contest No. 21

December, 2005

The annual MMC Contest is unlike any other mathematics contest known to us. It consists of one problem invented so that a wide variety of students and their teachers can participate if they wish. Full classes are allowed to send in an entry, but then individual students in those classes may not enter. (Teachers of those classes may enter if they have not used work of the students in their entry.)

The problem traditionally appears in the December issue of Points and Angles with an entry deadline during the first week of January. This gives entrants a few weeks to work on the problem and enables classes to combine work after the holiday break.

Calculator and computer technology may be used on the problem. Often the contest problem is complex enough that it is expected that technology will be used.

We are pleased to continue this tradition into its 21st year. We are also pleased to announce that the prizes have been increased by 50%, the first increase since 1990.

Frequent Flyer Freddie's Flights

Freddie's job requires him to fly from his home base $(0,0)$ to all the other 99 lattice points on or inside the square with vertices $(0,0)$, $(9,0)$, $(9,9)$ and $(0,9)$, and return back to his home base. While most people would simply go up and down rows and be efficient, Freddie is obsessed with getting frequent flyer miles. He wants the route that is the longest, so he can get as many miles as he can.

Freddie's boss does not like Freddie flying so far, but she likes Freddie, so they have reached a compromise. Freddie can take any flight he wants but if he flies directly over any other point he has to stop at that point. For instance, Freddie could begin by flying from $(0,0)$ to $(1,3)$, but he could not fly from $(0,0)$ to $(2,4)$ without stopping at $(1,2)$ in between. (In the latter case, on the answer sheet, you would place the number 1 by $(1,2)$ and the number 2 by $(2,4)$.) Your job is to create a route for Freddie with 100 flights that is as long as possible. The route must begin and end at $(0,0)$ and cannot stop at any point twice.

Frequent Flyer Freddie's Flights

DIRECTIONS:

- Freddie's route begins at the point (0,0) at the left bottom corner of the grid on the previous page. That point is labeled 0 and 100 because the route begins and ends at the point. In the grid on the previous page, place one of the integers 1 to 99 by each of the other 99 points to show the order of Freddie's route. Do not draw the segments connecting consecutive points because they will clutter the picture, but be careful that no segment of the route between two consecutive points would contain another point of the route.
- Use the standard distance formula between two points on the coordinate plane (or, equivalently, the Pythagorean Theorem) to calculate the length of each of the 100 segments. For instance, if you place the number 1 by the point (1,2), then the length of that leg is $\sqrt{5}$. Keep these calculations on a separate sheet of paper.
- The 27 possible lengths are listed below. In the table below, record how many legs of Freddie's route have each possible length. The sum of your frequencies should be 100.

Length	1	$\sqrt{2}$	$\sqrt{5}$	$\sqrt{10}$	$\sqrt{13}$	$\sqrt{17}$	5	$\sqrt{26}$	$\sqrt{29}$
Frequency									
Length	$\sqrt{34}$	$\sqrt{37}$	$\sqrt{41}$	$\sqrt{50}$	$\sqrt{53}$	$\sqrt{58}$	$\sqrt{61}$	$\sqrt{65}$	$\sqrt{73}$
Frequency									
Length	$\sqrt{74}$	$\sqrt{82}$	$\sqrt{85}$	$\sqrt{89}$	$\sqrt{97}$	$\sqrt{106}$	$\sqrt{113}$	$\sqrt{130}$	$\sqrt{145}$
Frequency									

- Use a calculator to calculate the total length of the 100 legs, rounded to the nearest hundredth. Record the total length here. _____
- Fill in all the requested information on the entry form. Mail your entry to Zalman Usiskin, The University of Chicago, 6030 South Ellis Avenue, Chicago, IL 60637, or fax your entry to 773 702-3114. Entries must be received by 5PM Thursday, January 4, 2006.
- The entry with the **highest total length** wins. Prizes are as follows: 1st place, \$100; 2nd place, \$60; 3rd place, \$40. In case of ties, prizes will be shared. If there are more than 10 winning entries tied, then six \$25 prizes will be distributed at random from the winning entries. If there are more than 3 second or 2 third place entries tied, \$15 prizes will be distributed at random from these entries.
- Any person (student, teacher, or other individual) or class may enter, but only once. Address questions about the contest to z-usiskin@uchicago.edu or call 773-702-1560.
- Winners will be announced in the February 2006 *Points and Angles*.

Board Report Meeting of 14 November 2005

The Board of Directors held its second meeting of the 2005-2006 academic year on 14 November 2005.

Mary Wiltjer reported a club membership of 508, of whom 9 are first year members, 42 are retired members, 41 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 is the chair of the Elections Committee; the other members are Paul Christmas, Harlan Goldberg, Ilene Hamilton, and Bill Roloff. The committee has begun searching for candidates for the election next spring. If you are interested in running, please contact Gwen or one of the other committee members.

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 16 February 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 9 February if you plan to attend. Because this is a dinner meeting, you would be expected to pay for your meal.

By-Law Changes

At the August board meeting, the MMC Board approved changes in the By-Laws. Those changes were printed in the October issue of the *Points and Angles*. The full text of the By-Laws can be found on the MMC website. Copies will also be available at MMC meetings through December. At those meetings, board members will be available from 6:00-6:30 to answer any questions about the suggested By-Law revisions.

Enclosed in this issue is your ballot. In order to be accepted, ballots must be received January 20, 2006. They should be sent to Past President Gwen Zimmermann, Hinsdale Central High School, 55th Street & Grant, Hinsdale, IL 60521

NCTM Central Regional Conference

Experience the Winds of Change in Mathematics Education!
Chicago, Illinois

September 20-September 22, 2006
(Wednesday, Thursday, Friday)

- Featuring a CAS (Computer Algebra Systems) Strand
- Located at the Hyatt Regency McCormick Place
- This will take the place of the 2006 ICTM Conference



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 _____

Address _____

Phone _____

School _____

Address _____

Phone _____

E-Mail _____

Check preferred mailing address above.

Change of Address

Membership: New Renewal

Choose one:

1 year (\$20) _____

2 year (\$35) _____

3 year (\$50) _____

1st year teacher } (\$10) _____
 retired }
 student

Donations:

Scholarship Fund _____

Speaker Fund _____

Total amount of check: _____

NOTICES & REMINDERS

MEECAS Upcoming Meetings
 Saturdays
 9 a.m. to 12 noon
 Continental Breakfast provided

December 3, 2005 "Proof and CAS"
 Glenbrook South High School
 4000 W. Lake Avenue, Glenview, IL 60026

For questions, more information, or to RSVP,
 contact Michelle Kolet at 847-755-4600 or mkolet@d211.org

MEECAS is a consortium for mathematics educators who are exploring, or are interested in exploring, the use of computer algebra systems (CAS) in mathematics classrooms.

<http://gbs.glenbrook.k12.il.us/Academics/gbsmat/meecas/home.htm>

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)

MMC Dinner Coupon

\$5 off a dinner for New Attendees

— or —

\$7 off a dinner for New Attendees

who join MMC

_____ name

_____ date used

Expires January 1, 2006. Limit one (1) coupon per person.

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.

MAILING LABEL

METROPOLITAN MATHEMATICS CLUB OF CHICAGO
 c/o MMC
 415 S. Ridgeland Ave. #2
 Oak Park, IL 60302

