

# The Almagest

The bi-weekly newsletter of the Department of Mathematics and Computer Science. Your trusted source for news.

Volume 5, No. 5

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Alma College  
Alma, MI 48801

## Math Colloquium

General relativity is the most mathematically beautiful theory in all of physics. Einstein's great insight was that gravity is not a force, but an inevitable side effect when objects try to move in straight lines after space and time have been curved by mass and energy. In this talk, **Dr. Steuard Jensen**, Assistant Professor of Physics at Alma College, will show us how to blend calculus with curvature and see how the mathematics of differential geometry can encode the shape of space itself. Parts of his talk will be purely conceptual, but to follow the details you'll need a basic knowledge of vectors and the gradient.

### "Einstein's Gravity: The Mathematics of General Relativity"

Presenter: **Dr. Steuard Jensen**

Date: **Monday, November 19<sup>th</sup>**

Time: 4:00

Place: SAC 109

*Refreshments at 3:50*

## News From The Math Club

The next event sponsored by the Math Club is:

### **Math Club Holiday Party**

Thursday, December 6<sup>th</sup>, 4-6 p.m. Location TBA

The Math Club meets **EVERY THURSDAY at 10 pm** in the Wright Hall lobby. The officers are:

Pres: **Caitlin Closs**      VP: **Phil Ryskamp**  
Treas: **LeeAnne Carr**      Sec: **Katie Dwenger**

## Why the Name Almagest?

Have you ever noticed that when people want to come up with a name for a newsletter they often put "gest" or "gazette" at the end of something obvious to make their publication sound fancy? To be completely honest, that is exactly what I assumed Professor Sipka was doing in naming our math newsletter the *Almagest*. Well, to put it simply, I was wrong.

The name, *Almagest*, has a history that extends a little further than 2009 when Professor Sipka brought the newsletter to Alma College. The *Almagest* dates back to the second century when **Claudius Ptolemy** wrote a mathematical and



astronomical treatise (essentially a fancy essay, somewhat like a PhD dissertation) based on the motion of the stars and planets. In the *Almagest*, Ptolemy documented the work of the ancient Greek mathematician, Hipparchus, which has since been

lost. Hipparchus wrote a lot about trigonometry, and if it hadn't been for Ptolemy, no one would have the pleasure of learning trigonometry in high school!

The *Almagest* was made up of thirteen little books ranging from an outline of Aristotle's cosmology, to an explanation of the equinoxes, and the motion of all of the planets. For those of you who are feeling ambitious enough to read the original *Almagest*, it was translated into English by G. J. Toomer with a second edition published in 1998.

*Jon Young*

## REU at North Carolina State University

North Carolina State University invites mathematics majors to participate in its 10-week summer research program from May 28<sup>th</sup> to July 31<sup>st</sup>. Participants will receive a stipend of \$4000 along with free room and board. Possible projects you may work on include: Modeling Biological Systems, Financial Mathematics, Crypt-analysis, Cluster Analysis, and Data Mining. Applications are due by **February 15<sup>th</sup>, 2013**. Information about the REU and application forms can be found at the following website.

<http://www.math.ncsu.edu/summer/IMSTATE/>

## Need Help?

Tutors are available to help you for the following courses at the times listed. *Please come!*

MTH 101 Monday & Wednesday  
8:00 – 10:00 pm in SAC 214

MTH 112  
MTH 121  
MTH 122

MTH 116 Tuesday & Thursday  
8:00 – 10:00 pm in SAC 214

## Solution to Previous Problem

Assume the two teams in the World Series are equally matched, so that the probability of either team winning a game is  $1/2$ . The series ends when one team has won four games. Assume no ties; one team or the other must win any given game. Calculate the probability that the series ends in *exactly* 4 games? In 5 games? In 6 games? In 7 games?

Several students submitted solutions, but **Alex Hegedus'** solution was the only correct one. He

computed:  $P(4 \text{ games}) = 2 \cdot \binom{4}{4} \cdot \frac{1}{2^4} = \frac{1}{8}$

$$P(5 \text{ games}) = 2 \cdot \left( \binom{5}{4} - \binom{4}{4} \right) \cdot \frac{1}{2^5} = \frac{1}{4}$$

$$P(6 \text{ games}) = 2 \cdot \left( \binom{6}{4} - \binom{5}{4} \right) \cdot \frac{1}{2^6} = \frac{5}{16}$$

$$P(7 \text{ games}) = 2 \cdot \left( \binom{7}{4} - \binom{6}{4} \right) \cdot \frac{1}{2^7} = \frac{5}{16}$$

## Puzzle of the Bi-week

Three numbers are in arithmetic progression, three other numbers in geometric progression. Adding the corresponding terms of these two progressions successively, we obtain

**85, 76, and 84**

respectively, and adding all three terms in the arithmetic progression, we obtain 126. *Find the terms of both progressions.*

Recall: An *arithmetic progression* is a sequence of numbers with the property that the *difference* between successive terms is constant. *e.g.*, 1, 4, 7, 10, 13, ...

A *geometric progression* is a sequence of numbers with the property that the *ratio* between successive terms is constant. *e.g.*, 2, 6, 18, 54, 162, 486, ...

A prize of **\$2.00** will be awarded to the **FIRST** student who submits a correct solution to Prof. Sipka.

Student assistant:	Jonathan Young
Faculty advisor:	Tim Sipka
Distribution:	Deb Smith

*If you would like to submit an announcement or a short article, please send it via e-mail to Tim Sipka (sipka@alma.edu).*