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NAZARETH COLLEGE MATHEMATICS DEPARTMENT

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By popular demand, this issue is brought to you by the number 808017424794512875886459590496171075705754368000000000.

Never let it be said we don't listen to our reader(s).

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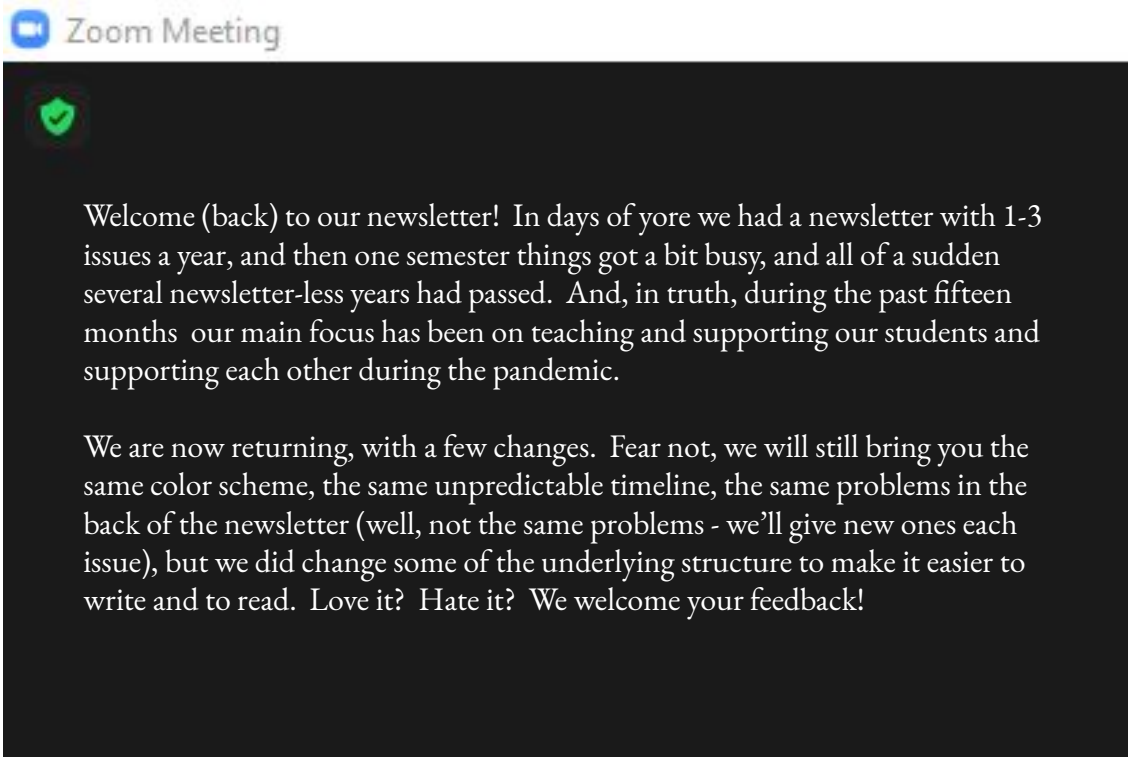
Simply Surreal



Welcome (back) to our newsletter! In days of yore we had a newsletter with 1-3 issues a year, and then one semester things got a bit busy, and all of a sudden several newsletter-less years had passed. And, in truth, during the past fifteen months our main focus has been on teaching and supporting our students and supporting each other during the pandemic.

We are now returning, with a few changes. Fear not, we will still bring you the same color scheme, the same unpredictable timeline, the same problems in the back of the newsletter (well, not the same problems - we'll give new ones each issue), but we did change some of the underlying structure to make it easier to write and to read. Love it? Hate it? We welcome your feedback!

Ethical Data Science

We have a new major! We actually have an entire new institute: the Institute for Technology, Artificial Intelligence, and Society (ITAS). You can hear our also-new president Beth Paul introduce it it in the video here, and also talk to the people involved (including Yousuf and Wendy!) on the March 10 Episode of the Prez Paul Podcast!"

The part most relevant to mathematics is that one of the majors associated with the institute is Ethical Data Science: students in this major take math, programming, and TAS courses, including *TAS 251: Artificial Intelligence and Data Ethics* and *TAS 223: Disinformation*. We welcome our first students to the major this year, so stay tuned for more info!

Hi Wendy! Welcome to Rochester!

We don't just have a new president, a new institute, and a new major, we also have a new faculty member! Wendy Norris hails most recently from Colorado, where she earned a Ph.D. in Information Science from CU Boulder, although previous work has taken her all over the world.

Wendy incorporates her previous experiences as an urban school social worker, public policy investigative reporter, nonprofit technology consultant, and Peace Corps volunteer into her courses as a way to think about the very real implications for social justice and equity in computing and data science. Her mixed methods quantitative and qualitative research probes how to improve technical systems used in humanitarian crisis response. And she's currently recruiting student research assistants for a computational social science study on international refugees.

She loves to explore far-flung places and has traveled from the North Atlantic (Iceland) to the South Pacific (Vanuatu). Wendy also loves to cook and has turned her tiny backyard into an urban farm to enjoy the glorious Rochester summers in her kitchen all year long.

Data fact: Extra large dogs are the best dogs! 14/10

Largest Prime Found!!! (so far)

The largest known prime number was discovered in December 2018. It is $2^{82,589,933} - 1$, and has 24,862,048 digits. It was found by Patrick Laroche as part of the Great Internet Mersenne Prime Search, a free distributed computing project that is responsible for the 15 largest known primes. This is only the 51st Mersenne prime found. (A Mersenne prime is a prime number that can be written as 2^p-1, where p is also a prime number. Since the smallest prime number is 2, the smallest possible Mersenne prime is $2^2-1=3$, which is in fact prime.)

Some of Heather's Favorite Things

- Math podcasts: *Mathematically Uncensored* and *My Favorite Theorem*
- Non-math podcasts: *My Favorite Murder*, *Black on the Air*, *This Podcast Will Kill You*, *The History Chicks* ....
- Codenames. It was the Blokus of 2020.
- The number 3.

Some of Matt's Favorite Things

- Math podcasts: *Numberphile*
- Nonmath podcasts: *No Such Thing as a Fish*, *Film Reroll*, *SinCast*
- Books: *What If?* by Randall Monroe, *Machine of Death* by Ryan North
- Webcomics: *xkcd* (drawn by Randall Monroe), *Dinosaur Comics* (drawn by Ryan North), *Order of the Stick*

Some of Wendy's Favorite Things

- Tech podcasts: *Note to Self* and *Hidden Brain*
- Non-tech podcasts: *This American Life*, *RadioLab*
- What I'm reading now: Allie Brosh's graphic novel *Solutions and Other Problems* and Elif Shafak's meditation on *How to Stay Sane in an Age of Division*
- Favorite cuisine: Indian food. The hotter the better.

John Conway

John Horton Conway (Dec. 26, 1937–April 11, 2020) was an English mathematician and Fellow of the Royal Society known for his contributions to a wide variety of branches in mathematics. Perhaps best known for inventing the "Game of Life", he also discovered major results in finite group theory, knot theory, coding theory, and game theory.

Conway was born in Liverpool, England, and attended Cambridge, where he received his Ph.D. in 1964. He taught at Cambridge until 1986, then moved to Princeton where he taught until his retirement. Early in his career, his wit and storytelling led to him being known as "the world's most charismatic mathematician." Conway passed away on April 11, 2020, due to complications from COVID-19.

Conway Puzzle

Find the unique(!) 10-digit number *abcdefghij* satisfying the following?

- *a* is divisible by 1
- *ab* is divisible by 2
- *abc* is divisible by 3
- *abcd* is divisible by 4
- *abcde* is divisible by 5
- *abcdef* is divisible by 6
- *abcdefg* is divisible by 7
- *abcdefgh* is divisible by 8
- *abcdefghi* is divisible by 9
- *abcdefghij* is divisible by 10

Conway's Wizards

Last night I sat behind two wizards, Azemelius and Bartholomew, on a bus. I heard this conversation:

Azemelius: I have a positive integer number of children, whose ages are positive integers. The product of their ages is my own age, and the sum of their ages is the number on this bus.

Bartholomew: Perhaps if you told me your age and how many children you had, I could work out their ages?

Azemelius: No, you could not.

Bartholomew: Aha! At last I know how old you are!

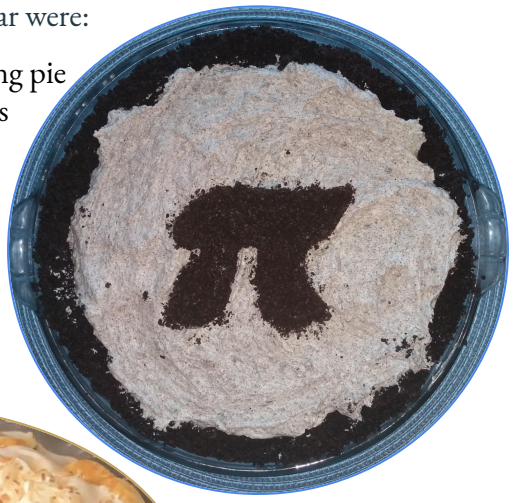
What is the bus number?

Pi Day!

This spring the Math Club once again celebrated Pi Day (March 14), though with the unique (we hope!) twist of being online. As usual, the campus was invited to submit pies to be judged though because we couldn't gather in person, "taste" was unfortunately not able to be a consideration. Our three winners this year were:

An apple pie made by **Justin Boyer ('21)**. Yes, all the apple slides had been cut into numbers..

An oreo-crusted pudding pie with homemade cookies and cream whipped topping made by **Helene Becker ('23)**.



A coconut creme pie made by **Isabella Willebrandt ('24)**.

Problems

Solutions to Problems 12.1

12.1.1: 3
12.1.2: 23421314
12.1.3:

21	1	8
2	5	13
3	34	1

Problems 13.1

13.1.1: Take an $n \times n \times n$ cube and paint the outside purple, then slice the cube into n^3 unit cubes. Put the unit cubes in a bag, draw one at random, and roll it. What is the probability that the face on top is purple?

13.1.2: How many (nonoverlapping) triangles can be drawn using 3 lines? 4 lines? 5 lines? What about in general?

13.1.3: Choose an integer greater than 1. List its prime factors in increasing order (including duplicates), then concatenate them to create a new integer. Now repeat the process with the new number, stopping when you get to a prime. For example, starting with 15: (3,5) -> 35; 35 (5,7) -> 57; 57: (3,19) -> 319; 319: (11,29) -> 1129, and 1129 is prime. Can you find such a prime (called a **home prime**) for each number 2–10?

Send solutions, vaccines, solitaire games, alumni news, sunscreen, or suggestions to Heather (hlewis5@naz.edu) or Matt (mkoetz1@naz.edu).