

L'Augarithms



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February 15—22, 2012

Mathematics Colloquium Spring Lineup

Colloquia are typically held Wednesdays 3:40—4:40 in Oren 113. Immensely appealing refreshments are served.

- Jan. 18 Chandra Erdman, '02, Ph.D., US Census Bureau
- Feb. 1 Ken Kaminsky, Augsburg College
 - 15 Loren Larson, Northfield, Minnesota¹
 - 22 Sadie Dietrich, University of Minnesota²
- Mar. 7 Karen Saxe, Macalester College
- Apr. 4 Thomas Sibley, St. John's University
 - 18 Danrun Huang, St. Cloud State University

¹Magical Mathematics (February 15)

Loren Larson, Northfield

“Magical Mathematics” is the title of a beautiful coffee-table book published just this year by Princeton University Press. The authors, Persi Diaconis and Ronald Graham are both first-rate mathematicians and magicians, and the book highlights the interconnections between these two cultures. We'll



learn some of the amazing and amusing tricks that are discussed in this brilliant book, and show why they work by considering the fundamental mathematics on which they are based. No prerequisites are required, though a familiarity with congruences and two-row permutation notation will be helpful.

²Estimating Food Demand (February 22)

Sadie Dietrich, University of Minnesota

Sadie Dietrich graduated from Augsburg in 2009 as an Economics major and Math minor. After graduation she spent a year living in Zhuhai, China followed by a year in Ithaca NY while my now husband went to graduate school at Cornell. I currently live in Saint Paul and am an M.S. student in Applied Economics. I write a blog called “Food Thought Blog” for The Food Industry Center on campus. I also am working on my Master's project which is funded through the SE MN Regional Partnership. I will be estimating food demands and number of acres needed to feed the SE MN population. I am passionate about good food, independent art, contemporary design, and all things local.



Problem of the week...

We had no solvers to last week's POTW. Here is another to try:

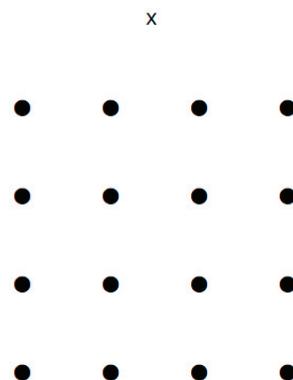
Using pennies, nickels, dimes, quarters, and half-dollars, in how many ways can you make change for a dollar bill?

❖ Reprinted with permission from Bradley U's old 'POTW' page <<http://hilltop.bradley.edu/%7Edelgado/potw/potw.html>>

Puzzle of the week...

Augsburg's **Charlie Green** solved the PZOTW from the last issue. He found ages 1, 12, 13, 14, and 19.

Without lifting your pencil from the paper, draw six straight lines that connect all sixteen of the dots below. Begin at the “X.”



❖ Submit POTW & POZTW solutions to kaminsky@augsborg.edu, or under Ken's door at SCI 137E, or in the puzzles and problems box just outside of Su's office.

L'Augarithms
 The approximately bi-weekly newsletter
 of the
 Department of Mathematics
 at Augsburg College
 Editor.....Kenneth Kaminsky
 <kaminsky@augsborg.edu>

Died on this day...

Pierre François Verhulst



Born October 28, 1804 in Brussels, **Pierre Verhulst** was educated there. In 1822 he entered the University of Ghent. Receiving his doctorate after only three years of study, he returned to Brussels.

There he worked on number theory, and, influenced by Quetelet, became interested in social statistics. He had been intending to publish the complete works of Euler but he became more and more

interested in social statistics.

In 1829 Verhulst published a translation of John Herschel's *Theory of light*. However he became ill and decided to travel to Italy in the hope that his health would improve.

In 1830 Verhulst arrived in Rome. However his visit there was not a quiet one. Quetelet wrote:

Whilst on a trip to Rome he conceived the idea of carrying out reform in the Papal States and of persuading the Holy Father to give a constitution to his people.

This plan did not meet with approval and Verhulst was ordered from Rome. He returned to Belgium.

In 1835 Verhulst was appointed professor of mathematics at the Université Libre of Brussels. There he gave courses on astronomy, celestial mechanics, the differential and integral calculus, the theory of probability, geometry and trigonometry.

In 1840 Verhulst moved to the military school, the École Royale Militaire. He continued to be influenced by Quetelet although he was not always in agreement with Quetelet's ideas.

Verhulst's research on the law of population growth is important. The assumed belief before Quetelet and Verhulst worked on population growth was that an increasing population followed a geometric progression. Quetelet believed that there are forces which tend to prevent this population growth and that they increase with the square of the rate at which the population grows.

Verhulst showed in 1846 that forces which tend to prevent a population growth grow in proportion to the ratio of the excess population to the total population. The non-linear differential equation describing the growth of a biological population which he deduced and studied is now named after him.

Based on his theory Verhulst predicted the upper limit of the Belgium population would be 9,400,000. In fact the population in 1994 was 10,118,000 and, but for the affect of immigration, his prediction looks good.

In 1841 Verhulst was elected to the Belgium Academy and in 1848 he became its president. However, the bad health which he had suffered from earlier returned to make his life increasing difficult over the last years of his life.

Verhulst died on February 15, 1849 in Brussels.

Tidbits of the Week (TOTW)

As of this date, the chance of your winning the Powerball lottery with a single \$2 ticket is $1/175,223,510 \approx 0.00000000570699673805$.

You have a $4/2,598,960$ chance of being dealt a royal flush in 5-card poker. You are almost 270 times more likely to be dealt a royal flush in 5-card poker than to win the Powerball lottery.

In some fields of physics, a *jiffy* is the time it takes for light to travel one fermi. This means that a jiffy is 3×10^{-24} seconds.

As of 2011, the largest known prime was $2^{43112609}-1$. It is 12,978,189 digits long.

The letters in "FORTY" are in alphabetical order. Can you find another such number (in English)?

Problems, we've got problems?

The **Konhauser Problemfest XX** will be held at Macalester College on Saturday **25 February 2012**. Students compete in teams of 3. The competition is 9:00-noon and the award ceremony follows a few hours later. Cash prizes for top scoring teams are awarded and the cherished pizza theorem traveling Konhauser Trophy is passed on the winning team's school. A picture of the trophy and a link to past problems and solutions can be found at <http://www.macalester.edu/academics/mscs/competitions/>. If you have interest in participating, please contact Prof. Matt Haines (haines@augsborg.edu) or Prof. Mike Weimerskirch (weimer@augsborg.edu)

Last Week's 3D Puzzle

There were no solvers to last week's 3D puzzle, in which you were to determine the relative closeness of the 5 digits in the side-by-side pictures. Alas, it seems as though in the few years since I last published a 3D puzzle, the ability to perceive 3D pictures without the aid of special glasses has gone away. We will try to work our way back up to a real 3D puzzle, but in the meantime, here is a cute little mouse to look at.

