TCU Math News Letter

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What is laid down, ordered, factual, is never enough to embrace the whole truth.

-- Boris Pasternak

Editor: Dr. Rhonda Hatcher and Archive of Newsletters

Three Speakers in the TCU Lectureship Series in October

Professor Neal Brand of the University of North Texas will be the next speaker in the TCU Mathematics Department Research Lectureship Series He will present his talk, "Growth rate of planar graphs," on Tuesday, October 7 at 4 p.m. The second speaker this month will be Professor David Blecher of the University of Houston. His talk, entitled "Algebra on Hilbert space," will be presented on Tuesday, October 21 at 4 p.m. The last lectureship speaker in October will be Professor Brent Gordon of the University of Oklahoma. He will talk about "Just what are motives, and what are they good for anyway?" This talk will be on Tuesday, October 28, at 4 p.m.

All of the TCU Lectureship talks are presented in Winton Scott Hall 145. Refreshments are served in the half-hour preceding each talk in Winton Scott Hall 112.

Professor Ken Richardson to Speak at the Next Parabola Meeting

Parabola, the TCU mathematics club will hold its next meeting on Tuesday, October 14. We will begin the meeting with refreshments at 3:30 in Winton Scott Hall 112. At 4 p.m., Professor Ken Richardson of the TCU Mathematics Department will present the talk "Geometry with Strings and Beach Balls." Those of you who know Dr. Richardson will know that he will actually bring strings and beach balls, and there is no telling what he will do with them.

All TCU students and faculty and other members of the community are invited to attend Parabola meetings. If you would like to join Parabola please contact Professor Rhonda Hatcher at 257-6062 or talk to one of the student officers, Aaron Heap, Priscilla Francis, and Dan Weaver. Dues are only $4 per year to help cover refreshment expenses.

Nova Special on the Proof of Fermat's Last Theorem

Unless a schedule change is made, on October 28, PBS will broadcast a Nova special on the proof of Fermat's Last Theorem. This very famous theorem states that the equation

$$x^n + y^n = z^n,$$

where n is an integer greater than 2, has no solution with x, y, and z all nonzero integers. The theorem was first proposed by the French mathematician Pierre de Fermat around 1637. Fermat made this claim in

the margin of his copy of Diophantus' *Arithmetica,* and added that he had a proof but that the margin was to small to contain it. The problem remained unsolved for over three hundred and fifty years. It was not until 1995 that a proof was finally completed and published by Andrew Wiles of Princeton University. The Nova special will very likely be on a fairly low mathematical level, but it should be quite interesting.

October 8 Deadline for Signing Up For the Putnam Exam

The deadline for signing up to participate in the Fifty-Eighth Annual William Lowell Putnam Mathematical Competition is Wednesday, October 8. The exam will be given on Saturday, December 6. All TCU mathematics majors and others with a good mathematics background are encouraged to give it a try. Students who want to sign up should contact Professor George Gilbert in Winton Scott Hall 141 or by phone at 257-6061.

Solution to the September 1997 Problem of the Month

Problem: The first row in chess has 8 squares occupied by white pieces. In the middle are the king and queen. Just outside of them are two bishops, flanked by two knights, with two rooks on the two outside squares. In a variant called Fischer Random Chess, named after the famous and eccentric chess player Bobby Fischer, the 8 white pieces are placed on the first row at random, subject to two restrictions: the bishops must be on opposite-colored squares and the king must be somewhere between the two rooks. The black pieces are then placed to mirror the white set-up, and the pawns are in their normal positions. How many initial positions are possible in Fischer Random Chess? (Be sure to include your derivation, not just the answer.)

Solution: There are 960 possible initial positions. We place the bishops first, then the queen, the knights, and finally the king and rooks. Because the bishops must be on opposite-colored squares, there are $4 \cdot 4 = 16$ ways to place them. There are now 6 possible squares for the queen. Next there are ${}_5C_2$ ways to place the two knights. Finally, there is just one way to place the king and the two rooks since the king must be in the middle. Therefore, the number of possible initial positions is $16 \cdot 6 \cdot 10 = 960$. This problem was correctly solved by TCU undergraduates Leon Ma and Jeff Moles.

Problem of the Month

This month's problem was used in a study of the problem solving techniques of Ph.D. mathematicians. It was among four questions given to eight of the country's leading mathematicians and to eight less-acclaimed mathematicians, who described their thoughts to observers and audio tape as they worked on these problems. The study aimed to discover any difference in approach between the two groups. Not all of the Ph.D.'s in the study solved this one! Perhaps you can; while not easy, it isn't as hard as it may sound. Prove the following proposition: If a side of a triangle is less than the average of the other two sides, then the opposite angle is less than the average of the other two angles.

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 (Math Dept. Office or P.O. 298900).