TCU Math Newsletter

I'm a mathematician, basically. What I do is look around for problems where I can find useful applications for mathematics. All I do, really, is the math, and other people have the ideas.

- Freeman Dyson

March TCU Math Club Meetings

The TCU Math Club will hold three meetings in March 2022. The first will be on Wednesday, March 2 at 7:00 pm in TUC 243, and it will feature a talk by TCU professor Dr. Efton Park discussing "Scissors Congruence."

The next meeting will be on Wednesday, March 16 at 7:00 pm in TUC 352. Dr. Ryan Dunning will present the talk "A Survey of Knot Energies." Dr. Dunning is a former TCU undergraduate who earned his Ph.D. in Mathematics from Rice University and now teaches at St. Mary's University.

The third meeting of the month will be on Wednesday, March 23 at 7:00 pm in TUC 243. This meeting will be a Jeopardy night math competition.

The TCU Math Club is an undergraduate student organization for students interested in mathematics. The club President is McGilley Simons. If you would like to join, contact McGilley at K.M.SIMONS@tcu.edu.

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.

## TCU's MS in Business Analytics Program Accepting Applications

TCU offers a MS in Business Analytics program. The program is a full-time, one year, program that begins each summer. The summer semester is online but the fall and spring semesters are in-person and on-campus. There is not a GRE requirement. Interested mathematics majors are encouraged to apply to the program.

More information about the program and a link to register for an information session can be found at
https://go.tcu.edu/msba

The application deadline is April 1, 2022.

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 through Spring 2026. They are posted on the Mathematics Department web site at
https://cse.tcu.edu/mathematics/files/Schedule4yr.pdf
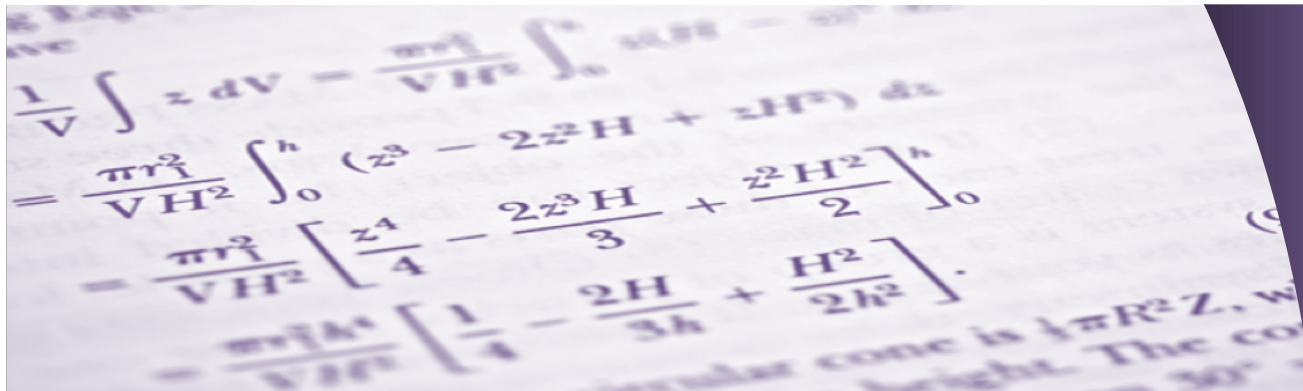
Solution to the February 2022 Problem of the Month

Problem: For all $x \geq y \geq z \geq 0$, show that $x^2y + y^2z + z^2x \geq xy^2 + yz^2 + zx^2$.

Solution: We observe that the two expressions are equal if any two of the three variables are equal. This implies that their difference is divisible by $(x - y), (y - z),$ and $(x - z)$. In fact,

$(x^2y + y^2z + z^2x) - (xy^2 + yz^2 + zx^2) = (y - z)(x^2 - y^2) - (x - y)(y^2 - z^2)$
$= (x - y)(y - z)((x + y) - (y + z)) = (x - y)(y - z)(x - z) \geq 0$

because all three factors are nonnegative.

The Problem of Month was solved by Duc Toan Nguyen and Jeff Bond (M.S. '12).

March 2022 Problem of the Month

When spaces are bounded, there are various theorems about the existence of fixed points for distance-decreasing functions. Prove that the function

$$f(x) = x + \frac{1}{1 + e^x}$$

satisfies $|f(x) - f(y)| < |x - y|$ for all distinct x, y ∈ ℝ and yet there is no x for which $f(x) = x$.