Points & Angles

Focusing on the Big Ideas in Mathematics from the Beginning

Angela Andrews
National Louis University

By Paul Christmas

From I-90 & Southbound I-294: 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 to Touhy Ave. & Lee Rd.; Walk East on Touhy to Mannheim Rd.

Friday, December 12, 2008
5:30 PM Doors Open, 6:00 PM Social Hour, 7:00 PM Dinner and Talk

Fountain Blue Banquets & Convention Center
2300 Mannheim Rd., Des Plaines
(847) 298-3636
$31 for Members, $37 for Nonmembers

Reserve by Noon, Monday, Dec. 8
reservations@mmcchicago.org or (847) 486-4690, day or night, leave a voicemail.

For over eight years, Angela Andrews has intervened with primary students for whom math has not been a sense-making experience. She will show the connections between the foundational ideas, such as counting, numerical recognition, adding and subtracting, place value, and higher mathematics. She will discuss how early intervention can prevent chronic failure in mathematics.

Angela is currently Assistant Professor at National Louis University and a Math Recovery Specialist and Trainer. She started her career in math education as a teacher and director of the Stepping Stone Preschool. She then became a Math Their Way instructor. She taught Kindergarten from 1984-1987. Angela then taught an Honors Math and Remedial Math Teacher in the Naperville school system for 1997 to 2002. Angela was then promoted to Primary Math Intervention Specialist for the Naperville school system. Failing high school Advanced Algebra influenced her career choice involving intervening with primary students to avoid future failure in higher mathematics.

Please note that while late reservations are accepted—we would hate for you to not come because you missed the deadline—calling or emailing in your reservation by the deadline helps Fountain Blue's preparation and room set-up.

Points from the Interior

By Phil Gartner

As the holidays approach we all get very busy but still look forward to some time with friends and family. MMC is part of that family so be sure to include this December's talk by Angela Andrews in your plans. Paul Christmas has given you a preview of her talk on the front page, so I will not get into the details of how her talk will be tremendously interesting and thought-provoking, how Angela is a funny and dynamic speaker, and how this talk will have some discussion of math pedagogy, curriculum design, and a healthy dose of just good mathematics. No, I will leave that for Paul.
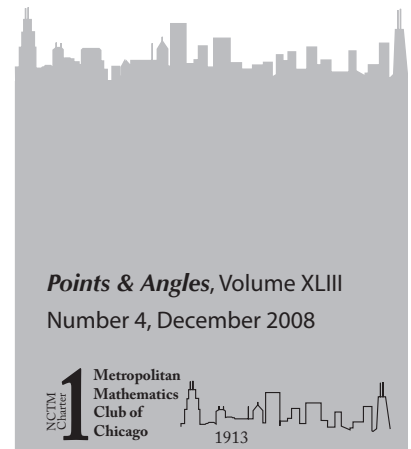
> MMC promises to deliver an enjoyable evening on Friday, December 12. There's just an excitement and a special atmosphere at the December meeting every year. Don't miss it!

So what should I talk about? Well, the holidays are a time for giving and selflessness. On that note, how would you like to give MMC the gift of your signing up to receive an electronic subscription to this newsletter? If you enjoy your paper copy of *Points & Angles*, then do not worry—the print edition will continue to be available (unlike some other professional organizations that have moved to solely electronic correspondence) and the print edition will continue to be the default option. You will continue to receive the paper newsletter as in the past until we are notified of a desire to change.

I know that some of you do not have a strong preference as to the form your newsletter takes or may even prefer getting the newsletter electronically. By going electronic, you can save the organization much needed funds—the printing and mailing of the newsletter is one of the largest expenses incurred by the Club. How do you go electronic and give the gift of lower costs to MMC? You can indicate so at any dinner or when you renew your membership or you can e-mail our Membership Coordinator, Mary Wiltjer. You no doubt have one of her witty e-mails in your mailbox already that you could simply reply to. If not, her e-mail is *mwiltjer@glenbrook.k12.il.us*.

Finally, the holidays are also a time for giving thanks. As we all count our blessings I am mindful of just how fortunate I am to be a part of such an outstanding group of people. While it may sound corny, in many ways the relationships that exist among the members are like the bonds of family. Many relationships among our more experienced members go back decades and gathering one Friday a month (and at the Annual Conference) is sort of like those family get-togethers to which we look forward. May this holiday season be a happy and healthy one for all!

MMC Contest No. 24: Wheel Number Alignment

Recently your contest designer needed to change the tires on his car. The tire dealer spoke of balancing and aligning the wheels. That conversation gave rise to the idea behind this year's contest.

In the diagram on the worksheet inserted in this newsletter, there are four wheels like the one shown at the right. Each wheel consists of three large concentric circles, 24 smaller circles on them, and a 25th small circle at their center. Thus there are 100 small circles in all. The goal is to place a different integer from 1 to 100 in each circle, so that the wheels are balanced and aligned as closely as possible.

Step 1: *Balance the wheels.* In each wheel, calculate the sum of the squares of the 25 numbers. You now have 4 sums, one for each wheel. Find the population standard deviation of these 4 sums. This is the measure of your wheel balance. The smaller the standard deviation, the better the balance.

Step 2: *Align each wheel.* In each wheel, split the 24 small circles (all but the center small circle) into 8 groups of 3 as shown by the ellipses. Take the sum of squares of the 3 numbers in each group. You now have 8 sums. Find the population standard deviation of these 8 sums. Add the 4 standard deviations (one for each wheel). This last sum is the measure of your alignment—the smaller the sum, the better the alignment.

To enter: Fill in all the requested information on the entry form. (You do not have to mail in the worksheet with the placements of the numbers on the four wheels.) Mail your entry to Zalman Usiskin, University of Chicago, 6030 S. Ellis Avenue, Chicago, IL 60637, or fax your entry to 773-702-3114. Entries must be received by 5PM, Wednesday, January 7, 2009.

Any person (student, teacher, or other individual) or class may enter, but only once. (However, you may replace an early entry by a later one.) If a class sends in an entry, individual students in the class may not enter. Teachers can enter if they have not used work of their students in their entry. Address questions about the contest to z-usiskin@uchicago.edu or call 773-702-1560.

Judging the entries: Entries will be ranked 1st, 2nd, 3rd, etc., by their wheel balance measures. A second ranking of entries will be by their wheel alignment measures. The two ranks will be added. The winning entry is the entry with the lowest sum of the ranks.

Prizes: 1st place, $100; 2nd place, $60; 3rd place, $40. In case of ties, prizes will be shared. If there are more than 8 winning entries tied, then eight $25 prizes will be distributed at random from the winning entries. If there are more than 3 second or 2 third place entries tied, $20 prizes will be distributed at random from these entries. Judges are Zalman Usiskin and Isaac Greenspan.

Winners will be announced in the March 2008 issue of *Points & Angles*.

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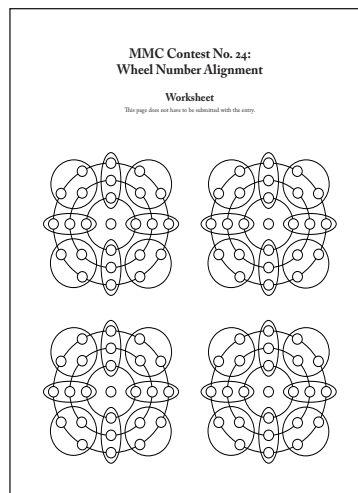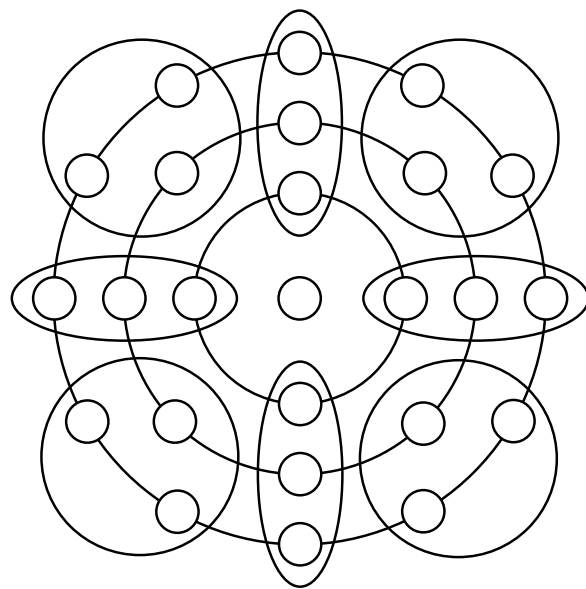
You can find the worksheet and contest entry form as an insert in this issue or online at *http://mmcchicago.org/*.

Scholarship

The Metropolitan Mathematics Club of Chicago is offering a $1,500 scholarship for a high school senior who will pursue a career in the teaching of mathematics. Up to two additional Filliman Scholarships may also be awarded for the same amount (funded by a gift from the Filliman estate). The selected students, their parents and their sponsoring teachers will be invited to the May 8th MMC dinner meeting at which time the scholarship recipients will be honored.

A selection committee of MMC members appointed by the Executive Board will determine the scholarship awards. To be eligible, an applicant must submit the application, have an official transcript sent, and request a letter of recommendation from a member of the MMC such that all of the materials are received by March 13, 2009. The committee will establish its own guidelines for evaluating applications, and will make a recommendation to the Executive Board as to the awarding of the scholarship. No member of the selection committee may nominate nor recommend a candidate.

The guidelines by which the winners are selected along with the scholarship application can be found in the November issue of *Points & Angles* as well as online at *http://mmcchicago. org/*.

The scholarship application form, along with the requirements, are available on the MMC website, *http://mmcchicago.org/*

Mozart's Dice Game

By Jenny Wexler

As MMC first-timers around the room introduced themselves prior to the start of the evening's talk, Ron Lancaster treated us to a photo slide show of art and architecture around the city of Chicago, including some shots of the My ∏ pizzeria on Clark and a number of photos of the Hotel Indigo on the Gold Coast, which uses the Golden Ratio as a decorative theme in its lobby, its restaurant ("The Golden Bean") and its bar ("The Phi Lounge"). Once he took the stage, Ron shared a few more photos from around the country, including a building mural in Minneapolis that depicts a musical composition and a shot of the Holiday Inn in New Orleans which has a building-height clarinet affixed to its wall. All of the photos are examples of what can be found in the column "Mathematical Lens," found in *Mathematics Teacher*. The audience was encouraged to submit their own photos along with mathematical questions about the photos for publication in the column.

Following the photo slide show, Ron began his talk in earnest. As advertised by his talk title, "Mozart's Dice Game and Other Beautiful Connections between Probability, Music, Art, and Drama," Ron treated us to a series of beautiful and intriguing creations by artists, authors, and musicians, all connected in some way to mathematical patterns and probabilities. He began by sharing some photos of the work Sliding Pi by Canadian artist Arlene Stamp, which is found in a downtown Toronto subway station. The artist used the digits of π to create a non-repeating pattern along the curving walls of the station.

Next Ron talked about the Knight's Tour Puzzle, where a knight moving around a chess board must visit each square exactly once. The Canadian illusionist Peter Reveen uses this puzzle as part of his show, and it's a fun puzzle to ponder. Additionally, Knight's Tours can create beautifully symmetric designs and tessellations, as shown above, at the far right.

Instead of tracing a Knight's Tour graphically, the sequence of moves can be mapped to music, where moving along the 8 rows or columns of a chess board corresponds to moves along an octave of notes.

Ron then moved on to giving some examples from theater and literature where the authors used chance to determine the sequencing in a story. A few years ago, a Toronto theater company put on a play called The Aleatory Project, where elements of the performance, from the characters' relationships to each other to the choices they make along the way, were determined by chance. Over the years there have
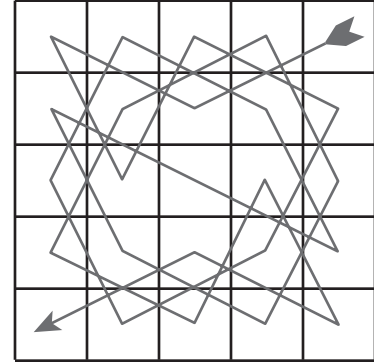
been similar experiments in film, including the 1971 work Six Reels of Film to be Shown in Any Order and the artistic film work SN by Fred Camper, which contained 18 reels. Marc Saporta wrote a book in the early sixties that capitalized on this same principle of ordering by chance—Composition No. 1 is a 149-page work where the reader shuffles the pages before reading. There is at least one example in poetry as well: Raymond Queneau's work Cent Mille Milliards de Poèmes (100,000,000,000,000 sonnets) gives 10 choices of lines for each of the 14 lines of a sonnet, and the reader mixes and matches by selecting different options on each line of the poem.

After entertaining the MMC audience with these various artistic and literary examples of patterns and chance in art, Ron closed by sharing Mozart's Dice Game. Mozart carefully created choices for 16 measures of music, where each measure was chosen by rolling a pair of dice. The 8th and 16th measures have two choices each, and the remaining 14 measures have 11 choices, resulting in more than 1.5×10^{15} possibilities. Each measure's options were written to "fit" with the previous measure, so the pieces of music created by Mozart's Dice Game are pleasing to the ear regardless of the roll of the dice. There are print and electronic resources available, including sheet music, for those who want to listen to or play the music.

Having opened with π in art, Ron closed with π in music. Steven Rochon, a math teacher at the Trinity School in Manhattan, composed a striking piece for solo violin, based on the first 220 digits of π. His work debuted on π Day 2008, and is posted on YouTube (*http://www.youtube.com/watch?v=whG11u457fo*).

Ron Lancaster's handout, containing more information on the examples given here as well as other examples and links, is available on the MMC website at *http://mmcchicago.org/*.


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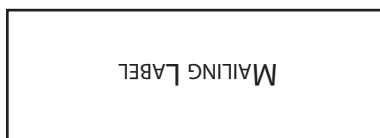
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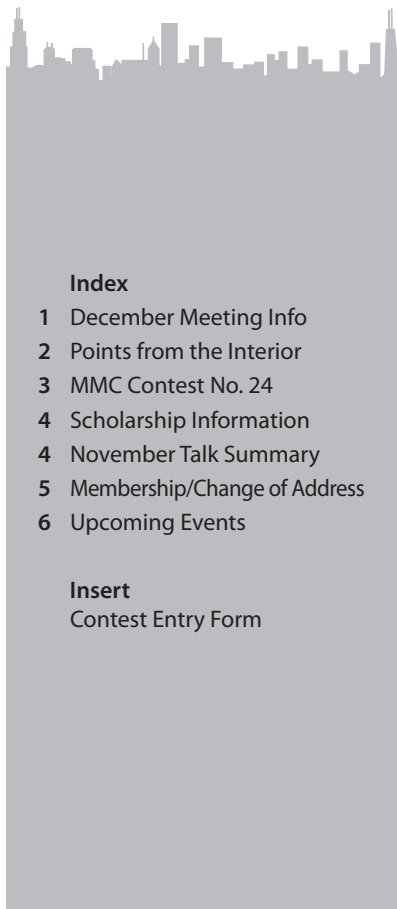
Upcoming Events

Fri., Dec. 12	Angela Andrews	Focusing on the Big Ideas in Mathematics—Right from the Beginning
Fri., Jan. 9	John Diehl	e, i, 2π, oh! Come Explore What These Numbers Can Do
Sat., Jan. 24	U. of C. Lab	MMC Conference of Workshops 2009
Jan. 31		*MEECAS: CAS Camp*
Fri., Feb. 6	Tony Peressini	Comparing Solutions of the Paper Roll Problem
Fri., Mar. 13	Claran Einfeldt	A Math Cursed Life
Apr. 18		*MEECAS: Precalculus, Calculus, and CAS*
Fri., May 8	Nick Jackiw	Using the Newest (Yet-to-be-Released!) Version of Geometer's Sketchpad to Improve Learning

Send upcoming event items to *ilg@chicagomath.org* no later than the date of the MMC dinner meeting preceding the issue in which the item should appear. All items are subject to editing.

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

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