

TCU Math Newsletter

Everyone has a weak spot. That is, the one thing that, despite your best efforts always brings you to your knees, regardless of how strong you are. For some people, it's love. For others, its fame, fortune, or alcohol. Mine was even worse: it was calculus.

Sarah Dessen

October TCU Math Club Meetings via Zoom

The TCU Math Club will be meeting via Zoom on October 12 at 6:30 pm. At this meeting, TCU graduate student Douglas Wagner will be giving the talk "How to Please All of the People All of the Time." The topic is perfect for the election season. A description of the talk is below:

Voting is a lot more complicated than "pick what you want, and the majority wins." This talk will explore just some of the rich and often counterintuitive tapestry of the subject, and even reveal the secret to perfect harmony that is hidden in plain sight. For those taking Topics of Math, we'll reinforce some key concepts integral to the course. For those who've already taken it, we'll cover some interesting extra details you may not have seen before. For mathematicians, we'll work examples and connections that entwine it with other fields of study. And for non-mathematicians, we'll present an accessible overview to a theory of vast practical and philosophical importance.

The TCU Math Club will also meet via Zoom on October 25 for a Kahoot Game Night. The game will likely involve simple math problems, and general math trivia (such as math history, etc.).

The Zoom meeting link below is the same for every TCU Math Club meeting:

<https://tcu.zoom.us/j/91368610847>

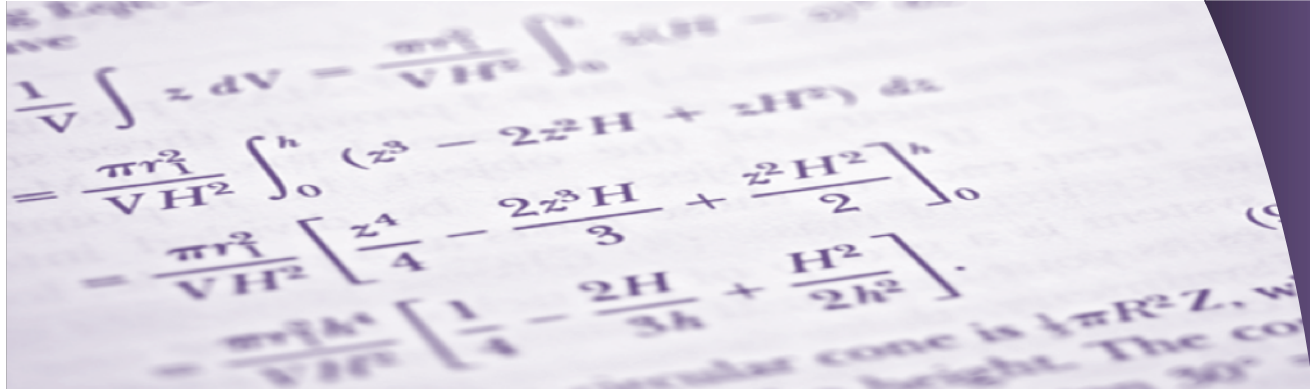
All TCU students are invited to attend!

Putnam Mathematical Competition

The William Lowell Putnam Mathematical Competition is the national undergraduate mathematics competition. Traditionally held on the first Saturday in December, this year it has been postponed until Saturday, February 20, 2021. Papers will be graded, but whether the contest will be official or unofficial depends on campus openings amidst the pandemic and remains to be determined. For more information about the contest, please visit

<https://www.maa.org/math-competitions/putnam-competition>.

If you might be interested in participating, please contact Dr. George Gilbert at g.gilbert@tcu.edu so he can e-mail you after the format is announced. In addition, if you would like some preparation for the contest, either this fall, between semesters, or in the Spring, please let him know.



Solution to the September 2020 Problem of the Month

Problem: Find all constants c such that the curves $y = 1 - x^2$ and $y = c/x$ are tangent (i.e. have a common tangent line at a point of intersection).

Solution: We show $c = \pm 2/\sqrt{27}$. A point of intersection satisfies the equation $c/x = 1 - x^2$, hence $c = x - x^3$. The slopes or derivatives at this point must also be equal. Thus, $-c/x^2 = -2x$ or $c = 2x^3$. Combining the two expressions for c and noting that $x \neq 0$, we find $x = \pm 1/\sqrt{3}$ and $c = \pm 2/\sqrt{27}$ (and $y = 2/3$).

The Problem of Month was solved by Gregory Groppell and Jeff Bond (MS '12).

October 2020 Problem of the Month

This month's problem appeared in Peter Winkler's Mind-Bender's for the Quarantined!, which is located within the National Museum of Mathematics site, <https://momath.org/visit/>. Two marksmen, one of whom ("Acuron") hits a certain small target 75% of the time and the other ("Blunderon") only 25%, aim simultaneously at that target. One bullet hits. What is the probability that it came from Acuron?

The museum has a square-wheeled tricycle among its exhibits:
<https://www.youtube.com/watch?v=FayemJb2-w4>

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.