

Points & Angles

Newsletter of the Metropolitan Mathematics Club of Chicago
Volume XLV No. 5 Jan. 2016

Two Chariots Leave Different Cities At The Same Time... A Lively Look At Word Problems Through The Ages

January Speaker
Steve Viktora



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, January 8, 2016

5:30 PM Doors Open, 6:00 PM Social Hour
7:00 PM Dinner & Talk

Fountain Blue Banquets & Convention Center

2300 Mannheim Rd., Des Plaines
(847) 298-3636
\$43 for Members, \$49 for Nonmembers

Reserve by Noon, Monday Jan. 4

Online at www.mmccchicago.org
or by phone at (847) - 486 - 4291

Please note that our phone number has changed for making reservations.

Written evidence of mathematical word problems dates to the fourth century BCE in ancient Mesopotamia. Perhaps the oldest mathematical word problem is the following:

A granary of barley. One man received 7 sila (of grain).

What are its men? (i.e., how many men can be given a ration?)

(If you are interested in solving this problem, you need to know that the capacity of the granary is 2400 gur, and 1 gur = 480 sila.)

Word problems have provided evidence of mathematical uses over time, indicating how societal concerns, priorities, and prejudices have shifted over the years. These mathematical situations, however, were often not very realistic. From applied, utilitarian beginnings, word problems became increasingly abstract. Word problems have often exhibited a “puzzle” quality, perhaps helping add to the genre of recreational mathematics. Other types of word problems that have existed for a long period of time include problems about right triangles, cisterns, and couriers.

Even though word problems sometimes seem contrived, educators have long felt that they are important in learning mathematics because the mathematical content is relevant to instructional needs. Problem contexts can motivate students and lead to interdisciplinary work. At our dinner gathering, Steve Viktora will show us examples of word problems from several perspectives and we will get the opportunity to try some of them.

Steve Viktora is a graduate of the Chicago Public Schools. He has a BS degree in Mathematics and an MAT degree in Mathematics Education from the University of Chicago, as well as an Administration certificate from National Louis University. Steve was a member of the Peace Corps in Ghana, teaching at two different teacher training colleges for five years. He then taught at Kenwood Academy in Chicago for sixteen years. He has been the Mathematics Department Chairperson at New Trier High School since 1991.

Steve won the Mathematical Association of America Edyth Sliffe Award for Distinguished High School Teaching while at Kenwood and is a recipient of the Illinois Council of Teachers of Mathematics Lee Yunker Award. Steve has co-authored seven books in the University of Chicago School Mathematics Project series. He also co-authored two National Council of Supervisors of Mathematics publications on mathematics leadership. Steve is a former president of MMC and ICTM. He has served on the MMC Board for more than twenty years and is serving a second term on the NCSM Board.

Come learn about and work some word problems! Make your reservation today for the January 8th dinner meeting. This is a presentation you won't want to miss!

Points From The Interior

BY PATRICIA TRAFTON

The holiday season is in full force now that Black Friday, Small Business Saturday, and Cyber Monday have passed. As I think about this joyful gift-giving season, I decided to see what Google would suggest when I type in “gifts to give my math students.” Six of the top seven websites Google suggested listed items that a teacher could buy for his or her students. I, however, was interested in seeing if any intangible suggestions would be mentioned.

The first website suggested by Google listed 30 free or inexpensive gift ideas for students. Of the 30 suggestions, only one was for an intangible gift, and that was just the first step in creating the gift. Also, the idea was only practical for teachers who taught one class of students, i.e., elementary school teachers. The seventh website was from a New York math educator journal article titled “Give Your Students the Gift of Mathematics Literacy.” This was the kind of a gift I was thinking of, something more powerful than anything that can be purchased. The gifts that I think all math teachers should give their students, and not just during this holiday season, but throughout the year, are the following:

- 1. Freely displaying your passion for mathematics:** Our enjoyment of mathematics may be what influenced many of us to major in mathematics and/or become math teachers, or it may have built up over a long period of time. Teachers who love to teach their subject may have students who love to learn it.¹ Students who enjoy a subject are typically more successful at it, and thus have more opportunities open to them.
- 2. Believe all of your students can understand and do mathematics:** Some students come to us liking, or even loving, mathematics, and that is so delightful. Such students already believe they are capable of understanding and doing mathematics, and their work shows that to us. Other students, however, come to us with fear, trepidation and disliking or even hating mathematics, often because they have not experienced much success in math classes. While all our students need to know that we believe they are capable of learning and understanding mathematics, it’s the students who haven’t experienced much success and struggle greatly with math, that need us most to believe in them.
- 3. Teach for understanding:** One way to help our students believe that they are capable of understanding and doing mathematics is to teach for understanding. “By aligning factual knowledge and procedural proficiency with conceptual knowledge, students can become effective learners.”² We should provide our students opportunities to reflect on their thinking and to learn from their mistakes. In doing so, students become competent and confident in their ability to tackle difficult problems and to persevere when tasks are challenging.²
- 4. Teach your students to persevere:** Perseverance is an important habit of mind that students need to develop. In our high-tech world where information can be obtained instantly via the Internet, students need to understand that many problems can’t be solved in five minutes or less. Developing a stick-with-it attitude, being willing to try a variety of strategies in order to solve a problem, and following a task through to completion will help students become competent and confident in their ability to tackle difficult problems, and maybe help students see that they can understand and do mathematics.
- 5. Offer students a wide range of application problems and extension experiences:** Go above and beyond your textbook or written curriculum. Help students make decision about the mathematics that they should use by giving them a wide variety of applications and extensions. “Help students develop their competency in strategic thinking on new problems and investigations—both mathematically based and in context. Show students the importance of formulating the problem so that they can apply their knowledge—and know what knowledge to apply.”³

As the holiday season comes to a crescendo, and throughout the school year, give your students the gifts of your passion for mathematics, your belief in their ability to understand and do mathematics, teaching for understanding, teaching your students to persevere, and offering them a wide range of applications and extensions. These gifts will be far more valuable to them, both now and in their future, than any gift you could buy. Happy holidays!

¹ Walls, R. T. (1999). *Psychological foundations of learning*. Morgantown, WV: WVU International Center for Disability Information.

² NCTM (2000). *Principles and Standards of School Mathematics: Executive Summary*, p.2. Reston, VA.

³ Kepner, Hank. “Your Students’ Math Journey So Far.” *NCTM Summing Up* (Dec. 2009)

December Talk Summary

BY LAURA KAPLAN

After an impassioned introduction by Pat Trafton, Dale Seymour took the stage. He began by showing us a long list of potential talk topics, explaining that he had difficulty deciding upon a topic. In the end he decided to touch on many of them, figuring if he presented 100 ideas, maybe we'd come away with one or two that we could use.

He began with a brief tour of his new book, *Geometric Design*. It is 500 pages to be freely available to teachers this spring. With chapters such as *Design Elements and Creation Techniques*, *Properties of Geometric Design*, and *Applications*, the book covers designs of all types – from those based on grids or lines to illusions and number patterns.

Dale explained that he had an interesting start to his career in education. He asserted that he was weaker in math than anyone in the room, and that he'd be happy to debate anyone on that. He had no student teaching experience, and he was simply handed a textbook at the start of the school year and sent on his way. Dale swore that he would never teach the way he had been taught.

When Dale arrived in Palo Alto, he took a job teaching junior high with the intent to move to the high school as soon as possible. He never left. He absolutely loved it.

He decided to write his own curriculum based on problem solving. The students were successful, and Dale began taking the junior high students to math competitions, even those designed for high school students. His students blew them all away. Before he knew it, he was taking bus-loads of students to math competitions. At one point the school had to cancel the track meet because too many of the students were going to a math competition instead.

Of course everyone wanted to know what he was doing. So he wrote *Eureka*, but nobody would publish it. They did not like that it was intended for only one book per classroom, so there was no way to make money.

Dale learned a lot about problem solving through all of this. He was in favor of removing the time pressure. Give them lots of time to work through a problem, like a month. He used and published books on math jokes, art, puzzles, challenges, etc. – anything to turn kids onto math. But his most successful was projects. The kids became excited about the topic they chose and researched. Then they presented them, getting others excited, too.

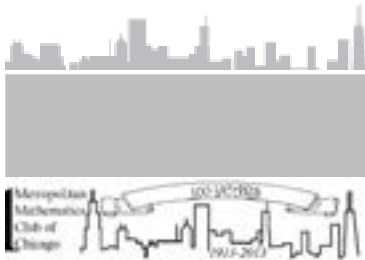
Dale sees that many kids see math as just a bunch of algorithms. There is no common sense about it. He cited a case he had heard about in which people were asked to add two fractions, each less than $\frac{1}{2}$. The most frequent answer was 17. Less people than that answered "I don't know." As Dale says, solving problems is great for common sense.

Two main threads wove through Dale's many anecdotes of mathematics education. One was to constantly ask students, "Who did that another way?" It's one of the most important things you can say. The other was to let the students discover and make connections between the ideas. Allow them to see the beauty. As Dale put it, "Nobody falls in love with math until they see how amazing it is."

Dale then treated us to a tour of his mathematical sculpture garden. Many of the images we saw can be seen at Seymoursculpture.com.

Dale concluded with a quote from his grandson, Franklin Habit. "Teaching seems to require the sort of skills one would need to pilot a bus full of live chickens backwards, with no brakes, down a rocky road through the Andes while providing colorful and informative commentary on the scenery."





MMC Scholarship

By LAURA KAPLAN

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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. In addition, up to two 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 13th MMC dinner meeting at which time the scholarship recipients will be honored.

A selection committee of MMC members appointed by the 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 MMC such that all of the materials are *received* by March 18, 2016. The committee will establish its own guidelines for evaluating applications, and will make a recommendation to the Board as to the awarding of the scholarship. No member of the selection committee may nominate nor recommend a candidate.

The guidelines used for selection shall be:

- A. Demonstration of overall academic scholarship with an inclusion of at least eight semesters of college preparatory mathematics. (A minimum cumulative grade point average of 3.0, where A = 4.0)
- B. A statement of the intention to pursue a career in mathematics teaching.
- C. Indication of participation in extra curricular activities, especially those that may have a positive influence on a teaching career.
- D. Applicants must have a letter of recommendation from a member of the Metropolitan Mathematics Club who is familiar with the applicant's academic performance and his or her potential as a mathematics teacher.
- E. Applicants must submit a short response to different prompts that deal with teaching and mathematics. See the application for more details. ***This is new this year***

** Up to 3 awards are possible based on candidate qualifications. The organization reserves the right to award fewer scholarships if these are not met.

Board Report

By LYNN BOND

The MMC Board of Directors met on November 18th at Glenbrook South HS in Glenview. Dates and potential dinner speakers for the 2016-17 school year were presented and discussed. The MMC Conference of Workshop booklets have been mailed, and registrations are already coming in.

Three scholarships of \$1500 each will be offered this spring, one from MMC and two from the Filliman family. The application is available on the MMC website, <http://www.mmccchicago.org>.

\$300 was approved for sound system repair.

MMC Members are encouraged to attend, and invite colleagues to, dinner meetings to meet and network with other local math educators and to learn from exceptional speakers. The next Board meeting will be Tuesday, February 9, 2016 at 6:00 pm at Schaumburg High School. Please contact John Diehl if you plan to attend.

Have you registered for the MMC Conference of Workshops yet?

If not, you only have a few more days to do so!

The registration deadline is January 8. Workshop registration is on a first-come, first-served basis, so get yours in soon!

The conference will be held on Saturday, February 6 at
Lincoln-Way Central High School in New Lenox.

The program booklet and registration are available on the website (www.mmccchicago.org)

All workshops are by pre-registration, so don't miss out on your chance to attend.
Register Today!!!

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| NAME | | PREFERRED CONTACT Check one: <input type="checkbox"/> Home <input type="checkbox"/> Work | |
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| | | SPEAKER FUND \$ | |
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Make check payable to *MMC*

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Mail completed form and check to:

MMC
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Upcoming Events

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| Fri., Jan 8 | Steve Viktora | Two Chariots Leave Different Cities At The Same Time... A Lively Look At Word Problems Through The Ages |
| Sat., Feb 6 | MMC Conference Of Workshops | Lincoln-Way Central High School |
| Fri., Mar 11 | TBD | TBD |
| Fri., May 13 | Zal Usiskin | The Real Big Ten: The Toughest Mathematical Ideas For High School Students To Learn, And How To Approach Them |

Send upcoming event items to jomalley@glenbrook225.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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