



# TCU Math Newsletter

*My theory stands firm as a rock; every arrow directed against it will return quickly to its archer. How do I know this? Because I have studied it from all sides for many years; because I have examined all objections which have been made against the infinite numbers; and above all, because I have followed its roots, so to speak to the first infallible cause of all created things.*

*- Georg Cantor*

## **Actuarial Presentations on August 30 and September 13**

Lei Jin, an actuary employed at Sun Life Financial, will present the talk "Actuarial Careers" on Thursday, August 30 at 3:30 – 4:30 pm in TUC 246. Ms. Jin earned her undergraduate degree from TCU, and recently earned a masters degree in actuarial science from the University of Waterloo. The program at Waterloo is ranked in the highest tier internationally. Her talk will focus on the benefits of pursuing a graduate degree in actuarial science and she will provide an overview of career options.

On Thursday, September 13 at 3:30-4:30, Shannon Merchant of TCU Career Services will discuss writing resumes and cover letters.

Refreshments will be served before both talks at 3:00 pm in TUC 300. All TCU students and faculty are invited to attend.

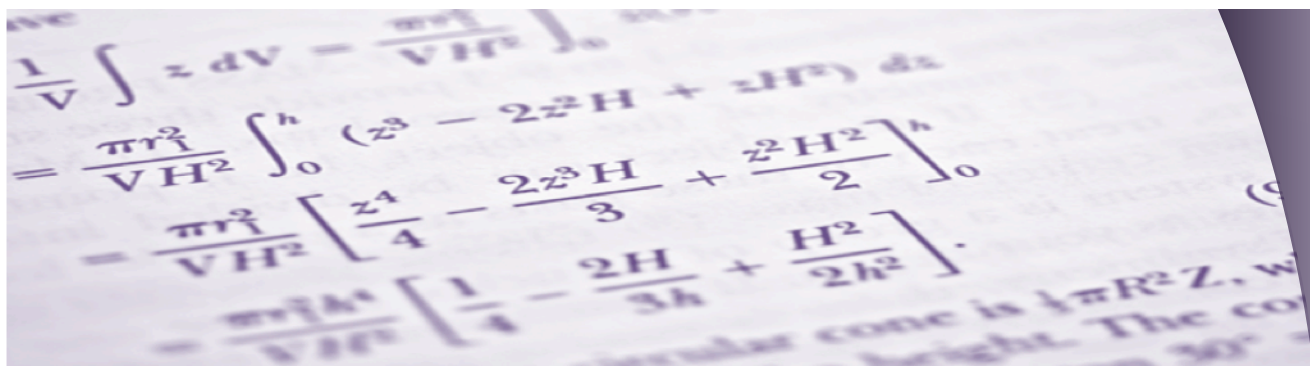
Approximately once or twice a month, the TCU Mathematics Department will host talks such as these of interest to students in the actuarial program. Many of the talks will be useful in general for careers in industry or finance.

## **Frank Stones Colloquium Talk**

The first speaker in the Frank Stones Colloquium series is Jonatan Lenells from Baylor. He will present the talk "Exact solutions of the Einstein equations" on Friday, September 28 3:30 pm in TUC 246. Refreshments will be served at 3:00 pm in TUC 300. In his talk, Professor Lenells will present new exact solutions of the Einstein equations which combine the Kerr and Neugebauer-Meinell spacetimes. The solutions are given explicitly in terms of theta functions on a family of hyperelliptic Riemann surfaces of genus four.

## **TCU Fall Career and Intern Expo**

TCU Career Services is hosting a Career and Intern Expo on September 12, 4:00 – 7:00 pm in the Campus Recreational building. Students attending the fair can meet with employers offering internships and full time jobs. If you are interested in participating in any of these events, please send an email to [frogjobs@tcu.edu](mailto:frogjobs@tcu.edu).



## Solution to the April 2012 Problem of the Month

**Problem:** Suppose a polynomial  $p(x)$  has integral coefficients and that  $p(n)$  is divisible by  $n^2 + 1$  for infinitely many integers  $n$ . Must  $p(x)$  be divisible by  $x^2 + 1$ ?

**Solution:** Yes. By the division algorithm, we can write  $p(x) = q(x)(x^2 + 1) + ax + b$ , where  $q(x)$  has integral coefficients and  $a$  and  $b$  are integers. Because  $\lim_{x \rightarrow \pm\infty} (ax + b)/(x^2 + 1) = 0$ , it follows that  $(an + b)/(n^2 + 1) = 0$  for infinitely many integers  $n$ . This can only happen if  $a = b = 0$ .

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

## September 2012 Problem of the Month

The following is a variant of a problem appearing in Peter Winkler's *Mathematical Mind-Benders* and later in the *New York Times*. A box has a jumble of identical extension cords (none plugged in). Two unattached, opposite ends are chosen at random and plugged into each other. The process continues until there are no more loose ends. What is the expected number of (very tangled) loops?

Students and others are invited to submit solutions to Dr. George Gilbert by e-mail ([g.gilbert@tcu.edu](mailto: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.