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NAZARETH COLLEGE MATHEMATICS DEPARTMENT

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We're back in person, masked up and happy to be in the classroom fulltime!

In This Issue...

Our Newsletter

The L'Hôpital Ledger

Infinitely Small Info

This issue is named after the mathematician Marie-Charlotte de Romilley de La Chesnelaye L'Hôpital, whose husband Bill was also a mathematician. But despite being listed as a mathematician on ~~several~~ two sites, including French wikipedia, we don't know much about her. (Here, try this site. It has the same info as wikipedia, but looks more official.)

We know that she was born in the 1600s, and we're guessing France since her name is Marie-Charlotte and her Aunt Jackie (Jacqueline de Montbel) was French, according to english wikipedia. Marie-Charlotte married Guillaume François Antoine, the Marquis de l'Hôpital, at some point and was good enough at math to preside over the printing of the book *Analysis of the infinitely small to understand curves* in 1696. This book (which was actually titled *Analyse des Infiniment Petits, Pour l'intelligence des lignes courbes* because, you know, it was in French) is sometimes called the first Calculus textbook. We don't know, however, if she actually wrote any of that book. Then again, we don't know if her husband did, either:

> In the preface, l'Hôpital mentions that he focuses on just differential calculus since Leibniz was writing a book (which was never finished) on integral calculus. L'Hôpital also credits Johann Bernoulli, whom he had hired to teach him the calculus of Leibniz. In fact, there is some question as to how much of the material in the Analyse is due to l'Hôpital and how much to Johann Bernoulli. (by Cynthia J. Huffman)

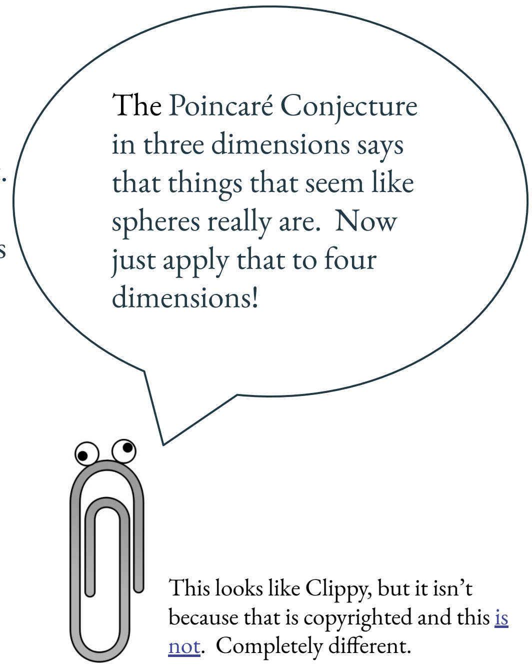
The only other glimpse into her mathematical knowledge is that she impressed another math professor, Monsieur de la Montre, with her knowledge of Euclid. She died on July 2, 1737 at the age of we-have-no-idea.

This may be an actual portrait of Marie-Charlotte de Romilley de La Chesnelaye L'Hôpital! It probably isn't, though - it's a painting of an unspecified woman by an unknown French artist in the first half of the 17th century. But wouldn't it be great if it were Marie-Charlotte?!

"Lost" Proof Found

In 1981, Michael Freedman proved the 4-dimensional case of the Poincaré Conjecture - one of the biggest unsolved problems in mathematics - publishing his result in *Journal of Differential Geometry*. The proof was so intricate, involving brand new mathematics, that very few people could read it. Unfortunately, it also contained quite a few gaps, a result of Freedman's intimate understanding that led him to leave out significant details. Forty years later, there were fewer than a handful of people in the world who understood the proof, and there was a fear that it would fade from mathematical understanding.

Thankfully, a "rescue" effort has been organized, resulting in the book *The Disc Embedding Theorem*, by Stefan Behrens, Boldizsar Kalmar, Min Hoon Kim, Mark Powell, and Arunima Ray. The book explains the proof in clear language, filling in the gaps from the original paper, and preserves the knowledge for future mathematicians to build on.



This looks like Clippy, but it isn't because that is copyrighted and this is not. Completely different.

Alumni Codenames

Are you a math or math adjacent alumni of Naz? Do you want to hang out online with other math alumni? Are you hoping that Matt and Heather and perhaps some other faculty will show up too? Do you want us to teach you how to play the game Codenames? Are you wondering if this whole paragraph is going to be one question after another?

Join us on Thursday, September 16, at 6pm where we'll teach you how to play! And by 6pm we mean "anytime after 5:30pm" because we'll be hanging out there just to chat and say hi! You can register (and then automatically get the Zoom link) at
https://naz.zoom.us/meeting/register/tZMsd-yvrDstHtSYScVteuNG9jgpUT7yRcOJ

Monday Morning Math(ematican)

Starting Monday, September 20 we'll be sending out an email every Monday morning (where by "every" we mean "hopefully every" and by "Monday" we mean "hopefully Monday") and by morning we probably do mean morning....where were we?

Right - every Monday morning we'll be sending out an email with a brief biography of a mathematician, or some interesting math, or both! Sign up below [or just email one of us] if you want to be added to the list to receive it!

https://forms.gle/uTjmqm3EveLobgL89

Brought to you by the number epsilon. Epsilon is a pretty small number. Other small numbers are 7/12345, 0.03, and 10,000 (depending on what you consider "small").

Alumni News

Molly Kingsley ('13): "I have a new job! Like a really, real job. I finished my PhD at the end of 2019 and for the past year have had an awesome postdoc position at Tufts University, but starting Tuesday I'll be working at a biotech company here in Boston (https://gritstonebio.com/). It isn't what I ever imagined I would be doing, but I'm excited. They are doing fantastic science and it will be so fun to be a part of it."

Claire Hardy ('18): "I appreciate the pure happenstance of receiving my alumni newsletter the day after I defended my Masters' Thesis for my Data Science degree. I also wholeheartedly agree on the score of 14/10 for the beautiful, big dog.

As the world reaches normalcy I hope I may be able to come back to the Nazareth Math Department and see everyone again. I'll most likely be in Rochester more often in the upcoming months for wedding planning. Josh and I are trying to reserve the Nazareth chapel for sometime next summer."

Problems

Solutions to Problems 13.1

13.1.1: $1/n$
13.1.2: 1, 2, 5, unknown
131.3: 2, 3, 211, 5, 23, 7, 3331113965338635107, 311, 773, 11

Conway Puzzle: 3,816,547,290
Conway's Wizards: 12

Problems 14.1

14.1.1: (A puzzle by Yoshinao Katagiri, via Futility Closet) A boy and a girl played Rock Paper Scissors 10 times. Altogether the boy played rock three times, scissors six times, and paper once, and the girl played rock twice, scissors four times, and paper four times (though, in each case, the order of these plays is unknown). There were no ties. Who won?

14.1.2: I have a number of apples to give to a group of children. I can give them each 4 except for the last child who would only get 3. If I give them each 3, though, I have 9 leftover. How many children are there, and how many apples?

14.1.3: (Inspired by Clifford Pickover) Notice that

$$\sqrt{2\frac{2}{3}} = 2\sqrt{\frac{2}{3}}$$

Can you find another such equation?

Congratulations to Justins Boyer and Sawran for solving one of the Conway puzzles from the last issue!

Send solutions, board games, alumni news, good books, time machines, plants, or suggestions to Heather (hlewis5@naz.edu) or Matt (mkoetz1@naz.edu).