TCU Math News Letter

Volume 15, Number 5 March 2007

A mathematical problem should be difficult in order to entice us, yet not completely inaccessible, lest it mock at our efforts.

-- David Hilbert

Professor Bob Devaney to be the 2007 Math Greens Honors Professor

Professor Bob Devaney of Boston University will be the 2007 Math Green Honors Professor.

Dr. Devaney's first talk will be on Monday, March 5 from 12:00 noon to 12:50 p.m. This talk is entitled "The Fractal Geometry of the Mandelbrot Set." The talk will be in Tucker Technology Center 138, and a pizza lunch will be served to all in attendance.

The second talk Dr. Devaney will present during his visit is "Chaos Galore." This talk will be from 4:00 to 4:50 on Monday, March 5 in TTC 244. Refreshments will be served before the talk at 3:30 p.m. in TTC 300.

On Tuesday, March 6, Dr. Devaney will give another lunchtime talk. The talk, "Animating and Enlivening Mathematics with Spreadsheets," will be from 12:30 noon to 1:20 in TTC 138. A pizza lunch will be provided to the attendees.

On the evening of Tuesday, March 6, Dr. Devaney will present a talk jointly sponsored by Phi Beta Kappa, Sigma Xi, and the TCU Mathematics Department. This talk, entitled "Chaos Games and Fractal Images," will be presented at 7:00 p.m. in the Sid Richardson Building, Lecture Hall 4.

The final talk presented by Dr. Devaney will be a third lunchtime talk. He will present the talk "Cantor and Sierpinski, Julia and Fatou: Crazy Topology and Complex Dynamics." The talk will be from 12:00 noon until 12:50 in TTC 138. A pizza lunch will be served to attendees.

For more information about Professor Devaney, you can visit his web site.

TCU Junior Jumpstart on Saturday, March 3, 2007

The TCU Junior Jumpstart program will be held on Saturday, March 3, 2007 from 10:00 a.m. to 3:00 p.m. at the Radisson Fort Worth South. At this workshop, students can learn about interviewing, applying for graduate school, getting an internship, and building a network.

The keynote speaker for the workshop is Suzie Humphreys. Student participants will join Dallas-Fort Worth professionals at a networking luncheon during the workshop.

To register for Junior Jumpstart, TCU juniors should visit the website www.careers.tcu.edu or e-mail Abby Hicks at a.hicks@tcu.edu.

TCU Student Research Symposium on April 20

The TCU Student Research Symposium (SRS) will be held on Friday, April 20, 2007. The purpose of the Student Research Symposium is to showcase both undergraduate and graduate science research in a relaxed, interdisciplinary setting. For more information about SRS, visit the SRS website www.srs.tcu.edu.

Parabola Habitat for Humanity Workday On Saturday, March 3

Parabola, the TCU undergraduate mathematics student organization, will hold a Habitat for Humanity workday on the morning of Saturday, March 3. They will be working on "Froghouse," a house sponsored by TCU.

Solution to the February 2007 Problem of the Month

Problem: Find a line that is tangent to the curve $y = x^4 - 8x^3 + 6x^2 - 8x + 1$ at two points.

Solution: If the curve is tangent to $y = mx + b$ at r and s with $r > s$, then r and s are double roots of

$$y = x^4 - 8x^3 + 6x^2 - (8 + m)x + (1 - b).$$

Expanding $(x - r)^2(x - s)^2$, we see that

$$2r + 2s = 8, \quad r^2 + 4rs + s^2 = 6, \quad 2r^2s + 2rs^2 = 8 + m, \quad r^2s^2 = 1 - b.$$

From the first two equations,

$$4rs = 2(r^2 + 4rs + s^2) - (2r + 2s)^2/2 = -20,$$
$$(r - s)^2 = (2r + 2s)^2/4 - 4rs = 36,$$
$$r - s = 6,$$
$$r = 5, \quad s = -1.$$

Substituting into the last two equations, we find $m = -48$, $b = -24$, so that $y = -48x - 24$.

March 2007 Problem of the Month

This month's problem is due to Murray Klamkin. Find all functions on the real numbers for which $f(x)f(y) - f(xy) = x+y$.

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.