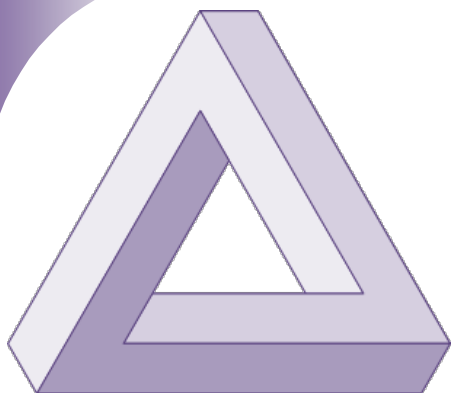




TCU Math Newsletter

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*I have hardly ever known a mathematician
who was capable of reasoning.*

*-Plato (ca 429-347 BC)
Republic, VII, 531*

Frank Stones Colloquium Talk

Professor Taylor Martin from Rice University will present the talk "Lower Order Solvability of Links" on Friday, November 2 at 3:30 pm in TUC 246. Before the talk, refreshments will be served in TUC 300. In her talk, Professor Taylor will discuss link concordance and the n -solvable filtration, with the goal of giving a classification of 0-solvable links and some insight into understanding 0.5-solvable links.

November Actuarial Talk

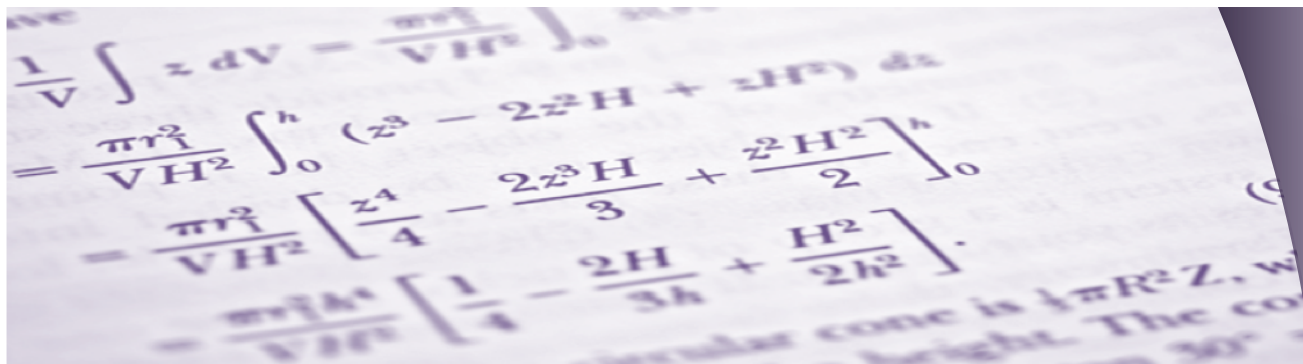
Ms. Catherine Taylor of USAA will present the talk "Catastrophe Management" at 3:30 pm on Thursday, November 8 in TUC 246. At this talk, you will learn about the actuarial profession and catastrophe risk management from a casualty actuary's perspective.

TCU Career Network Webinar on November 7

TCU Career Services and Alumni Relations are presenting a new career webinar series for TCU students and alumni. One of the webinars is scheduled for Wednesday, November 7 from 7:00 to 8:00 pm. The title of the webinar is *Find the Right Job Right Now* with author Alan Kearns. You can register for it and view previous webinars at <http://expertwebinarseries.com/tcu/Webinars.aspx>.

Valuable Information for Undergraduate and Graduate Mathematics Students on the American Mathematical Association Web Site

The American Mathematical Society (AMS) has a web page dedicated to resources for undergraduate and graduate students in mathematics. On the site, you can find information about jobs and internships, careers in mathematics, graduate schools, graduate fellowships, math competitions, math conferences, on line journals, and other mathematically related resources. Information specifically for undergraduates can be found at the site www.ams.org/programs/students/undergrad/undergrad, and information for graduate students is at www.ams.org/programs/students/gradinfo/gradinfo.



Solution to the October 2012 Problem of the Month

Problem: Show that one can form a closed path in 3-dimensional space consisting of seven line segments of length 1 with a right angle between adjoining segments.

Solution: We join together two pieces, the first a U-shaped piece consisting of 3 sides of a square. The second will have four edges and be symmetric with respect to a plane through the “middle” vertex. Put this “middle” vertex at $(0,0,0)$ and join it to vertices at $(1,0,0)$ and $(0,1,0)$.

We now use the fact that adjacent edges are perpendicular if and only if the dot product of the vectors representing these edges is 0. Keeping the symmetry, we join $(1,0,0)$ to $(1,r,s)$ and $(0,1,0)$ to $(r,1,s)$, where $r^2 + s^2 = 1$. To join the U-shaped piece requires the distance between $(1,r,s)$ and $(r,1,s)$ to be 1, so $r = 1/2$ and $s = \sqrt{3}/2$ (or $-\sqrt{3}/2$).

We can now join the U-shaped piece and can pivot it to make the edges perpendicular. Describing the two parallel sides of the U-shaped piece by the vector (a,b,c) , we need $b + \sqrt{3}c = 0$ and $a + \sqrt{3}c = 0$, along with $a^2 + b^2 + c^2 = 1$, with one solution $a = b = -\sqrt{3}/\sqrt{7}$, $c = 1/\sqrt{7}$. The final two vertices are $\left(1 - \frac{\sqrt{3}}{\sqrt{7}}, \frac{1}{2} - \frac{\sqrt{3}}{\sqrt{7}}, \frac{\sqrt{3}}{2} + \frac{1}{\sqrt{7}}\right)$ and $\left(\frac{1}{2} - \frac{\sqrt{3}}{\sqrt{7}}, 1 - \frac{\sqrt{3}}{\sqrt{7}}, \frac{\sqrt{3}}{2} + \frac{1}{\sqrt{7}}\right)$.

This month’s problem was solved by Brad Beadle (’96). To see a model, stop by George Gilbert’s office in Tucker 205.

November 2012 Problem of the Month

In triangle ABC , the angle trisectors of angle A intersect side BC in points D and E . If $BD = CE$, must ABC be isosceles?

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.