TCU Math Newsletter

Mathematics is a place where you can do things which you can't do in the real world.
- Marcus du Sautoy

Math Majors Honored

Tamara Fuenzalida has been named the 2015 TCU Mathematics Department Senior Scholar. The winner of the award is determined by a vote of the Mathematics Department Faculty.

Skylar Addicks, Sarah Clement, Tamara Fuenzalida, Kaley Hicks, Rachel Hoffman, Kyle Keyzer, John Kouris, Anh Nguyen, Rachel Ramirez, and Olivia Wilkins will be initiated into the mathematics honor society Pi Mu Epsilon later this month. Marie Ballard and Katie Grebel were initiated last year.

Tamara Fuenzalida and Elizabeth Oster will both be initiated into membership in Phi Beta Kappa this May.

Congratulations to all of these students!

Calculus Bee on Tuesday, April 21

The annual TCU Mathematics Department Calculus Bee will be held on Tuesday, April 21 at 3:30 pm in Tucker Technology Center 245. The material covered is Calculus I and II, but not beyond the material that current Calculus II students have had. Those wishing to compete should arrive for refreshments and contestant number assignment at 3:00 pm in TUC 300. All TCU undergraduates are eligible to compete. Barnes & Noble gift cards will be awarded to the top three finishers, with $75 for first place, $50 for second place, and $25 for third place.

TCU Mathematics Majors Attend Actuary Seminar

Six TCU mathematics majors were sponsored by Casualty Actuarial Society (CAS) to attend the Ratemaking and Product Management Seminar & Workshops in Dallas on March 10, 2015. The TCU students attending, in the picture above from the event, from left to right, were Carly Marston, Daniel Castro, Jacob Davis, Rachel Ramirez, Alexandria McMillan, and Anh Nguyen.

Workshop in Geometric Topology at TCU June 2015

The 32nd Annual Workshop in Geometric Topology will be held at TCU this year on June 25 – 27. The featured speaker is Wolfgang Lück of the University of Bonn and the Hausdorff Research Institute for Mathematics, who will give a series of three one-hour lectures. The workshop will also include many other talks by mathematicians from around the country. Dr. Greg Friedman of the TCU Mathematics Department is one of the organizers. More information about the workshop can be found at http://faculty.tcu.edu/gfriedman/GTW2015/
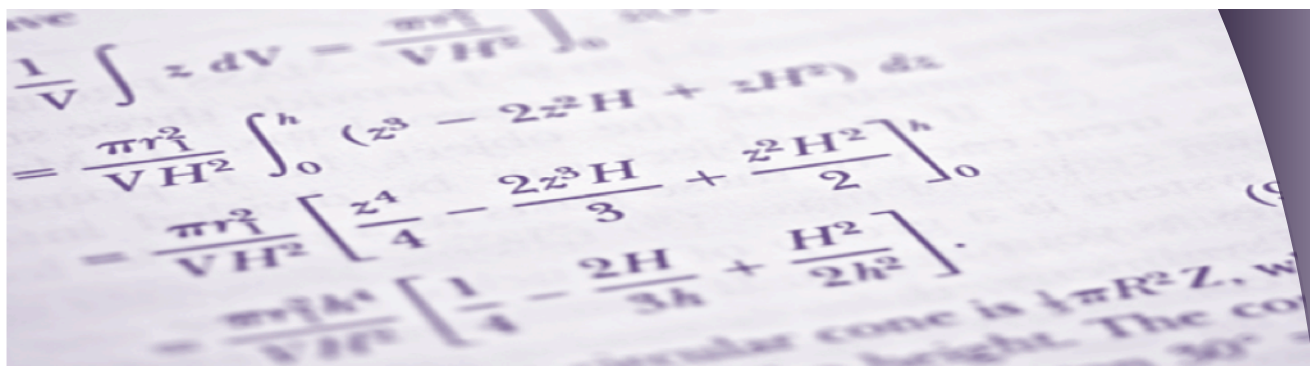
Solution to the March 2015 Problem of the Month

Problem: Show that any closed disk (i.e. a circle and its interior) of radius 1 in the plane contains at least two points with integral coordinates.

Solution: Denote the coordinates of the center of the disk by (c, d). Because every real number is within $1/2$ of an integer, the square with corners $(c \pm 1/2, d \pm 1/2)$ contains a point (m, n) with integral coordinates. Note that
$$r^2 = (m - c)^2 + (n - d)^2 \leq 1/2.$$
Reflecting in the x- and/or y-axes if necessary, we may assume $m \geq c, n \geq d$. If $(m - 1, n)$ does not lie in the disk, then
$$1 < (m - 1 - c)^2 + (n - d)^2 = r^2 + 1 - 2(m - c),$$
or $0 \leq m - c < r^2/2$. Similarly, if $(m, n - 1)$ does not lie in the disk, $0 \leq n - d < r^2/2$. But then
$$r^2 = (m - c)^2 + (n - d)^2 < r^4/2,$$
implying $2 < r^2$, a contradiction.

April 2015 Problem of the Month

This month's problem is due to V. N. Murty and J. M. Maynard. It appeared in *The Two-Year College Mathematics Journal*. Let x be positive and let y be a real solution to

$$e^y = \frac{x}{1 - e^{-x}}.$$

Prove that $x > 2y$.