

**If  
You Don't  
Read This  
Issue,  
We'll Kill  
This  
Goose**

## "HOW WOULD YOU OVERTHROW THE mathNEWS EDITORS IN RESPONSE TO THEIR OPPRESSION IN THE mastHEAD?"

Just so the mastHEAD question doesn't give you the wrong idea: mathNEWS is a democratic institution led by the hegemonic power benevolent guidance of its dictators editors. One of our writers made up that hypothetical question in the context of a hypothetical scenario in which we editors regularly oppressed and exerted autarchic control over our writers in the mastHEAD. Which we don't. I'm not even sure what it means to oppress someone through the mastHEAD.

Anyway, a few highlights of this issue are: Surya Banerjee on the formula to comedy, and CC's final 3500-word entry (which needs to be pitched to Hollywood now) in their "X as a Dating Site" series.

I don't have much space left (since some of our writers seemed very... impassioned by the idea of overthrowing the editors) so I'll make the following mushy bit quick. The beginning of May, when I had taken up the role of editor again, now seems so far away. Our first fully online term! It would be completely uncharted territory. I wanted mathNEWS to "thrive," but I was afraid that we would lose something important this term — direction, maybe, or that inexpressible sense of community between writers felt at each prod night and in each issue. I'm glad my worries were for nothing. All of our writers this term, new and old, have been wonderful. There's definitely a community here — you need only to look at all the cross-references in each issue for a taste. mathNEWS has thrived this term, and I know it will again in the next. Stick around for Volume 144. You won't regret it. Till then,

clarified  
Editor, mathNEWS

## ARTICLE OF THE ISSUE

mastHEAD many words, so few words here. CC article Bastion of Erudite Affection: mathNEWS as a Dating Site very good. Warms heart. Is article of issue. No prize. Sorry.

god ⚡ peED  
Editor, mathNEWS

- PSYCHGIRL | Throw a bunch of rotten onions at them until they leave.
- TENDSTOFORTYTWO | "; drop table editors;—
- CC | It's a trap!
- DERIVING FOR DICK | Gently
- QUANTUM GOOSE | Something something 90kg projectile over 300 metres
- VARIOUS PSEUDONYMS | Take over the mathNEWS office, barricade the door, and perform an acapella rendition of *Les Miserables* until our demands were met. If that failed, exert seniority.
- A COOL PEN NAME | The way any oppression is resolved: gather a small minority of Bolsheviks, kill the monarchs — er, "editors" — and redistribute the wealth amongst the common folk.
- SANDWICH EXPERT | mathNEWS Editors are always correct. They are flawless individuals and there is no need to overthrow them.
- CIX | I agree with Sandwich Expert.
- TURBOMOIST | Have you seen the ending of *1984* (P.S. It's not a happy one)
- FINCHEY | Coup! Coup! Coup!
- BOLDBLAZER | Organize the masses. We have nothing to lose but our chains.  
I've seen enough historical examples and watched enough dramatic reenactments in movies, so we can cover all bases and all tactics. We can even take the more political route and take control of the system from within using their own rules, and then break the system from within.
- A MATHEMATICAL PSYCHIC AND ASTROLOGER | For so long all I wanted was for you to love me, to accept me [...] But really, I was just trying to please you [...] My father editor, who challenged me, a 13-year-old boy, to an Agni Kai. How can you possibly justify a duel with a child?...  
But I've come to an even more important decision. I'm going to join The Avatar writer uprising, and I'm going to help him them defeat you.  
(Proceeds to redirect their lightning back at them)
- UNTITLED PD GAME | Denounce the current pope editors and install the Imprint editors, thus kicking off a papal editorial war.
- GOD ⚡ PEED | I watched *The Death of Stalin* so I know a thing or two about coups.
- CLARIFIED | I find the writers' lack of loyalty disturbing.

You're here, so the goose lives to see another day.

CLARA XI, mathNEWS EDITOR FOR SPRING 2020  
ALONG WITH JAIME ANDERSON, JOSH RAMPERSAD, AND KEVIN TRIEU

# mathASKS 143.6

## FEATURING PROFESSOR SURYA BANERJEE

### SANDWICH EXPERT: IF YOU HAD A QUESTION TO ASK SURYA BANERJEE, WHAT WOULD IT BE?

“Why did you agree to do this? And why did you wait till the last minute?”

Instead, How about I tell you three weird things about myself:

- I once went to a jail in Africa to bail out a guy who stole my laptop from my home.
- My friends and I once panhandled in a train in India to get change because someone stole all our money.
- I am a closet Redditor, and an amateur joke writer. I have hit the front page of Reddit more than once with my original “jokes” if you could call it that. If you like terrible dad jokes, and have read a few over the last three years, there is a small, but non zero probability that I came up with it.

In fact, I was once offered \$50/joke by some dude who works for a comedy show. I told my wife, “Maybe I should quit my job and write jokes for a living.”

Ironically, that got the biggest laugh from her in a long time.

(Want to know more? Take one of my classes.)

### TLLLOW PRINCESS: WHERE IS YOUR FAVOURITE TOILET ON CAMPUS?

I can tell you my least favourite. The bathrooms in DC. I was teaching a class there, and walked into it a few years ago, and am still a little traumatized by that experience.

My favourite toilet (I thought I would take the secret to the grave) is the one on the ground floor of the Energy building (?)—the one behind M3. Don't tell anyone.

### GOD ⚡ PEED: THOUGHTS ON THE VARIOUS ONLINE STATISTICAL ELECTION FORECASTS?

2016 predictions were generally unsatisfactory, and I don't think I saw much soul searching among the statisticians after they were so wrong.

Nate Silver has a rating for the different polls, and I tend to look at them before I look at their polling data.

Hopefully, 2020 will be better, but I'm worried, to be honest.

### TURBOMOIST: WHAT'S YOUR FAVOURITE MIDNIGHT SNACK?

Depends. Desserts, mostly. Chips, sometimes. Pakoras, occasionally. Generally anything unhealthy is ok by my book.

### CLARIFIED: WHAT DO YOU LIKE THE MOST ABOUT TEACHING?

It may sound like sucking up, but the students mostly. The sparkle in someone's eyes when they finally understand a point, the good fortune of introducing some deep, fun, applicable mathematical and financial ideas to really smart people—what's not to like?

I've had a wide variety of bosses and colleagues in my 20 years in academics. There are those who were so good and inspirational that I would run through brick walls for them. And then they were those who shouldn't be allowed to run a lemonade stand, let alone be in or run a department.

Dealing with this kind of uncertainty and unpleasantness is mentally stressful sometimes, and my classes have been an oasis in that sense. I've always enjoyed going to class, and it's inevitably the high point of my day. The days that I am good in class (a few), I'm on a high and think I did make a difference, and all of this is worth it. The days that I suck (a lot more often than I would admit) I am grumpy, and can't wait to fix it the next time around.

tl:dr It's not that hard to teach kind, curious, and eager to learn people.

**ALYSSNYA: WHAT DO YOU THINK OF THIS?** <https://twitter.com/andishehnourae/status/1284237474831761408?s=20>

I saw this a few days ago. Initially (possibly because of my political leanings) I was convinced it was malicious, but now I'm not too sure.

A great example for a future stat class though.

### EGGOCHUGGO: WHAT MUSIC DO YOU LISTEN TO WHEN YOU DO MATH?

I'm old school, and listen to a lot of 60s and 70s music. A lot of Dylan (if I can brag, I predicted in 2009 he would win the Nobel Prize some time, and people just laughed at me), Leonard Cohen (an absolute treasure), and old Bollywood film songs.

Dylan might sometimes sound like a drunk guy who is insisting he's ok to drive, but I would encourage you to give him a shot. The lyrics are quite magical.

Leonard Cohen should be compulsory listening for Canadians. And everyone else.

### TENDSTOFORTYTWO: WHAT IS YOUR FAVOURITE STATISTIC?

It has to be the Pearson's Chi squared statistic. The idea is intuitive, and can be reasonably explained to a non specialist.

**ROYAL NO.69 MILK TEA: WHAT IS YOUR FAVOURITE PROBABILITY DISTRIBUTION?**

The Uniform, for sure. It's deceptively simple. All other random variables can be constructed from it, (Remember the Universality of the Uniform distribution?) and I find it quite mysterious.

**SANDWICH EXPERT: WHAT IS THE BEST UNDERGRAD STAT COURSE? WHAT IS THE BEST GRAD STAT COURSE?**

I would go with instructors rather than courses. A good instructor can make an ordinary course extraordinary.

Any course taught by the newer faculty members (Eric, Reza, Ben, and others, if I'm forgetting I apologize) are always good. They are less cynical and more interested in teaching than us older folks. Also professors like Steve (Drekic) and Pengfei (Li) and Cecilia (Cotton) and a lot of others are amazing instructors. You guys are lucky to have so many good ones here.

**MATHSOC PERSON: WHAT ARE YOUR THOUGHTS ON ONLINE PROCTORING SOFTWARE (ALSO CALLED SPYWARE BY SOME) SUCH AS PROCTORU AND PROCTORTRACK?**

I'm not too knowledgeable about it, but it seems very adversarial, and runs into serious privacy issues.

Generally I detest the idea of playing cops and robbers with students. We tend to forget that we are on the same team here, and your grades (if rightfully obtained) is positively correlated with my happiness.

**CC: WHERE DO YOU GET YOUR AMAZING STATS LECTURE HUMOUR FROM?**

I wouldn't go that far as call it amazing. My friends and family will probably use a different word—"annoying." When my wife groans and rolls her eyes at my jokes, I feel this weird sense of satisfaction that's hard to explain.

Most of my lectures is like a stream of consciousness, and weird analogies keep popping out of my mouth before I have a chance to swallow them in my brain, if that makes sense. It also helps to make the material memorable. Most of my STAT 231 students have probably forgotten the likelihood ratio test statistic, but they remember the "racist geese" example.

I've noticed that's what students find funny. It's the spontaneity, I think. Nothing is worse to me than a pre-practiced joke, and they usually fall flat.

**ALYSSNYA: WHAT'S A WIKIPEDIA ARTICLE THAT YOU REALLY LIKE?**

I don't have a favourite. However, sometimes I take two random terms—like "Alexander the Great" and "Blueberry Pie," and see whether I can go from one to the other just by clicking on links in their Wikipedia page.

Is there a game like that? Six degrees of Wikipedia? If not, there should be. Don't forget to send me a cheque if you get rich by developing this app.

**CLARIFIED: WHAT DREW YOU INTO STATISTICS IN THE FIRST PLACE?**

Not too sure. I could always do math. My ninth grade math teacher (in Kolkata, India), Mr. Hassan, taught us Geometry. He was the first one to open our eyes to the beauty of mathematical rigour. That was the turning point, I think. It was almost like poetry.

We were all deathly afraid of him, as he was really curmudgeonly. Had a profound impact on a lot of lives though.

**CIX: WHAT IS THE AIRSPEED VELOCITY OF AN UNLADEN CANADA GOOSE?**

Are we taking manual? Or automatic?

On a related note, let me make a note as a non-Canadian living here for a long while. My theory is that the reason you Canadians are so polite is that you can somehow transplant your own orneriness and give it to the surrounding geese.

You should teach us your wise ways.

**BOLDBLAZER: HEADING INTO TERM 3A, I HAVE YET TO DECIDE ON A MAJOR. WHAT IS SOMETHING CONVINCING YOU'D SAY TO ME TO 'WIN' ME OVER TO THE MORE STATS RELATED MAJORS?**

Even though Statistics and related subjects are incredibly useful and will always be in demand, I don't think it's my job to convince someone to get into a stat related major.

When students try to sign up for my mathematical economics program I always ask them, "are you sure?", because you have to do this for the rest of your life.

Do something you enjoy. Money is important, but shouldn't be the only criterion. And the thing to remember— success and happiness are not substitutes, they are synonymous. If you are happy, you are successful, regardless of what you are doing, and how much you are making.

Let's end on that cheesy note.

**I've never said, 'I love the distance between your eyes.'**

**SURYA BANERJEE**

# A GOOD JOKE

## profTHOUGHTS 143.6

A few years ago, I was forwarded a post on Facebook by an ex-student of mine. It was on a website I hadn't heard of till then—Stuff Waterloo Professors Say, which (for those who don't know) is a collection of amusing (and not so amusing) things we say in our classes.

The post was something I said in class, apparently went “viral,” and he ran into it independently from someone. I wish I remembered what it was—I am sure it was something idiotic, and I am a little afraid and lazy to go find out. But that got me thinking—why not write something for **profTHOUGHTS** about humour?

When I told my wife about this, she warned me that it was a terrible idea. Analyzing and defining humor (as E.B. White put it) is like dissecting a frog. You understand it better, but the frog dies in the process. But I have two things to say in my defense. One—bad ideas have never stopped me before. And two—I am hoping people who are reading **mathNEWS** on the web in the middle of the pandemic are not really looking for high brow entertainment, so the stakes are pretty low.

The earliest joke I know of was written in 1900 BC by the Sumerians (it was a fart joke, aimed at the four year old demographic, in case you are curious), the oldest Egyptian joke is from 1600 BC and the oldest recorded British joke is from 1000 BC. (None of the three are appropriate for this magazine, so I won't put them on here.) But this tells us one thing—the idea of a joke is almost as old as language itself, and as universal across cultures as is possible.

So what makes a good joke? An amusing story? Of course, it is subjective, but to me, a classic joke is like an excellent magic trick. It involves misdirection, a suspension of logic, and a satisfying reveal which makes everything come together. Sometimes the reveal is almost instantaneous (the one-liners), or sometimes the reveal is dragged on for such an absurd length that it crosses the threshold from annoying to funny (the Shaggy-Dog story or feghoots—examples later).

Personally, I come from a culture that has a long history of storytelling. I grew up in Bengal, a state in Eastern India. For those of you who don't know much about India's diversity—if India was Europe, we Bengalis would be the French. We make a lot of depressing black and white movies, smoke a lot of cigarettes, spend a lot of time in dimly lit cafes, and worship our writers, poets, singers, and raconteurs more than film stars.

Bengalis have a word in our language called “adda,” which means “aimless chitchat.” Adda is as essential to a Bengali life as breathing. The better you are at adda, the more popular you are in certain circles. So I was always around legendary and witty storytellers (my dad was one of the best), and joke writers, who were always trying to one up one another over steaming cups of tea, often late into the night, where stories got more and more absurd as the night progressed. One of

my favourite memories from my twenties and about the only things I remember from my college days. Think Seinfeld, but with brown people.

Before I give you some examples of jokes I like below (disclaimer: none of the jokes are mine), let me give you, dear reader, some unsolicited advice if you are ever thinking of incorporating humour in your presentation or in your classroom. One cardinal rule to follow—never punch below your weight (That's just bullying and being a jerk), always punch above. In other words, don't make fun of students from Brock, but make fun of Feridun instead. (And Feridun, if you are reading this, we never make fun of you. So don't fire me.)

Now on to my favourite jokes:

There are two kinds of jokes I like. On one extreme, there are the one-liners (where the punchline is instantaneous). There has been a long history of really clever people writing these—from Wilde and Twain in the old days to Woody Allen, Dorothy Parker, Henny Youngman in the fifties to people like Tim Vine and the late Mitch Hedberg today.

A variation of these short joke format are puns—jokes with word play, generally considered to be the lowest form of written humour (and naturally, my favourite). Nowadays, they are called Dad Jokes, as we dads use these jokes to embarrass our kids and family members in public.

Choosing a favourite joke is like choosing a favourite child—it just doesn't seem right, but here are some short jokes that I enjoyed over my life.

1. I took a course in Existentialism. I left all the answers blank and got a 100. (might be Woody Allen, I am not sure)
2. September, October, November, and December should have been the seventh, eighth, ninth, and tenth months. Whoever screwed this up—I hope he got stabbed.
3. My Math professor was 16 minutes late for his first class, 8 minutes late for his second, and 4 minutes late for his third. At this rate, he will never be there on time.
4. At the end of the physics lecture, I walked up to my professor and asked, “What exactly happened before ‘The Big Bang?’” He said, “Sorry. No time.”
5. As I handed my dad his 50<sup>th</sup> birthday card, he looked at me with tears in his eyes and said, “You know what, one would have been enough.”

On the other extreme, there is a subset of jokes called a feghoot. It is usually a long, boring, awfully bad story, that

ends with a terrible pun. It is so awful, so pointless, and so idiotic, that you can't help but laugh. (Colin Mochrie does that sometimes in *Whose Line is it Anyway?*)

Warning: There is a good chance that people might physically attack you after you end your joke—it is that bad. I enjoy them the most of all.

My favourite one is too long and I would spare you all the agony, but here is one example (by Isaac Asimov, one of the most famous):

Monty Stein, in the year 3047, committed quite a heist and made off with quite a tidy sum. He was eventually caught, and the judge sentenced him to seven years imprisonment. However, the night before his impending incarceration, he calmly set his time machine for seven years and one day, and stepped through.

When he emerged in 3054, there was quite an uproar. Prosecution maintained that Monty Stein never actually served the sentence, since effectively no time passed for him. Defense stated that the effect was basically the same, since he lost seven years of living in society, or something to that effect. Both sides called each other names (as lawyers are wont to do).

Eventually, Stein was set free. Some say that the judge succumbed to peer pressure; others said that he simply couldn't resist the temptation. For his decision, in full, was:

"A niche in time saves Stein."

I hope after reading the above joke, you are regretting the choice of asking me to write for **mathNEWS**. If so, my job here is done.

Prof. Surya Banerjee

## THE DECIMAL SYSTEM IS BETTER

Fuck 12.

All my homies use base 10.

Screw the duodecimal system.

**boldblazer**

10 > 12

## profQUOTES 143.6

AMATH 332: JOE WEST

“ I wanted to end this course on a personal note. I just wanted you to know that you have been the best group of students that I've ever had in all of the times that this course has been offered online.

CS 251: ROSINA KHARAL

“ You guys wouldn't know how bad the Comfy Lounge used to be.

“ Sometimes you walk by the Comfy Lounge and see things you don't wanna see.

“ [There was] a dreadful, moldy, you know, not a good smell when you walked by the Comfy Lounge.

“ My friends used to say to me, Rosina, don't you dare have a nap in that room.

“ I had a friend in Environmental Studies who would get me a package of baby wipes [...] to wipe up my desk in the labs before I sat down because she said, Rose, the CS people that you work with are so unclean that you're gonna catch a disease.

MATH 239: MARTIN PEI

“ If you find a fast algorithm for solving TSP, let me know secretly, and together, we can take over the world.

## N WAYS TO GET SNARKY COMMENTS FROM THE EDITORS IN YOUR mathNEWS ARTICLE

- Call them out directly in the article
- Make direct reference to god ⚡ peED in your article [Editor's Note: Any publicity is good publicity.]
- Make recommendations to improve **mathNEWS** and say in them that the editors must be reading this recommendation since they must read **mathNEWS**
- Bribe them [Editor's Note: What are you insinuating about our moral character here?]
- Thank them in your article
- Blackmail them that if they don't add an editor's note on this bullet point then you will post the onion video on the Slack [Editor's Note: No... Not the onion video! Anything but that! PLEASE!]

Sandwich Expert

## THE FINAL WEEKLY PUZZLE CHALLENGE

Get your thinking caps on, the Math Student Life Team in partnership with MathSoc present the Weekly Puzzle Challenge. Here is this final puzzle! For more details, the submissions form, and a list of rules visit [bit.ly/UWPUZZLE](http://bit.ly/UWPUZZLE). Each correct solution submitted before the deadline will give participants an entry into our prize raffle for a \$50 Amazon e-gift card (must be a registered UWaterloo Faculty of Math student to be eligible for the raffle).

Check out the puzzle here: [bit.ly/UWPUZZLE](http://bit.ly/UWPUZZLE)



### WHAT STUFFED TOY DID YOU BUY?

5 mushrooms  
2 yogurt containers  
5 tomatoes  
3 pancake boxes  
1 toothbrush  
1 oreo box  
2 potato bags  
1 banana bundle  
3 peaches  
1 spaghetti sauce jar  
1 ketchup bottle  
2 lemons  
4 nectarines  
4 hamburger patties  
1 avocado  
1 lasagna  
6 chocolate bars  
3 cookie boxes  
1 chicken  
1 milk bag  
4 sausages  
3 oranges  
4 tarts

The Math Student Life Team

## N THOUGHTS FROM FIRST YEARS ABOUT THE 225 CATASTROPHE

225 ca-tas-tro-phe

/kə'tastrəfē/

noun

1. The singular 2020 event wherein Waterloo overshot CS and CFM by more than 225%, with other math programs experiencing similar over-admittance, causing great and often sudden damage or suffering; a disaster.

What are your thoughts on the 225 catastrophe?

- “waterloo moment” — *a seagull (ion even know) man*
- “not very cash money of them to destroy the already miniscule chances of CS transfer from hon math that some people had in mind” — *shaditato, knight*
- “the geese did it. they want more students to terrorize, and the math faculty is the only faculty with first years on-campus. something's up” — *arthony*
- “Frankly, I think it's rather ridiculous on behalf of the university, upper year CS course enrollment opportunities as well as coop jobs are going to be scarce. I'd appreciate if the university were to work out a plan to ensure success but it's looking like weed-outs may be the route they choose to ensure grad numbers.” — *term*
- “waterloo needs more spaces in 14x. Also, how the hell do online class spots fill up?” — *1*
- “If the University of Waterloo was planning on people to drop out from the Math faculty over the difficulty of online classes, thereby explaining the cause of the... choice of admitting more than double the expected limit, then they better prove that they're not stepping in two boats at once, else they sink” — *lecronium*
- “and now, the end is near” — *turing\_machine*

A Writer Attempting Real “Journalism”

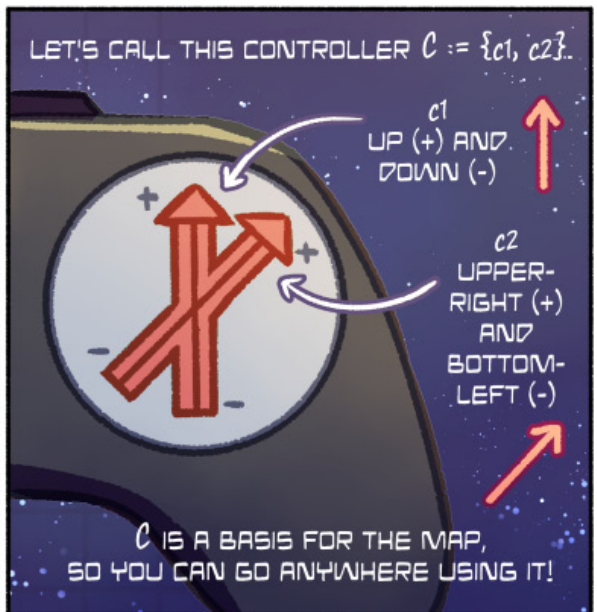
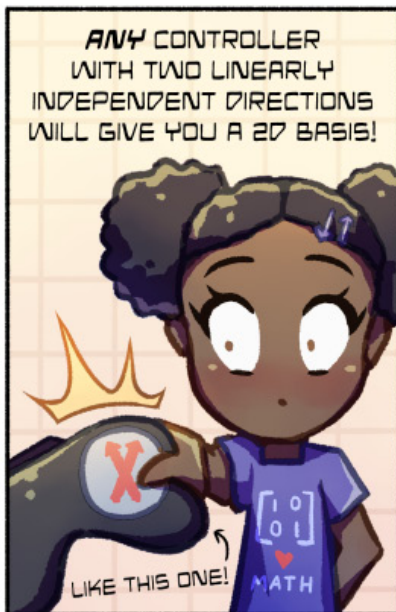
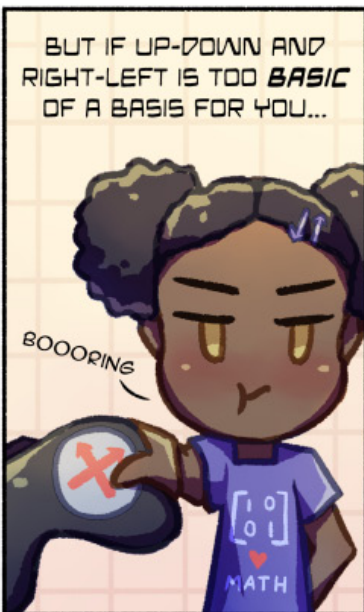
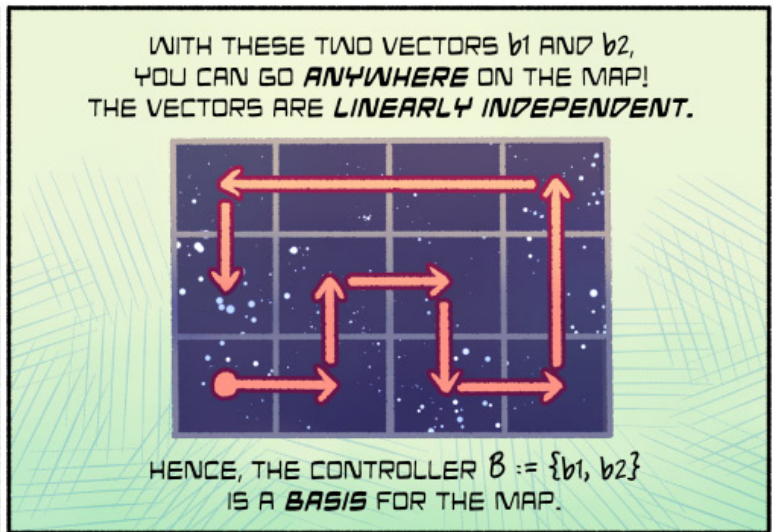
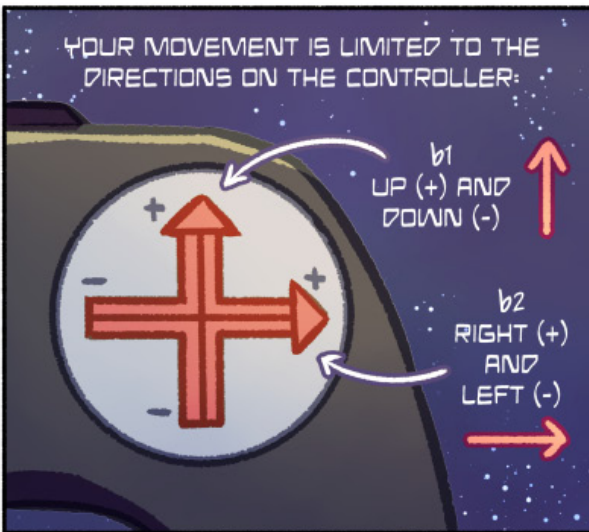
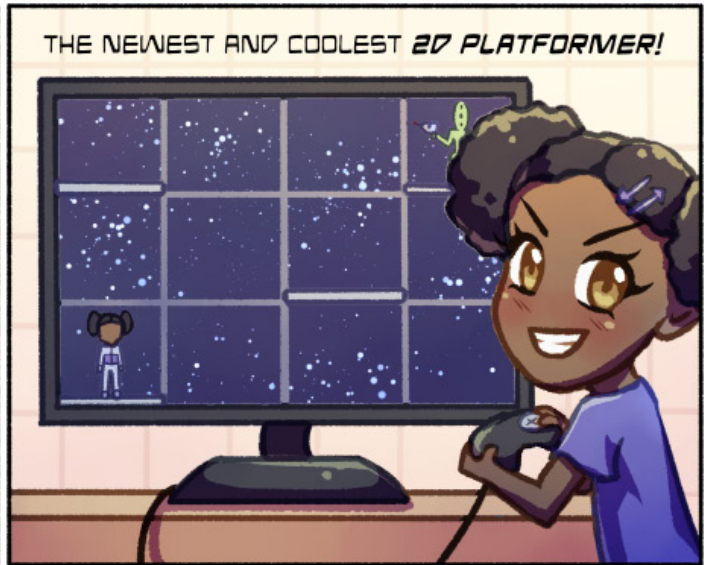
## EPISODE SEVEN: LINEAR ALGEBRA CHANGE OF BASIS

On the following page, enjoy episode seven of MathSoc's educational cartoons series: [Linear Algebra Change of Basis!](#) This cartoon attempts to connect vector space concepts to video games. If you have any feedback please email Gavin Orok at [gjorok@uwaterloo.ca](mailto:gjorok@uwaterloo.ca) or fill out the following survey: [https://bit.ly/cartoon\\_feedback](https://bit.ly/cartoon_feedback). For each unique educational cartoon we produce that you give feedback on through this survey, your name will be entered in a draw. At the end of the term one person from this draw will be chosen to win a \$25 gift card prize!

Gavin Orok

# LINEAR ALGEBRA: CHANGE OF BASIS

STORY BY MATHSOC | ART BY AVA PUN





SAY YOU WANT TO GET FROM X TO Y ON THE MAP. YOU COULD GET THERE BY PRESSING  $2b_1 + 3b_2$  ON THE B CONTROLLER.

$$[\vec{v}]_B = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$$

BUT HOW WOULD YOU GET THERE USING THE C CONTROLLER?

THE *CHANGE OF BASIS* MATRIX WILL TELL YOU!

# CPB

NEW BASIS      OLD BASIS

MULTIPLY IT BY THE COORDINATES OF THE VECTOR IN B:

$$\begin{aligned} cP_B [\vec{v}]_B &= cP_B \begin{pmatrix} 2 \\ 3 \end{pmatrix} \\ &= \begin{pmatrix} -1 \\ 3 \end{pmatrix} \\ &= [\vec{v}]_C \end{aligned}$$

THAT'S THE NEW BUTTON COMBINATION!

JUST PRESS  $(-1)c_1 + 3c_2$  ON THE C CONTROLLER AND...

$$[\vec{v}]_C = \begin{pmatrix} -1 \\ 3 \end{pmatrix}$$

**IN SUMMARY:**

- ANY TWO LINEARLY INDEPENDENT VECTORS IN THE PLANE MAKE A BASIS.
- THE CHANGE OF BASIS MATRIX  $cP_B$  CONVERTS FROM COORDINATES IN B TO COORDINATES IN C.
- A SOUND UNDERSTANDING OF COORDINATES IS IMPORTANT IN EXTERMINATING ALIEN INVADERS.

# PLAYING POKEMON GO DURING A PANDEMIC

I have been a pokemon fan since around late 2006 and a player since 2007. Starting with the DS pokemon games all the way up to now, I have played pretty much every single official pokemon game that I could get my hands on. Before Pokemon Go, the few available pokemon mobile games weren't the best, nor were they really supported long term (RIP Pokemon Duel<sup>1</sup>, Pokemon Rumble Rush, etc.). That all changed when Pokemon Go, developed by Niantic, was released.

I didn't really care too much about it after the novelty wore off, since there wasn't much of an incentive for me focus on it compared to the main series games. That changed with new features like "Legendary Raids" and later, "Community Days"—I now treated Pokemon Go with the same level of dedication. Each Community Day is centered around a feature pokemon, and participating in them gives many good benefits. Community Days have since become a must-go event for me—I actually started leaving my home during my free time, when before that wouldn't even cross my mind. During Community Days, I frequent Central Park, in Metro Vancouver. Central Park is great for events like this, being at a convenient location and with plenty of Pokestops and long park trails<sup>2</sup>. In the past, my parents had to negotiate with me to even take me to Central Park, but now I go there willingly for more than four hours every month.

With my experience here I know very well what a typical Community Day weekend Central Park looks like. Thus, I ended up being able to compare pre-pandemic and in-pandemic park conditions.

## PRE-PANDEMIC

The last 'normal' Community Day occurred on 22 February, featuring Rhyhorn. There were fewer people than usual, although I mostly attributed that to the weather. The following March Community Day featuring Abra was when things took a turn for the worse. Initially, it was scheduled for 15 March. However, as the coronavirus kept spreading, Niantic decided to postpone the event in some locations, and the event was eventually indefinitely postponed worldwide.

After some time, Niantic added ways to play Pokemon Go indoors. They announced a changed Abra Community Day, rescheduled to 25 April, featuring a new event that cost \$0.99, which I bought, that gave you an in-game medal that said 4.20 on it<sup>3</sup> (I'm not joking). The Community Day itself was doubled in length, and provided more perks than usual, allowing players to do the whole Community Day indoors. However, that did not deter me from going outside that day.

## APRIL

When I went, I took necessary precautions such as wearing a mask, carrying hand sanitizer, and making sure I was not touching anything except my phone. I had not gone outside for weeks prior to this, and the severity of the COVID situation fully dawned on me then—there were no people, no

cars, no usual bustling city noises. It was like playing Pokemon Go on Christmas Day, except in April, and with better weather. The only people at Central Park were those who were there to play Pokemon Go. All the park facilities were closed, fenced in, or wrapped in plastic. I think I only came across less than 10 people total. Nothing eventful happened.

## MAY

The May Community Day featuring Seedot was announced for 24 May, which was a few days after the BC government's proposed day to open some open-air park and recreation facilities. I did not expect that to lead to what I saw at Central Park.

There were probably ten times more people there that day than the average amount in the weekends before the pandemic. It seems with the lack of things to do, everyone ended up going to the one place that was open and available. Everyone tried to socially distance, with plenty of people wearing masks, but the sheer density of the crowds made it practically impossible.

I also saw that more things were opened, such as the occasional fitness stations dotted around the park trails, but the playgrounds remained closed behind metal fences.

## JUNE

The June Community Day featuring Weedle was announced for 20 June; a heated vote on Twitter between the superior Weedle Gang and the other lame options of Gastly, Sandshrew, and Squirtle saw Weedle and Gastly come out on top. Weedle became the feature pokemon for June, receiving the most votes by the slimmest of margins, with Gastly being slated for July.

By this time even more restrictions had been lifted, including the opening of smaller parks, recreation centres, and other public facilities. The number of people at Central Park decreased to about twice the usual amount before the pandemic. I found it funny that it was with fewer restrictions that social distancing became possible again. It's a bit ironic, and quite the unintended consequence.

## JULY

The July Community Day featuring Gastly happened on 19 July. This time the entirety of Central Park was open, except for the swimming pool, Swangard Stadium, the horseshoe pitch, and the lawn bowls field. The parking lot used for drive-thru COVID testing also remained inaccessible, for obvious reasons. The playground opened again, but there were barely any kids around. I think I saw only three kids actually using the playground, way below pre-pandemic numbers. Mostly, the only people passing by the playground were people on their phones playing Pokemon Go like me.

The weather was nice, like in June, but there were noticeably fewer people on the trails compared to back then, which probably means that the weather was not the main factor for the amount of people at the park in June. However, the same could not be said outside of the trails, particularly around the two main lakes. People were throwing birthday parties, picnics, and barbecues. There was even a wedding happening!

Amidst all that, it was disappointing to see just how few people were wearing masks. Honestly, I felt a bit out of place as I was pretty much the only one wearing a mask in the park. I occasionally saw other mask-users, but we were definitely in the minority.

### CONCLUSION

I must say it was absolutely an interesting experience to see how conditions in Central Park changed throughout the different stages of the pandemic. It turned out that during the most serious parts of the pandemic was when the most people showed up. Other than to and from the park for Pokemon Go, I have not gone to any other parts of the city, so I can't say for sure what things were like there.

Thank you for coming to my TED talk.

*boldblazer*

PS: It turns out there was a loophole when city park and recreation facilities were closed. The city by-law enforcement officers did not answer report calls after the offices were closed for the day. I saw, through my window, many people using city facilities, such as the skate park and the fields, after about 7 p.m., despite warning signs everywhere saying they were closed and that heavy penalties can be levied against violators.

1. In my humble opinion, I think out of all the multiplayer pokemon mobile games besides Pokemon Go, Pokemon Duel was the best. I think it's a great original concept for a strategy game, basically combining pokemon and chess. I don't think any other pokemon mobile game will ever be as good (I'm looking at you, Pokemon Unite). Pokemon Duel was so good that I would risk being on the receiving end of Nintendo and the Pokemon Company's famous C&D orders to make my own version of Pokemon Duel.
2. In my most humble opinion, aside from Stanley Park (named after the same person as the Stanley Cup), Central Park is the best park in Metro Vancouver. Accessible by Skytrain via Patterson Station, it contains two lakes with many long park trails, tons of picnic areas, all sorts of wildlife (when unbothered by an invasive species of snakefish), a golf course, some baseball fields, a horseshoe pitch, some tennis courts, a miniature boating club, a lawn bowls club, fitness stations dotted around everywhere, the multi-functional Swangard Stadium, a public swimming pool, many plaques commemorating royal visits, and a war memorial.
3. This seems to possibly suggest that they originally planned for it to be rescheduled on 20 April 2020, despite that date not being a weekend. It could also just be a joke that was accidentally left in the game but who knows?

## PUSHKIN SONNET FOR STAT231 WITH 100% PERFECT METER, RHYME, SYLLABIC STRESS, AND OTHER SUCH OBJECTIVE MEASURES OF QUALITY

If STAT Two-Thirty-One aspires  
to teach research and conscious thought  
then it'd be great if it requires  
some more than how to join the dots  
Like, solve this: how much time is wasted  
on R code that we copy-pasted?  
No matter how I CTRL-V  
I still won't grasp the student's  $t$   
The teachers' answer to discussion  
is 'stop and point to the course notes'  
They ought to read what themselves wrote  
and pair it with some poems in Russian  
OR something. Conclusion it sucks  
this whole damn course is for the geese  
I mean ducks

*girafarig*

## TOSS A COIN TO YOUR WATERLOO FROSH

Statement p: "I didn't pull an all nighter listening to the Witcher soundtrack on repeat the night before course changes."

Statement q: "I got into all my required courses because there is a reasonable number of incoming first years in the faculty."

$p \Leftrightarrow q$  is a tautology.

*A cool pen name*

O Valley of Plenty

**ЭТОТ ТЕКСТ ПРОСТО  
ВЫГЛЯДИТ КРУТО.**

**ЭТО НИЧЕГО НЕ ЗНАЧИТ**

# BASTION OF ERUDITE AFFECTION: mathNEWS AS A DATING SITE

MONDAY, FEBRUARY 24, 2020 — A DARK, COLD WINTER'S NIGHT.

It was a cold, still evening on campus, and Camien was looking for somewhere to cry. Snowflakes, borne on a slow, silent wind, drifted slowly by, bathed in the solemn orange lights of campus. He paused beneath the bridge of the chemistry building and contemplated going inside. Beyond the doors, he saw half-lit hallways; too foreign and lonely to soothe his sadness. He wanted the solace of a familiar place—somewhere that might be empty now, but held warm memories from the past. He continued past the egg fountain in the courtyard, and raised weary, quivering eyes to the building before him. The building where so many old, fond memories had been forged.



Inside MC, at the **mathNEWS** production night, Wordress was struggling with writer's block. Concurrent MATH 138 and MATH 237 midterms had accosted most of the writers who would normally show up, and with the dearth of writers came a dearth of ideas. She sighed and drummed her fingers across the keyboard.

The room was just quiet enough, and Wordress just close enough to the entrance of the lab that when the sobbing started, she just barely heard it. She glanced around the room, but the other writers were chatting or typing away. Wordress tapped the shoulder of Sarah, who had taken the seat next to her and had been humming as she typed. Sarah paused, lifted one cup of her headphones, and raised an eyebrow.

“Do you hear that, um, crying?” Wordress asked, rubbing her arm. “Do you think someone might need help?”

Sarah squinted. “Ya, I hear it, he sounds totes sad, but he'll probably be oh-kay, maybe just got some assignment mark back. Happens all tha time in em-say.”

Wordress opened her mouth, but Sarah had turned back to her article, nodding along to her music. Wordress tried to continue writing, but the intermittent crying, just on the edge of her hearing, dispelled all vestiges of concentration she could muster.

She fidgeted a little longer, then stood up and tapped Sarah's shoulder again.

“Umm, I'm going to see what's up, and I'll, like, totally blame you if you don't come with me and I get kidnapped.”

Sarah took off her headphones with an exasperated sigh, and followed Wordress as they stepped out into the hallway.

The second-floor halls of MC echoed eerily with the sound. The crying wasn't much louder than in the computer lab, but

Wordress could tell it was a guy now—soft, sniffling sobs, with a hiccup now and then. They two followed the sounds around the corner, then down the hallway, and to the door of a lecture hall. Wordress paused there, considering, for a moment, if this was truly a wise idea. She looked at Sarah, who gazed back blankly. Wordress stepped in.

The room was brightly lit; the lights must have been newly upgraded. A few messily scribbled math equations were written in chalk on the blackboard. Sarah walked in as well, and followed Wordress' gaze to the back of the room. On a chair, with a damp, puffy winter jacket draped over the back, a guy was sitting, his head down on the table, crying.

Wordress waited a moment, then spoke.

“Hi, I'm Wordress. Are you, um, okay?”

The guy lifted his head, surprise breaking across his face briefly. He answered quietly, after a weighty silence.

“Not entirely.”

“Umm, that's too bad.. I mean, I meant to say I'm sorry... Oh sorry, that, uh, I mean...” Wordress had no idea what to say, but through his tears, hint of a smile flickered across the guy's face.

“That's okay. Thanks for asking. I'm Camien.”

“I guess, uh, you're welcome.” A thought. “So, like, there's this event going on, and do you want to, like, come to it with us? It's the **mathNEWS** writing night, and you can get some free pizza if you write a little.”

“Thanks. I'll decline for tonight, though. Have some crying to get through. I really do appreciate you coming in and checking if I was all right, though.”

Wordress smiled, nodded shyly, and headed back to the lab with Sarah.

“Ya, went betta than I thought.” Sarah said.



Camien was left alone in the room. He tried to return to the state of mind he'd been in earlier—a emotional, cathartic storm—but he couldn't. He felt empty and light; all cried out. He thought of Wordress and the other girl. What type of people would check in on a person crying in MC at eight o'clock on a cold Monday night?

Maybe he would check out the writing night, after all. He'd seen **mathNEWS** issues around campus in his time as a math student, but had never seen the inner workings before.

He pulled out his phone, and started looking for where **mathNEWS** ran their “writing nights.”



At 8:32 P.M., Camien pushed the door of the lab open, and asked if he could write. The editors set up an account for him, and he took a seat across the aisle from Wordpress.

“You made it!” She smiled and ruffled through her backpack. “Uh, here, have a napkin. I, um, I guess they didn't really tell you what to do here, uh, but you can write about anything.”

He sat before the page, and dabbed at a tear streak with the napkin. *You can write about anything.* There was only one thing on his mind now, and if **mathNEWS** would take it, it was theirs to take. He remembered the suffocating anguish, held it tight and strong, and wrote it onto the tear-blurred page. A line from a poem had come to mind—“It is equal to living in a tragic land / To live in a tragic time.” And indeed, he thought, it was.



Wordress liked to sneak glances at other writers' screens. To her left, Sarah, reviewing some audio equipment, bopped her head to her headphones' music as she wrote. Behind her, the new guy, Camien, stared with the stoniness of a gargoyle at the screen.

Wordress read the title and the first few lines. Ah, Steven Wallace, a high school English classic. As for the article itself, it looked like it would be a sorrowful exhalation of what the guy was feeling. Wordress could understand; for better or for worse, she'd used **mathNEWS** as her personal venting place before. She had an article idea now: for all the eloquence of Wallace's quote, she felt it could nitpicked, and maybe, just maybe, cheer the sad guy up a little.



The rest of the production night passed uneventfully. Camien left before the pizza arrived, saying little. Wordpress and Sarah departed post-pizza.

Outside, the gentle drifting of snow had given way to stinging wind, but Wordpress felt warm as she trudged through the unshovelled streets home.

#### FRIDAY, FEBRUARY 28, 2020 — V14214 PUBLISHED.

It was Friday morning, and Camien sat in a basement MC classroom. The Math lecture dragged on and on, the tantalizing prospect of the weekend dancing across the mind of many a student. Monday's tragedy still hung cloudily above him, but it was a little further away now.

Just before noon, the professor dismissed the class, and Camien headed up the stairs to find some lunch at the C&D. A colourful new **mathNEWS** issue on a kiosk beside the

stairs caught his attention, and he picked it up. The C&D was bustling, and he figured he could take a look as he waited in line for some chili.

He flipped through *N Things* articles, a few reviews, an impressive-looking series on divestment, and there, on page 16, just after the **profQUOTES**, were a pair of articles.

There was his article! *It is equal to living in a tragic land / To live in a tragic time.* He was surprised that it had actually been published. In the clear light of day, it was a mess. The editors had probably thought it was satire. But placed next to it was a second: *It is darker to living in a tragic land / To live in a tragic time.*

Camien read through it. It was an uplifting article, picking at the phrasing of the quote, arguing against the sadness of the words to try and find hope in its place instead. The writing was confident, and the last sentence felt like it could have been written to him: “In a tragic time, there is naught to do but wait. In a tragic place, there is movement, light—a chance to walk to somewhere better.” He looked at the pen name.

*Wordress.*

She'd written it! He hadn't been planning on writing for **mathNEWS** again after his first atrocity of an article, but if kind Wordpress had written an article in response to his, he would go again. Even if it was just to say thanks.



Wordress found a copy of **mathNEWS** v142i4 in a DC stand. She'd read it in its entirety once lectures were done for the day, but glanced through the issue now. Near the end of the issue, her article was nestled beside Camien's. The editors were good at what they did—she hadn't even asked for a special layout.

At the bottom of Camien's article, a single-word pen name: *tragic.* Fair enough, Wordpress thought. Fair enough.

#### MONDAY, MARCH 9, 2020 — V14215 PRODUCTION NIGHT.

A week later, the sun was just setting as Wordpress and Sarah walked into MC for the next **mathNEWS** production night. They'd arrived a few minutes after production night started, and as Wordpress walked into the lab, she was greeted by a not-too-familiar, but still recognizable voice.

“Hey Wordpress—how's it going?” Camien was already sitting at a computer in the lab. “When you have a minute, could I ask you about your article last issue?”

Sarah winked at Wordpress, and moved to take a seat elsewhere, donning her headphones. Wordpress sat beside Camien, and started,

“Um, sure. What about it? Did you, uh, like it?”

"I thought it was great! I really appreciated the message, it was a great pick-me-up. What I wanted to ask about in particular was the style you write in. How do I put it? It's so strong and confident. You sound so *sure of yourself* in the writing, and I have no idea how you're doing it."

Wordress turned her head away, smiling. "I guess I can, uh, talk about it a little. It's a bit, I guess, boring and technical writing stuff."

"I'd love to hear it."

"Okay... Well, it's mostly this thing called modality I learned about in an English class." Wordress paused, and looked back at Camien. He waited quietly, and Wordress decided to continue. "When you're writing, I guess, you have a choice of degree of commitment you want to express in a statement. A sentence with lower modality sounds less certain, less confident. I guess, something like 'I feel the water might be bad.' Words like 'might,' and 'I feel' give that effect. Something with higher modality sounds more certain, and I used sentences like that a lot in the article. Umm, let's see. 'Not a single soul will lay claim to that position.' Sounds more like a command. I hope I'm not boring you."

"That's neat! I'd never thought of that before. It's cool how you sounded almost like a different person there, maybe a prof, when you were talking about that." Camien smiled, and Wordress blushed. "No, not different in a bad way, just more confident. I wanna know more—tell me more?"

"I guess so, uh, I mean, sure! Nobody asks me about writing. Hmm... Let me tell you about the difference between epistemic and deontic modality..."



Wordress and Camien chatted away the production night. Wordress was surprised by Camien's interest in writing technique—not even the people in the English course where she had learned it had been quite as enthusiastic. Camien, on the other hand, didn't know all that much about the topic, but was thoroughly fascinated. *Some people think about such small, details of writing*, he thought. *I didn't even know it was something to consider.*

The production night had better turnout than the last, with a lively post-production pizza party. Camien stayed for the whole evening this time, and Wordress did too.



"See you next production night?" Camien asked Wordress, as the pizza boxes were being cleared away and the writers dispersing.

"Umm, definitely!"

**FRIDAY, MARCH 13, 2020 — V142I5 PUBLISHED.**

"Ya, Wordpress, did ya get tha mail?" Sarah said through a mouthful of Rolltation. They were sitting at a table in DC, sharing a late lunch, and Sarah scrolling through something on her laptop.

Wordress had been reading v142i5 of **mathNEWS**. Some listicles, a whole bunch of longer, high-quality articles, and what was this? A little article titled *What I learned about modality from a really smart girl*. At the bottom, a pen name: *less tragic*. She had been smiling, and about to start the article, when Sarah had spoken.

"Uh, nope." Wordress answered. "What's up?"

"Tha prez just cancel tha classes for tha term! COVID n' such, he say." Wordress' eyes widened.

"Really? No way! Does that, um, mean we don't have CS 240 this afternoon?"

"Nah." Wordress leaned in to read what was on Sarah's laptop, and a long email blurred by as Sarah scrolled furiously. "We got two fortay. None afta today though."

*Friday the thirteenth—fitting*, thought Wordress. She knew that she should be concerned how classes would run for the rest of the term, or how much else COVID-19 would change, but the first thing on her mind was something very different and surprising. It was that no, she would not be seeing Camien next production night.

**MONDAY, MARCH 23, 2020 — V142I6 PRODUCTION NIGHT.**

It wasn't perfect, but it was something, Camien mused as he gingerly placed the webcam on top of a stack of textbooks. He clicked the link the **mathNEWS** editors had sent, and joined the call.

A virtual **mathNEWS** production night had been set up. It was a week since classes had been suspended, and Camien was more than a little bored. Big changes were happening around the world—the WHO had declared COVID-19 a pandemic, countries were going into lockdown, and normalcy was quickly draining away. He'd just been idly wondering how Wordress was finding the pandemic. Maybe he'd have a chance to ask today.

There he was, in a midst of lower-than-life resolution faces and rooms. A novel online production night, a response to a novel coronavirus, and turnout wasn't too bad. There were six people on the call now, including himself. There'd probably be no pizza, less chatter, less camaraderie. But there was someone. Wordress was there.

"Hi Camien." She said. "I, uh, liked your article last issue."

The production night was a loud, busy affair, with many voices eager to talk after a week without classes. Camien didn't have

much chance to speak with Wordpress, and he was a little disappointed.

Near the end of the night, when people were starting to drop off the call, Camien had an idea. He was a little nervous, but decided to do it anyways.

He send Wordpress a message on the **mathNEWS** Slack—the only point of contact he had with Wordpress.



Wordress didn't like the online call very much. She felt like she'd barely said a word, but at the same time, the talking made it a little difficult to focus, and sitting in front of a screen at home felt so much more tiring than in MC. Sarah was calling from the kitchen.

“Ya, Wordpress, cooking's good, come eat!”

Wordress was about to reply when she heard a Slack notification sound. It was from Camien!

“Uh, I'll be there in a moment!” Wordpress shouted back, then read the message.

**less tragic** 10:23 PM  
hey

had a thought, I wanted to talk to you about some articles you wrote in the last issue, up for a call sometime?

**Wordress** 10:24 PM  
I would be delighted to!

**less tragic** 10:24 PM  
awesome :)

when works for you?

**Wordress** 10:24 PM  
How about tomorrow at noon? With no classes follows a propensity for flexibility and a clear schedule.

**less tragic** 10:24 PM  
you dm like you write lol

i like it

noon's good! :)

If anyone had been paying attention to Wordpress' expression as she said goodbye and slipped quietly off the call, they would have seen a barely-concealed giddy smile, entirely incongruous with the whole situation that had forced an online production night in the first place.

## INTERREGNUM — THE ONLINE WORLD.

Life continued, for Wordpress and Camien, in the pandemic era. It was a difficult time, with everything from poorly planned classes, a fear of sickness, and political and economic turmoil.

Camien moved home a few weeks after that day. Wordpress stayed in her Waterloo apartment with Sarah.

In the midst of all the disruption, there were a few anchors for them both. Tuesdays, at noontime, just like the first time Camien had asked to chat, the two would eat lunch and chat over the phone. Some days the conversation would be mundane, talking about how work had went, or how an assignment had gone. But now and then, they'd delve into something far more intricate, and it would feel, to Wordpress and Camien, that they were little philosophers, musing about life in unprecedented times.



Then, there was **mathNEWS**. In spite of the lack of pizza and the lack of print, it continued with a dogged determination. Writers wrote; editors published, and the schedule continued. A global pandemic wouldn't stop **mathNEWS**.

Sometimes the two would exchange **mathNEWS** articles, writing to each other or in response to each other. One, feeling particularly romantic, could imagine they were love letters of the utmost erudition, in long, rhetorical form—delicately handwoven exchanges; weeks between each reply.



Spring turned to summer, and summer fell to autumn. Autumn gave way to winter, and the online world continued. Online classes, online production nights, online internships, online everything, it seemed at times. It was exhausting at times, but Wordpress and Camien always had something to look forward to. They grew close, over the long online months.

The announcement that the Spring 2021 term would be in-person, with campus fully opened at long last, was a welcome one. It would be a study term for both Wordpress and Camien.

The day the announcement was made, Wordpress resolved to write a certain special article for the last issue of Winter 2021.

## FRIDAY, MARCH 26, 2021 — V14516 PUBLISHED.

Camien woke up early and got ready for work. “Getting ready for work” was more of a routine than anything, since he'd been working remotely the whole term. A last day of work before the weekend, and even better, in barely a month or so, he'd be back on campus, taking classes in-person! The announcement had been the highlight of his entire month. Camien figured it might even be his highlight of the year.

He ate breakfast, perusing the day's issue of **mathNEWS**. It had been a bit over a year since he started writing, and he felt he'd come a long way in his writing skills. His article this issue was "A Farewell to the Online World," and he was quite proud of it. He skimmed through the issue, looking for Wordpress' article first, as he always did. He found it, and he felt his breath quicken as he read the title.

DEAR LESS TRAGIC,

Today, I doff the flourishes of language. I shed the armour of intricacy, the shelter of verbiage. I have something to ask; something I've been meaning to ask for a while. I ask it in bare simplicity. Now that the chains of the online world have been lifted, and we can once again meet in person,

Would you like to go on a date?

Wordress

What were the words Wordress had used so long ago? Camien remembered. *I would be delighted to.*

**SATURDAY, MAY 1, 2021 — A BRIGHT, CLEAR, SUMMER'S MORNING.**

It was a cool, bright morning on campus, and Wordpress was looking for a special someone. Birds, borne on a lazy, gentle wind, drifted slowly above, bathed in the warm sunlight. She paused beneath the bridge of SLC, finally complete after an eternity of construction, and contemplated going inside. Beyond the doors, she saw quiet, clean spaces; barely touched, waiting patiently for students to consummate their existence in a few days when classes started. But today, she was here not to find somewhere, but *someone*. She continued past the trees of Alumni Lane, and raised eyes bright with excitement to the person she had come here for. The person with whom so many beautiful, beautiful memories would surely be forged.

CC

[Editor's Note: Camien/Wordress is my OTP now.]

## N THINGS ABOUT MY NEW \$50 AGENDA THAT WILL MAKE ME MORE PRODUCTIVE

We all know that the upcoming fall term will be tough. If the last few months of high school are any example, my personal educational career is heading more and more towards studying on my bed, covered in Cheerios, wearing nothing but an oversized T-shirt that smells awfully suspicious and reading notes on first principles at 3 a.m. before an AP calc exam. But no, I will not let that happen in university! I have read enough of the titles on the self-help articles that pop up on my Instagram feed to take back control of my life. So even though I'm about to drop a solid 80k towards an education, this agenda seemed like an **absolute** necessity. It will really make me more productive, efficient, and organized. Here's why:

- The front page says "go after your dreams" in gold italics that'll inspire the middle-aged suburban white mom inside me.
- The covers are laminated because I have higher standards than those flimsy-ass agendas that tear apart in October.
- It has large rungs that don't spiral (innovative Rung Technology™) so the agenda looks simultaneously both more *and* less likely to fall off. Infinitely more important though, the rungs are heart shaped.
- There's a two year calendar in the front so I can like, **visualize** my time, y'know?
- Then there's another two year calendar but it's in this list form where each month looks like a to-do list and each line is a different day, so again, **visualization... but different**.
- Each month has a super artsy title page with lists for birthdays (not that I care), monthly goals (not

that I have), important dates (not that I know), and a grid of dots for other... notes... I guess? Hm.

- Okay *this* is the good stuff: so at the front of each month there's a monthly calendar where I'll put important dates in advance.
- After that it has four weekly calendars. So I'm going to transfer all the information from the monthly calendar to the weekly calendars on the first day of each month. Better remember to schedule that in the monthly calendars...
- Each week has a sidebar for notes (also in weird grid form??) so I can write other important information from my monthly calendars that didn't fit into the weekly calendars there.
- Each day is split into three parts. I know what you're thinking!! Events for the day, classes for the day, and homework for the day! I absolutely love organizing my time down to the very last second. Doesn't everyone??
- Each date is written in cursive which I just think is really cute.
- The month tabs are shiny.
- The back!! Has even more space for notes!! In grid form!!!

A cool pen name

I'd like to personally thank **mathNEWS** for giving me an outlet for my anxiety that I spent \$50 on a piece of garbage. [Editor's Note: You're welcome.]



# GEN Z STUDENT OPENS HIS REAL LIFE MAILBOX FOR THE FIRST TIME, LOSES HIS MIND

So I ordered some stickers for my laptop online, because what kind of CS student would I be if my laptop wasn't covered with stickers of every single technology that I use on a biannual basis or more. Imagine my horror when I get a UPS email saying that my package was "delivered by local post," but there's no envelope at my door!

So it turns out that we have an actual real-life mailbox for our apartment, and we need to physically go to the box to get our mail. So I do that, and the box is almost *full*. There was my package there, yes, but also a couple of letters addressed to my roommate, and a bunch of spam mail. So naturally, in this episode of Mail 📧 Review 📧, I will take a look at all the mail in our box that was *not* addressed to my roommates.

## RESTAURANTS

Honestly, I don't even consider this spam (for now). I'm new to Waterloo and don't know a whole lot about the local restaurants, so I'm happy to have someone let me know that they exist, so I can look their reviews up and decide if they're worth ordering. Plus getting discount coupons is always a bonus. So here we have:

- **City Pizza, Pizza Nova, and Pizza Pizza:** only delivered a menu, no coupons. They do have a scheme on certain pizza sizes, but for City Pizza it's for pickup only, and I don't go outside ever in these uncertain times. 2.5 / 5
- **Swiss Chalet, Papa John's, Taco Bell, Wendy's, Subway, Burger King, Domino's Pizza, DoorDash:** only coupons, no menu! I don't mind this, since now I know they exist and I can always look their menu up online. And most coupons are valid till August/September too! Nice. 4 / 5
- **Waterloo Region Food Bank:** I'm a bit short on cash right now, saving up for next term, but if you find that you have money to spare for COVID-19 relief, send it their way! They're @FoodBankWatReg on most social media, or thefoodbank.ca on the web.

## HOME IMPROVEMENT

Now, as you might have guessed with me being an undergraduate student, I don't really have a home to improve. Nonetheless, these people are some of the most persistent in advertising to me, sending multiple pamphlets about water softening and lawn maintenance to my apartment's postbox. We have:

- **Culligan Water (6 pamphlets):** High efficiency water softeners! And a free chlorine removal system! Wow! Sadly, I think the water out of my taps is just fine right now, and their pricing scheme of "9.95/mo (for the first three months)" with no

mention of what it's like after 3 months is... a bit sketch, to say the least. Still, you have to admire their persistence. *Six pamphlets!* 3 / 5

- **Aire One (2 pamphlets):** Rebates! Rebates! Rebates! Before I knew what these guys sold, I knew for a fact that whatever it was had serious rebates going on. Why else would they write it thrice? Anyway, they seem to have air conditioning, water softeners, and water heaters. Nothing I need, but it's all at a significant discount from what I assume is a very marked-up price. 2 / 5
- **TruGreen (2 pamphlets):** They did it. The absolute madlads. They put a tailored lawn advertisement in the post box of an apartment complex. I hope they're proud of themselves. Shame too, the advertisement is really well-designed and is the first in this category to not immediately give me a headache, what with proper whitespacing, a good color palette, and great fonts as well. 3.5 / 5

## COUPON BOOKS

I was excited at first when I saw these. Free magazines? Yes, please! But then I looked closely and sighed, because it was all advertisements. They're all pretty similar, but anyway, here we go:

- **Waterloo Living (3 issues):** Very tall and narrow booklet. Kinda hard to look through the pages this way. And the content is all home improvement—likely rivals of Culligan and TruGreen not big enough to run their own publications. All useless to me, anyway. 2 / 5
- **Money Saver (3 issues):** A more traditionally sized booklet, much more easier to access. Still filled with mostly home-improvement stuff, but with the occasional restaurant or grocery store. For some reason, there's a picture of a group of people, all in red uniform, all holding their right hand up into the air. Um... alright. 3 / 5
- **AdSave (1 issue):** Unlike the other two, this is completely filled with coupons, for mostly local restaurants. Really useful, and really conveniently sized as well—small enough to fit into a drawer, and wide enough that pages will still turn easily after you take the coupons out. The only downside is that there's only one of these. 4.5 / 5

## MISCELLANEOUS

And now, all the stuff that didn't spam often enough to make it into its own category. We have:

- **Real estate:** So I had 5 pamphlets from Dave Roach Realty, coming close to the maximum of Culligan Water, and then a woman named Cindy Cody

straight up mailed me *an entire notepad* with her advertisement on the top 20% of every page. While I appreciate the effort and will be keeping and using the notepad, I don't have a house to sell (yet) and I maintain that real estate people are the weirdest people to exist. 3.5 / 5

- **Local stores:** Signature Vape is selling masks and sanitizer (???) at uninflated rates (oh nice), Mr Lube gives you \$8–10 off on car service (doesn't that cost like hundreds of dollars? idk I don't own a car), Dodge is selling some trucks with 96 month payments so you can be even more in debt (and own a car for that sweet Mr Lube discount), and Sportchek has up to 60% off on exactly all the stuff that you won't like. All good to know. 3 / 5

- **Canadian government:** some advice on how to stay safe from COVID-19. Wash your hands, wear a mask, avoid nonessential travel, and for further info check your own mailbox. All great advice. 5 / 5
- **Someone else's mail:** Uh... I don't want this. Do I just like... go to Canada Post and give it to them? I guess that's what I'm gonna do. Oh well. 2 / 5

Honorary mention to Desjardins Insurance. I wrote the entire list and then realized you existed. Sorry!

Anyway, that's all for this issue. Tune in after three more months, when I collect even more junk mail and hopefully remember to review it!

tendstofortytwo

## THE E-READER THAT WOULDN'T TURN ON

### BASED ON A TRUE STORY

During the summer, I had taken to reading **mathNEWS** the weekend after a new issue came out. My roommate wrote for it, and I hadn't much else to while away my time with. Well, besides baking pastries, but even that had lost its shine after a month or two, to say nothing of how cramped my kitchen was and how little space there was left in the apartment to store new supplies. Ah, the joys of student housing.

It was the Saturday after the fifth issue had been released, and I was reading it, grazing the headlines: *N Reasons You Should Go Bald Today*, *N Ways To Get This Entire Issue Banned In Mainland China*, *N Books I Loaded Onto My Kindle In Hopes Of Getting Back Into The Habit Of Reading*. The last article caught my eye.

I pulled out my desk drawer. The e-reader was inside, just as I had put it in there when I moved into the apartment at the beginning of the year. I flicked the power switch a few times; it was out of battery. I plugged it into a wall charger and set it aside.

When I went to check on my e-reader the next morning, I still found myself unable to turn it on. Naturally, I complained about it to my roommate over breakfast.

“So it's not just a problem where you just need to leave it charging for longer? Not even the indicator light turns on?” he asked, chewing on a simple *tartine*.

“Nope. It's too bad, Satie, because after seeing that **mathNEWS** article, I really wanted to get back into reading, you know? Download some new books on my e-reader that I've been meaning to get through. I have so much more free time now,” I said, munching away on a day-old blueberry croissant. “I can only read my cookbooks so many times. Like, you know how many times I've read *The Cake Bible*? I need to read some *literature*, like, John Green or something, you get me?”

Satie squinted behind his coke-bottle glasses. “When were you so interested in reading?”

“The last time I used my e-reader was during my last co-op term, when I had more free time. My guess is that the battery's dead after completely draining it by leaving in my drawer for so long.”

Satie squinted some more. “What have you tried so far?”

“Well, I tried flicking the power button a few times. Nothing. I tried holding the power switch for a few seconds, then a few minutes. Afterwards, I tried using a paperclip to press the button in the back. And then I held the power switch and the home button at the same time. I even pried off the back of the case with a butter knife and disconnected and reconnected the battery. But nothing worked.”

Satie closed his eyes. “Mmm. I think I have a battery pack in my backpack. Let me get it.”

“How's a battery pack gonna help me?”

“Sometimes you get a cleaner DC signal off a power bank. It helps if your battery is flat. *Aide-moi*,” he beckoned to me. “I can't find it.”

I shoved the rest of the stale croissant down my mouth and joined Satie to rummage through his backpack with him. “Gee, you have a lot of stuff in here, don't you?” I said.

Satie was silent as he withdrew miscellany from his bag, scattering his belongings across the living room floor. I reached into his bag, which felt mysteriously cavernous. After some searching, I felt something hard and flat in an inner pouch and took it out. It was a hip flask. When I shook it, I heard some liquid splash around inside. “What's in here?”

“Chickpea milk. I forgot about that. Give me that.” He snatched the flask from my hand, uncapped it, and gulped its contents down in a single swig.

Not to be deterred by my roommate's erratic behaviour, I kept rummaging. Eventually I felt something else that was hard and rectangular, and I pulled it out, only to realize it was one of Satie's old pocketbooks. Bummer. I chucked it onto the mountainous and ever-growing pile of stuff on the floor.

“Aha!” Satie exclaimed at long last, withdrawing a black battery pack from some unknown pocket in his bag.

“Oh God, finally.” My stomach rumbled, hungry for lunch. “Well, let's get to it and see if your idea actually works,” I said.

“If it doesn't, you might have to get a new battery,” said Satie.

“I looked into that, and there's no official battery replacement from the manufacturer. I'm not, like, an electrical engineer, so I don't think I could replace the battery with a random third-party one on my own.”

“What about a new e-reader?”

“Yes, I've thought about that too. This e-reader I've got is pretty old after all. It came out ten years ago. Y'know, maybe that's why the battery died on me. New e-readers are pretty pricey. A Kobo Clara's like 150 dollars, and a Kindle Paperwhite's about the same. I snapped up the old e-reader for free off Kijiji.”

“How do the new ones compare to yours?”

“The only notable upgrades were backlights and a higher resolution screen. And I don't need either of those, especially the backlight. I don't like reading in the dark. Here it is.” I unplugged my e-reader from the wall charger and handed it to Satie. “I'll probably trawl Kijiji again for a used e-reader, though it'll take some time. People sometimes have unrealistic expectations for how much they can get for their stuff, y'know? Like they'll try to sell a Kindle from 2010 for over a hundred bucks, the price they paid for it, which is just ridiculous. You know how cars instantly depreciate in value once you drive them off the lot? That applies to basically everything else. Maybe I'll try to find some more cookbooks to read instead. I do have *Best Of Christophe Michalak* on my Amazon wishlist. You can help translate French for me, right? Oh, but I'd need to order more pastry-making tools. I was gonna ask you at some point if I could use your half of the pantry, Satie, because I don't have enough space to store all my baking supplies, and eventually I want to get more baking molds and confectionery equipment. I always let you eat what I make anyway and I know you like it, so—”

“*Regarde ça,*” Satie said, holding up the e-reader. “I didn't even need to use the battery pack.” He flicked the power switch and the screen flashed white as it began to turn on.

## F: UWATERLOO SERVICE → DATING SITE

Over the course of the past term in **mathNEWS**, I've written a series of exploratory articles interpreting various UWaterloo services and organizations as dating sites. It's been a fun ride, and I hope you've enjoyed reading these articles as much as I've enjoyed writing them!

- v143i2 — [Not Unless You Like to Date Courses: Quest as a Dating Site](#)
- v143i3 — [Modern Problems Require Modern Solutions: Learn as a Dating Site](#)
- v143i4 — [It All Starts With a Question: Piazza as a Dating Site](#)
- v143i5 — [Relationships Are All About Teamwork: Microsoft Teams as a Dating Site](#)
- v143i6 — [Bastion of Erudite Affection: mathNEWS as a Dating Site](#)

A special thank you to A cool pen name for their article in v143i1 that sparked the series: [Hi can someone be my zoom buddy—request from an almost-frosh](#).

I'll leave you with a short message.

It's been a difficult term, in a difficult time, and I'm proud of all of you. Sometimes, life sucks. Sometimes, there are things we want that we can't have, and even worse, things we need that we can't get.

In the end, we work with what we *do* have. Nothing I've reviewed is great as a dating site, but we can make do. It's never perfect when we make do with less, so give yourself some leniency, some breathing room this term. If it's less than perfect, it's okay. We'll make it through.

CC

## HOLY SHIT I CAN'T WRITE AN ARTICLE LMAO

I was trying to write an article for the last **mathNEWS**, but I guess my creativity from the last issue couldn't carry on to this one if you can even call that creativity.

I think that's the beauty of **mathNEWS**, though. You can shitpost about whatever you'd like. One wise man said:

“In the future, comedy is going to be randomly generated.”

Fun fact of the day: women have a higher chance of pregnancy than men.

TurboMoist

# CALCULATING THE SHA-256 HASH OF A FILE

Hi! Last issue, we talked about what hash functions are, and this issue, we're going to see what it takes to calculate the hash of a file ourselves. If you haven't already, I highly recommend you read my article in the previous issue, because I will be pretending you know all the words from back then.

The hash function of choice for our calculation will be SHA-256. Why this one in particular, you may ask? Well, analyzing the SHA-256 hash function was a rather large part of my PD 11 work term report, so most of my work is kinda done for me. With that out of the way, let's start calculating!

SHA-256 is, as the name suggests, a 256-bit hash. Now, as some of you may know, a byte is generally 8 bits. Another important unit is a *word* — for the purposes of our calculations, we will consider a word to be 32 bits long. So a SHA-256 hash is made up of 8 words. The general process looks like this:

1. Start with an initial value (IV) that is 8 words long.
2. For each 512 bit chunk of the original message, take the chunk and somehow merge that into the value from the previous step.
3. After you process the last chunk, the final value out is your hash!

For SHA-256, the IV is chosen as the first 32 bits each of the fractional parts of the square roots of the first eight primes. Kinda beautiful, isn't it? Once we have chosen this value, we can proceed to step 2.

Now, you'll notice that for step 2, we're working in chunks of 512 bits, so we expect the message to be evenly divisible by 512 bits in length. Sadly, not all messages are designed to be like that, so we add some padding. We first take the message in binary format, and count the number of bits in this message, let that be  $L$ . Then we append a single 1 bit at the end. Then we pad it with enough zero bits to make the length of the message congruent to  $448 \pmod{512}$  — that is, enough bits that if you divide the length of the padded message by 512, you would get a remainder of 448. You'll notice that this leaves 64 bits to spare. Here, we store  $L$ . Hopefully  $L$  was less than  $2^{64}$  bits (or 2.3 exabytes, give or take). If you have a longer message... well,  $\setminus(\u2197)\setminus/$ .

Now we have chunks of 512 bits. Notice that 512 bits is 16 words! So we create an array of 64 words, known as the *message schedule array*. The first 16 words are filled in with the chunk. The next 48 words are filled in by taking previous words and combining and splitting them with a series of operators like right rotates and XORs. The exact operations can be seen on Wikipedia<sup>1</sup>.

A *right rotate* of 1 to a number would move every bit in its binary representation one place to the right, and the rightmost bit to the leftmost place. A right rotate of  $n$  to a number is the same thing,  $n$  times. For example, the number 69 as a byte in

binary is 01000101, and after a right rotate of five, it would become 10101000, which is 168.

An XOR or *exclusive or* of two numbers takes their binary representation and compares each bit. If the bit is the same, it gives a 0. If it's different, it gives a 1. So, 69 is 01000101 as a byte in binary, and 42 is 00101010. 69 XOR 42 then would be 01101111, which is 111.

Once we have the message schedule digest ready, we run a *compression loop*. The compression loop takes the current words in the hash and the message schedule digest, and runs 64 times to compute words  $a, b, c, d, e, f, g, h$ . These words are then added to the corresponding words of the hash (and the carry-over value past the size of the word is dropped/ignored). This chunk has been added to the hash now!

We repeat this entire process for every chunk in the message, and once that's done, the combination of our 8 words is our final SHA-256 hash!

I skipped over a lot of the details in the compression loop, because there's really no good way to write down a bunch of mathematical calculations in paragraphs. You can see all of the gore in the Wikipedia pseudocode linked below. But I did my best to provide a good overview of the algorithm. If you want to learn more, I really suggest trying to implement it yourself in the programming language of your choice!

tendstofortytwo

1. <https://en.wikipedia.org/wiki/SHA-2#Pseudocode>

## ISSN 0705-0410

UW'S BASTION OF ERUDITE THOUGHT SINCE 1973

mathNEWS is a normally fortnightly publication, funded by and responsible to the undergraduate math students of the University of Waterloo, as represented by the Mathematics Society of the University of Waterloo, hereafter referred to as MathSoc. mathNEWS is editorially independent of MathSoc. Content is the responsibility of the mathNEWS editors; however, any opinions expressed herein are those of the authors and not necessarily those of MathSoc or mathNEWS. Current and back issues of mathNEWS are available electronically via the World Wide Web at <http://mathnews.uwaterloo.ca/>. Send your correspondence to: mathNEWS, MC3030, University of Waterloo, 200 University Ave. W., Waterloo, Ontario, Canada, N2L 3G1, or to [userid.mathnews@gmail.com](mailto:userid.mathnews@gmail.com) on the Internet.

This work is licensed under the Creative Commons Attribution-Noncommercial-No Derivative Works 2.5 Canada License. To view a copy of this license, visit <https://creativecommons.org/licenses/by-nc-nd/2.5/ca/> or send a letter to Creative Commons, 559 Nathan Abbott Way, Stanford, California 94305, USA. Terms may be renegotiated by contacting the mathNEWS Editorial Team.

# AFTER HOURS

## gridCOMMENT 143.6

Welcome to the last **gridWORD** of the term, everyone. I'll be real right now, it is 1:00 A.M. on Friday as I write this, so this is officially **gridCOMMENT** After Hours.

As you may have gathered by now, without a resident **gridMASTER**, the presence of this section is primarily driven by "do we have an even number of pages" considerations, and today we would have 21 pages without this section.

So, I've dug up another Richard "The Griddler" Bilson special for you all, from v78i6, circa November 20<sup>th</sup>, 1998. Back in those days, **mathNEWS** was much shorter, (only 14 pages) Admittedly, their **profQUOTES** were much longer, (a whole 2 pages).

Hopefully that will correct itself when we're back on campus.

I'll let the Griddler finish out our final **gridCOMMENT**.

Hopefully this week's grid will keep you busy for all of the right reasons. Betcha can't tell that I was studying for an electric circuits exam while I was making it up. Submissions are due at 6:00 pm on Monday, November 30. They can be submitted to the **BLACK BOX**, to the MathSoc office, or by e-mail to [mathnews@undergrad.math.uwaterloo.ca](mailto:mathnews@undergrad.math.uwaterloo.ca).

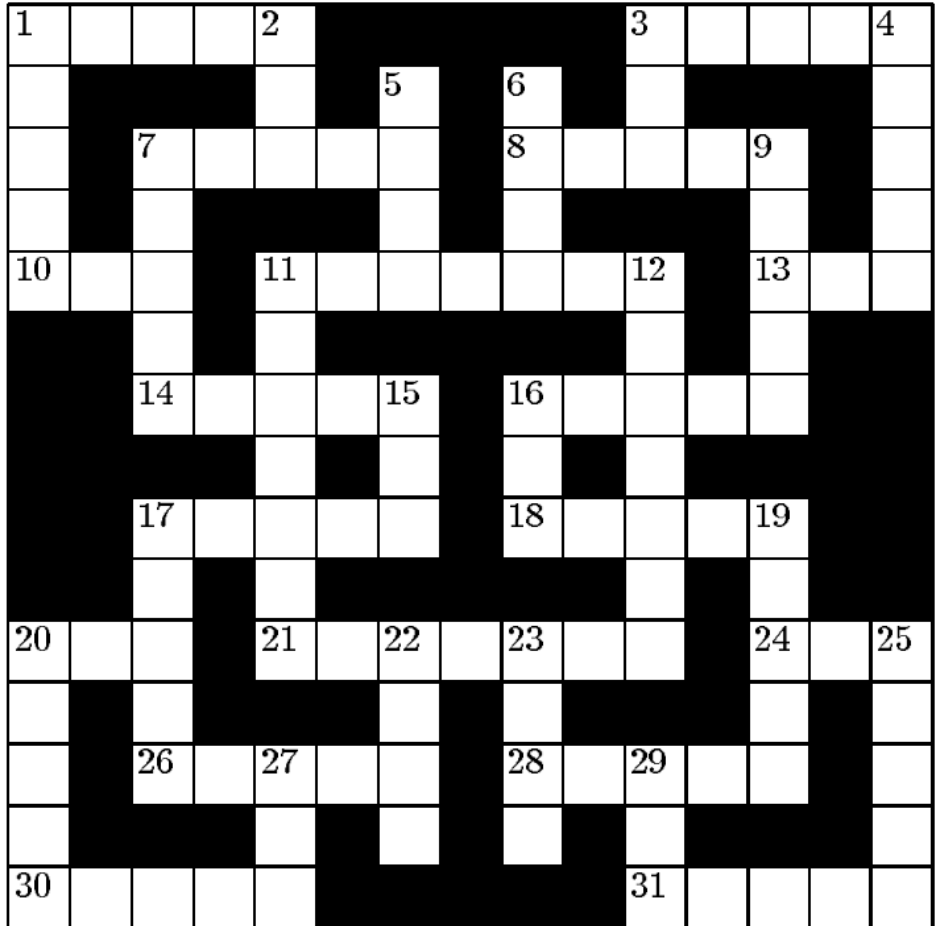
god ⚡ peED

### ACROSS

1. Tool for making holes
3. To foretell
7. Bridal payment
8. Blood-sucker
10. Unit of electric resistance
11. Ale source
13. French name
14. Orange variety
16. Supra-aquatic transport
17. Chance occurrence
18. To praise
20. Ultimate conflict
21. Skull
24. Sodom citizen
26. Put off
28. Neutered rooster
30. Spiral
31. Sea crustacean

### DOWN

1. Relating to sound
2. Uncooked
3. Extent in time
4. Kingdom or dominion
5. Funereal fire site
6. Hint
7. Evil spirit
9. Unit of electromagnetic inductance
11. Temporary military encampment
12. End of sailing pole
15. Sodium Hydroxide
16. Adversary
17. Unit of electric capacitance
19. Bird's toe
20. Anger
22. Not as planned
23. Native Peruvian



Thanks for reading! Good luck on your exams and we'll see you in the fall.

# LOOKAHEAD

SUN AUG 9

MON AUG 10

TUE AUG 11

WED AUG 12

THU AUG 13

FRI AUG 14

SAT AUG 15

Co-op – Direct Offer starts

National Creamsicle Day ☺  
Final assessment period ends

SUN AUG 16

MON AUG 17

TUE AUG 18

WED AUG 19

THU AUG 20

FRI AUG 21

SAT AUG 22

Grades begin to appear in Quest

National Soft Ice Cream Day 🍦

Augustin-Louis Cauchy's 23<sup>rd</sup> birthday

## THIS WEEK'S gridSOLUTION

A	U	G	E	R		A	U	G	U	R					
U			A			G				E					E
D	O	W	R		P	C			C	H					A
I					R	U			E	L					L
O	H	M			B	R	E	W	Y		N	O			M
					I	A			R						
					N	A	V	E	L		F	E	R	R	Y
						O			Y		O	D			
						F	L	U	K	E	E	X	A	L	T
						A							R	A	
W	A	R	A		C	R	A	N	I	U	M		A	L	O
R															T
A	D	E	F	E	R										H
T					I	Y			C	A	P	O	N		O
H	E	L	I	X					A		U				R
									P	R	A	W	N		

## SOCIAL MEDIA'S ALL THE RAGE!

It'll be over a month before the first issue of Fall comes out. I know what you're thinking:

“Where will I get my mathNEWS fix in the meantime?”

I'm pleased to tell you that it's easy! All you have to do is check us out on our social media!

We are active on Twitter (<https://twitter.com/uwmathnews>) and Instagram (<https://www.instagram.com/uwmathnews>). We also have a

Facebook (that we haven't posted on in two years) and a Youtube channel (that we haven't posted on in seven). You can follow those too, if you really want. We don't have a TikTok, but that might be for the best, since it looks like it'll be banned in the States 45 days from now.

clarifED

otherNEWS is made technically possible by club executives of the Math Faculty.

I say "technically" because if they had sent us more news this week, this box wouldn't be here.

THE mathNEWS EDITOR WHO PUTS THE "NEWS" IN mathNEWS