TCU Math News Letter

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A genius is one who shoots at something no one else can see, and hits it.

-- Anonymous

Editor: Dr. Rhonda Hatcher and Archive of Newsletters

First Parabola Meeting On Wednesday, September 11

The TCU undergraduate mathematics club, Parabola, will hold its first meeting at 3:00 p.m. on Wednesday, September 11 in Winton Scott Hall 171. The purpose of the meeting is to talk about summer internships and scholarship opportunities for undergraduate mathematics majors. Kristi Eggleston, a senior mathematics and physics major at TCU will tell us about her very positive job experience last summer. Of course, as always, we will have refreshments.

The second meeting of Parabola will be on Wednesday, October 2. This meeting will feature a yet-to-be-titled talk by the ever popular Professor Ken Richardson of the TCU Mathematics Department. We will have refreshments starting at 3:00 p.m. in Winton Scott Hall 171, and then move to room 145 at 3:30 for the talk. Please watch the Parabola bulletin board for more details about this meeting.

The officers of Parabola this academic are seniors Tedi Donevska, Kristi Eggleston, and Priscilla Francis. Membership in Parabola is open to all TCU undergraduates, faculty, and other interested members of the community. Dues are just four dollars per year, which we use to help cover the cost of refreshments. If you are interested in joining, please try to attend our first meeting or contact one of the officers or Professor Rhonda Hatcher, the faculty sponsor of Parabola, at 921-7335.

TCU Lectureship Series Begins on Tuesday, September 10

TCU Mathematics Department Research Lectureship Series for 1996-1997 will feature nine research mathematicians from other universities. The first speaker will be Professor Lesley Ward of Rice University. Her talk is entitled "Conical Limit Sets," and will be presented at 4:00 p.m. in Winton Scott Hall 145 on Tuesday, September 10.

The second speaker in the Lectureship Series talk will be Professor David Saltman of the University of Texas at Austin. He will present his talk, "A Very General Division Algebra," at 4:00 p.m. in Winton Scott Hall 145 on Tuesday, September 24.

Refreshments will be served in Winton Scott Hall 171 during the half-hour preceding each talk. All TCU students, faculty, and other interested members of the community are invited to attend the lectures.

Undergraduate Graders Needed

Graders are still needed for several of the undergraduate mathematics courses at TCU this year. All undergraduate mathematics majors or other undergraduates with a good background in mathematics may apply for these jobs. The jobs involve grading the homework assignments for one or more undergraduate mathematics classes. If you are interested in grading this semester, please contact Professor Victor Belfi at 921-7335 or in Winton Scott Hall 151 as soon as possible.

Solution to the April 1996 Problem of the Month

Problem: *What is the maximum greatest common factor of $n^2 + 1$ and $(n + 1)^2 + 1$ as n ranges over all integers?*

Solution: The maximum greatest common factor is 5. It is easy to see that 5 is a greatest common factor; simply take $n = 2$. To verify that there is no larger common factor, observe that $(2n + 3)(n^2 + 1) - (2n - 1)((n + 1)^2 + 1) = 5$. Thus, any common factor of both $n^2 + 1$ and $(n + 1)^2 + 1$ must also be a factor of 5 and we are done.

While the above is a completely justified solution, it is not at all obvious how we obtained the last "miracle" expression. The idea in its derivation is that if two numbers have a common factor, then so does their remainder after long division. We extend this idea to polynomials. First, we see that $\left((n + 1)^2 + 1\right) - (n^2 + 1) = 2n + 1$. To find the greatest common of $n^2 + 1$ and $2n + 1$, we would like to divide $n^2 + 1$ by $2n + 1$, but in order to avoid fractions, we divide $4(n^2 + 1)$ by $2n + 1$ instead, obtaining $4(n^2 + 1) - (2n - 1)(2n + 1) = 5$. Replacing $2n + 1$ by $\left((n + 1)^2 + 1\right) - (n^2 + 1)$ and simplifying yields the "miracle" expression above.

Problem of the Month

Find all of the integers a for which the equation $x^3 - 7x + a = 0$ has integer roots.

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).