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TCU Math Newsletter

The opposite of a correct statement is a false statement. But the opposite of a profound truth may well be another profound truth.

- Niels Bohr

National Science Foundation Research Experience for Undergraduates Summer Programs

The NSF funds a large number of summer research opportunities for undergraduate students through its REU Sites across the country. Each Site consists of a group of about ten undergraduates who work in the research programs of the host institution. Students are granted stipends and, in most cases, housing and a travel allowance. Several TCU students have participated in REU programs in the past and found them very rewarding.

A list of REU sites in the Mathematical Sciences where you can find details about the individual programs and the application processes can be found at
www.nsf.gov/crssprgm/reu/list_result.cfm?unitid=5044
The application deadlines vary for the different sites, but many of the deadlines are in February,

Parabola Talk for Undergraduates

TCU graduate Kris Garrett, who is now pursuing his Ph.D. in applied mathematics at the University of Texas at Arlington will present a Parabola talk at 3:30 pm on Friday, February 3. The talk, "Parallelization Problem on an NVIDIA GPU," will be in Tucker 246 with refreshments at 3:00 pm in Tucker 300. Undergraduates are encouraged to attend.

Colloquium Talks

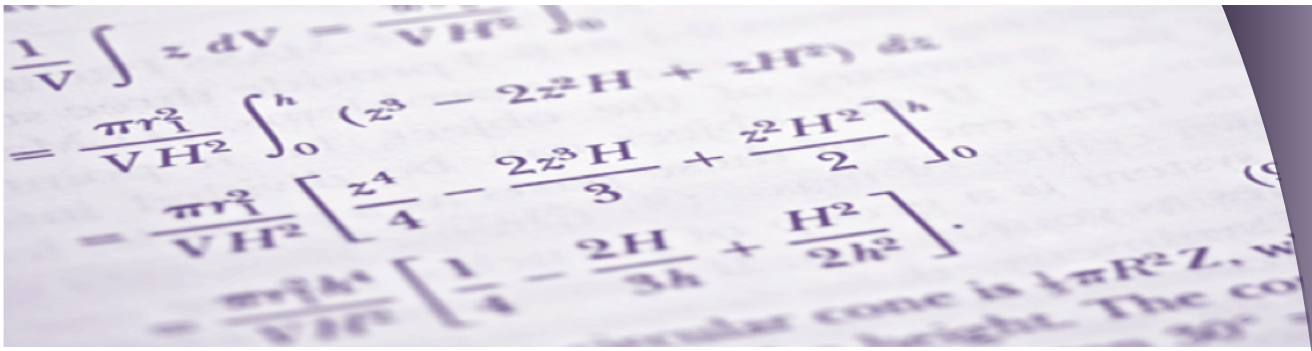
Professor Gregory Berkolaiko of Texas A&M University will be the next presenter in the Frank Stones Memorial Colloquium Lecture series. The talk will be at 3:30 pm on Tuesday, January 24. His talk is entitled "Nodal Count of Eigenfunctions as Index of Instability."

On Friday, February 17, Professor Raymond Heitmann of the University of Texas at Austin will present a colloquium talk. Please watch the TCU Mathematics Department web page for details

Both talks are in Tucker 246 with refreshments before each talk at 3:00 pm in Tucker 300.

Gary Patterson Gives the TCU Math Department a Nod in Poinsettia Bowl Press Conference

In the Poinsettia Bowl, Coach Gary Patterson converted on three fourth down plays. When asked at the post game press conference about his decision to go for it on so many fourth downs, Coach Patterson replied "Haven't you guys seen the study on 4th downs? I went over it with the math department and they were telling me how it was stupid to punt." We assume Coach Patterson was referring to the talk Professor Efton Park gave last spring, "The Mathematics of Fourth Down", which Coach Patterson attended and contributed to. It is nice to see mathematics put to use, and it is a good thing Dr. Park's advice panned out!



Solution to the November 2011 Problem of the Month

Problem: Is there a polynomial $p(x)$ of degree 2, with integer coefficients, whose value is irrational whenever x is an irrational number?

Solution: This month's solution is due to Brad Beadle ('96), all the way from Germany.

There is no such polynomial. Let $p(x) = ax^2 + bx + c$, with a, b, and c integers and $a \neq 0$. Then $\sqrt{2} - \frac{b}{2a}$ is irrational, yet

$$p\left(\sqrt{2} - \frac{b}{2a}\right) = \frac{8a^2 - b^2 + 4ac}{4a}$$

is rational.

February 2012 Problem of the Month

This month's problem appears in a collection of problems by Mark Krusemeyer, Loren Larson, and George Gilbert. For $x \geq 0$, let $y = f(x)$ be continuously differentiable, with positive, increasing derivative. Consider the ratio between the distance from $(0, f(0))$ to $(x, f(x))$ along the curve $y = f(x)$ (the arc length from 0 to x) and the straight-line distance from $(0, f(0))$ to $(x, f(x))$. Must this ratio have a limit as $x \to \infty$?

Students and others are invited to submit solutions to Dr. George Gilbert by e-mail (g.gilbert@tcu.edu) or hard copy (Math Dept. Office or TCU Box 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.

Editor: Rhonda Hatcher
Problem Editor: George Gilbert
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