

# math news

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## The Economics of Studying Mathematics

At the 2006 Career Day presentation for Mathematics, students attending heard encouraging and helpful advice from alumnus Dr. Terance Rephann (Class of 1986, Mathematics and Economics). Dr. Rephann attended graduate school at West Virginia University, and completed a postdoctoral appointment at a research facility in Sweden. He then returned to western Maryland to serve as Director of Institutional Research at Allegany College of Maryland. He also has a private consulting firm, and is on the Cumberland city council.

Of the courses taken at Frostburg, he believes that the Calculus sequence, Differential Equations, Matrix Algebra, Mathematical Statistics, and Foundations of Mathematics proved most helpful to him in his later coursework, research, and career. He advised students to be familiar with mathematics software such as Mathematica, a statistics package such as SAS, SPSS, or Stata, and a programming language such as C++ or Java. He warned that in real world problem solving, we are often forced to consider very carefully any underlying assumptions, to deal with "dirty" data, and to rely on simulations. He also acknowledged that interpersonal skills and public speaking abilities can play a significant role in a person's career.

Our guest congratulated the mathematics majors for choosing a "hard path" through college, one that requires lots of studying and much mental effort, but one that can bring big payoffs later. He said mathematics graduates are good people to hire because they are able to step in and hit the ground running as problem solvers. His firm's website is [www.quotient.net](http://www.quotient.net).

## Puzzle: Guessing on the Final Exam?

You are taking a True/False examination for which you are unprepared(!). At one point you decide your best strategy is to take a purely random guess between two alternative choices. You reach in your pocket and pull out a penny, but you suspect that this is most likely a biased coin. Can you derive a good strategy to use to determine a 50/50 random selection using this coin? (Answer in February issue.)

## Happy Holidays from *Math News*

We wish you good luck on your final exams, a pleasant holiday season, and a great start to 2007. You will see us again in February.

## Congratulations to December Graduates

The following mathematics and actuarial science majors will graduate at the end of this term:

Charise Burton, Mathematics  
Kelly Hobel, Mathematics  
Matt Taggert, Mathematics  
Amanda Reitz, Actuarial Science

Math News congratulates these students and wishes them well in their future careers/advanced study.

## Solution to Last Month's Puzzle

**The problem:** Sara and Katy are ready to sprint, each at her own pace, on a circular track. Katy starts at point K and runs clockwise, while Sara simultaneously starts at point S and runs counterclockwise. They first meet at point X and continue, next meeting at point S; still running, they meet again – this time at point K. What is the ratio of their speeds?

**The Solution:** Assume for the sake of simplicity that the track's circumference is 1 unit. Let  $k$  be the distance Katy runs from point K to point X, and let  $s$  be the distance from point S to point X. The distance to the second meeting is  $s$  for Katy and  $1-s$  for Sara. The distance to the third meeting is  $1-k-s$  for Katy and  $k+s$  for Sara. Adding the distances for each runner, we get a total of 1 unit for Katy and  $1+k+s$  for Sara. Because they each run at a constant speed, we have the following equality of ratios:

$$\frac{k}{s} = \frac{s}{1-s} = \frac{1-k-s}{k+s}$$

From these equalities, we can derive the quadratic equation:  $s^2 - ks - k^2 = 0$ . Solving for  $s$  in terms of  $k$ ,

$$s = \frac{1 + \sqrt{5}}{2} k$$

or

$$\frac{s}{k} = 1.618.$$

[Note: you may recognize the expression  $\frac{1 + \sqrt{5}}{2}$  as the

Golden Ratio.]

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