The Almagest

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

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Next Colloquium – Tuesday, Oct. 29th

The next Math & C.S. colloquium will be given by Dr. Carl Lee. Dr. Lee is the chair of the Department of Statistics, Actuarial and Data Sciences at Central Michigan University. Dr. Lee's talk is entitled "An Overview of Data Science."

During recent years, the term "Data Science" has become a magic term for companies trying to find insights from a vast amount of data in the modern competitive business. The term was first referenced in the Proceedings of 5th Conference of the International Federation of Classification Society. The journey of data science as an area of study is evolving and growing due to the advancement of technology and the rapid growth of data in volume, variety and velocity. Although data science has become extremely popular, the definition of data science as a discipline is different for researchers in different disciplines. In this presentation, I will first briefly present the history of data science and Big Data, attempt to distinguish the difference between these two terms, talk about what knowledge and skills one may acquire to become a "Data Scientist", discuss strategy for initiating and conducting a "data science" project, and present some examples of data science projects. ~ *Dr. Lee*

"An Overview of Data Science"

Date: **Tuesday, October 29th**
Time: 4:00
Place: SAC 113

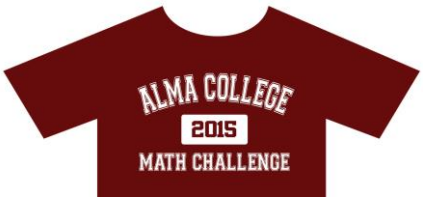
Refreshments at 3:50.

Remaining Math & C.S. Colloquia

Nov. 13: **Dr. Garry Johns** (SVSU)
Nov. 26: **Dr. Andrew Thall** (Alma College)

Problem Solvers Needed – Nov. 2nd

If you enjoy the thrill of solving non-routine math problems, then you'll want to participate in the 25th annual MATH Challenge on Saturday, November 2nd. The **MATH Challenge** is a *team-oriented*, 3-hour exam consisting of ten interesting problems dealing with topics found in the undergraduate math curriculum. Teams consist of 2 or 3 students, who take the exam on their home campuses from 9:30 am to 12:30. You may form your own team or you can simply be placed on a team. Before the exam, you'll be provided with a "hearty breakfast" of bagels, donuts, and juice. Also, each participant will get a t-shirt! If you're interested, please contact Dr. Molina.



Winter & Spring Term Courses

Registration for Winter term courses begins the week of November 4th. Here are a few courses you may want to consider:

For Winter Term 2020

MTH 221 *Differential Equations*, Dr. Fonley
MTH 223 *Mathematical Structures*, Dr. Molina
MTH 280 *Applied Stat. Methods,* Dr. Westgate
MTH 421 *Abstract Algebra*, Dr. Kaylor
MTH 480 *Senior Presentation Seminar*, Dr. Fonley

CSC 180 *Programming with Data*, Dr. Dexter
CSC 240 *Algorithms and Complexity*, Dr. Dexter
CSC 440 *Compiler Design*, Dr. Thall

PHY 380 *Gen. Relativity & Cosmology*, Dr. Jensen

For Spring Term 2020

CSC 180 *Technology and Dis/ability,* Dr. Dexter

The Gamma Function: Expanding the Factorial

Looking back on the definition of the factorial function, we know that for any positive integer n, $n!$ is the product of all positive integers less than or equal to n. It is easy for us to calculate the factorial of any positive integer, but what about the values of n that aren't integers? What about non-real numbers? What would such a value even look like?

This problem was first considered by mathematicians Daniel Bernoulli and Christian Goldbach around 1720, and was solved by Leonhard Euler shortly afterward. Euler's original extension to the factorial function was expressed as an infinite product, and since then many different forms have been discovered. The most recognized and widely used is the gamma function:

$$\Gamma(z) = \int_0^\infty x^{z-1} e^{-x} dx$$

When dealing with z greater than or equal to 0, the gamma function behaves just like the factorial function:

$$\Gamma(1) = 1 \text{ and } \Gamma(z+1) = z\Gamma(z)$$

while:

$$0! = 1 \text{ and } (n+1)! = (n+1)n!$$

Therefore, if n is a positive integer:

$$\Gamma(n) = (n-1)!$$

While these functions behave similarly, the main difference between the gamma and factorial functions is the domain. While the factorial can take any positive integer n, the gamma function is defined for all complex numbers with the real part greater than 0. Through analytic continuation, the domain of the gamma function can be extended to negative real numbers, with poles occurring at negative integers.

Using the gamma function we can find some interesting results, such as $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$. While the gamma function has many uses, I prefer the pi function, which is just a shifted version of the gamma function such that $\Pi(z) = \Gamma(z+1) = z!$ I prefer this version since the pi function yields $n!$ when inputting a positive integer n into the function.
~ Brandon Hart

Math Club

The Math Club meets **every Tuesday** at 9:00 pm in Dow 132. *All are welcome!*

Puzzle of the Bi-week

Players A and B are bowling. They alternate turns, with Player A going first. Whoever gets the first strike wins. Player A has a 1/2 probability of getting a strike on each turn, and Player B has a 1/3 probability. What is the probability Player A wins?

A prize of **$2.00** will be awarded to the 1st student who submits a correct solution to Dr. Westgate.

Solution to Previous Puzzle

A number has the very special property that when it is divided by 2, 3, 4, 5, or 6, the remainder is 1, but when divided by 7 the remainder is 0. Find the smallest positive number that satisfies these conditions.

Andrew Bach submitted the correct solution of **301**, earning the **$2.00** prize.

Solution to Puzzle Previous to Previous Puzzle

A Mini Rubik's Cube has dimensions 2x2x2. An ant is walking from one corner to the opposite corner and chooses to walk only along the edges of the smaller 1x1 faces that make up the exterior of the cube. How many different paths of length 6 units are there for the ant to take?

There have still been no correct solutions submitted for this puzzle! There is a **$5.00** reward for solving this puzzle. You may use a mathematical argument or computer code to compute the answer.

Student assistant:	Brandon Hart
Faculty advisor:	Brad Westgate
Distribution:	Jackie Gage SAC 224

If you would like to submit an announcement or a short article, please send it via e-mail to Brad Westgate (westgatebs@alma.edu).

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