# TCU Math Newsletter

*We should take care not to make the intellect our god; it has, of course, powerful muscles, but no personality.*

*- Albert Einstein*
*Out of My Later Life, 1950*

## Spring 2016 Upper Level Math Classes

The TCU Mathematics Department will offer a wide selection of upper level math classes this spring. In addition to the classes Math 50253 Abstract Algebra I and Math 50323 Differential Geometry, the following will be offered:

Math 60223/40970 Survey of Mathematical Problems
Math 60323/40970 Algebraic Topology
Math 60643/40970 Dynamical Systems
Math 60603/40970 Game Theory
Math 60970/40970 Advanced Real Analysis

If you are interested in these classes, see the TCU catalog description and the professors offering the classes. The planned mathematics course offerings for the next 4 years will be emailed to all majors and minors soon.

## Career Consultant for the College of Science and Engineering

Gabriela Martinez has joined the TCU Center for Career and Professional Development as the Career Consultant liaison to the College of Science and Engineering. Her hours will be from 8 am to 5 pm at the following locations: Jarvis, 1st floor on Monday, Wednesday, Friday, and TUC 003G on Tuesday and Thursday. The services she offers include résumé reviews, interview coaching, career and personality assessments, and job search strategies. To schedule an appointment with Ms. Martinez, call 817-257-2222.

## November TCU Actuarial Talks

Ben Hagan and TCU graduate Ash Nyangani of Mercer will be the next speakers in the TCU Actuarial Talk series. They will present the talk "The Consulting Industry & Today's Retirement Challenges" on Monday, November 2 at 3:30 pm in TUC 352. In this talk, you can learn what a retirement consulting actuary does,

The second November actuarial talk, presented by AON, will be on Monday, November 16 at 3:30 pm in TUC 352. Refreshments will be available before both talks in TUC 300.

## Frank Stones Colloquium Talk on November 20

Professor Andrew Blumberg from the University of Texas in Austin will speak in Frank Stones Colloquium Series on Friday, November 20. The talk will at 3:30 pm in TUC 352 with refresh refreshments served in TUC at 3:00 pm.
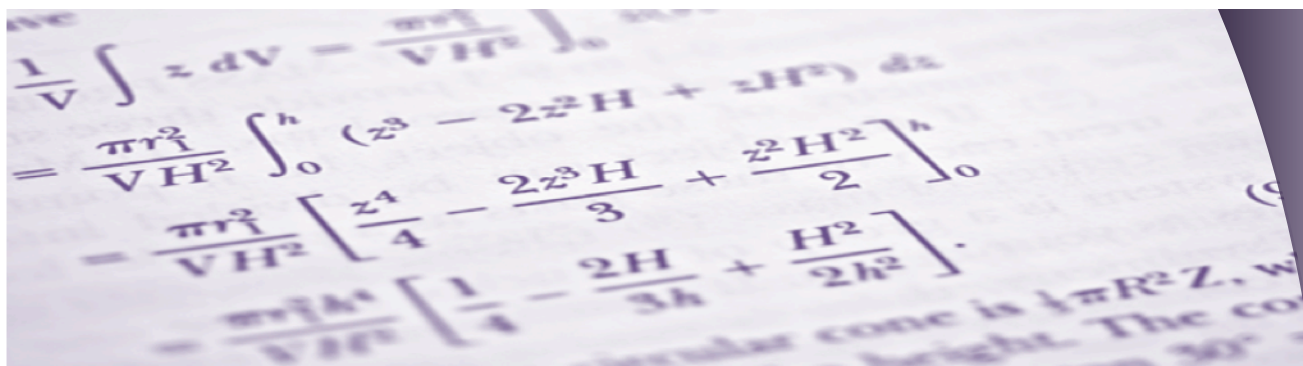
# Solution to the October 2015 Problem of the Month

**Problem:** Show that
$$(1 - 2^{-1})(1 - 2^{-2}) \cdots \left(1 - 2^{-(n-1)}\right)(1 - 2^{-n})$$
is greater than ¼ for every positive integer $n$.

**Solution:** (Brad Beadle '96) Use the inequality $(1 - a)(1 - b) > 1 - (a + b)$ for $0 < a < 1, 0 < b < 1$ repeatedly and the geometric series formula to conclude

$$(1 - 2^{-1})(1 - 2^{-2}) \cdots \left(1 - 2^{-(n-1)}\right)(1 - 2^{-n}) = \frac{1}{2}\left(1 - \left(\frac{1}{4} + \frac{1}{8} + \cdots + \frac{1}{2^n}\right)\right)$$

$$> \frac{1}{2}\left(1 - \left(\frac{1}{4} + \frac{1}{8} + \cdots + \frac{1}{2^n} + \cdots\right)\right) = \frac{1}{2}\left(1 - \frac{\frac{1}{4}}{1 - \frac{1}{2}}\right) = \frac{1}{4}.$$

# November 2015 Problem of the Month

This month's problem was Math Central's final Problem of the Month. Find all pairs of real numbers $a$ and $b$ such that all roots of $3x^2 - 12x + 2a$ and $x^3 - ax^2 + bx - 8$ are nonnegative real numbers.

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.