

TCU Math Newsletter

Probable impossibilities are to be preferred to improbable possibilities.

- Aristotle

Budapest Semesters in Mathematics Education

Budapest Semesters in Mathematics Education (BSME) is a study abroad program in Budapest, Hungary intended for students interested in the teaching of mathematics at the secondary school level. At BSME, students learn about the Hungarian approach which emphasizes problem solving, mathematical creativity, and communication. The courses are designed so that credits will be transferable to American colleges and universities. BSME is currently accepting applications for Fall 2019 (due April 1), and Spring 2020 (due Nov. 1). The applications are reviewed on a rolling basis, so students are encouraged to apply early. More information, including the online application, can be found at bsmeducation.com.

Planned Course Information Available on TCU Mathematics Department Web Site

When registering for mathematics classes, it is helpful to take a look at the planned mathematics course offerings for Fall 2019 through Spring 2023. They are posted on the Mathematics Department web site at <https://mathematics.tcu.edu/wp-content/uploads/2019/01/Schedule4Year.pdf>

Colloquium Talk on March 19

Professor Allison Miller of Rice University will be the next speaker in the Frank Stones Memorial Colloquium Series on Tuesday, March 19. Her talk title is "Knot theory and 4-dimensional topology."

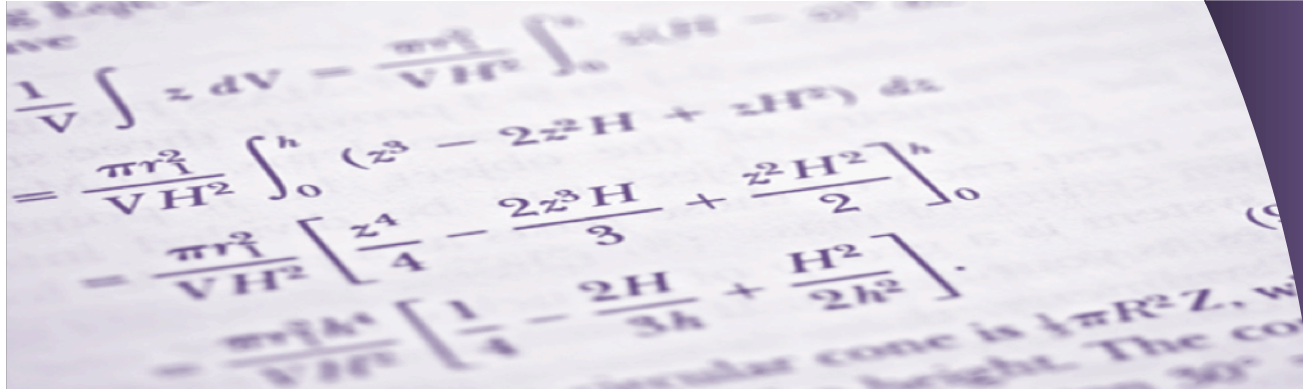
The talk will be in TUC 352 from 3:30 to 4:30 pm. TCU students and members of the community are invited to attend the talk and enjoy the refreshments served in TUC 300 during the half hour before the start of the talk.

TCU College of Science and Engineering Senior Honors Symposium

On Friday, March 29, students in the TCU College of Science and Engineering will present their senior honors projects in the CSE Senior Honors Symposium. The presentations will be judged by faculty who will select CSE finalists for the campus-wide Boller Award Competition. The finalists from each college will compete in the Boller Award Competition for the best Honors presentation on Tuesday, April 9 from 12:00 pm to 5:00 pm in the Scharbauer Hall Debate Chamber.

Pi Day

Pi Day, a holiday commemorating π , is celebrated on March 14 because in month/date format 3/14 matches the first digits of π . To learn more about Pi Day and π see the web site <http://www.piday.org>.



Solution to the February 2019 Problem of the Month

Problem: What is the largest positive integer $n \geq 3$ such that there exists a polynomial $p(x)$ with integral coefficients such that $p(1) = 1$, $p(2) = 2$, $p(3) = 2019$, $p(4) = 2020$, ..., $p(n) = n + 2016$?

Solution: The largest such n is 5. The polynomial $q(x) = p(x) - x$ has roots 1 and 2, hence factors as

$$q(x) = (x - 1)(x - 2)r(x),$$

where $r(x)$ is a polynomial with integral coefficients. Substituting $n = 3, 4, 5, 6$, we find $r(3) = 1008$, $r(4) = 336$, $r(5) = 168$, $r(6) = 504/5$. Thus, the largest n we can hope for is 5. We can fit this data to a parabola using undetermined coefficients or Lagrange interpolation, obtaining $r(x) = 6048 - 2436x + 252x^2$. The corresponding $p(x)$ has integral coefficients.

This month's problem was solved by Brad Beadle ('96).

March 2019 Problem of the Month

Let $a_0 = 1$ and, for $n \geq 0$, let $a_{n+1} = (1 - 1/2^{n+1})a_n$. Prove that the sequence (a_n) converges to a number that is at least $1/4$.

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.