



TCU Math Newsletter

*If it's just turning the crank it's algebra, but if it's got
an idea in it, it's topology.*

- Solomon Lefschetz

Advising Sessions for Math Majors on October 4 and 6

For Math Majors degrees starting in 2017, there has been a significant change to the Math BS degree. In particular, there are now three distinct paths to pursuing a Math BS. One of these is a pure math track, another an applied math track, and the third is actuarial math concentration. We continue to offer two Math BA degrees – one pure and the other actuarial. The Mathematics Department will host two informational sessions next week to explain the degree plans and give an overview of advising. The two sessions, which will be lead by Dr. Sue Staples, will have the exact same presentation.

If you are a freshman or sophomore math major, you *must* attend either one of these two sessions. If you are a junior on the current Math BS plan, you have the option to keep your current degree plan, but you are encouraged to attend an advising event to learn about the options and see if your schedule is flexible enough for you to switch to the new Math BS.

The first session is at 12 noon on Wednesday, October 4. The second session is at 3:00 pm on Friday, October 6. Both talks will be in TUC 138.

Dr. Emily Herzig and Dr. Drew Tomlin Named 2017 Project NExT Fellows

Dr. Emily Herzig and Dr. Drew Tomlin of the TCU Mathematics Department were honored by being named 2017 Project NExT Fellows.



Emily Herzig

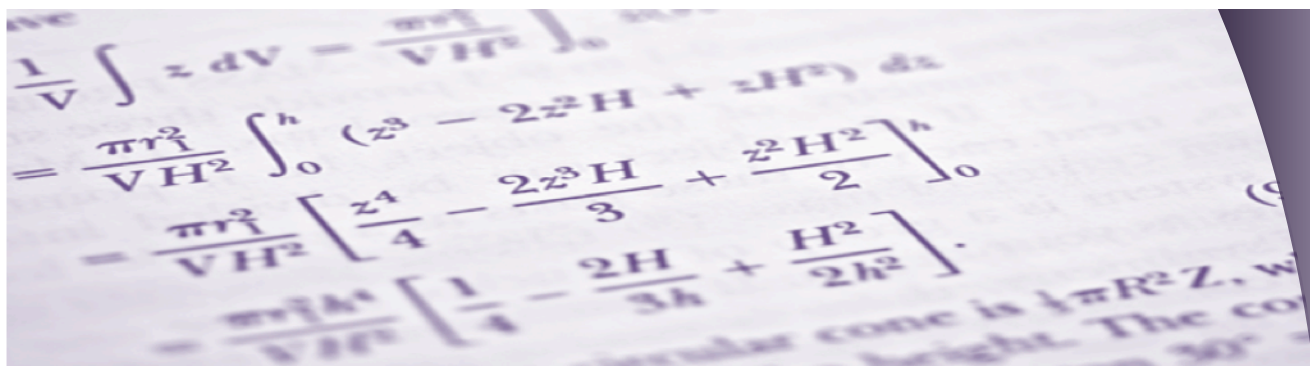


Drew Tomlin

Project NExT (New Experiences in Teaching) is a two-year professional development program for new or recent PhDs in the mathematical sciences. The program aims to help the participants improve their teaching, engage in research and scholarship, and seek opportunities for service and other professional activities. It also provides the participants with a network of peers and mentors. Dr. Eric Hanson of the TCU Mathematics Department is in the second year of the Project NExT fellowship he was awarded last year.

Frank Stones Colloquium Talk on October 20

The next talk in Frank Stones Colloquium Series will be presented by Professor Lee Kennard from the University of Oklahoma. He will present the talk "Torus Actions and Positive Curvature" on Friday, October 20 at 3:30 pm in TUC 352. TCU students and members of the community are invited to attend the talk and enjoy refreshments served in TUC 300 during the half hour before the talk.



Solution to the September 2017 Problem of the Month

Problem: Given integers a_0 and b_0 , define sequences by $a_{n+1} = 2a_n - 1$ and $b_{n+1} = 2b_n + 1$. What is the largest number of integers the two sequences can have in common?

Solution: The largest possible number of integers in common is two. One example is when $a_0 = b_0 = 2$, for which we also have $a_2 = b_1 = 5$.

Observe that each sequence is strictly increasing, strictly decreasing, or constant. Thus, if they have two integers in common, either both are strictly increasing or both are strictly decreasing. Furthermore, both sequences consist of odd integers from the second term onward. Finally, every odd integer in (a_n) except possibly the first is 1 more than a multiple of 4 while every odd integer in (b_n) except possibly the first is 3 more than a multiple of 4. Therefore, a second common integer must be odd and there cannot be a third common integer.

This month's problem was also solved by Brad Beadle ('96) and Qi An.

October 2017 Problem of the Month

Let p be a prime number. Prove that there are integers k and n such that $k^2 + n^2 + 1$ is divisible by p .

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
Thought of the Month Editor: Robert Doran