TCU Math News Letter

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If you keep doing what you're doing, you'll keep getting what you're getting.

-- Anonymous

Editor: Dr. Rhonda Hatcher and Archive of Newsletters

Parabola Meeting on April 7

TCU mathematics majors Aaron Heap, Zoe Szymanski, and Dan Weaver will present the talk "Classical Constructibility Problems" at the next meeting of Parabola on Wednesday, April 8. In this talk classical geometric constructions with compass and straightedge will be examined from an algebraic point of view.

The Parabola meeting will begin with refreshments at 3:00 p.m. in Winton Scott Hall 112, and the talk will begin at 3:30 p.m. in Winton Scott Hall 145.

Mathematics Department Picnic on Saturday, May 2

The Math Department Picnic, sponsored by Parabola, the TCU Undergraduate Mathematics Club, will begin at 12 noon on Saturday, May 2, at the home of Dr. Rhonda Hatcher and Dr. George Gilbert at 4204 Harlanwood Drive. Their home is only about one and a half miles from the TCU campus. All students, faculty and friends of the Math Department are invited to come. A sign-up sheet and maps to the picnic are in the Math Department Office in WSH 112.

Problem Solving Seminar

Professor George Gilbert plans to run a problem solving seminar again next fall, provided that at least three students are interested. (There will be new problems if students return from last fall.) If you are interested in problem solving, you can participate either informally (no credit, free) or as a one-hour, Math 4970, Special Topics, course. The emphasis will be on gaining experience with contest-type problems and on writing clear, complete solutions. Both aspects will be of benefit to you in upper level mathematics courses. Contact Dr. Gilbert (Winton-Scott 141, 921-7335, g.gilbert@tcu.edu) right away if you might be interested. This is highly recommended for those who would like to take the Putnam mathematics contest in December.

Calculus Bee to be held on Wednesday, April 22

The TCU Calculus Bee will be held on Wednesday, April 22 beginning at 3:30 p.m. in Winton Scott Hall 145. Of course, there will be the requisite refreshments for all the contestants in Winton Scott Hall 171 from 3:00 to 3:30 p.m.

All TCU undergraduates are eligible to compete. A prize of $75 will be awarded to the first place

contestant, and prizes of $50 and $25 will go to the second and third place contestants, respectively.

Last year, the first place contestant in the Calculus Bee was Mitsutaka Shirasaki, a junior engineering and mathematics major. The second and third place contestants were mathematics majors Jeff Moles and Aaron Heap.

Students interested in competing in the Calculus Bee should sign up in the Mathematics Department Office in Winton Scott Hall 112.

Computer Science-Mathematics Department Volleyball Game

The Computer Science Department students and faculty have challenged the Mathematics Department students and faculty to a volleyball match. With a lot of tall people and two women students who played varsity volleyball in high school, we should be able to take them on. The game is scheduled for 10:30 a.m. at the Rickel Center courts on Saturday, April 25. We will play until 11:30 or 12 (or until they've had enough of us) and then have lunch together. All students or faculty interested in playing should let Dr. Hatcher know.

Aaron Heap Named Mathematics Department Senior Scholar

The 1998 Senior Scholar of the Mathematics Department will be Aaron Heap. Aaron will receive this honor at the Honors Banquet on April 16. Congratuations Aaron!

Solution to the March 1998 Problem of the Month

Problem: Find a second-degree polynomial with integer coefficients, $p(x) = ax^2 + bx + c$, such that $p(1)$, $p(2)$, $p(3)$, and $p(4)$, are perfect squares, but $p(5)$ is not.

Solution: One example is $p(x) = 8x^2 - 40x + 57$. It seems easier to find such a polynomial, whose graph is a parabola, if its axis of symmetry is at $x = 5/2$, forcing $p(1) = p(4)$ and $p(2) = p(3)$. Such a quadratic must have the form $p(x) = a(x - 5/2)^2 + c$. Then

$$p(1) = \frac{9a}{4} + c = r^2 \quad \text{and} \quad p(2) = \frac{a}{4} + c = s^2.$$

Subtracting the two equations, we find that $2a = r^2 - s^2$. One possibility is $a = 8$, $r = 5$, and $s = 3$, from which we deduce $c = 7$ and $p(x) = 8x^2 - 40x + 57$. Quickly check that $p(5) = 57$ is not a square. (The possibility $a = 4$, $r = 3$, and $s = 1$ leads to $p(x) = (2x - 5)^2$, which is always a perfect square.)

Problem of the Month

This semester's final problem of the month is due to Lee Sallows of The Netherlands and appeared as Macalester College's problem of the week.

Find an expression for 24 in which the numbers (not digits!) 1, 3, 4 and 6 each appear exactly once, while nothing beyond the four operations +, -, . and /, along with any brackets required, is used.

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).