TCU Math News Letter

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He who never made a mistake never made a discovery.

-Samuel Smiles

Editor: Dr. Rhonda Hatcher and Archive of Newsletters

TCU Mathematics Department Research Lectureship

Professor Ruth Gornet of Texas Tech University will be the first speaker in the TCU Mathematics Department Research Lectureship Series for 1995-1996. Dr. Gornet's talk is entitled "Spectral Geometry on Nilmanifolds." It will be given at 4 p.m. on Tuesday, September 12, in Winton Scott Hall 145.

The second research lectureship talk will be presented by Professor Robert Hardt of Rice University. Dr. Hardt will present his talk, "Energy and Singularities of Maps Between Manifolds," on Tuesday, September 26, at 4 p.m. in Winton Scott Hall 145.

All TCU undergraduate students, faculty, and other members of the community interested in mathematics are invited to attend the Research Lectureship talks. You are also invited to join us for refreshments in Winton Scott Hall 171 during the half-hour preceding each talk.

First Parabola Meeting on September 19

Parabola, the TCU Undergraduate Mathematics club, will meet on Tuesday, September 19. We will have refreshments in Winton Scott Hall 171 from 3:00-3:30 p.m. followed by an undergraduate talk presented by Professor Efton Park of the TCU Mathematics Department. Dr. Park's talk is entitled "Scissors Congruence."

All TCU undergraduates interested in mathematics are invited to join Parabola. The 1995-1996 officers for Parabola, called the Focus, are Teddy Donevska, Kristi Eggleston, and Anna Mueller. The faculty sponsor of Parabola is Professor Rhonda Hatcher.

TCU undergraduates interested in joining Parabola should come to the September 19th meeting or contact Professor Hatcher in WSH 142.

Putnam Exam Sign-up

The 55th annual William Lowell Putnam Mathematical Competition will be held on Saturday, December 2. The TCU Mathematics Department will give the exam from 9 a.m. - 12 noon and 2 p.m. - 5 p.m. in Winton Scott Hall.

This competition is open only to regularly enrolled undergraduates of the United States and Canada who

have not yet received a college degree. It consists of two sessions of six problems requiring ingenuity but only a modest mathematical background. Last year's exam is posted on the Problem Solving Bulletin Board in Winton Scott Hall. Answering only a few questions on the Putnam Exam is a very good performance.

Prizes and honors are awarded to the top contestants nationally. In addition to individual honors, the Putnam Competition recognizes the performance of teams from each institution with at least three registered entrants.

The deadline for signing up is early October. Please contact Professor George Gilbert in his office in WSH 141 or by telephone at 921-7335 for more information or to sign up.

Budapest Semesters in Math for Undergraduates

Junior and senior undergraduate students in mathematics and computer science who are interested in studying abroad may want to consider applying to the Budapest Semesters in Mathematics Program. This program offers students an opportunity to study mathematics in Hungary. All courses are taught in English. If you are interested in seeing detailed information about the program see Dr. Hatcher in Winton Scott Hall 142. The deadline for applications for the Spring 1996 semester is October 15, 1995, and the deadline for the Fall 1996 semester is April 30, 1996.

Solution to the April 1995 Problem of the Month

Problem: Alice, Bob, and Mikhail play in a chess tournament among themselves that consists of many rounds. Each round consists of 3 games: Alice vs. Bob, Bob vs. Mikhail, and Alice vs. Mikhail. Construct the results of such a tournament so that: (i) Alice had fewer defeats than the other two, (ii) Bob had the greatest number of wins, and (iii) Mikhail had the highest score. Note: Chess scoring is identical to hockey scoring, except divided by two: games can be won (1 point), lost (0 points), or drawn (1/2 point).

Solution: One possible solution is

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        Alice beats Bob          1 time
        Bob beats Alice          2 times
        Alice ties Bob             4 times

        Bob beats Mikhail        3 times
        Mikhail beats Bob        4 times
        Bob ties Mikhail           0 times

        Mikhail beats Alice      0 times
        Alice beats Mikhail      0 times
        Mikhail ties Alice         7 times

    Points:       Mikhail: 7.5     Bob: 7          Alice: 6.5
    Wins:         Bob: 5           Mikhail: 4      Alice: 1
    Losses:       Alice: 2         Mikhail: 3      Bob: 5
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What should one look for to find such a solution? Alice has few defeats but not the highest score, so she must have a lot of ties, and few wins. Bob has a lot of wins but not the highest score, so he must have a lot of losses. One could set up a system of inequalities or proceed by trial and error. In any case, at least 7 rounds are required.

Problem of the Month

This year's first problem of the month is due to undergraduates Hilda Carrillo, Tonya Cobb, and Sonia Stewart. The Fibonacci numbers are defined by $F_0 = 0$, $F_1 = 1$, and $F_{n+1} = F_n + F_{n-1}$. Show that

$$\frac{F_{4n}}{F_{2n}} - \left(\frac{F_{2n}}{F_n}\right)^2 = \pm 2.$$

Their solution involves the formula

$$F_n = \frac{\left(\frac{1+\sqrt{5}}{2}\right)^n - \left(\frac{1-\sqrt{5}}{2}\right)^n}{\sqrt{5}},$$

although a solution directly from the recursion would be interesting.

Students and others are invited to submit solutions to Dr. George Gilbert (Math Dept. Office or P.O. 298900). Correct solutions submitted by persons who are not members of the TCU math faculty will be acknowledged in the next issue of the newsletter. Note that a correct solution is an answer and a justification of its correctness. The solution to the problem will be published in the next edition of the newsletter.

The TCU Math Newsletter will be published each month during the academic year. Dr. Hatcher: Editor; Dr. Gilbert: Problem Editor; Dr. Doran: Thought of the Month Editor. Items which you would like to have included should be sent to Dr. Hatcher via e-mail.