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October 2018

TCU Math Newsletter

Mathematicians are notorious for laboring for weeks to prove what is obvious to the rest of the world.

– Nigel Higson

Engineering & Technology Career Fair at TCU on October 3

TCU students are invited to attend the Engineering & Technology Career Fair on October 3 from 10:00 am to 1:00 pm in Tucker Technology Center. The Fair will provide an opportunity for TCU students to meet with engineering and technology employers who are interested in connecting with students about internships, part-time positions, and full-time positions.

To register visit www.careers.tcu.edu. If you have trouble registering on line, call the Career Center at 817-257-4141 for assistance.

Colloquium Talks

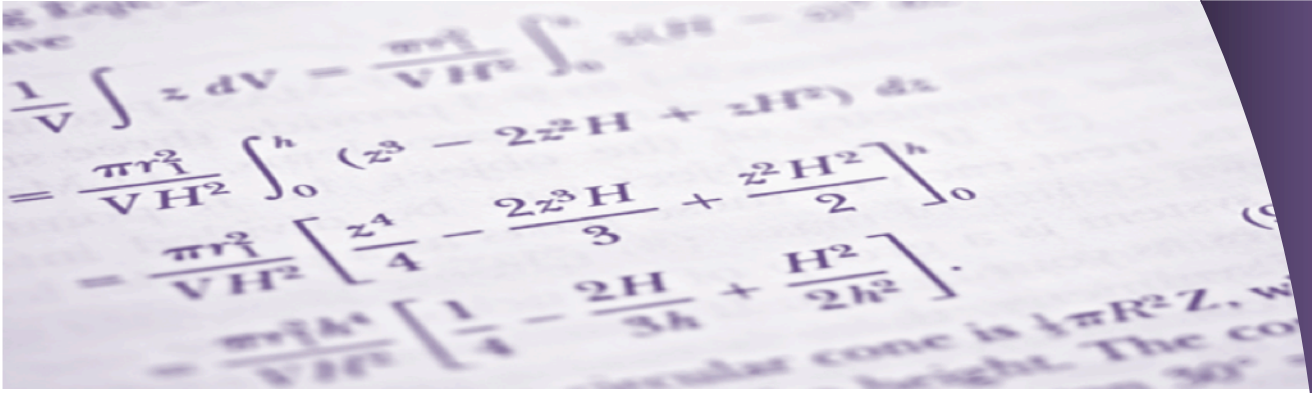
Professor Rick Ancel of the University of Wisconsin, Milwaukee will present his colloquium talk on Monday, October 8. A talk presented by Professor James Gabe of the University of Glasgow will be on Friday, October 19. Professor Boris Hanin of Texas A&M University will also present a talk on Friday, November 2.

All the colloquium talks will be in TUC 244 from 3:30 to 4:30 pm. TCU students and members of the community are invited to attend the colloquium talks and the refreshments served in TUC 300 during the half hour before the start of each talk.

TCU Actuarial Students attend Dive In Event in Dallas

On September 25, 2018, Dive In (The Festival for Diversity and Inclusion in Insurance) hosted the event *Three Martini Lunch and the Post-Mad Men Era: The Insurance Industry Then and Now.* This event was intended for young professionals, and featured roundtable mini case studies, followed by an executive panel speaking about the insurance industry's progress in the area of diversity and inclusion. Eight TCU Actuarial Mathematics majors attended the event.

Front row: Alaina Jerguson, Maddie Graff, Casey Lutz
Back Row: Rooshna Ali, Eric Haacker, Madi Leonard, Peter Dore, Jack Skokin



Solution to the September 2018 Problem of the Month

Problem: Find all pairs of positive integers such that the difference of their least common multiple and their greatest common divisor equals their difference.

Solution: The pairs are positive integers such that one divides the other.

If g is the greatest common divisor of positive integers $a \leq b$, then $a = gc$ and $b = gd$, where c and d are relatively prime positive integers. The least common multiple of a and b is then gcd, so we have the equation

$$gcd - g = gd - gc,$$

which is equivalent to $(c-1)(d+1) = 0$. It follows that $c = 1$ with d arbitrary, i.e. the pairs are a and ad for arbitrary positive integers a and d.

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

October 2018 Problem of the Month

Let S be a set with binary operation * having an identity element e satisfying

$$a * e = e * a = a$$

and satisfying

$$a * (b * c) = (a * b) * (a * c)$$

("self-distributivity") for all $a, b, c \in S$. Prove that

$$(a * b) * c = a * (b * c)$$

for all $a, b, c \in S$ (i.e. * is associative).

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.

Editor: Rhonda Hatcher
Problem Editor: George Gilbert
Thought of the Month Editor: Robert Doran