Comps Gala Take 2

Did you enjoy this past week’s Comps Gala? Did you miss it and feel jealous of those who attended? You have another chance this week! Come to Olin 141 on Thursday, March 5 to see your fellow mathematicians present their work.

The Poincare Group: Representations of the Elementary Particles
Emma Turetsky, David Guild, Michael Feinberg, and Kyle Drake
3:00 p.m.

In physics, the symmetries of Minkowski spacetime form a Lie group called the Poincaré group. In 1939 Eugene Wigner discovered a stunning correspondence between the elementary particles and the irreducible representations of the double cover of the Poincaré group. We will classify these representations and explain their relationship to physical phenomena such as spin. No string theory attached.

Data Mining with a Dragon Theme
Joe Lindner, Sammy Morin, Khanh Nguyen, Max Olivier
4:00 p.m.

Have you ever wondered what kind of person buys 6 million dollars of Gargoyle statuary? How about whether Kansas residents have an affinity for Gothic wall sculptures or if Dragon fountains and Egyptian lamps tend to be bought together? Come to our comps talk to discover the answers to these questions and learn about some of the statistical and data mining techniques used to find them.

Bijective Proofs: You Say You Want an Involution?
Dan McDonald and David Lonoff
5:30 p.m.

John Lennon might have said, “The purpose of mathematical proof is not to verify but rather to understand.” Our presentation is inspired by this idea. We will present direct combinatorial proofs of theorems about integer partitions that were originally shown using less straightforward techniques.

Welcome to Helen Wong

For those of you who enjoyed attending the math candidate talks over the past few weeks, the math department would like to announce that Helen Wong will be joining us next year. The Math Department would like to sincerely thank all the students who participated in this process by attending talks, taking the candidates to lunch, giving tours, and providing us your reactions to the candidates. We are very excited to add Helen to our department, and she’s very excited to be coming.

Top Scrabblers Among Us

The first annual Carleton-St. Olaf Scrabble Tournament recently concluded. There were two divisions, a Tournament-Style and a Friendly Division. First place in the Friendly Division (of the thirty registered) went to Bob Dobrow, and second place to Steve Kennedy. Both went undefeated in play, with Bob earning the higher average score. Steve also made the highest-scoring play in the Friendly Division, with 89 points for “WATERED”. (The two have yet to play each other.) Congratulations to both!
Sexy Job: Statistician

Enjoy this quote from Hal Varian, the Chief Economist for Google: “I keep saying the sexy job in the next ten years will be statisticians. People think I’m joking, but who would’ve guessed that computer engineers would’ve been the sexy job of the 1990s? . . . The ability to take data—to be able to understand it, to process it, to extract value from it, to visualize it, to communicate it—that’s going to be a hugely important skill in the next decades, not only at the professional level but even at the educational level for elementary school kids, for high school kids, for college kids.”

Math Major Potluck

The inaugural math major potluck will be on the Thursday of reading days, from 7-11 pm at Steve and Deanna’s house. Put it on your calendar! And RSVP to Danny Wells (wellsd).

Math Awareness Month: Climate

Looking ahead to spring: the month of April 2009 is Math Awareness Month, and the Mathematical Association of America, the Society for Industrial and Applied Mathematics, and the American Statistical Association have decided on the theme of Climate. There are a myriad of ways that Climate can be studied, and mathematics is certainly one of them!

Problems of the Week

1. Consider a rectangular array of numbers, extending infinitely to left and right, top and bottom. Start with all the numbers being 0 except for a single 1. Then go through a series of steps, where at each step each number gets replaced by the sum of its four neighbors. For example, after one step the array will look like

\[
\begin{array}{c}
1 \\
1 0 1 \\
1
\end{array}
\]

surrounded by an infinite “sea” of zeros, and after two steps we will have

\[
\begin{array}{cccc}
& 1 & & \\
1 & 2 & 0 & 2 \\
1 & 0 & 4 & 0 \\
& 2 & 0 & 2 \\
& & 1 &
\end{array}
\]

a) After \( n \) steps, what will be the sum of all the numbers in the array, and why?

b) After \( n \) steps, what will be the number in the center of the array (at the position of the original 1)?

c) Can you describe the various nonzero numbers that will occur in the array after \( n \) steps?

2. Does there exist a differentiable function \( f \), defined on the positive real numbers and with positive real values, which is one-to-one (and thus has an inverse function) and such that the inverse function of \( f \) equals the derivative of \( f \)? If so, give an example of such a function; if not, show why no such function exists.

This was a productive week for solutions; Daniel McDonald, Alex Fisher, Danny Wells, and “The Vault” all solved last week’s first problem, and “The Vault” also polished off the second problem. If the identity of “The Vault” (whether a hollow space or a leap, I have no idea) can be established (handwriting analysis, perhaps?) he/she/it can stop by CMC 217 to collect a “C” block or something else from the B.B.O.P. In the meantime, Daniel should pick up such an item. Keep up the good work, problem solvers!

- Mark Krusemeyer

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