New Faces in Mathematics

Over the course of the next few weeks, the Math Department will be bringing in four candidates to interview for a new tenure-track opening in our department. Each of these four candidates will give a colloquium for students in addition to meeting faculty and administrators. We would appreciate our majors (and math-interested folks) attending as many of these colloquia as possible. You'll see specific information about the talks over the next two weeks in the Gazette, but for now, please save the following dates:

- Tuesday, February 3, 4:30-5:30
- Thursday, February 5, 4:00-5:00
- Tuesday, February 10, 2:45-3:45
- Wednesday, February 11, 4:00-5:00

If you have questions, please contact Deanna Haunsperger.

Congratulations to the Problem Solvers!

Way back last term, November 15 to be precise, four teams from Carleton participated in the NCS/MAA Team Contest, a problem-solving contest sponsored by the North Central Section of the MAA. A total of 75 teams took part in this event. Each of Carleton’s teams placed in the top half of this field. Congratulations to the team of Dustin Anderson, Becca Cordes, and Collin Hazlett and the team of Madhav Ajampur and Yuan Tian for this achievement. Special congratulations to the team of David Lonoff, Daniel McDonald, and Max Olivier for placing fifth and the team of Danny Chen, Shao Min Tan, and Sen Zhao for placing seventh in a very tough field.

Future problem solving events include another team contest, the Konhauser Problemfest, which will be held here at Carleton on Saturday, February 28. Contact Gail Nelson if you are interested in participating.

Volunteer Opportunity in Northfield!

The ACT volunteer tutoring program is looking for volunteer tutors in AP Statistics for Northfield high school students. Time commitment is about one hour/week. Please contact fischmar for more information or to get involved!

Opportunities for Carls

REU in Ohio

Miami University in Oxford, Ohio has a 7-week REU this summer, called Summer Undergraduate Mathematical Sciences Research Institute (SUMSRI). Applications will be due March 1. Go to www.units.muohio.edu/sumsri for the information you need.

Texas A&M Undergraduate Summer Programs

MCTP has mathematics programs for both young undergraduates who are not yet ready for an REU, as well as a program for current juniors who are considering graduate school. Applications are due March 1. For information, visit math.tamu.edu/research/undergrad/MCTP.

Wabash Summer Institute in Mathematics

Wabash College is hosting an REU, with two groups in Abstract Algebra and one in Applied Mathematics. Participants will conduct re-
search in small teams as well as engage in seminars to investigate the ethics of research. Go to www.wabash.edu/academics/math/wsim to learn about the application, which is due February 28.

**MASS REU at Penn State**
Pennsylvania State University is hosting a 7-week REU this summer that will integrate learning with research, perhaps to lead into their fall Mathematics Advanced Study Semester (see later in this issue). The application is due on February 28, so visit www.math.psu.edu/mass for a wealth of information.

**Thinking About Fall Term?**
Are you itching to get off campus but not willing to leave mathematics behind? Does Budapest just sound too cliché? Perhaps you would like to look into the Mathematics Advanced Study Semester (MASS) at Pennsylvania State University. There you will have the opportunity to hone your math skills and enthusiasm in an intensive program of custom-made courses. This is a program intended for those who are pursuing a career in mathematics, and participation in this program looks very good on graduate school applications. The application deadline for the fall semester is April 10, though you might want to consider the MASS summer program as well (see above). For more information, go to www.math.psu.edu/mass.

**PROBLEMS OF THE WEEK**

1. For the purposes of this problem, we’ll say two positive integers \( a \) and \( b \) are “one step apart” if \( ab + 1 \) is a perfect square. For example 2 and 24 are one step apart (the square is 49); 24 and 7 are also one step apart, so it seems natural to say that 2 and 7 are at most two steps apart. In fact, since 15 is not a square, 2 and 7 are exactly two steps apart.
   a) Show that any two (distinct) positive integers are a finite number of steps apart.
   b) Let \( m \) and \( m + 1 \) be two consecutive positive integers. How many steps are they apart? (The answer may depend on \( m \), of course.)
   c) How many steps are 1 and 4 apart?

2. Suppose a particle starts at the point \((0,1)\) in the plane, heading due northeast, and continues to travel at some constant speed so that at any point \((x,y)\), its direction is 45 degrees to the right from the direction that is away from the origin. (For example, at the initial point \((0,1)\), the direction away from the origin is due north, and so the particle starts off heading northeast.)
   a) Explain why the particle will eventually leave the first quadrant.
   b) At what point will the particle be when it leaves the first quadrant?

Whether it was the momentous transition in Washington, something about last week’s problems, or something else altogether, the sad fact is that no solutions whatsoever arrived this week. Here’s hoping for change in that respect also ...

-Mark Krusemeyer