Volume 11, Issue 2 and also Issue 3 because this is long enough to be two issues.

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Notes

Congratulations to **Seth DeLisle ('17)** for his awesome Lacrosse skills, which helped propel the Naz Lacrosse team to First Place in the Empire 8 Championships and a spot in the NCAA tournament. Seth was also named Empire 8 Player of the Year!

Adventures Inside this issue:

Our Newsletter
The Darden Daily

Because some jobs ARE rocket science

The Adventures of the Class of 2016

Paxton Brewer ('16): "I'm attending Naz for grad school in the Literacy Education program and I'll be done in August. I also am hoping to have an elementary teaching job come next Fall (hopefully in Rochester somewhere), so fingers crossed there. My favorite parts of last semester were when I visited the Math Center and I can't wait to come back soon. :)

Still pretty bitter about the lack of Math Center dog... Also pretty bitter the Math Department doesn't put their cheese fund to good use (see: lack of fondoodler) I miss everyone and everything Math from Naz!"

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The Adventures of Christine Darden

"Most of what you want in life will be because of your discipline. Discipline is perhaps more important than ability." — Christine Darden

Christine Darden (September 10, 1942—present) was born in North Carolina and taught high school in Virginia before earning her M.S. in Applied Mathematics from Virginia State College and becoming a data analyst and then an aerospace engineer at NASA's Langley Research Center. She then earned a doctorate in mechanical engineering and became the technical leader of the Sonic Boom Group. She has won a number of awards (including ten Certificates of Outstanding Performance from NASA) and her research is important today for developing supersonic aircraft that, with the lowered sonic booms, might be allowed to fly over land.

The photo is from the Joint Mathematics Meetings in Atlanta in January 2017, where she spoke on a panel about the Hidden Figures of mathematics. The quote is from blackhistorypages.net/pages/cdarden.php, and the biographical information from www.thehistorymakers.com/biography/christine-darden.

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Kelly Broderick ('16) is a Business Development Associate at Alliance Advisory Group in Rochester, and is also the head women's basketball coach at Finger Lakes Community College!

Cool Fact: Kelly was also featured in a news article recently
http://www.mpnnow.com/sports/20170124/college-basketball-finger-lakes-cc-changes-direction-with-broderick

Matt Coffey ('16) (Chem major, Math minor) is chemistrying somewhere.

Danielle Fisher ('16) is a Benefits Analyst for Rochester Regional Health.

Emily Griffith ('16): "Since graduation I have been a full time graduate student at Nazareth, in the accelerated program. I will have my Master's degree in August 2017 — so it is a year program. I am in the Inclusive Childhood Education program and a teaching fellow. That means I am doing research in a 2nd grade classroom twice a week all day and implementing new strategies with the students and teacher to benefit the students' learning while going to school full time. I am also now working as a substitute a couple days a week."

Cody Hunt ('16) is theatreing. Specifically, he's working with the Finger Lakes Music Theatre Festival, and doing other stuff as well.

Courtney Malia ('16): "I miss everyone! Can I come back? I'll work in the Math Center forever.

I don't really have too many interesting things going on in my little town. Still teaching 8th and 9th grade. Trying to get kids to pass the algebra regents this Thursday, which is rather stressful. I coached Modified soccer this year for an undefeated season and assisted the varsity team who went to the sectional semi-finals. Now coaching JV basketball and we are currently 7-3 which is pretty great. Trying to make it through grad school without pulling my hair out. But other than that, staying very low key.

Just waiting to get my letter from Naz wanting me to be an adjunct."

John McCarty ('16) is teaching at Discovery Charter School in Rochester.

Stephanie Mumpton ('16): "Hope you're doing well! I want to be in the magazine so I'm definitely going to play along. However I would have *loved* to hear what you all came up with [Editors' note: This is in response to the fact that when we aren't sure what alumni are up to, we sometimes list what they *might* be doing.] I'm currently working in Human Resources at Genesee Regional Bank. Loving my job, the people I work with, especially my manager. There's more math involved than I ever thought. I spend a large portion of my time working in Excel with employee information. I process payroll for over 100 employees; salary, hourly and commission. I am the head of onboarding and I participate in recruiting as well. (Not directly math related but I find myself creating formulas to increase our efficiency). My team appreciate my math background and so do I :) I miss the family at Naz, but I was extremely prepared for the 'real world'."

Taylor Olmstead ('16) is in the same Naz program as Emily Griffith (Inclusive Childhood Education).

Kelsey Quigley ('16) just finished her first year of graduate school in math at the University of Nebraska-Lincoln, which at least half of the editors agree is the greatest graduate school ever.

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Rob Ramos ('16) (History major, Math minor) is a Research Analyst at Edelman Intelligence.

Alex Ross ('16) (Accounting major, Math minor) wore his math socks to trivia night, but they weren't enough to carry his team past the current math seniors.

Adrienne Torrey ('16): "Since May, I have accepted a job to be the Special Education Math teacher at Oneida High School. I'm also working towards my Master's degree in Curriculum and Instruction at SUNY Oswego part-time. The first year of teaching is definitely challenging but I'm learning a lot every day. I love knowing that I'm making a difference in a child's life even though they or myself may not even know it yet."

Nebraska Adventures

Bailey Carter ('19) and **Claire Hardy ('18)** attended the 19th annual Nebraska Conference for Undergraduate Women in Mathematics at the University of Nebraska-Lincoln in February.

They ran into alumni **Kelsey Quigley**, currently a UNL graduate student in math, and **Caitlyn Parmelee ('10)**, who earned her Ph.D. from UNL in 2016 and is now bringing *her* students to NCUWM, and had an impromptu Nazareth Math reunion!

This space intentionally left blank to represent the vast near-emptiness of...space.

Contest Adventures

For the dozen and a half[th]* time, a group of students took the William Lowell Putnam Mathematical Competition. These two-thirds of a dozen students spent half a dozen hours working on the dozen problems on December quarter-dozen[th]. Pictured here left-to-right are **Claire Hardy ('18)**, **Joshua Thorp ('17½)**, **Lindsey Golas ('18½)**, **Norah Zhang ('19)**, **Jack Whalen ('17)**, **Vy Bui ('20)**, **Bailey Carter ('19)**, and **Alison Stedman ('17)**.

*We recommend this word for your next game of hangman.

Norah Zhang ('19) and **Maggie Jin ('19)** were the Nazareth team for the 2018 COMAP Mathematical Contest in Modeling. They spent a long weekend proposing a solution to the problem of dam placement in "Managing the Zambezi River":

Photo by Ben Bird

The Kariba Dam on the Zambezi River is one of the larger dams in Africa. Its construction was controversial, and a 2015 report by the Institute of Risk Management of South Africa included a warning that the dam is in dire need of maintenance. A number of options are available to the Zambezi River Authority (ZRA) that might address the situation. Three options in particular are of interest to ZRA:

- (Option 1) Repairing the existing Kariba Dam,
- (Option 2) Rebuilding the existing Kariba Dam, or
- (Option 3) Removing the Kariba Dam and replacing it with a series of ten to twenty smaller dams along the Zambezi River.

Norah and Maggie had to provide an overview of potential costs and benefits associated with each Option and a detailed analysis of Option 3 as part of their solution.

Dancing Adventures

Courtney Larkin ('14) was featured on Channel 13 this fall in a news story about how she uses the show *Dancing with the Stars* to teach mathematics to her students at Greece Athena high School. Courtney is quoted in the article:

> "I am a big fan of the show and grew up dancing…. It's amazing. The students relate to it very well. I've been blessed with these students. They're engaged and having fun – which is the best thing for a teacher ever!"

Her students like the class just as much:

> "She's just my favorite teacher," 12th grade student Jayda Wilkinson said. "She explains it in a certain way to make it understandable."
>
> "She's my favorite!" Alex Lachimia said. "I love being here."

As a super-awesome bonus, Derek Hough, who has been on what seems to be nearly all the seasons of Dancing with the Stars, recorded a video specifically for Courtney's class. You can see it, and read the whole article at: http://13wham.com/news/top-stories/dancing-with-the-stars-helps-students-learn-math

Bailey Carter ('19) is an Irish Dancer, and headed once again to the World Championships in Dublin this April. Last year she had ranked 18th, but this year she halved her ranking to 9th place. Yay Bailey!

Bailey with her grandparents, aunt, uncle, and parents after awards!

National Adventures

Lost: One Yousuf George, currently on sabbatical. If found, please return to the Math Department.

International Adventures

Laura Herman ('19) went to Ireland over Spring Break on a Nazareth program that has enticed math majors in the past, and came back just as impressed with the experience. She traveled along the west coast of Ireland, visiting cliffs and castles, walls and stones, and saw a lot of green while Rochester itself was covered in two feet of snow.

While Laura was having adventures in Ireland, **Megan Searing ('18)** was doing the same in Hungary. She gave a talk at the America Week conference in Veszprém ("Incorporating Dance and Movement into the Childhood Mathematics Classroom", because Adventures in Dance isn't just for page 5) and finding a place that served pie — or something close to it — on Pie day. That's when when the photo in the lower left (featuring not just Megan, but **Heather Lewis** and son Emmett who went on the trip as well) was taken.

And now, a mathematical mystery: Megan noticed this plaque on a building in the town of Székesfehérvár by the memorial to King Matthius! It depicts a math teacher, but we can't find much more about it.

This issue brought to you by the number 10958 (and by pie)

This issue is brought to you by the number 10,958, as it was the only number less than 11,111 that was available on such short notice. In Inder Taneja's paper *Crazy Sequential Representation: Numbers from 0 to 11111 in terms of Increasing and Decreasing Orders of 1 to 9*, 10,958 is the only number not to have a representation using the digits 1 to 9 in increasing order. (See https://arxiv.org/abs/1302.1479, p158.)

$$10957 = (1+2)^{(3+4)} \times 5 - 67 + 89.$$
$$10958 = \text{still not available.}$$
$$10959 = 12 + 3 + 456 \times (7 + 8 + 9).$$

From p158 of Taneja's paper.

The number 10958 is also the zip code for New Hampton, NY, a small town in the so-called "Black Dirt Region", formerly known as the "Drowned Lands of the Wallkill [River]."

The Math Club held its annual Pi Day celebration in March. As always, there were many amazing, delicious pies for everyone to enjoy (including several unsuspecting passersby). The winners:

Presentation: **Alison Stedman ('17)**
Taste: **Alison Stedman ('17)** & **Heather Lewis**
Creativity: **Josh Thorp ('17)** & **Shawna Koetz**



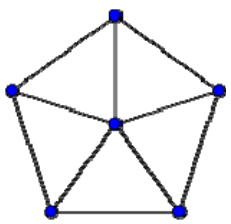


Problems

Solutions to Problems 11.1:

11.1.1: 3
11.1.2: 4
11.1.3: A gets 95, while C, E, G, I, and K get 1 each. The rest get 0.

Problem 11.2.1: Label the vertices of the diagram below with some of the numbers 0—10 so that each vertex has a unique label, and the edges, labeled by the positive difference of their endpoints, are labeled 1—10.



Problem 11.2.2: Using the digits 1—9 in increasing order, as well as +, —, ×, /, parentheses, and concatenation, write an arithmetic expression that equals 2017. Then write one using the digits in decreasing order.

Problem 11.2.3: How many solutions to the equation $p + q = 999$ are there with p and q both prime?

Problem 11.2.4: Shuffle a standard deck of 52 cards, then divide it into two piles of 26 cards each. What is the probability that the number of red cards in the first pile is equal to the number of black cards in the second pile?

Send solutions, light fixtures, alumni news, high end electric can openers, melamine divided plates, or suggestions to Heather (hlewis5@naz.edu) or Matt (mkoetz1@naz.edu).

We also gave our first ever Alumni Award to **Kelsey Quigley ('16)** for her Taxicab-Inspired Pie. As a reward, a photo of her pie will be featured in an award-winning mathematical newsletter.