



TCU Math Newsletter

The explosive freedom we gain from describing reality in mathematical metaphors is breathtaking. We can discover truths about ourselves that we could never have learned as poets writing in English.

- Paul Rapp

National Science Foundation Research Experience for Undergraduates Summer Programs

The National Science Foundation (NSF) funds summer research opportunities for mathematics undergraduate students through 56 REU Sites across the country. Students are granted stipends and, in most cases, housing and a travel allowance.

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

http://www.nsf.gov/crssprgm/reu/list_result.jsp?unitid=5044

The application deadlines vary for the different sites, but many of the deadlines are in February.

Texas Undergraduate Topology and Geometry Conference

The annual Texas Undergraduate Topology and Geometry Conference (TeXTAG) will be held on February 27-28, 2016 at the University of Texas at Austin. The conference will be comprised of plenary lectures and student talks. For more information and to register, see the conference webpage:

<http://www.ma.utexas.edu/conferences/textag/>.

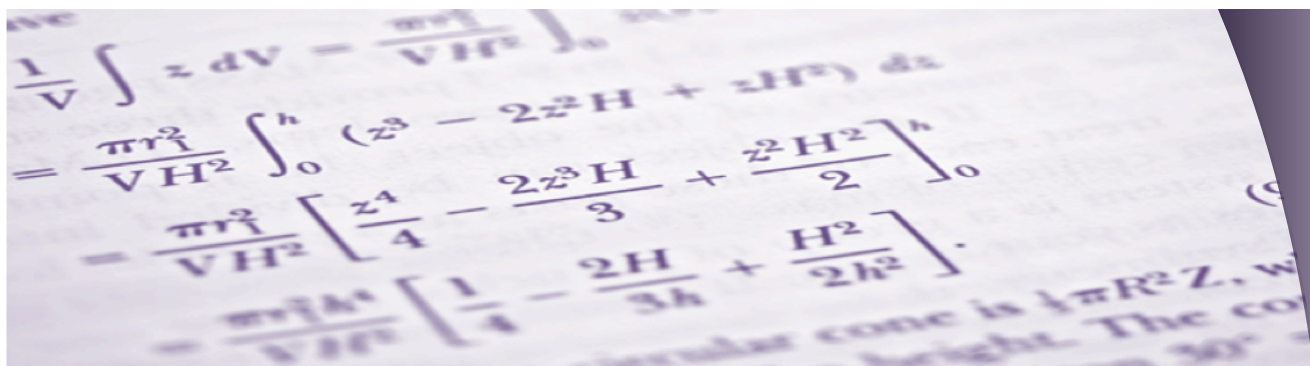
TCU Career and Intern Expo on February 3

All TCU students and alumni are invited to attend the TCU Career and Intern Expo on February 3, 2016 from 4:00 to 7:00 pm in the Campus Rec Center. Top employers hiring for internships and full time positions in a wide range of industries will be at the Expo.

Advanced registration is not required. Students should bring their TCU IDs to the check-in the day of the event, and are encouraged to dress professionally and bring copies of their résumés.

TCU will host the Texas Geometry and Topology Conference

TCU will host the Spring 2016 meeting of the Texas Geometry and Topology Conference (TGTC) on February 19-21, 2016. Mathematicians from Texas, adjoining states, and around the world will be attending and speaking. For more information visit the web site <http://faculty.tcu.edu/gfriedman/TGTC2016/>



Solution to the November 2015 Problem of the Month

Problem: (Math Central) Find all pairs of real numbers a and b such that all roots of $3x^2 - 12x + 2a$ and $x^3 - ax^2 + bx - 8$ are nonnegative real numbers.

Solution: The quadratic has roots $2 \pm \sqrt{36 - 6a}/3$. Two nonnegative roots implies $0 \leq a \leq 6$. On the other hand, nonnegative roots r_1, r_2, r_3 of the cubic satisfy $r_1 + r_2 + r_3 = a$ and $r_1 r_2 r_3 = 8$. By the arithmetic-geometric mean inequality $a \geq 3\sqrt[3]{8} = 6$ with equality if and only if $r_1 = r_2 = r_3 = 2$, the solutions when $a = 6$ and $b = 12$.

The November Problem of the Month was solved by Brad Beadle '96.

February 2016 Problem of the Month

This month's problem was inspired by match-three video games such as Candy Crush Saga. Let m and n be integers, each at least 3. Suppose each square of an $m \times n$ checkerboard has either a white or a black checker and that there are not three squares in a row, horizontally or vertically, that have checkers of the same color. Prove that there are always two adjacent squares whose checkers may be switched to obtain three checkers of the same color in a row.

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

Editor: Rhonda Hatcher
Problem Editor: George Gilbert
Thought of the Month Editor: Robert Doran