

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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Math Club Movie Night – Hidden Figures

The Math Club is showing the movie *Hidden Figures* on **Thursday, February 6** at 7:30pm in SAC 109. The Math Club will provide snacks and drinks. Also, the Math Club is offering to give help on homework assignments. Attend to see a great movie and get your homework questions answered!



Math Club High School Math Competition Volunteers Needed

The Math Club is organizing a high school math competition on **Friday, March 20**. They are looking for volunteers to help manage the competition. Volunteers will be scheduled in shifts throughout the day, so you can pick a shift that fits your schedule. Please contact Kasey Jones (jones1km@alma.edu) if you are interested in volunteering or would like more information about the competition.

Calculus and Elementary Statistics Tutors

The tutor for Calculus I and II is **Brianne Giddis**. Brianne's office hours are from 7-9pm every Monday and Wednesday in SAC 216.

The tutor for Elementary Statistics is **Morgan Mydloski**. Morgan's office hours are from 7:30-9:30pm every Tuesday and Thursday in SAC 214.

Please see our tutors if you have questions on course material, homework, or while studying for exams.

The Interests/Expertise of the Faculty

If you are a math or computer science major or minor, you may become interested in working on a project with a faculty member. Below you'll find a list of the expertise and interests of the math & computer science faculty members.

If a topic looks interesting to you, visit the professor and discuss the possibility of doing a project. Also, feel free to visit if you are not sure about a project but just want to learn more about the subject. (Professors will never pass up an opportunity to talk about their favorite topics!)

Dr. Zhewei Dai

Applied Mathematics, Inverse Problems, Statistics, Actuarial Science

Dr. Scott Dexter

Free and Open-Source Software, Digital Humanities, Technology and Culture, Computers and Music

Dr. Morgan Fonley

Mathematical Modeling, Dynamical Systems, Differential Equations

Dr. Lisa Kaylor

Algebraic Number Theory, Linear Algebra, Abstract Algebra

Dr. Robert Molina

Graph Theory, Discrete Math, Combinatorics, Recreational Math, Real Analysis

Dr. Andrew Thall

Mersenne Primes, Image Analysis, Computer Graphics, Game Design

Dr. Brad Westgate

Bayesian Statistics, Sports Statistics, Stochastic Processes, Data Mining

Amicable Numbers

Amicable numbers are numbers that are formed by the sum of the proper divisors of the other number of the pair. The term proper divisor is used to refer to a positive factor of a number n , which is not equal to n . An example of a pair of amicable numbers is the pair (220, 284) since the proper divisors of 220 are 1, 2, 4, 5, 10, 11, 20, 22, 44, 55 and 110, which sums to 284, and the proper divisors of 284 are 1, 2, 4, 71 and 142 which in turn sum to 220. This pair is also the smallest pair of amicable numbers. Some additional pairs are shown in the following picture:

1184		1210
6232		6368
10,744		10,856
17,296		18,416
9,363,584		9,437,056

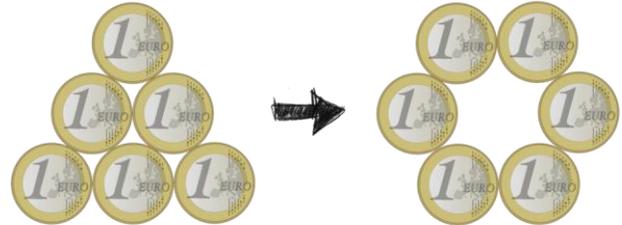
Source: excelmathmike.blogspot.com

Throughout the years notable mathematicians have tried to figure out ways to find pairs of amicable numbers. In the ninth century, Arab mathematician Thābit ibn Qurra was responsible for discovering a formula for generating these pairs. This formula however relies on prime Thābit numbers, which are prime numbers of the form $2 \cdot 3^n - 1$, reducing the pool of potential numbers used to find amicable pairs. Euler did some work with Thābit's formula and produced a more generalized approach to finding amicable pairs. This brought the total number of known pairs from 3 to 61.

While the formulas found by Thābit and Euler can be useful for finding some pairs, there are many pairs that have been found that do not fit either formula. This makes it difficult to find pairs of amicable numbers that fit more restrictive requirements. The use of computers has made the search for amicable numbers easier. In fact mathematicians have gone from only 390 pairs known in the 1940s to over 1 billion known in 2020.
~ Brandon Hart

Puzzle of the Bi-week

You must rearrange the following pyramid of six coins into a hexagon that possesses a hole large enough for a seventh coin. A move consists of sliding a single coin along a flat surface to a new position so that it is in contact with at least **two** other coins. When moving a coin, you cannot move or jostle any other coin.



What is the smallest number of moves required?

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

Solution to Previous Puzzle

Suppose n is a positive integer. If the expression $(x + y)^n$ is expanded, what is the sum of the coefficients?

Noah Whitford earned the **\$3.00** prize by submitting the correct solution of 2^n , and by writing a computer program to calculate the coefficients and demonstrate the solution for an arbitrary value of n .

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

If you would like to submit an announcement or article, please email it to Dr. Westgate (westgatebs@alma.edu).



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