Department of Mathematics September 15, 2006

UNDERGRADUATE MATHEMATICS SEMINAR

The first meeting of the seminar will be this coming Monday, September 18, in the Math Department's common room, beginning at 7:00. Cider and donuts will be provided. The speaker will be our own Alan Taylor.

TITLE: Fair Division: From Cake-Cutting to Dispute Resolution

ABSTRACT: Mathematical investigations of fair division traditionally have been phrased in terms of the "cake-cutting" metaphor and the following general question: Suppose we have n people and a cake C, and suppose that different people value certain parts of the cake differently. Can we find a constructive procedure wherein each person has a strategy that will guarantee his or her "satisfaction" even in the face of a conspiracy by the others?

If n = 2, everyone knows the solution—one divides, the other chooses. The question of extending this to $n \geq 3$ essentially originated with Hugo Steinhaus during the Second World War. In this talk we will trace the 50-year history of constructive cake-cutting, as well as comment on some real-world aspects of fair division involving divorces, inheritances, and the resolution of international disputes.

The 2006 William Lowell Putnam Exam

The Putnam Exam is a national mathematics contest for college and university students. This year's exam will be administered in two three-hour sessions on Saturday December 2. In each session students are given six problems to attempt to solve. These problems, while difficult, offer an exciting challenge to your problem solving abilities.

At the Undergraduate Mathematics Seminar, problems from previous Putnam Exams will be distributed for people to work on during the week. The following week, people will have the opportunity to discuss their approaches and solutions to the problems either in the donut-and cider portion before the seminar or immediately following the seminar.

The Poincaré Conjecture Has Been Resolved!

In 2002-3, a Russian mathematician, Grigory Perelman, posted a series of three long and difficult manuscripts online in which he apparently proved a difficult and longstanding topological problem: The Poincaré Conjecture. Due to its significance and also its difficulty, the Clay Mathematics Institute dubbed this problem one of seven "Millennium Prize Problems". Upon each of these seven problems, the Clay Institute placed a $1,000,000 prize.

In the years since Perelman posted his manuscripts, leading geometers and topologists have been reviewing the works for correctness. Recently, after these three years of vetting, these mathematicians seem to believe that there are no gaps or unresolvable errors in Perelman's works.

For his contributions to this problem, Perelman was awarded one of the most honored prizes in mathematics: The Fields Medal. Remarkably, Perelman has refused to accept any prizes for his work.

In the Math Department's common room, there is a very nice non-technical article from the New Yorker Magazine as well as an article from The New York Times chronicling this development and the personalities involved in the resolution of the conjecture.

Do you have any ideas for future newsletters?

E-Mail:
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We're on the Web!

See us at:
http://www.math.union.edu/~friedmap/Newsletters/

Faculty Doings: Where's Professor Zwicker?

Professor Zwicker is teaching at Skidmore College this Fall as part of an exchange program funded by the Mellon Foundation. His course, "Mathematical Reasoning and Discrete Structures," is Skidmore's analogue of Union College's Mathematics 199.

This summer Professor Zwicker's research carried him as far as Turkey, where he presented papers at two conferences and served as the outside reader of a Masters thesis at Istanbul Bilgi University. The conference reception was in a former palace of the Sultan, on the shores of the Bosphorus River, and he notes that none of it looked like Schenectady.

Professor Zwicker is currently completing a paper with Remzi Sanver, a Turkish economist, entitled "One-way monotonicity as a form of strategy-proofness." The paper introduces a new property of voting rules and shows that the property may help explain a link between some positive features of certain voting rules and the drawback that these same rules can be manipulated by voters who lie about their true preferences.

Resources for Students

- The Math Department offers a free tutoring service for students enrolled in its calculus courses through Math 115. The Calculus Help Center is open five nights a week, Sunday through Thursday, from 7:30pm to 10:00pm in the seminar room of Sorum House.
- Professor Black will be holding an informative "Introduction to TeX (or LaTeX)" session for this year's thesis students so that they can learn how to use these mathematical typesetting packages. Tuesdays 9/19, 9/26 from 4:30-5:30 in Olin 106
- Another upcoming contest! The Mathematics Contest in Modeling will be held February 9-12, 2007. In this contest teams of (up to) three students solve real-world problems using their mathematical modeling skills. For more information see http://www.comap.com/undergraduate/contests/mcm/

Problem of the Newsletter

At exactly 12:00 the minute and hour hands of a clock are perfectly aligned. To the nearest second, what is the next time at which this will happen?

Solutions to this problem will be accepted by Professor Friedman until 3:00pm Friday, September 22. Please put your solution in his mailbox in the Math Department's office on the second floor of Bailey Hall. The most mathematically elegant correct solution will be awarded an as-yet-to-be-determined prize.