TCU Math News Letter

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As is well known, physics became a science only after the invention of differential calculus.

--- Bernhard Riemann (1882)

Editor: Dr. Rhonda Hatcher and Archive of Newsletters

Calculus Bee on April 17

The TCU Calculus Bee will be held on Thursday, April 17 beginning at 3:30 p.m. in Tucker Technology Center 244. Refreshments for all the contestants will be served in TTC 300 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 winner in the Calculus Bee was Matthew Kolman. The second and third place contestants were Alissa Grissom and Jared Hoag, respectively.

Students interested in competing in the Calculus Bee should sign up in the Mathematics Department Office in Tucker Technology Center 206.

Lectureship Talks

On April 15, 2003, Professor Sean Keel of the University of Texas at Austin will present the next talk in the TCU Lectureship series. His talk is entitled "The Lie Operad and the Canonical Embedding of $M_{\{0,n\}}$." Professor Keel's talk will be at 4 p.m. in Tucker Technology Center 138.

On April 29, Professor Ruth Gornet of the University of Texas at Arlington will present a research talk. The talk will be in TTC 138 at 4 p.m. Watch the TCU web page for further details.

Refreshments will be served before each talk in TTC 300 at 3:30 p.m.

Senior Scholar in Mathematics

Senior mathematics major Jared Hoag was named the 2003 Senior Scholar of the TCU Mathematics Department.

Jared is planning on continuing his education by pursuing a Ph.D. programs at Dartmouth and the University of Iowa.

Solution to March 2003 Problem of the Month

Problem: Find all solutions in integers to $2^n=n^k$.

We first observe that $|n|$ must be a power of 2, i.e. $n=\pm 2^m$ for some integer m. The given equation becomes $2^{\pm 2^m} = (\pm 1)^k 2^{mk}$, from which it follows that $(\pm 1)^k=1$ and $k=\pm 2^m/m$. In order for k to be an integer, it is necessary and sufficient that $m=2^s$ for some nonnegative integer s. Thus, the solutions are $(k,n) = (2^{2^s-s},2^{2^s})$ and $(k,n) = (-2^{2^s-s},-2^{2^s})$, where s is a nonnegative integer.

Matt Farmer solved this month's problem.

April 2003 Problem of the Month

This month's problem also appeared in the Pi Mu Epsilon Journal. It is due to Scott Kim. Three drummers are positioned at the corners of a large equilateral triangle. Each drummer beats his drum at a constant rate, with the time between beats equal to the time it takes for the sound to travel the length of one side of the triangle. The drums are synchronized so that a listener standing in the center of the triangle would hear all three beats simultaneously. This also means that it seems to each drummer that the other two drums are in synch with his own drum (actually they are delayed by one beat). Where else can a listener stand and hear all three drums in synchronization?

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).