



# TCU Math Newsletter

*We could use up two Eternities in learning all that is to be learned about our own world and the thousands of nations that have arisen and flourished and vanished from it. Mathematics alone would occupy me eight million years.*

- Mark Twain

## Parabola Talk on October 26

Professor Greg Freidman of the TCU Mathematics Department will present a Parabola undergraduate math talk on Wednesday, October 26 at 3:30 pm in Tucker Technology Center 244.

The talk is entitled "The 85 Ways to Tie a Tie: The mathematics of neck ties." In this fun talk we'll bring the power of mathematics to bear on a critical topic for both gentlemen and the ladies who dress them: How many ways are there to tie a neck tie? And more importantly, how many *good* ways are there to tie a necktie? Audience members are encouraged to bring their own neckwear for participation in the talk (though we'll have some ties available for those who don't have their own).

Parabolas talks are accessible to undergraduate students. All faculty, students, and interested members of the community are invited to attend. Refreshments are served before the talks in TUC 300 at 3:00 pm.

## Graduate and Professional School Fair

TCU Career Services is hosting a Graduate and Professional School Fair on October 12, 10:00 am – 2:00 pm in the BLUU Auditorium. Students attending the fair can meet with graduate and professional schools from across the country.

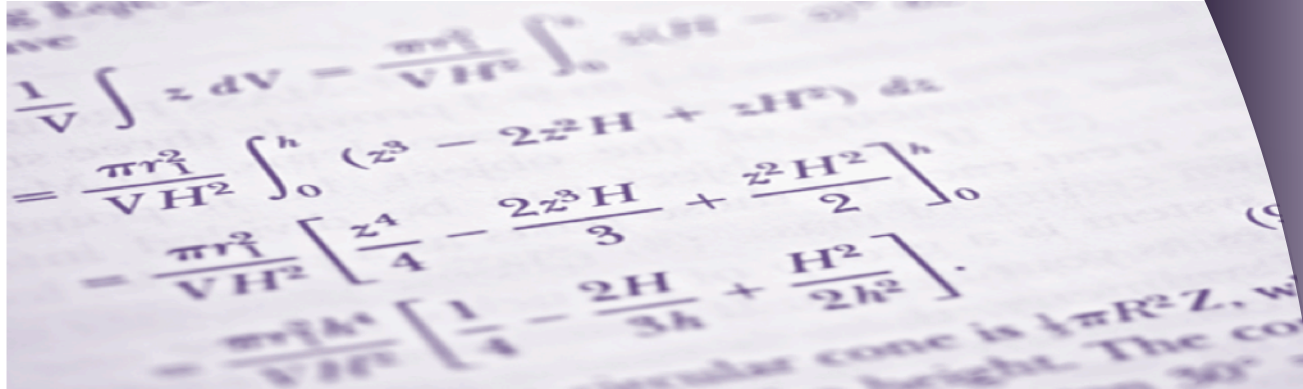
## Sign Up for the Putnam Mathematics Contest Soon

Undergraduates interested in signing up to take the Putnam exam this year should contact Professor George Gilbert at [g.gilbert@tcu.edu](mailto:g.gilbert@tcu.edu) by Friday, October 7. For more information about the Putnam Mathematics contest visit <http://math.scu.edu/putnam/>.

## The Statistics of a Winning Baseball Team

With Major League Baseball playoffs in full swing, we might ask what is the formula for a winning baseball team? University of Delaware Professor Charles Pavitt presents his answer to this question in an article in the October *Journal of Quantitative Analysis in Sports*.

In his article, "An Estimate of How Hitting, Pitching, Fielding, and Base-stealing Impact Team Winning Percentages in Baseball," Pavitt found that hitting accounts for more than 45% of teams' winning records, fielding for 25%, pitching for 25%, and that the ability to steal bases is not that important to the overall winning record. His statistical analysis was based on the data of every MLB team over a 48-year period from 1951-1998.



## Solution to the September 2011 Problem of the Month

**Problem:** A circle of radius  $r$  has a chord of length  $c$ . The shorter arc cut off by this chord is subdivided into three arcs of equal lengths; the chords corresponding to these arcs have length  $w$ . Find a polynomial equation relating  $r$ ,  $c$ , and  $w$ .

**Solution:** Let  $\theta$  be the angle subtended by the shorter arcs. Thus,  $\sin \frac{\theta}{2} = \frac{w}{2r}$  and  $\sin \frac{3\theta}{2} = \frac{c}{2r}$ . Using the addition law for sines and double angle formulas,

$$\begin{aligned} \sin \frac{3\theta}{2} &= \sin \theta \cos \frac{\theta}{2} + \sin \frac{\theta}{2} \cos \theta = 2 \sin \frac{\theta}{2} \cos^2 \frac{\theta}{2} + \sin \frac{\theta}{2} \left(1 - 2 \sin^2 \frac{\theta}{2}\right) \\ &= 3 \sin \frac{\theta}{2} - 4 \sin^3 \frac{\theta}{2}. \end{aligned}$$

This yields  $w^3 - 3wr^2 + cr^2 = 0$ .

## October 2011 Problem of the Month

Let  $x$ ,  $y$ , and  $z$  be real numbers such that  $x + y + z = 1$  and  $x^2 + y^2 + z^2 = 2$ . What are the possible values of  $x^3 + y^3 + z^3$ ?

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.