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TCU Math Newsletter

Wise men talk because they have something to say; fools because they have to say something.

- Plato

Frank Stones Colloquium Talks

Two speakers will be giving talks in the month of September in the TCU Frank Stones Research Lectureship Series. Matt Farmer of the University of North Texas will give the talk "Strong Choquet Topologies on the Closed Linear Subspaces of Banach Spaces" on Friday, September 9. Former TCU student Darren Ong of Rice University will present his talk "Limit-periodicity of the recurrence coefficients of orthogonal polynomials corresponding to measures on the unit circle" on Friday, September 30.

The Lectureship talks will be held in Tucker Technology Center 244 at 3:30 pm. Refreshments are served before the talks in TUC 300 at 3:00 pm. The lectures are open to all students, faculty, and other interested members of the community.

Former TCU Math Major Wins Teaching Award

Former TCU mathematics major Aaron Heap was awarded the 2011 SUNY Chancellor's Award for Excellence in Teaching. Aaron graduated from TCU in 1998, and completed his Ph.D. in mathematics at Rice University in 2004. He is currently an Assistant Professor at SUNY (State University of New York) Geneseo.

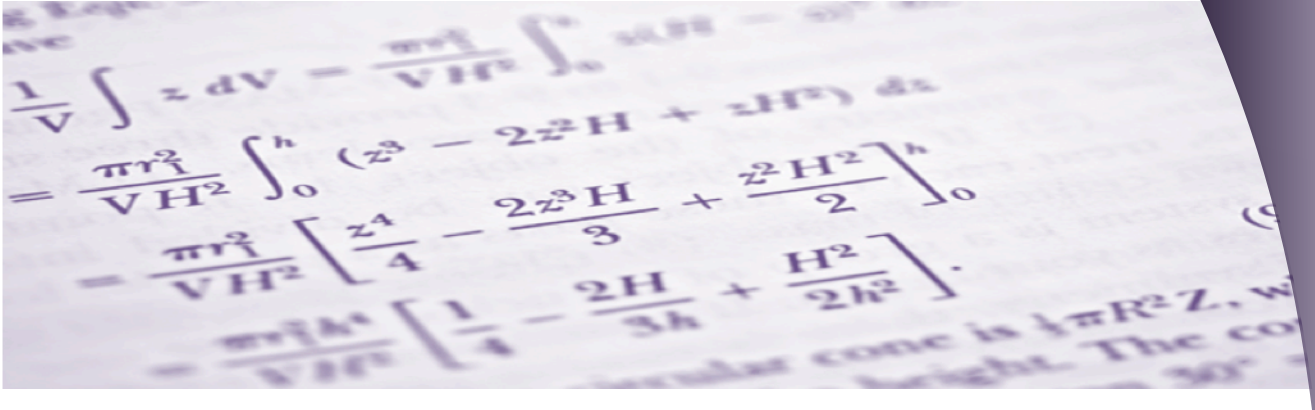
Putnam Mathematics Contest

The 72st Annual William Lowell Putnam Mathematical Competition will be held on Saturday, December 3, 2011, from 9:00 am to noon and 2:00 to 5:00 pm. The questions require different levels of mathematical background, and all require a bit of ingenuity to solve. The scores on the exam are typically quite low, and even answering a couple of questions is considered an excellent performance. The competition is open to undergraduates enrolled in colleges and universities of the United States and Canada who have not yet received a college degree. For more information about the contest visit http://math.scu.edu/putnam/.

Those interested in signing up to take the Putnam exam this year should contact Professor George Gilbert at g.gilbert@tcu.edu by 5 pm on Wednesday, October 5.

Problem Solving Group

Students interested in honing their problem solving skills this semester, for instance as preparation for the Putnam competition, should contact Professor George Gilbert at g.gilbert@tcu.edu. The group will arrange times to meet once or twice a month.



Solution to the April 2011 Problem of the Month

Problem: Is there a cubic polynomial that has three distinct integer roots, critical points at two distinct integers, and an inflection point at an integer?

Solution: Let $p(x) = x(x-a)(x-b) = x^3 - (a+b)x^2 + abx$. Thus, $p'(x) = 3x^2 - 2(a+b)x + ab$ and $p''(x) = 6x - 2(a+b)$. If a and b are distinct integers such that $a+b$ is a multiple of 3, then p and p'' have distinct integer roots. The roots of p' are $(a+b \pm \sqrt{a^2 - ab + b^2})/3$. Use the quadratic formula to factor $a^2 - ab + b^2 = (a + b\omega)(a + b\omega^2)$, with $\omega = (1 + \sqrt{3}i)/2$. To rig this to be a perfect square, set $a + b\omega = (c + d\omega)^2 = (c^2 - d^2) + (2cd - d^2)\omega$. The choice $c = 5, d = 1$, leads to the possibility $a = 24, b = 9$.

September 2011 Problem of the Month

Our first problem for this academic year originated with general contractor Gary Fankhauser. A circle of radius r has a chord of length c. The shorter arc cut off by this chord is subdivided into three arcs of equal lengths; the chords corresponding to these arcs have length w. Find a polynomial equation relating r, c, and w. (The original design had five rather than three sub-arcs, corresponding to the panes of a bay window.)

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
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