

IN MEMORIAM
mathnewspe-main
2014-2023

“WHAT DO YOU ENJOY DOING ON A RAINY DAY?”

Happy post-reading week, my loveliest readers!

To all of you, at least. I'm on co-op this term, you see, and unfortunately my employer refuses to give me ~7.2% of my internship off, so it was just a week like any other for me.

Fun fact: in running that calculation, I realized that the number of work days I'm paid for this term is 69. Nice.

A friend of mine recently mentioned to me that they were preparing for their Halloween costume, which was a great reminder for me that Halloween is just around the corner! If, like me, you always scrounge together on the night of October 30th using Dollarama cat ears and your existing wardrobe, let this be your reminder, your one chance to do something cool and unique for the first time, just like it will be mi—

Oh. All the Halloween costumes on Amazon are back-ordered till November, and I don't know how to make my own. Guess I'm dressing up as The Color Brown this year.

In **otherNEWS**, curl had a high-severity heap overflow in its SOCKS5 proxy code, reminding all sysadmins to update their servers and all programmers to never write code in C again.

God, I can already hear the *CS Major Diss Track* being mockingly rapped at me for that last paragraph. Go on, laugh! We'll see who's laughing when the robot uprising happens and we're the only ones who know how to turn them off.

Yours in smug nerd superiority,

caffeinatED
Editor, mathNEWS

ARTICLE OF THE ISSUE

Wow. Lots of good ones again. This week it goes to aphf for *Fish in a Barrel*. For those keeping track, this is aphf's fourth Article of The Issue. That's an impressive collection of Conestoga Mall gift cards. Another awaits at MC 3030. Someone please stop them.

evaluatED
Editor, mathNEWS

別	go for a walk
SOMEBODY	Complaining
YALEVOYLIAN	Abstract Algebra
FINEGEOMETER	Working on my math or programming projects! I don't see how the rain is relevant, though.
COMMONDIYAR	Biking outside and catching a cold.
HELI×2	listening to study lo-fi with rain ambiance to double the rain ambiance
XX_420SONICFAN69_XX	Examining the wares and products of ugo-ii.com
WINK WONK	eating mathNEWS
SNOWDOZER	Singin' in the Rain
PAPI	sideways flossin'
MOLASSES	studying on the Math CnD balcony :)
NOT_A_UW_STUDENT_(YET)	Praying to the mathNEWS gods for None Pizza With Chicken.
WATER	scrum
UW UNPRINT	Writing obsessive letters to my favorite rapper, becoming increasingly angry at his lack of response, and then crashing my car off a bridge.
h	face down, pavement
NORMALPARAMETERS	art gallery :)
TENDSTOFORTYTWO	Go to a nearby cafe, get a large hot coffee, and sip it as I read a book or play a video game sitting next to the window.
APHF	Work on my papier mache public art
LARS NOOTBAAR	What does a rainy day enjoy doing on you?
DICK SMITHERS	Deference for Darkness— Halo 3: ODST Original Soundtrack (2009)
WHOLE NUMBER HAVER	Having an excuse to drag others through each and every of the university's tunnels and skybridges
SEXY_SOFTWARE_BABE	fucking up my sleep schedule
__INIT__	Eating sushi in a dead urban mall in Peterborough
BOLDBLAZER	Stay indoors and be cozy and warm :3
LABYRINTH	enjoying a nice bowl of warm soup!
ANDOIHI	Singing, standing outside, losing my umbrella
EVALUATED	Evaporating
DISTRACTED	weather doesn't exist in the mathNEWS office...
AWED	cramming my CS assignment
CAFFEINATED	Go to Math CnD, get a large hot coffee, and sip it as I copyedit articles or write the mastHEAD sitting next to the window.
CLASSIFIED	making tea, drinking tea

Reading week? Yeah, I'm not strong at reading either.

NAMAN SOOD, mathNEWS EDITOR FOR FALL 2023
ALONG WITH EVAN GIRARDIN, DANIEL MATLIN, AWAB QURESHI, AND ISABELA SOUZA

mathASKS 153.3

FEATURING mathNEWS EDITOR CLASSIFIED

!?: CLASSIFIED? CLASSIFIED WHAT?

Yes

LABYRINTH: WHAT LED YOU TO CHOOSE YOUR EDITOR NAME?

It's just that I love crime TV shows (always found them very relaxing) and also it is a badass editor name. "Who wrote/edited this?" "Sorry sir, it's classifiED."

WINK WONK: HI

hello :))

TENDSTOFORTYTWO: WHAT IS YOUR FAVOURITE PART OF BEING EDITOR? LEAST FAVORITE?

Favourite part: puzzling! Doing layout is so fun and it is so satisfying when an article fits perfectly on the space left on a page. Least favourite: copy-editing long articles in a row. Just kidding, please keep submitting your articles, just minding the 1,000 word limit. ~~I am tired and it's cold.~~

UW UNPRINT: WHAT'S THE GROSSEST PART OF THE OFFICE?

The keyboard, why the hell does it look that way? Why is it so hard to type? For its weird shape, I thought it would be much more comfortable to use. Normal keyboards >>

PREDAP: ARE THERE ANY PARTICULAR TYPES OF mathNEWS ARTICLES THAT YOU WANT TO SEE MORE OF?

I don't know, I just love mathNEWS and everybody is usually so creative. I guess I am a fan of chaotic articles or overly dramatic articles, my humour is kind of broken. Oh, maybe more art? I really like how we are getting more art submissions. The bottom line is to just be sure that it doesn't harm anybody.

WHOLE NUMBER HAVER: HOW DO I WIN?

You don't :(

COMMONDIYAR: WHAT COMES TO YOUR MIND WHEN I SAY: LOSER-CORE?

Listens to [insert popular alternative band here] 10 times a day. Thinks they have an obscure music taste. "I wish I was born in the [insert decade here]"

AWED: ARE YOU OF THE OPINION THAT PINEAPPLE BELONGS ON PIZZA?

No... Short answer: I just don't really like mixing sweet and savoury. Long answer: I've always been the kind of person who refuses to eat fruits or anything sweet until I am done with my meal. I have engaged in heated debates on why we should

never mix sweets and savouries for years. Honestly, I am terrified that if I eat a slice of Hawaiian pizza, I might like it or even worse, love it. I would never forgive myself.

SHAHABEE: WHAT ARE YOUR THOUGHTS ON THE LAZEEZZA?

It does look like an experience, however, I am not sure if it's for me. What I can say is that it makes me feel homesick. In my hometown, we have these pizza restaurants with *rodizios*, they are similar to all-you-can-eats, but instead of having a self-serve system, there are servers going around with different pizza flavours that you can choose to accept or decline. For example, they have Chicken Fricassee pizzas. Just like Lazeez, Chicken Fricassee is a meal on its own, but they use it as a topping too! Also, I really miss the dessert pizzas: pizzas with sweet toppings. There are chocolate pizzas, M&N pizzas, and my favourite: caramelized banana with ice cream!

CAFFEINATED: WHO'S YOUR FAVOURITE EDITOR OTHER THAN YOURSELF? LEAST FAVORITE?

You know what? What a great question, I really, really like this question... [*leaves*]

MOLASSES: WHAT'S YOUR FAVOURITE DECLASSIFIED DOCUMENT?

I think it's gotta be [redacted] because I never thought that [redacted]. I learned about it last month when [redacted] and [redacted], but it's really not that surprising that [redacted]. Oh wait, you said declassified?

BOLDBLAZER: HOW DO YOU FIND THE TEMPERATURE OF THE mathNEWS OFFICE? I ALWAYS FOUND IT A TAD BIT TOO WARM.

It is kinda warm, right?

PIZZEUDONYM [NOTE: RED SQUIGGLY LINE UNDER]: HOW DO YOU FEEL ABOUT BECOMING A mathNEWS EDITOR?

Getting out of my introvert comfort zone, never felt so good. I actually was convinced by a **blackBOX** at the end of an issue to become a **mathNEWS** editor. I am serious lol. Although to be honest, I was already interested in editorship after reading past editors' experiences in the anniversary special edition issues. By the way, red squiggly line noted ☺

WATER: WHAT'S ONE THING YOU WISH YOU KNEW BEFORE BECOMING AN EDITOR?

Memorizing the office's door code is impossible.

TERMINAL: WHAT'S THE CURRENT TIME?

11:68 pm

MOLASSES: WHAT IS YOUR FAVOURITE CLASSIFICATION SYSTEM?

The Eisenhower Matrix! I don't know if it really counts, but it is a way to classify or organize tasks.

I always get overwhelmed at the start of the term (sometimes even at the start of the week) with the amount of things I have to do for university. It feels like I have to do everything at once and then I actually end up feeling like doing nothing. However, the way the Eisenhower Matrix works is that you organize your tasks based on urgency (urgent/not urgent) and difficulty (hard/easy). This way, I know which tasks to focus on first and everything seems a little less overwhelming.

NOT_A_UW_STUDENT: WHAT'S A CONSPIRACY THEORY YOU BELIEVE?

Not as interesting as the Flat Earthers out there or the ones who believe that Michael Jackson is still alive on some remote island, but I believe that Larry was real. Like as in, Louis and Harry Styles from One Direction dated. I don't think they have been together anymore for years, but there are so many "coincidences" in the past and even some specific references in their solo albums. I just think it's hard to believe they were never a thing.

DOLLAR STORE PERSON: FAVOURITE VEGETABLE?

PO-TA-TOES. Can't get enough of them. I love gnocchi which has potato as its main ingredient, I love mashed potatoes and mashed potato pies, potato salad, french fries... I swear I could eat potatoes every day for my whole life and I would never get tired of them.

DICK SMITHERS: HOW DO YOU FACE YOUR FAMILY? HOW DO YOU SLEEP?

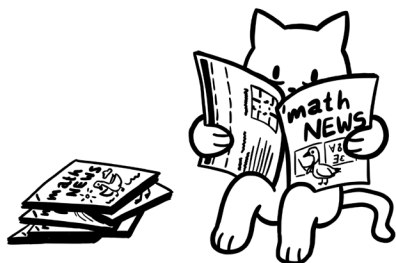
It's actually pretty hard, thanks for asking. And by the way, what is sleep?

BOLDBLAZER: WHAT'S YOUR COLOUR OF CHOICE IN AMONG US?

Black! It's my favourite colour actually.

CUTLET: HOW LONG DID IT TAKE YOU TO ANSWER THESE QUESTIONS?

About 2–3 hours.



HOW TO GET YOUR NEXUS CARD

The NEXUS program is a program jointly run by the Canada Border Services Agency and the Department of Homeland Security, providing expedited clearance to trusted travelers, i.e., anyone who can fill out a form and stand at an airport twice. Here's how you get this prized clearance.

1. Sign up for an account at the Trusted Traveler Program website
2. Add the "login.gov" 2FA code into Duo Mobile
 - a. Isn't it crazy that Duo Mobile ended up being useful for things that aren't LEARN?
3. Start your application
4. Fill in every place you've lived, worked, and pissed at for the last six years.
 - a. Realize one of your co-ops has literally ceased to exist as a legal entity
 - i. Give them your boss's personal phone number (sorry, Krishna)
5. Wait
6. Wait
7. Forget you applied and then go on vacation and remember again
8. Wait
9. Get conditionally approved!
10. Sign up for the Canadian portion of the interview, which is at an actual airport for some reason
11. Sign up for the American portion of the interview, which must be immediately before you actually fly to America
12. Don't commit a felony or an act of terrorism
13. Really remember that last part, it's important
14. Do your first interview and then I guess just leave the airport?
15. Wait
16. Do the American portion
17. Realize you can't use the card the same day, so you have to go through the normal security line
18. Get approved (for real)
19. Go on another trip
20. Use the NEXUS line
 - a. Bask in your superiority
21. Wait two and a half hours for your flight since you showed up three hours early like you're supposed to
22. Don't buy the airport food
23. Don't buy the airport food
24. Fine, buy a pastry for nine dollars
25. Fly to the US

And that's all you need! Good luck on your quest to put even more of your data in American data centers.

HIGHWAY 115/“I’M GETTING CLOSER”

Absolutely scalding hot take: finals are mentally and emotionally draining and I hate them. I hate the numb, emotionless feeling I get when I’ve been thinking about nothing but exams for weeks. I can try to take breaks, go for walks, socialize, but exams continue to take up permanent space in my head.

I’ve found that the only way to get rid of this feeling is to relax, for like, a week. Every reading week, or period between terms, without fail, it’s around the seventh day that I start to feel normal again. Obviously, I want to be able to feel normal in less than a week, since I don’t have spare weeks spilling out of my back pocket.

One Saturday morning in the finals month of Spring ‘23, I decide to try to brute force myself into taking a break and embark on a solo journey to Peterborough on GO Transit. I reread my ECE 350 course notes on the bus to Bramalea, and on the train to Union, and on the train-replacement bus to Oshawa, and by the time I’m on the final bus of the trip—the 88 Oshawa/Peterborough—I’m wiped out and relaxed enough to just stare out the window. Mission accomplished. Head is empty.

There aren’t very many roadside attractions by Highway 115, which the 88 travels on for most of its route. The bus, for whatever reason, seems to go out of its way to avoid towns at all, in favour of tiny park-and-rides tens of kilometers away from any human settlement. Where there aren’t farm fields, there are trees, with the occasional billboard advertising a fireworks stand for Victoria Day despite it being August. It’s not particularly breathtaking, but it is pretty in a sort of ordinary way. The bus has maybe a quarter of its seats filled, the seats are the comfy blue ones, and the quiet conversations in the seats behind me are barely noticeable, which is great because I don’t feel like wearing headphones. It’s about the exact level of excitement I need right now.

After not spending very long in Peterborough because of some unfortunately timed rain, I head back on the same bus route as before. This time, I’m listening to the self-titled debut album by M83.

You all know M83, right? You know, the *Midnight City* band. But that song came out in 2011, and their first album, released ten years earlier, sounded very different. Nobody seems to ever talk about it, because it’s weird and hard to approach.

It’s largely instrumental, heavily sample-based (a practice which I have never before talked about in **mathNEWS**), and fills the space with ambient noise. It’s got plenty of those funky electronic sounds that your weird friend who listens to Aphex Twin might enjoy, and there’s even a bit of influence from video game music, so your other weird friend who only listens to SNES chiptunes might also find it appealing. What else? Oh yeah: the song titles spell out a story! Like this: *Last Saturday / Night / At the Party / Kelly / Sitting / Facing That / Violet Tree / Staring at Me / I’m Getting Closer / She Stands Up /*

Caresse / Slowly / My Face / I’m Happy, She Said. That’s pretty neat. I wonder why I’ve never seen anything else like this.

Okay, yeah, on second thought, it’s easy to figure out why: it becomes much harder to write songs that fit those titles. What does a song called “Facing That” sound like? And indeed, the songs rarely seem connected to their titles, almost ironically at times: “Slowly,” for instance, is one of the most upbeat songs on the record.

But having each song stand alone as a sonic depiction of its title isn’t really the goal here: with the entire album, M83 is trying to capture a stream of consciousness that feels much longer than it really is, one where you remember every detail and could write a hundred **mathNEWS** articles about every feeling you felt (or, if you like, 744 megabytes of PCM audio data). It’s a few-seconds-long experience decompressed into a hour’s worth of music.

And it’s pretty good at it. *Last Saturday, Night* and *At the Party* set the scene. *Kelly*, naturally, is where the music starts to get weirder, with its droning “uhhh” sound and odd-metered random syllables sounding like a sonic depiction of nervousness. *Sitting* is another song with a funny title: it literally starts with a deep voice shouting “LET’S GO” before launching into some sort of action movie chase music. It’s silly. It feels like the narrator is telling themselves to not take this interaction so seriously.

Facing That, owing to its title composed of transition words, is filled with background thoughts of the narrator, various loosely-related melodic ideas and vocal samples from movies, each one taking up an uncomfortable amount of time. *Violet Tree* is a beautiful melody of chimes and synths that sounds exactly like a violet tree.

And then we get to *I’m Getting Closer*, which feels like the epic song that plays at the climax of our sentence-long movie. M83 captures a moment that is ordinary yet feels magical at the same time, the butterflies you get when sharing a romantic moment with someone, in a song that takes ideas from every other song on the album and doesn’t really sound like anything I’ve ever heard before. Ordinary but also magical is also sort of how I’m feeling about Highway 115, as the spruce trees rush past my line of vision by the side of the quiet road.

I think this is exactly what I’m looking for to escape from exams. The barest hint of normalcy, reassuring me that life is still here, and familiar feelings don’t go away just because I’m temporarily busy. I finish my journey back home, not at all disappointed by my short stay in Peterborough, the juxtaposition of Highway 115 and *I’m Getting Closer* lingering in my head.

The lesson? Go to strange places. Listen to weird music. You find some great stuff sometimes.

HOW TO SURVIVE AT WATERLOO WITHOUT CAMPUS HOUSING

Surviving without housing can be hard. Especially if you're a student at Waterloo, the city has less life than a high school band. On top of that, we have less life than dead animals people see on the street. However, one easy solution is to fight among first years for Campus Housing: you get somewhere to sleep, somewhere close to campus, and a meal plan! And if you know, having a meal plan basically means all your meals are free, as per Axiom #1 of GMATH 101. If you can't find a place, or if you get REV, here are ways to live without Campus Housing!

Disclaimer: This is not intended for long-term use and some parts may be satirical.

OPTION #1

Sleep in someone's dorm, and not at REV. Preferably with a friend.

OPTION #2

If you have no friends, you can still live without paying rent, possibly just less comfortably.

1. Find places that are open 24/7 and that will allow you to sleep discreetly, such as MC Comfy, Math CnD, and the corners in DP (yes it closes at 11 but if you go to the 9th floor no one will notice you in a corner). The possibilities are endless.
2. Rent out a locker at PAC for your belongings, some may require multiple lockers.
3. You can also shower and complete your hygiene routine at PAC (some math students may choose to skip this step).
4. If you don't like PAC, then there are showers at E7 for you to use. Keep in mind, however, you'll be sharing the showers with uncivilized Engineering kids.
5. Bribe a club exec to allow you to sleep on the couches in their club office after they close. This works better if you are friends with said exec, however not necessary.

OPTION #3:

Sleep with the alpacas at Eby Farmstead. Better yet, take a long-term sabbatical with them so you don't have the stress of grades or co-op!

OPTION #4

Crawl onto the ION after trains end, and you get to sleep in them after they return to the depot for maintenance.

Note. This also works for buses.

OPTION #5

If you are currently failing in all your classes and you have parents who would not tolerate any failure, you can sleep on the ION tracks.

Note. This is highly dangerous. Do so at your own risk. All damage that occurred is at the fault of the doer and we are not responsible for any harm perpetrators take from partaking in such actions. Serious harm may occur if you do choose to partake in this activity.

OPTION #6

Find shelter in a restaurant in the plaza or the homeless shelter by UWP. It's better than not having a roof over your head, right? Plus it's probably free and you can get some food out of it.

OPTION #7

Buy a tent and sleep in Laurel Park. You get pretty nice views of nature and it's very peaceful and quiet. If you're lucky you can probably fish there too.

OPTION #8

USE AS A LAST RESORT. Apply for REV and pray to Sir Goose that they let you in.

This **MUST** be used as a last resort and all other options are exhausted. If not, do NOT under any circumstances partake in this step. You will regret it.

joesunsunjoe, cherry ♡

FIVE MINUTE JOURNAL

Recently, I bought the Five Minute Journal. Today is Day 1. This morning I wrote about what I am grateful for, daily affirmations and what would make today great. I hope this habit can make a positive impact on my life.

A quote I like to live by is "if it's meant to be, it will be". Every day it reminds me that everything happens for a reason and worrying about things outside of my control is not good.

panda1



WRITING PROGRAMS FOR THE NINTENDO 3DS IS FUN!

As you may have heard, Nintendo is shutting down online services for the 3DS and Wii U in April, and they already shut down the eShop a while back. When companies abandon their hardware, it may seem like your hardware has turned into e-waste. Fortunately though, brave souls develop exploits to break out of the jail Nintendo locks you into and give you freedom over your own hardware. Through such homebrew software, you can:

- play online games after April (<https://pretendo.network/>),
- play games from other regions (like Japanese-exclusive stuff!),
- download and play 3DS games after the eShop shut down,
- emulate older gaming consoles, and
- (*the point of this article*) write your own programs for the consoles without Nintendo's permission!

The software that I ended up writing was a TOTP generation app. You know Google Authenticator? You scan a QR code and then it just generates 6-digit numbers over and over and you can use those to log in? Yeah, that.

Turns out, the algorithm is really simple, and only depends on you having the ability to:

- compute an HMAC using SHA-1 as the hash function (this is crypto stuff you can use a library for),
- do some basic messing around with data,
- decode base32 text (this is crypto stuff you can use a library for),
- scan QR codes (this is computer vision stuff you can use a library for), and
- the current Unix timestamp in UTC (this is standard library stuff that any sane programming language should provide).

The spec is here, if you care: <https://www.rfc-editor.org/rfc/rfc6238>. The fun thing is that TOTP is basically HOTP with special inputs, so when you implement the latter you basically get the former for free. Specifically, $\text{TOTP}(\text{secret}) = \text{HOTP}(\text{secret}, \text{floor}(\text{current Unix timestamp} / 30))$.

Unfortunately,

- no modern crypto libraries provide HMAC using SHA-1 anymore since they all nudge you into using HMAC using SHA-256 or something else, so you'll have to implement HMAC yourself using just SHA-1,
- the data manipulation requires you to know what a "31-bit big-endian integer" is and how to get one from a bunch of bytes,
- base32 is actually the unpopular sibling of base64 and you'll probably have to implement that as well,

which is hard since it operates in multiples of 5 bits, which no language has good support for,

- scanning QR codes is something you *can* use a library for, but the only languages that are easy to code for are C and C++, and they have no conception of a package manager, and
- the Nintendo 3DS has no conception of timezones, and it just lies to the C++ standard library and pretends that the timezone it is currently in (in my case UTC minus four hours) is UTC.

Fortunately, all of these problems are hard and fun to solve! I've been working on these since late August and I finally have a proof-of-concept ready. You can check it out at <https://github.com/tendstofortytwo/tick-tock-lock>. At the moment, you'll have to build it yourself to try it, since it's not polished enough for me to make a full release... but that's just the practice you need to start making your own 3DS apps!

I still need to solve the timezone issue, so you need to set your 3DS's clock to UTC for this to correctly detect TOTP's (HOTP's work fine), but it seems that that should be solvable by adding a timezone selector. Thankfully, due to the efforts of Paul Eggert and IANA, the C++ standard library contains a "timezone database" that I can just use. The next hard part is building enough of a GUI for a dropdown menu! Can't wait.

Anyway, that's what I've been working on for the past week/few months, and this special-interest-rant is brought to you by me forgetting to write a **mathNEWS** article until production night and having to scrounge something together so the editors would give me pizza.

tendstofortytwo

SUNHAT

I met a woman in the elevator
 about my mother's age
 she wore a rose-petaled sunhat
 in an elevator shaft on a cloudy day
 she asked about my weekend,
 then told me of hers, a "wine and cheese party"
 where Marty had something that was neither wine nor cheese
 and I didn't have time to ask what he ate, or who he is,
 only to breathe deeply of the invitation to the shared memory
 of cranberry wine, sliced brie, and something neither wine nor brie
 and I stepped out of the elevator into our life I love
 gifted a reminder that one day our children
 will fight through assignments and exams on long-forgotten sleep
 and our greatest concern will be wine and cheese parties
 and what Marty did or did not drink.

SCARED, ALONE?

Content warning: violence (including sexual violence), war, ethnic discrimination.

A year and a half ago, as I sat and ate in the SLC, some guy sitting maybe fifteen, twenty feet to my front-right, facing in my general direction, was half-shouting—at no one in particular, but perhaps for the two girls on either side of him to hear—about Israelis. “Fuck Israelis!” I heard. I looked up. “Fuck Israelis!” he continued. He started playing a song and announced to the world that it was the Palestinian national anthem, and then caught me watching. “Hey, you, are you Israeli?!” As I shook my head and looked down, I heard him say “... yeah, you better not be.”



Reading week this term began with news of slaughter, followed quickly by news of war. A massive wave of rockets was sent into Israel, and simultaneously, Hamas militants crossed into Israel from the Gaza Strip, I read. Later I saw that hundreds of Israeli civilians had been killed. Some shot point-blank, some beheaded. Women were raped, children and babies were burned alive. I had the misfortune of reading a news article which showed a blurred image of a charred baby's corpse. Thinking about it now, days later, I'm still nauseous.



My extended family, except for my first cousins' families, is primarily Israeli. That day I received fast confirmation that no one in my family was a casualty, but also that the younger of my two second cousins was currently in the army (he happens to be in the age range of military service), and the older was called for military reserve duty. He's since seen action. I am not Israeli, but my family is, and so I spent my reading week hoping that my cousins are safe, hearing that my dad's cousin attended the funeral of his friend's daughter, and looking into how the other Israelis I know are faring.



I don't typically view my family as Israeli, but I also don't usually think of my family outside of North America. I grew up here because my parents were lucky enough to have a relative that could support them as political refugees, fleeing discrimination in the Soviet Union. My extended family left everything behind for the same reasons, but ended up in Israel because that was the only country that would accept them as refugees. As I see it, it's blind luck that I was born on this side of the ocean and not in Israel to experience the war firsthand.

And yet, being from here isn't a guarantee of safety. The Israeli friends I made at my Jewish summer camp in high school appear to be fine, but two former counselors and two former campers have been killed, as well as a camper from a different camp under the same organization. Of those, two grew up at least partially outside of Israel. And so I can't stop thinking about how there's nothing other than circumstance that sets

those who died apart from me. It could have been me. It could have been me.



Growing up, I heard stories of the Holocaust. I heard about how my grandparents fled eastwards from the front as the Nazis approached, and how my grandma's sister took a bullet in the leg in the process. I heard about how my other grandma's extended family was completely killed at the Ninth Fort in Kaunas, Lithuania. When I visited the Holocaust museum in Israel in eighth grade, my parents took some time to look through the books to find their names in the list of the dead.

I also heard stories about how my parents faced discrimination in the USSR. I heard about how my mom applied to a high-ranking university against my grandma's advice, and was given incrementally harder entrance exams until she was failed. I heard about how my grandma walked down the street past a Belarusian woman, and was called a slur for Jews for no reason at all. I heard about how my family's national IDs stated their nationality as “Jewish”, so that any government worker providing them service would know that they were different. And when I visited Minsk in 2017, a drunk woman on the street yelled in my direction not to worry, because they tolerate Jews now. This, of course, happening because she saw my curly Jewish hair. Tolerant, I'm certain.



Hamas attacked civilians: innocents, except for their crime of being ethnically Jewish. A crime that I'm guilty of as well, committed by being born to my parents and not others. Their choice to attack on a Jewish holiday underscores their real motivation: genocide of Jews. My pretend innocence (a lie to myself) has been shattered; in my life, I've now known the largest killing of Jews since the Holocaust.

And when I see the news that protestors in New York City made throat-slitting gestures at Jewish counter-protestors, chanting the number of dead Israelis, or that some thirty student groups at Harvard signed onto a letter putting the sole blame for Hamas' war crimes on Israel, how am I supposed to view that? It's a celebration of the killing of people like my family in Israel. And again, the only difference between myself and my Israeli family is where they were able to escape to get away from persecution. They have no other country. But it's taking place in North America, where I am, and at this point, I wonder if I'm safe myself. I certainly wouldn't walk around wearing a Star of David right now. I'm not religious, but I am, always will be, and cannot not be Jewish, and I now don't feel safe to make that known. To tell you the truth, I'm kind of scared to publish this article.



Not a single friend from Waterloo has asked me about how I'm doing when it comes to the war, and on the outside, I seem fine enough. But every time I walk through the SLC, I think back to the guy from a year and a half ago, the one who seemed to wish harm on my family, and now that the war has started, I wonder if he's happy.

☹

As they say in Hebrew, may the memory of all innocents taken by this war be a blessing.

scared waterloo jew

BRITISH VS. AMERICAN SPELLINGS

- colour vs. color
- analogue vs. analog
- theatre vs. theater
- grey vs. gray
- organise vs. organize
- defence vs. defense
- pyjama vs. pajama
- aeon vs. eon
- tyre vs. tire
- disc vs. disk
- gaol vs. jail
- jewellery vs. jewelry
- doughnut vs. donut
- sulphur vs. sulfur

mathgeek

EVERY TIME I HEAR A FUNNY VACUOUS TRUTH JOKE, I ADD IT TO THIS N THINGS ARTICLE

hyperlynx [Editor's note: <3]

heli×2

AN OPEN LOVE LETTER

...TO mathNEWS!

I'm not a very witty or funny person, but I can be unbearably mushy if I have a veil of anonymity to hide behind. So, I feel due to write a love letter to **mathNEWS**.

mathNEWS simply has so much charm and character to it. The range from shitposts, **profQUOTES**, comics, poetry, to hauntingly candid personal anecdotes, it all just feels so... *human* to me? I find it very endearing.

I went on a trip out of the country to visit some friends. We shared bits and pieces of each of our university's culture, our complaints about them, and their charms. So naturally, I brought out the most recent copy of **mathNEWS** at the time, volume 152 issue 6. We read the submission titled *Madeline* and it never really left my mind. A copy of that page is now on my bedroom wall. (I printed out the page in DC. I left behind the issue of **mathNEWS** as a gift to my friend hosting me. I didn't want to rip out a single page from the issue.)

I keep an issue of **mathNEWS** on my dining table so I can read it while I drink my morning coffee. Sometimes my roommates and I like to collaborate on the **gridWORD**, so I leave it out until the next copy's around. So, I guess I'm a bit of a fan of **mathNEWS**...



Now that you've seen Fermat's Little Theorem, you may be wondering about Fermat's Big Theorem.

PROF. PENNY HAXELL

(KIND OF) WINNING THE KEY CLUES CHALLENGE

FROM A MEMBER OF THE (KIND OF) WINNING TEAM

WHAT IS THE KEY CLUES CHALLENGE?

The Key Clues Challenge is a yearly puzzle solving competition run by the CEMC, open to all University of Waterloo students, faculty, and alumni. This year, 16 puzzles were gradually released between September 27 and October 2. The solutions to these puzzles combined to point to a key hidden somewhere on campus, and the first team that found this key was declared the winner.

This format is typically known as a puzzle hunt. Puzzles in puzzle hunts are special in that they revel in being eccentric and opaque. Some throw a twist on a familiar format, such as a crossword with no clues or a sudoku with very large numbers. Others are wholly unique. No two puzzles are the same, but they do tend to share one common theme: they don't include instructions on how you're supposed to solve them.

AN EXAMPLE PUZZLE

This was one of the puzzles, titled Word Search:

C	U	Y	O	T	E	E	R	O	Z	N	E
L	A	D	R	O	P	Z	O	N	E	P	O
A	L	A	E	W	A	P	T	E	N	O	Z
C	C	A	I	E	A	U	A	L	L	I	N
A	P	Q	U	E	X	S	D	T	P	T	R
X	S	E	L	E	C	T	I	O	N	R	R
I	E	P	A	I	C	O	A	O	T	A	A
S	S	I	T	P	N	P	S	O	N	I	B

APEX
AXIS
BARRIER
CALCULATE
DROPZONE
EQUAL

EXACT
EXPULSION
EXTRACTION
LOOP
PARALLEL
PINPOINT

SELECTION
STOPZONE
TILT
TOWER
TRAIL

If you treated this like a normal word search, you wouldn't get very far. Instead, you had to notice that the grid was divided into six squares, and that parts of words seemed to be split across multiple squares. This would lead you to hypothesize that this wasn't a rectangular word search, but rather a word search on the surface of a cube. You were intended to cut out the squares and tape them together, then find words on the resulting structure. However, our team solves puzzles on a spreadsheet, so our cube ended up looking like this:

				T	I	S	S	u	l	a	t	a	p	q	u			
				A	P	E	I	q	e	p	i	x	s	e	a			
				L	E	S	X	p	s	e	s	i	e	p	l			
				U	Q	P	A	a	x	i	s	s	s	i	t			
				C	U	Y	O	T	E	E	R	O	Z	N	E	P	I	E
				L	A	D	R	O	P	Z	O	N	E	P	O	N	C	C
				A	L	A	E	W	A	P	T	E	N	O	Z	P	O	T
				C	C	A	I	E	A	U	A	L	L	I	N	S	A	I
E	X	S	D	T	P	T	R	e	w	o	t							
E	C	T	I	O	N	R	R	a	a	p	e							
I	C	O	A	O	T	A	A	u	p	z	e							
P	N	P	S	O	N	I	B	a	t	o	r							

After finding all the words, you had to return to the original set of squares. Highlighting all of the letters not part of any word, and taking them in reading order, would spell out the final answer: YOROZU AND PICASSO. Thematically, these are the names of two famous Cubist artists.

C	U	Y	O	T	E	E	R	O	Z	N	E
L	A	D	R	O	P	Z	O	N	E	P	O
A	L	A	E	W	A	P	T	E	N	O	Z
C	C	A	I	E	A	U	A	L	L	I	N
A	P	Q	U	E	X	S	D	T	P	T	R
X	S	E	L	E	C	T	I	O	N	R	R
I	E	P	A	I	C	O	A	O	T	A	A
S	S	I	T	P	N	P	S	O	N	I	B

If you're interested, the other puzzles in this hunt can be found at <https://keyclueschallenge.com/puzzles>.

HOW OUR TEAM (KIND OF) WON

Our team, known as wait, is a subset of a larger puzzle hunt team known as the α -betical order (that's a Greek letter alpha, not an A). We are very familiar with typical puzzle hunt tropes, having done dozens of them online. Ironically, we almost didn't find out about this one because the posters were too cryptic.

This previous solving experience helped us get through the puzzles faster than every other team. The site had a leaderboard tracking solve times, and we stayed at the top pretty much the entire hunt. Near the end, we were pretty confident about winning the whole thing. However, in an outstanding final-day upset, the Biggest Fans of Blake unearthed the keys two hours before us.

Due to our previous quick solves, we still topped the leaderboard in the end. The organizers took pity on us and

retroactively gave us a prize for this (which were free tickets for KWEscape rooms).

HOW THE BIGGEST FANS OF BLAKE WON

The final set of four puzzles relied on a location service known as what3words (at <https://what3words.com>). This website divides the world up into 3-meter squares, and assigns each square a unique combination of three words. For example, shrimp.belong.rocked is a square corresponding to the approximate location of MC 3030.

The intended order of operations was to solve three location puzzles, each producing a word as an answer. Plugging those words into what3words produced the location of a chest hidden near the Graduate House. The chest was shut with a six-letter word lock, whose code was the fourth puzzle's answer.

The **Biggest Fans of Blake** solved *one* location puzzle, obtained a single word, then searched through *every* what3words square on campus until they found one containing that word. They got to the chest, then sat there for 30 minutes brute forcing the combination. This let them solve the entire final stage in less than an hour.

For what it's worth, our team, solving all the puzzles as intended, took 2 hours and 48 minutes to find the keys. Hats off to the **Biggest Fans of Blake** for their clever short-cutting, although know that you are now our mortal enemies.

SOME MISCELLANEOUS STORIES

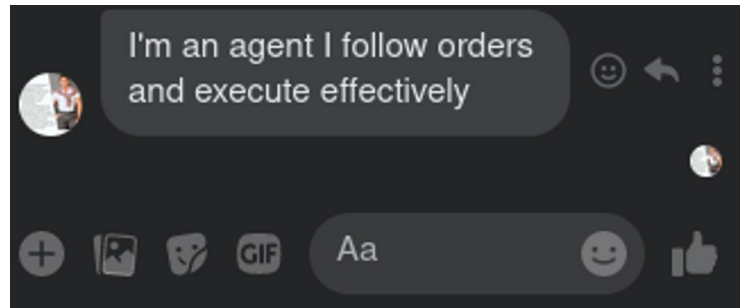
- The hunt's website initially contained many vulnerabilities. The most notable of these was that, astoundingly, changing your team name in local storage to admin allowed you to access the admin tab. We avoided touching this, but one team managed to quickly bump their solve count up to 13 this way. The organizing team quickly patched these issues and removed the extra solves. Miraculously, none of the vulnerabilities leaked puzzle solutions or allowed early access to puzzles, so the hunt continued as planned.
- One of our teammates was missing in action when the final batch of puzzles released. About half an hour after we found the chest, they posted in the group chat: "I forgot to wake up"

YOU CAN SOLVE PUZZLES TOO!

The next Key Clues Challenge won't start until next year. In the mean time, I recommend checking out the 2023 CMU Puzzle Hunt from November 4 to November 5. Although it is CMU-based, it is open to everyone and can be solved entirely online. Or, if you want to jump into the deep end with a harder hunt, the 2023 Galactic Puzzle Hunt runs from November 10 to November 20.

snowdozer

IS THE SENDER OF THIS FACEBOOK DIRECT MESSAGE



(a) defending their past transgressions before a tribunal at The Hague,

or

(b) requesting a rental application fee for a Toronto sublet, in direct violation of section 134(1)(b) of the Ontario Residential Tenancies Act of 2006?

h

ISSN 0705-0410

UW'S BASTION OF ERUDITE THOUGHT SINCE 1973

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UNICODE CHARACTERS FROM MY WALL

Recently, I put up a poster on the wall beside my bed. It is quite a large poster, over 43 by 55 inches in height and width respectively—dimensions I cannot match to any standard paper size. I purchased it from the Gutenberg Museum in Mainz, Germany for its uniquely nerdy content which will become immediately apparent if you haven't already read this post's title (but that would be pretty weird of you).

Across its vast surface are exhibited no less than 51,980 Unicode characters—those which can be displayed of the first 65,536 code points (U+0000 through U+FFFF). This is known as the *Basic Multilingual Plane* (The BMP!) Now, since I cannot choose a favourite character as that would reflect poorly on me for the other 65,535, here are five characters I have randomly¹ selected from my wall, in addition to my reviews of them and their meanings.



U+0262

Do not mistake this character for its non-small counterpart, LATIN CAPITAL LETTER G. LATIN LETTER SMALL CAPITAL G hails from the IPA Extensions block, dedicated to allowing you to digitize your phonological research or whatever.

Evidently, the G makes the /g/ sound—that's a voiced uvular plosive for the linguistically uninitiated. But let's be honest, it's mostly used for GORGEOUS AESTHETICS. Overall, I think it has a pleasant compactness compared to regular G, so I'll rate it a seven out of theta.



U+033D

COMBINING X ABOVE comes from the miscellaneous additions of the Combining Diacritical Mark block. Of course, there's some normal usage of this accent in the IPA for indicating mid-centralized vowel pronunciation, if you can call that normal. What we should really be afraid of is the potential for some god-forsaken subfield of math or physics using these in their ever-expanding index of cursed literature: "Let x_i be some x of X ". On the positive side, I'm sure it would look nice in *zalgo* text. I'll give it a W out of 23.



U+1384

What? You're not familiar with ETHIOPIC SYLLABLE SEBATBEIT BWA from the Ethiopic Supplement block? How could you forget the Sebat Bet Gurage characters in the Ge'ez script! Disappointing. I can't find too much information about this character but since it is a few edits away from an amogus, I can't help but rate it a 1270/sus.



U+231F

This is BOTTOM RIGHT CORNER. Yes, it is called that. Some people use it as half-brackets, or as quasi-quotation / quine quotation marks, or as the end of the floor function instead of \lfloor , or even supposedly the interior product in differential geometry—but I have never taken PMATH 365 so I maintain that differential geometry is a made-up field to confuse people by combining two seemingly unrelated subfields of math. What a lovely addition from the Miscellaneous Technical block: L out of -1. (this is a positive rating I promise)



U+4A08

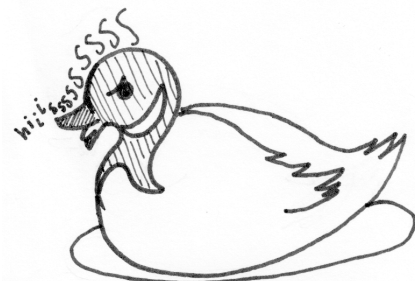
It wouldn't be fair to call this a Unicode article without any character from CJK Unified Ideographs Extension A. CJK UNIFIED IDEOGRAPH-4A08 represents some sort of small bird in Chinese, pronounced *bīn* in Mandarin and *ban1* in Cantonese—not that I'm particularly fluent in either. Not the nicest looking or the worst looking ideograph, but I like how it is laid out: 不 out of 错.

Thanks for reading :)

Perhaps I will continue this series when I inevitably run out of **mathNEWS** ideas.

Whole Number Haver

1. You can tell these are randomly selected since otherwise I would fill it with meme characters.



ANIME REVIEWS PART 5

[Insert witty preface here]

GOLDEN TIME — 8/10

I really liked *Toradora!*, so naturally I had high hopes for writer Yuyuko Takemiya's second-best known work, and I'd say it delivered well enough. *Golden Time* chronicles the life of one Banri Tada as he steps forth into the mysterious world of university as a freshman law student, but also pulls us back in time to relive his high school days from before a traumatic injury that saw him lose his memories. This duality goes so far as to manifest itself in the form of a ghost that wants nothing more than to return to the past that its present self remembers almost nothing of (*almost*). Apparently a lot of people disliked this ghost, but I can appreciate a subtle touch of the supernatural if it isn't overdone. The show isn't as rife with the will-they-or-won't-they dynamics which are typical of high school romance anime, in large part because it's at a university. The setting lends itself not only to more relatability as a university student myself, but also to more mature subject matter in general.

(As a personal aside, I found it amusing that one of the characters, "2D", reminds me a lot of a certain someone I know in real life—they both have waifu-related nicknames that almost everyone addresses them by in real life. But anyway, back to the review.)

I found *Golden Time's* plot interesting and was genuinely surprised by a lot of the twists, and I also think the music was excellent. However, the writing kind of fell off towards the end. I suspect that the intention with the hastily-woven love polygon in the last 8 episodes or so was to emulate the similar tensions among the cast in *Toradora!*, but it didn't quite fit as well with the personalities established up to that point and ended up coming off as out of character at times. Moreover, there are a number of criticisms to be made of the show's poster girl Kouko Kaga, who plays Juliet to Banri's Romeo (that's not a spoiler, by the way, the opening implies as much before it's even 70 seconds in). She is often portrayed as mean-spirited, jealous, clingy, and in the words of tvtropes.org, "somehow mentally unstable". Not the most likeable combination of traits by a long shot, but her occasional moments of self-awareness prevent her from being insufferable. All things considered, I had a fun time (no pun intended) with it. It's no *Toradora!*, IMHO, but taken as its own story with the occasional bit of artistic similarity owing to common authorship, you might find it appealing too.

ELFEN LIED — 5/10

I wanted to like this anime, I really did, but I think its execution fell short in too many ways to overlook. Conceptually, the show follows the birth of the mutant human subspecies Homo Diclonius and a shadowy laboratory that seeks to usher in a new human race by way of experimentation on the Diclonii and their "vectors". These aren't the MATH 136 kind, however; instead they're invisible arms capable of

shielding bullets, lifting huge objects as if by sorcery, and causing people to instantly be sliced in half and gush blood everywhere (which happens quite often). Lucy, a particularly adept Diclonius, escapes from her enclosure and makes a murderous escape from the facility to the coastal city of Kamakura, but a cranial bullet wound leaves her with a split personality along the way.

The premise is respectable, and I had high hopes for the show's religious theming and symbolism after seeing the distinctive opening art paired with the equally beautiful Latin song "*Lilium*" that recurs as a leitmotif throughout the series. However, the abundance of plot conveniences, especially the intertwined childhoods of the protagonists, made parts of the story feel very trite. Additionally, there's a lot of gore and nudity. I don't mind R-rated stuff in principle, and this aspect is apparently a big part of what brought the show notoriety among American audiences in 2005, a time before dark and edgy anime was as commonplace in the West—*Elfen Lied* predates the likes of *Attack on Titan*, *Tokyo Ghoul*, and even *Death Note*. Nonetheless, it feels done to death pretty early on. Finally, it seemed to end on an ambiguous note that felt far less satisfying than I had hoped for. Maybe a second season could have saved it, but as it is *Elfen Lied* just doesn't quite live up to its potential in my opinion.

GHOST STORIES — 7/10

Ghost Stories is kind of like the subreddit r/comedyheaven: "so bad, it's ascended". That ascension comes courtesy of the folks over at (the now defunct) ADV Films, who in 2005 saw fit to produce an English gag dub after being granted the rights to the script following its less-than-successful run on Japanese TV a few years prior—or so the popular narrative goes. Numerically, the show did fairly well and had several reruns in Japan; so it's more likely that the marketing personnel at ADV just thought that a yokai show wouldn't be understood or received as well by Western audiences. Either way, the end result was a bizarrely hilarious self-parody. The principal writer Steven Foster is quoted as saying

The whole recording process was me just coming up with shit I thought was funny. [...] The actors would chime in with a joke or a line every now and then, which is I guess how the rumour got started that the whole show was ad libbed.

Picture *South Park*, but edgier and somehow even more American-sounding, and with ghosts instead of aliens, as an early 2000s anime, and you more or less have *Ghost Stories*; which is to say that the plot is dispensed with in favour of comedic jabs at everything from Republicans to Judaism to weeaboo culture to the show's own voice actors and everything in between. If you don't care to sit through 20 episodes of it, though, you can always just look up the clip compilations on YouTube.

DOES HE KNOW?

I saw one of my favourite artists play a show in Toronto last Friday. I went with a friend, partly because he likes some of the music I like, but also because he has a car.

On the long ride there, I wondered what I'd say to the guy. I knew it would be a smaller show, and I'd likely get the chance to shake his hand and tell him how much I loved the show and how much I loved his music and how, for a brief and difficult period earlier in the year, the only thing I could bear to listen to was an album he had worked on at the age of 20—the age I am currently. But what more could I say?

I told my friend this, and he referenced a meme—an image of Paul Dano as the Riddler with the caption:

“Does he know?”

I settled on a question: “How do you meet the people you make music with?” I've struggled with this for a while: I've always suspected that there are people out there making music the way I wanted to make music—where were they hiding? Maybe the guy would know.

We found a parking spot and waited in the cold evening air outside the venue. At one point, we saw a white truck pull out of a parking spot and a black one pull in—a lone guy hopped out with a bandana over his mouth and snuck into the venue. Was that him?

We were eventually let inside. It was dark and full of fog. By the front of the stage, there was a table of synthesizers and other equipment, obscured by two large speakers protruding from the sides of the stage. My friend and I got near the front but failed to see past the speakers.

After an hour, a guy walked up to the synthesizers and started playing. Was this the guy? The audience stood still as the guy slowly twisted knobs, producing beautiful synth tones that eventually gave way to house music. When he finished playing, we clapped. He was the opening act.

Another half hour passed before more people appeared on stage—I suspected it was the guy. He was joined by another guy with a cello and a third guy behind some laptops. They started playing. This was definitely the guy.

The show was great. It was strange and largely improvised. At one point, the guy left the room, and the cellist took a long and dissonant solo, during which I could make out parts of a jazz head I recognized. I felt special in that moment, as if there was some exclusive and mutual understanding between us about the origins of that reference. When the guy returned, he entered the crowd and pointed the mic at several people, asking what time it was. It was intense, and from my corner of the room, I caught glimpses of the guy deep in concentration.

The show lasted an hour. We applauded, and the guy smiled and thanked us for coming out. The lights turned on and the

fog cleared out as the players packed up their gear. As they did so, I told the cellist that I knew the jazz head he snuck into his solo.

“That was sick!” I said.

“Thanks,” he said. “Great ear!”

My friend and I stayed behind and watched people get their shirts and vinyl signed. The guy was mystical just moments ago, singing and screaming and being weird and free, moving by some unknowable internal logic. Now, he was regular: sweet and soft-spoken, someone you might meet in a bakery.

The guy greeted us and shook our hands. And maybe it was because the guy seemed so normal, but I was suddenly overwhelmingly starstruck. I said something that I had been thinking to myself for a long time:

“I've been listening to your albums a lot, and I've been thinking about your albums a lot, and it's crazy to me that you're actually... *real*.”

And he responded in a way that, when telling this story to my friends, I've been unable to imitate, so imagine him saying this with a kindness and intrigue so genuine that it instantly fills you with shame for thinking every thought you've ever think:

“Oh, okay!”

I then asked him the question I had carefully prepared—how he meets the people he makes music with—and he chuckled and said:

“Uhhh... luck?”

He thought some more before giving up. “I'm sorry, I really wish I had a better answer,” he said. “All good,” I said.

I sat in silence for much of the ride home, still reeling for a reason I couldn't name. I asked my friend if he thought it was weird that I told the guy that I couldn't believe he was real; I didn't pay attention to his answer. I then asked him if I had asked the right question; he told me it was a good question, and that I shouldn't overthink it.

“Maybe I asked that question because I wanted to be known,” I said. “My favourite music makes me feel known, and I wanted to know how I could be known by others—known by those who know me like that music seems to know me.”

“Uh huh.”

“And maybe I asked that question because I wanted to show that *I knew*, even if I didn't really—to show that I, too, hear the music you hear and know you in that way, and that I, too, make music and yearn to be known through it.”

“Uh huh.”

“But maybe my favourite music isn’t my favourite music because it knows something inherent about me. Maybe my favourite music *becomes* my favourite music when I keep listening to it and I let parts of myself become known by it.”

“Maybe we grow into our favourite music.”

“Maybe.”

χ

N THINGS I POSTED ON FACEBOOK AS A MINOR

I DEFEND MY FACEBOOK USAGE BY LETTING YOU KNOW I DIDN'T GROW UP IN NORTH AMERICA

- i never get any interesting anon messages wtf where are my death threats
- someone explain american politics to me
- why does everyone hate centrists
- i will pay you to be my friend
- yall ever overhear a real bad take
- what the fuck is 1% milk
- either all my clothes have gotten big or ive gotten small i cant tell
- hey who live new york
- mangos are good fruit
- shoutout to america
- Subjects I like: Maths
Subjects I don't like: Not maths
- hey
fuck math
- Anime is the cancer of today's society.
- send me a picture of a dog and then we can talk abt it for a bit
- i havent trusted statistics since i was like 8 and i read a book of statistics and the last page said that more than half the statistics in the book were probably not true and i had to rethink my entire life
- fuck

alyssnya

mathNEWS is the best thing that's ever happened to me.

A \$100% SINCERE mathNEWS EDITOR

HOW TO BECOME FIRST-YEAR COUNCILLOR

This year, I'm going around as a first year (grad) student, seeing the campaign posters and being reminded of how it was all those years ago. And I feel... cynical. From a laystudent's perspective, First-Year Councillor is a weird role. It gets a disproportionate amount of competition and campaigning compared to its actual importance. I don't remember who became FYC in my year, nor anything they did to affect my experience as a student.

Surely at least some FYCs went on to positions of higher influence in MathSoc in later years, but one month into the term is a bad time to vote for who gets to be these people. Nevermind a month, it takes many terms to build rapport with such a large student community. For lack of any good way to assess merit, the FYC is instead chosen for their ability to market themselves and rally the homies (highly valuable skills in themselves).

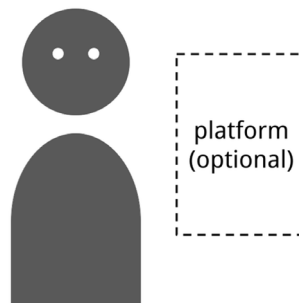
And marketing works. Memes and raps don't necessarily translate to student governance, but they sure get people's attention. So do many other stunts, but you should probably check before they earn you a fat paragraph about demerit points under your name on the ballot. If nothing else, acts of creativity convey that you're willing to put effort into something despite everything else going on in your new university life. If you win FYC, I (and your voters) hope you continue to place your effort in this area.

The best creativity is the kind that nods to your familiarity with things important to the students. Maybe that's math. Maybe that's free food. Maybe that's memes and tomfoolery. Fortunately, there's an institution that caters to all three of these things. It is recognizable to first years and pros alike, and it is even an occasional topic of discussion on the subreddit.

You're reading it right now.

firstLAST

FIRST-YEAR COUNCILLOR
OCTOBER xx, 20xx



CC SOME RIGHTS RESERVED

profQUOTES

ENVS 200: BRAD FEDY

- “ The salmon are aggressive and horny until they get up the stream.
- “ Most people like hearing the birds singing, except if it's a robin right outside your window at 5 AM and you're hung over from all the tequila you drank last night.

CS 246E: BRAD LUSHMAN

- “ Can we? Yes. Should you? No. Will we? Yes.
- “ Imagine you offend your friend in conversation, and instead of saying something like “I take exception to that”, they throw a hopefully-soft object at you that will hit a lamp if you don't catch it.

MATH 145: JASON BELL

- “ You might say, “Jason, you didn't have to do that.” Well I don't have to do anything! I could just leave class and get fired!
- “ I'm not a thermometer, I can't tell you the temperature.
- “ Since I have 5 minutes left, I'll make your lives much more difficult.
- “ *[Writes FLT in reference to Fermat's Little Theorem]* Doesn't that look like it says Fermat's Last Theorem? Speaking of that, we're gonna prove Fermat's Last Theorem later in the course.
- “ I didn't have to do that. I did it to make you happy! I don't think it worked.
- “ Oh, I only have three minutes! Is that gonna stop me?

PMATH 453: BLAKE MADILL

- “ It comes from the balls expanding and exploding
- “ By Baire Category Theorem, or Baire-ly if you want to be efficient
- “ Similarly, wait no, not similarly. Differently,

STAT 240: YINGLI QIN

- “ For this problem we change the balls into people.
- “ And so it follows that the Poisson process *[sees student distracted and giggling in front row]* I hope you will also be laughing after the Poisson process.

MATH 249: DAVID WAGNER

- “ I really don't like doing algebra in public.
- “ The good news is, I get to cook all the examples, so you won't run into horrible real life problems, only nice well-cooked examples.
- “ This isn't cooked, this is half-baked.
- “ If you're not happy with complex numbers, then just think about real numbers; if you're not happy with real numbers, think about integers; and if you're not happy about integers, then what are you doing here?
- “ I was not as productive as I had hoped over reading week, for various reasons.

CS 341: RAFAEL OLIVEIRA

- “ If you want to be more stupid you can.
- “ That's the beauty of dynamic programming: you don't need a brain to do it.
- “ Let me just write this before someone slashes my tires.

CS 245: LILA KARI

- “ It's better to not have a quote in **profQUOTES**.
- “ I will now explain to you why this joke is funny.

CO 442: PETER NELSON

- “ I'm like 85% sure I have my inequalities the right way. Again I'm 85% sure I want floor.

CO 485: DAVID JAO

- “ This number is clearly not 1: it's a hundred digits long.

CS 145: GORDON CORMACK

- “ Oh good! I killed it.
- “ After goof-off week, be aware that your assignments are due Tuesdays. Instead of one extra week, you only get 6 days!
- “ Someone might be very good at eating pizzas but have no idea how to cook a pizza.
- “ If I'm giving you pizzas, you have no business looking into my oven.
- “ I have come to learn to love Big Brother.

“ Invoke it from some braindead language like Java or something.

“ All the computers in a warehouse that can generate enough heat to heat a small country.

“ You can use this to beat up your friends who say that Racket is useless.

CS 370: JUSTIN WAN

“ We allow cheat-sheets for psychological purposes.

“ How many theorems have we covered in this course? One. So if you don't remember that, you're gonna break my heart.

MATH 145: JERRY WANG

“ Find integers x, y such that $69x + 420y = 3$.

PHYS 121: RICHARD EPP

“ Football players are made of football player.

PMATH 945: JASON BELL

“ I won't look at my notes so this is just like doing sudoku... sometimes, sudokus can be hard.

“ They want freedom. They want to live in the US.

“ It sounds like he's cheating people out of their social security or something.

STAT 231: MICHAEL WALLACE

“ We can take the log of the relative likelihood function. There are no log police to stop us.

WHAT I DID DURING READING WEEK

- Saturday: Nothing
- Sunday: Nothing
- Monday: Nothing
- Tuesday: Nothing
- Wednesday: Nothing
- Thursday: Nothing
- Friday: Nothing
- Saturday: Nothing
- Sunday: Nothing

Fried Rice

A REFLECTION OF UNIVERSITY COURSES IN GERMAN AT UW (UG) VS. GOETHE INSTITUTE (GI)

After taking several courses with the Goethe Institute, I wanted to change it up and take my next course with a different organization and the university seemed like a great place to do that. Unfortunately, it wasn't. Here is my review of the two systems.

Both systems are mostly “do this list of exercises and you'll learn German through them”. The GI course contained some additional notes when doing the exercises, UG: absolutely nothing. There was also a much higher emphasis on vocabulary I found in UG compared to GI, which I think was good but didn't particularly enjoy. The worst part of UG was really the discussion posts, as *everything* was a discussion post, and being expected to respond to other people and critique them has never really been my idea of fun. And I'm talking 4+ discussion posts a week. Now GI also had some discussion posts, but it was more along the lines of 1 per week, and these discussion posts were supplemented by private submissions of short texts and oral responses. The feedback also felt much more detailed in GI, partially because I think that UG isn't necessarily taught by native speakers.

Ultimately, there's no right way to learn a language, but I think that I'll continue my German learning experience without receiving credit for it.

Ja manchmal

N THINGS I'VE MADE FOR DINNER RECENTLY

- Pasta with mushrooms
- Pasta with cheese sauce
- Pasta with chickpeas
- Pasta with pesto
- Pasta with black beans
- Pasta with black beans and corn
- Pasta with hotdogs
- Pasta with *please help I'm drowning in macaroni*

normalparameters

Send profQUOTES.

THE mathNEWS READERSHIP

WANT TO MAKE A VIDEO GAME? JOIN THE UW GAME JAM!

Have you ever wanted to make a video game? Join the University of Waterloo Fall 2023 Game Jam for 72 hours from Thursday, October 26th to Sunday, October 29th! For anyone of any skill level or skill set, this is an excellent chance to grow your talents, connect with peers and industry leaders, and get a completed project to put on your resume.

What's a game jam, you ask? In short, it's like a hackathon for games—a short-term sprint through the entire game dev process. We give you a theme, and you (alone or in a group) will design, develop, refine, and polish a game from start to finish in just 72 hours.

Anyone can participate, no matter your experience level. We've had complete beginners come in and complete a game over the weekend—no expertise required! Our environment is super welcoming, and we have tons of experienced jammers who are more than willing to share their knowledge. Plus, if you ever wanted to get some experience, now is a great time to do it!

We're also looking for jammers with a bunch of different types of qualifications—programming, art, writing, music, audio, game design, or any combination of these things are all wanted. Any type of game-related submission is accepted too—from video games, to card games, board games, TTRPGS, concept art, design documents, and more. No programming required!

Plus, this is a great way to meet fellow game devs—not just fellow students interested in the hobby, but professional developers who are coming to give presentations and share advice. The exact schedule is TBD, so please follow our Instagram account @uwgamedev for more information closer to the date.

We have a few in-person jam locations, too. Here's our schedule so far:

- Thursday, October 26th—RCH 205, 5pm–7pm (Event Kickoff, Theme Reveal, Presentations, Work Session)
- Friday, October 27th—RCH 205, 5pm–7pm (Presentations, Work Session)
- Saturday, October 28th—QNC 2501, 10am–8pm (Presentations, Work Session)
- Sunday, October 29th—QNC 2501, 10am–8pm (Closing Ceremonies and Showcase, Presentations, Work Session, MC/DC Performance)

Don't worry if you can't make it physically for some of these times, they're just when the rooms will be open. You're encouraged to work from wherever you are during the 72 hours of the jam. And if you're busy, that's also not a problem—you don't need to work the entire length of the

event. Do what you can, from where you can. Even unfinished projects are valuable for your growth as a game dev.

If this sounds like fun to you, you can register at the form linked in the QR code below (or at the link here if you're reading the online version of this issue: <https://forms.gle/NSurYdtA27bQL9rf7>). Also, please join our Discord! It's where we'll be giving out updates and streaming all our events for people who can't make it in person. The link is in the registration form.



We can't wait to see you!

University of Waterloo Game Dev Club

SOME MATH PUZZLES

ANSWERS ON PAGE 31

Given a notion of “objects” and “maps” between them, make the following definition.

An initial object is an object with exactly one map to every other object.

Here are some puzzles.

- If “object” means set, and “map from A to B ” means “function from A to B ”, what is an initial object?
- What if “map from A to B ” instead means “function from B to A ”?
- What if “object” means vector space, and “map” means linear transformation?
- What if “object” means ring, and “map” means ring homomorphism?

finegeometer

LIFE OF MATH 145 (JERRY WANG) STUDENTS

INTERVIEWING WITH SEVERAL STUDENTS ON THEIR EXPERIENCES

In the following, I compile the experiences of 1A students brave enough to take MATH 145 with Jerry Wang. As arguably the hardest first-year course, those students live life differently from the rest of humanity. After a few weeks in university, those 1A students have experiences to share with the rest of us.

Student 1: MATH 145 was my first official university lecture. I walked into the lecture hall on a Wednesday morning. The room itself had nothing special, it was moderate in size and features.

Jerry arrived a few minutes after I had settled down. The first lecture progressed rapidly, starting with an introduction to famous unsolved problems and ending with Jerry pointing out we solved an IMO problem. He provided nice proofs and explanations but made me feel like my prior knowledge of number theory from math contests was a requirement rather than an addition. It's fine though; it'll be something I'll overcome.

Life progressed steadily for the next few weeks, and I started getting spoon-fed more and more hints for homework while sleeping later every Thursday (before assignment deadlines). Last Thursday, I was in COMMST 223 at around 3 p.m., when my friend who shares MATH 147 and 145 with me suggested we hit the gym after we submit our assignments for both classes. Even with an internet outage, we could finish whatever we had left of MATH 147 in about an hour. We hit the gym at 11:30 pm, with MATH 145 still unfinished and my friend not

having eaten since 1 pm. All this is to say that the more time one spends on that class, the more will be required.

Personally, I think MATH 135 is an "introduction to proofs" class rather than an algebra class and MATH 145 is an "introduction to proofs" class where your professor assumes you already know how to do proofs. This means that every waking hour (or at least most) is spent thinking about assignment questions. These problems are impossible to put off and it's not uncommon for friends to scream something along the lines of "Eureka!" when they suddenly realize something about the problem (just to be disappointed later that they got it wrong). This is taken to such a degree that some students even report coming up with solutions in their dreams and waking up to discover they were wrong. I think to maintain sanity all of us have to actively try and take time away from this course.

However, even then, there's probably an active copium around those taking the course. For example, recently my friend told me "didn't [insert name] say question 5b is the easy one?" and we coped (we're struggling on 5b, so we must've misheard and they meant 5c). MATH 145 is easily harder than all my other courses combined. It probably also takes more time. When I was told university would be challenging, I didn't expect 4 easy courses and 1 crazy one. If I survived this far, what's there to finishing it right?

Yeah, I only interviewed 1 student.

ORZ

PSA: YOU SHOULD READ ONE PIECE

Last issue I wrote about the Netflix adaptation of One Piece and how it was really good, to the point of making me want to read the entire thing. Well, I finally caved and started reading it and damn it is a really good idea.

First of all, One Piece is great. Every single member of the Straw Hat Pirates has already endeared themselves to me, even though only around half of them have shown up so far in what I've read. There's a good mix of funny and serious character moments, which gives each character a three-dimensional personality. And there's already little sneak peeks of the fact that the world of One Piece has an extensive history and lots and lots of juicy lore, which I'm eager to uncover. And I just want to spend more time with all these zany characters!

I know, I know, it's really long. 1000+ chapters can seem daunting. Especially since each episode of the anime is 22 minutes, and each episode corresponds to one chapter. However, the episodes are drawn out and it only takes about 5 minutes to read one chapter.

Picture this: you've got 5 minutes to kill on your phone. You're waiting for class to start, or waiting for the bus, or taking a shit, and what do you do? You probably spend those 5 minutes scrolling Instagram reels or TikTok or whatever. Think about how much that time adds up. You're just downloading hours of endless, useless, meaningless content into your valuable brainspace, when you could be reading a story that's better than Joseph and the Amazing Technicolor Dreamcoat. Sounds like a pretty good deal to me!

someBODY

PSA: YOU SHOULD NOT READ ONE PIECE

it's too long

yalevoilian

MATHEMATICS CANNOT PROVIDE CERTAIN KNOWLEDGE OF THE FUNDAMENTAL NATURE OF REALITY

AN ARGUMENT USING MATHEMATICAL STRUCTURALISM

What is the nature of mathematics? What, fundamentally, are numbers, vectors spaces, sets, or categories? One approach to understanding the nature of mathematics is to consider the role that mathematical objects or structures play in scientific theories.

In philosophy of science, the Quine-Putnam indispensability argument (QPI) proposes that people should commit to the existence or reality of entities if they are indispensable to successful scientific theory.¹ The argument is as follows:

- **(P1)** We ought to have ontological commitment to all and only the entities that are indispensable to our best scientific theories.
- **(P2)** An entity X is indispensable to our best scientific theories.
- **(C)** We ought to have ontological commitment to entity X.

Mathematical structuralism is the view that mathematics is fundamentally the study of patterns and structures in a highly formalized and abstract way. Science, in general, is the study of the structures and patterns hypothesized to underlie physical phenomena. Mathematical structuralism proposes that mathematics and science are just different ways of studying structures, though science focuses on structures that underlie empirical phenomena.²

The best theories of science use mathematics to formulate their theories and make empirically successful predictions about physical phenomena. For example, quantum mechanics utilizes Hilbert spaces to formulate predictions of the physics of the smallest scale phenomena.

Now, let us consider what happens if we combine mathematical structuralism with the Quine-Putnam indispensability argument:

- **(P1)** We ought to have ontological commitment to all and only the entities that are indispensable to our best scientific theories.
- **(P2)** *Mathematical structures* are entities that are indispensable to our best scientific theories.
- **(C1)** We ought to have ontological commitment to *mathematical structures*.
- **(P3)** Mathematical structuralism is true in that physical phenomena and objects are exemplifications of mathematical structures.²
- **(P4)** The best scientific theories hypothesize mathematical structures in the underlying physical phenomena, such that experimental observations of phenomena determine the mathematical structures for that scientific theory.

- **(C2)** The mathematical structures in the best scientific theories are based upon experimental observations of physical phenomena.
- **(P5)** Humans cannot experimentally observe all possible cases of physical phenomena due to physical and technological limitations. Humans cannot travel to every place in the universe and perform experiments to test our theories. Likewise, we cannot travel into the past. Also, new technology might grant scientists access to new parts of the universes to study.
- **(P6)** It is not certain that new experimental observation will not falsify (or force people to revise) the mathematical structures in the best scientific theories.
- **(C3)** It is not certain that the current mathematical structures in the best scientific theories are the correct final structure of the phenomena. All of mathematical structures within the best scientific theories of our time risk being perpetually underdetermined or underspecified by the observations we have.
- **(C4)** We ought to have ontological commitment to mathematical structures, which are perpetually underdetermined.

The result of accepting mathematical structuralism and applying the Quine-Putnam indispensability argument means that people must be ontologically committed to (or more simply accept the existence or reality of) mathematical structures. The empirical utility or applicability of mathematical structures in successful scientific theories means people must accept that mathematical structures are, in some sense, parts of fundamental reality.

Since scientific theories only use mathematical structures that are empirically supported and new empirical observations are always possible (and in fact new observations do crop up over time), then particular mathematical structures in the best and most advanced scientific theories are always subject to change.

Therefore, mathematics cannot provide final and ultimately certain knowledge of what mathematics structures underlie the universe. We are committed to accepting that mathematical structures are basic parts of reality, but the precise and correct mathematical structures are perpetually underdetermined and outside of possible human knowledge.

I hope this little article about philosophy of math has spurred the readers of this prestigious paper to be interested in the deep philosophical questions of what really is mathematics and what is mathematics' relationship to the natural sciences.

I welcome rebuttal or discussion articles to aid in everyone's mathematical and philosophical journey for truth.

James Chow

1. Colyvan, Mark. 2023. *Indispensability Arguments in the Philosophy of Mathematics*. Edited by Edward N. Zalta and Uri Nodelman. Stanford University. Accessed October 14, 2023. <https://plato.stanford.edu/entries/mathphil-indis/>.
2. Shapiro, Stewart. 1983. "Mathematics and Reality." *Philosophy of Science* 50 (4): 523–548.

GO TRANSIT FANTASY ROUTES

OR HOW I LEARNED TO LOVE BRAMPTON

I just came to mathNEWS prod night to submit some profQUOTES and apparently you don't even need to go to prod night for that, so I'm going to submit an article in order to not feel like I've wasted my time. There's no way I can write about any technical topic right now so I'll just turn to the only other thing my brain is occupied with, that being transit routes. Here are some routes that I think they should implement or that would just be fun to have and some schedules if relevant. I will put the numbers of non-existent routes in italics. Apparently, GO buses are numbered in blocks of 10, with the first digit corresponding to "nearest train line" (is that an average across all points or something? The Hamilton/Waterloo bus seems to be numbered under the Lakeshore West block). It's a little confusing how they measure this but my understanding gives:

- **0x**: Lakeshore West, except 09 which is Lakeshore East
- **1(0–8)**: Lakeshore West
- **19**: Milton
- **2x**: Milton (but there seems to be one Kitchener in there? idk)
- **3x**: Kitchener
- **4–5x**: N/A, 407 express routes
- **6x**: Richmond Hill and Barrie (I guess they didn't have enough room...)
- **7x**: Stouffville
- **8–9x**: Lakeshore East

Yep, seems consistent. Now, to the routes:

WATERLOO-GTA CORRIDOR

- 19b: Extension of the 19 line, runs from North York to UW Station and back. Would alternate with below.
- 19a: Renaming of the current SQ1→North York route. Would run maybe 75% of the time with 19b taking up the rest of the time. On Saturday/Sunday, could be closer to 50%.

- 42: Express UW to Pearson, Markham & Scarborough route. Stops at Kitchener GO, takes 401 and stops at Pearson, heads to 407, stops at Langstaff GO, stops at or somewhere around Unionville GO, ends at Scarborough Town Centre. Would kill many birds with one stone.
- 34: Guelph to Kitchener express bus. Stops at UW Station, Kitchener GO, UofGuelph, Guelph GO
- Kitchener GO: Re-extend to London REEE. The route needs to be way better though which would require building new track I guess. The last one was 4 hours from Union or something, if you go through Woodstock instead that time can probably be dramatically slashed.
- 33: Special bus that goes from King and Columbia to TMMC Cambridge in the morning and then periodically goes between TMMC Cambridge and Woodstock so I don't have to spend money on a car next term.

TORONTO-OTTAWA CORRIDOR

- Lakeshore East: Extended to Ottawa. Completely impossible (by Canadian standards) but man could you imagine? Stops in Bowmanville (as already planned), Port Hope, Coburg, Belleville, Brockville, Kingston, Smiths Falls, Ottawa (so basically just replacing the VIA line). Before you say this is too long for a GO route, remember London took like 4 hours, but that was probably one of the reasons they cancelled it
- 98: Oshawa to Port Perry bus since Durham regional transit will probably die eventually. Also stops at Brooklyn.

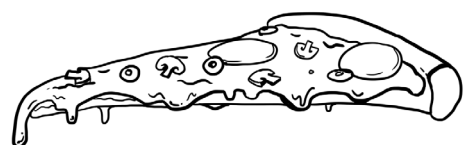
TORONTO-BARRIE CORRIDOR

- 68b: Extended to stop at Wasaga Beach and Collingwood, regional busses kind of suck and I don't think there's any way to get between Barrie and the former at all by transit. I guess everyone's that goes there is probably rich enough to not even consider transit though. Could be nice for teenagers working at ski hills.

I think 19a/b, 42 and 34 could be genuinely useful, the rest are probably dumb but maybe Ontario will suddenly have a 10 trillion dollar surplus some day and create them. Who knows.

Wait, damn, this was supposed to take like 20 minutes and I've been here for 2 hours or something. I guess I'm failing PSYCH 101.

Epic Waterman



WHY I LIKE PLANESCAPE AS A D&D SETTING

For anyone who has never heard of Planescape: it's a Dungeons & Dragons setting in which characters travel across a multiverse of 9 distinct Outer Planes of existence (one for each alignment), as well as a funky city built on a donut-shaped plane called Sigil.

For anyone who has never heard of D&D: I can't help you.

YOU CAN GO VERY EASY ON YOUR PLAYERS

As a DM, you might be very concerned about killing the wonderful characters your players made with love and affection. However, a lot of players will also be angry if you blatantly throw a Deus Ex Machina to the party to save them, since it feels like cheating. In Planescape, however, using reincarnation is respected and expected, so while a party wipe might be a curveball, it also lets you turn your game into the Doom clone you've always wanted to run, with your players trying to escape the Nine Hells to which they were condemned.

YOU CAN KICK YOUR PLAYERS' ASSES

On the other hand, you can also be seriously mean to people who deserve it. The Planes, even those which are (allegedly) good aligned, are all home to exceedingly powerful and creatively made creatures, which often have equally creative ways of dealing with that one player you don't like. Take, for example the Astral Dreadnought, a giant space lobster that attacks people while they travel between planes, trapping them in its pocket dimension stomach forever.

YOU CAN EASILY IMPLEMENT INTERESTING MECHANICS

Each different Plane in the setting is supposed to have interesting mechanics relating to its alignment on the Good/Evil and Chaotic/Lawful axes. These are largely up to you, and they give you as DM an excuse to frequently change the rules to create variety. For example, the Lawful plane of Mechanus, on which you could impose a restriction that only "legal" spells can be cast. You could require that players buy or find a permit, or that they "prove" spells are allowed by making them do your assignment questions. On the flip side, the Chaotic plane of Limbo is expected to be completely unpredictable, so you could justify throwing your players into a non-Euclidean hell world.

ACTUALLY INTERESTING FACTIONS

A personal issue I have with most campaign settings is that the factions tend to always be defined in terms of what they *do*, instead of what they *believe*. While I don't really mind if a faction just kinda does things, I prefer if they have interesting motivations. It makes it more fun to justify their actions, and you can indoctrinate your players. This is why I like Planescape so much: each faction is essentially a philosophical sect. For example, we have the Society of Sensation (Epicureans), Fated (social Darwinists), and more interesting

units like the Sign of the One, who believe each person might be God.

ACTUAL USEFUL ALIGNMENTS

Everything in Planescape relies on alignment, since it determines how different planes react to your character, and collective belief can literally rip places out of a plane and put them in another. So there is a real reason to give a fuck about what your character believes in even if you're a murderhobo, because your chaotic energy might just make your favorite inn slide into the Abyss. While I know that alignment is often contested by people who think it makes no sense, I actually think that it makes sense in this setting: Planescape is inherently about the contest and debate of different ideals.

FUNNY SLANG

Guvners, Well-Lanned, Barmy, Brain-Box, etc.

Shahabee

FISH IN A BARREL

They had me fucking surrounded. I swear every cop in the city must have responded to the call.

The Federal District Courthouse was packed. From Greenwich to Newark, from the vineyards of the Finger Lakes to the high-rises of Manhattan, the streak of high-profile thefts across the tri-state region had caused a media frenzy over the past three years. The Honourable Everett stood from her chair, silencing the room.

"The court will now hear arguments in the case of The State vs Henry Achenbach."

No heist ever goes off without a hitch. Plan as much as you please, use military grade security system exploits, have a stealth bomber for a getaway vehicle, account for the scheduling of all 3,500 employees who work in the skyscraper you're gonna rob, and it won't change the fundamental chaos of the universe. A spanner will be dropped in the works. I would know. I did all of that, and look where I am now. You only know you've succeeded after surmounting at least one insurmountable hurdle—and being handcuffed to the defence bench, four armed guards around me, is quite sufficiently insurmountable. The best thieves are masters of improvisation and I am, above all, the best thief.

DA Son was probably the sharpest prosecuting attorney working on the East Coast in the past seventy years. He was over six foot, and had a commanding presence in the courtroom. It went without saying that he had never lost a case.

"Thank you, your honour."

He nodded towards the jury. “Over the past three years, Henry Achenbach has been responsible for over sixty striking thefts with very little connecting them. On paper, his break-ins make little sense. Mr. Achenbach’s pattern was to rob the most secure buildings, ones that were symbolic of security and of wealth, and yet very often not substantial in easily stolen valuables. In many cases, Mr. Achenbach could have gotten more value from a gas station stickup. It is clear Mr. Achenbach is not financially motivated, so what explains his actions? Why did he endanger innocent civilians?”

“It’s quite simple. He is an addict. Not for drugs or for alcohol, but for the thrill of the heist. He takes so much pride in his work, and in this great pride he made a mistake. He left us a thread, and pulling on this thread has unravelled his entire operation.”

“Over the course of this trial, you will see every shred of evidence the state has collected. Shreds that, when woven together, form a grand tapestry. A tapestry that will see Mr. Achenbach put behind bars for as long as he lives.”

It wasn't a mistake. These guys just like the story of the great thief who overlooks one small thing, who has one fatal flaw. They couldn't be further off. They like to think I am fallible. That I am prone to mistakes. That I am just like the rest of them. I had been working on cracking the Guggenheim for six months, and that's on top of keeping up with my ordinary jobs. It was the best plan I had ever made. Rewiring security cameras, syncing the charges with the ongoing fireworks, manipulating the little league schedule so the night shift would be short-staffed, I'd spared no expense. In the end, the museum's lockdown protocol had been its own demise, locked down guards on the inside, me on the outside. The fact that a patrol car would get a flat tire right outside the gift shop was not a mistake.

It was bad luck. At that point there was nothing I could do, ten more patrol cars were there within thirty seconds.

The trial stretched on. Throughout the days and weeks, the case files presented by the prosecution were expansive and thorough. A combination of several federal authorities using the latest advancements in cryptography and forensics to place Achenbach at over sixty crime scenes across five states. The defence was constantly on the back foot, doing as much as they could to throw suspicion onto testifying experts, calling anything and everything into question. The jury was not seeming convinced.

After two months, Henry Achenbach himself was called to the stand. This was the one chance the defence would have to salvage any sympathy from the jury. Although Natasha Parks did have a lot of courtroom experience, at the end of the day she was just another public defender. She held up a photograph.

Mr Achenbach, have you seen this man before?

“Yes.” *Of course I have. I have an incredible memory for faces.*

What happened last time you saw him?

Out of twenty-five officers this guy was the only one within ten paces of me. Funny, I am never armed, and these pigs were sheltering behind cover. This guy was my only way out. I waited for him to take a step towards me, all his weight on his front leg, his muscles not fully tensed yet, slightly off kilter.

“I struck him. Left temple.”

And did you see any vehicles driving by at around that time?

See? I didn't even need to see it to know it was there. How could anyone have missed it? The sound of those air-cooled 1200cc single port V4 engines could be picked out by a child. To a professional like me, it was trivial to tell how long since it had been last taken in for maintenance.

“A 1956 Volkswagen Beetle.”

And what did you say to the officer upon assaulting him?

“Punchbuggy, no punch backs.”

☺

No heist ever goes off without a hitch. Plan as much as you please, it won't change the fundamental chaos of the universe. A spanner will be dropped in the works. You only know you've succeeded after surmounting at least one insurmountable hurdle.

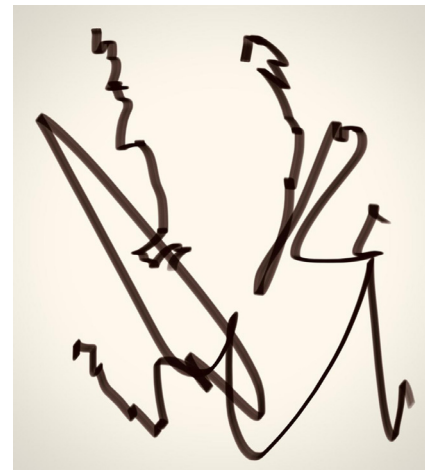
After a year in jail throughout this trial, It sure feels good to breathe the outside air again.

aphf

MINECRAFT IRL

TOO BUSY IN THE MINES TO FINISH MY ARTICLE

Check back next time for in-depth updates on the mine experience. For a small taste, I have included a drawing of a smiley face I completed while driving around the mine. I think it reflects the road conditions very nicely :)



A STATISTICAL(?) ANALYSIS ON THE BOSTON CREAM DONUT FILLINGS

Content Warning: Contains contents related to Integrals. CS students be warned.

So you want to measure the volume of a donut alongside the volume of the filling, but you only have a ruler and a plastic knife? Worry not. By the end of this article, you will be able to plug-and-chug like a professional donut measurer!

For the purposes of this statistical research project, we are mainly interested in the ratio of volume of fillings to volume of donut itself.



FIG 1. A Typical Tim Hortons™ Boston Cream Donut

INITIAL THOUGHTS

One easy method of approximation would be to simply approximate the donut as an elliptical cylinder. Simply measure the lengths of both semi-major axes (a , b) and assume uniform height (h) across.

Thus, we have a formula of $V = \pi \cdot a \cdot b \cdot h$ where each of the measurements can be done by ruler alone.

Can we do better?

Yes, we can! We observe that the edge around the donut is, in fact, not a straight edge. Thus, what we can do is to model the round edge better. Suppose you have a circular donut with rounded edges. We first observe that the curve around the edges of the donut is rather sharp. If we are to start with a semi-circle as its cross section $y = (hx - x^2)^{\frac{1}{2}}$, it would be too pointy. Thus, to flatten it, we can apply another square root to it! We get a shape as follows.

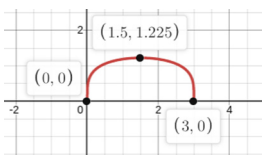
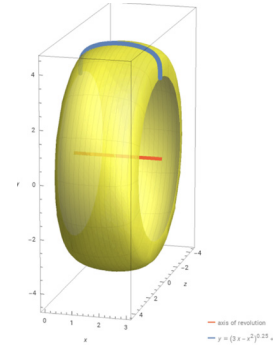


FIG 2. Our cross section area for the edge, $y = (hx - x^2)^{\frac{1}{4}}$

From here on, all we need to do is to apply a solid of revolution around the y -axis after applying an offset (assuming a circular base section) representing radius of the “fixed-height section”. For the illustration we pick that as $h_{\text{fix}} = 3$, we thus have $y = (hx - x^2)^{\frac{1}{4}} + 3$.

From here on, it becomes straightforward to apply revolution. For that, we simply take the integral $\int_0^h \pi y^2 dx$, where y is defined above.

Thus, we get a figure similar to this.



Which is a satisfactory approximation for a circular donut.

Now we note that while in the real world, donuts are not perfectly circular, most donuts are not too far off. Assuming the shape of an ellipse, the two semi-major axes differ typically no more than 15%, making a circular perfectly reasonable, and we still only need the two semi-major axes and height of the donut. (As a non-trivial exercise for the reader, extend this formula against revolution about an ellipse.)

FILLING

Unfortunately, here is where the mathematical models break down. Unlike the solid donut, the filling typically consists of a somewhat viscous incompressible fluid. This means that it is difficult to pin down the exact geometric shape of the filling, making it pointless to even begin considering a model.

Due to the viscous nature of the fluid, however, the fluid is typically in place when we cut open the donut. Thus, using the in-place assumption we can roughly estimate it to be a rectangular prism, where each dimension can either be directly measured by the cross section or measured by careful dissection of the donut. I will leave the rest as an exercise for the reader. (Before you send me an angry email about the rigour of approximation as the error bound is not determined, we should note that we are fundamentally limited in both precision and accuracy by the tools, i.e. ruler and plastic knife, in the dissection of the donut in the first place. I don't expect to have access to a laser cutter at the nearest Tim's unfortunately.)

We can thus take both measurements and proceed to measure the ratio of filling volume to the overall volume of the donut for each donut encountered.

EMILY

I have a friend called Emily.

Emily is a pretentious soul with an insatiable inclination to evince herself above the mediocrity. The narcissism itself appears to be quite a commonality among my usual companions, but the edge to her, my very best friend, is that her egotism is the manifestation of a heated hatred for the incompetent. She despises stupidity to a much greater extent than the display of malice of an identical magnitude, which, as she claims, had been her primary motivation to befriend me, that “I liked that you are smart.”

Smart enough that we grok through ambiguity or smart enough to be comfortable with the lack of definition?

“Smart enough to not ask stupid questions,” is what Emily would say.

We lay tangled between the navy-coloured bed sheets within the small haven of my dormitory. You can tell that it is my place from the oversized Lana Del Rey poster hung close beside that thrifted nightstand, on top of which stood my candle collection, with my favourite few flickering. Emily thinks the concerted fragrances, sweet like candy, are suffocating and surely poisonous. But the walls at her own residence are thin whilst her snowy linen bedding stains rather easily, so here we are, in the heart of my lair.

What I favour the most in this little room is the flush-mount ceiling light at the center of my sky, my own moon to gaze upon, in conversations too intimate to look into the other person’s eyes. The dim illumination smoothed out the rough textures of our personalities as, skin everywhere, we liked to carve out our softest flesh to each other. Emily fingered me while I whispered all of my secrets out loud, about a drawn-out series of vain hopes and some long-forgotten dreams, only pausing to ask me if it hurt.

I told her the “M” in my name stands for masochist.

“There’s no ‘M’ in your name,” Emily breathed out beside my ear. She cupped my right breast under the faded T-shirt and kissed my belly, a soft tingling, I wondered whether it was and if it could be a muted memo meaning love.

“Of course I love you,” Emily squeezed me lightly, “You’re my bestest friend.”

I wanted to know the magnitude of said love.

She replied softly: “I love you to death.”

I was curious to learn the depth of the death.

“I have no illusions about you,” Emily answered. “I know you are arrogant, flippant, and greedy, but I love you. I love that you are unnecessarily violent and chaotic with ideas crass and crude. It’s comic when I think of you having the skin peeled

off your face, blood dried down your neck, without much of your limbs intact, because I would love you then, you as pulps and clumps. The consistency is in how I would pick up the pieces and fragments of you in a similar manner after your death within each of the infinite universes, and kiss you like you kiss me now, with a moon being the singular witness.”

Weirdly enough, my orgasm brought to me a sense of nostalgia for a careless evening around an excessively decorated Christmas tree, hot chocolate in mugs, and marshmallows afloat.

Would Emily like to do a movie marathon sometime in December? She promised maybe.

Would you still love me by the time of this Christmas?

“Don’t be stupid,” said Em.

Kaisa

ONEXBUS THEOREM

THIS ARTICLE BROUGHT TO YOU BY ONEXBUS INTERCITY BUSES

Consider the following logical consequence:

- **Buscemi’s Theorem:** God stays in heaven for fear of what he has created.
- **Denver’s Conjecture:** West Virginia is almost heaven.
- **Proof by exercise:** West Virginia is really Fucking far away from Sportsworld Station.
- **Proof by logical transitivity:** Almost heaven is really Fucking far away from Sportsworld Station.
- **Proof by logical transitivity:** God is really Fucking far away from Sportsworld station. Proof self-evident.
- **Omnipotence Axiom:** God exists in all things.
- **Universal membership lemma:** The Kitchener-London Onexbus is a thing.
- **Hermes’s corollary:** God is in the Kitchener-London Onexbus.
- **Conclusion:** My Kitchener-London Onexbus is in West Fucking Virginia.

molasses

This article written after one hour of Sportsworld Station purgatory spawned by a bus delay. If Doug Ford brings GO Transit buses to London, Ontario, I will hand-deliver him my firstborn.



A COMPREHENSIVE REVIEW OF CRUSH SOCIAL EATERY

People who have read my articles in the past (or worse, know me in real life) will understand how much I adore kitsch. I love diving into things that are unrepentantly quirky and off-putting. There's a joy I find spending time on the fringes, with strange ideas that don't quite land. From art to architecture, there's nothing that bores me more than when something goes down easily. I want to be confused. I want things that are challenging and strange.

This is why I was remarkably upset by the closure of the Lobster Burger Bar late last term. The Lobster Burger Bar (or LBB—we'll be talking about it a lot, and these articles have a word limit) was always a fascination of mine because I just couldn't understand the logic behind it. On what planet did it make sense to put a premium lobster restaurant *directly next to a University*, in the same plaza famous for such gourmet dining options as the Campus Lazeezza?

What made me more interested was the bizarre theming in and around the LBB. There were live lobsters and netting inside the restaurant, plus posters of models holding lobsters, but I was most fascinated by a sign on the outside of the building which read *Come on in... Your Lobster Friends Are All Inside!* with a picture of a burger with a lobster claw sticking out of it. Say what you will about the LBB, I've never had a restaurant threaten to kill me before. Which is why I was so broken when I heard—in the very same publication you hold in your hands—that the LBB had closed and I missed it.

People who know me can attest that I was legitimately torn up about this. Sure, I had universally heard only middling things about the restaurant itself, but what I was mourning was the *experience*. I wanted to be able to tell my grandkids that I went to a university lobster restaurant, back in the before-times, when we still had such things as “lobsters” and “universities”.

All was not lost, however, for I had a nugget of hope. The owners of the LBB weren't about to give up on their dreams (and more importantly, that valuable real estate). They would open it back up as a new restaurant—one with, perhaps, a higher chance of getting actual attendance.

Maybe this new restaurant—whatever it ended up being called—would retain some of the kitschy ridiculousness of the LBB. Maybe I would have a chance to be happy. When myself and a handful of friends and fellow writers went to this new restaurant a few weeks ago, I was genuinely optimistic.

In retrospect, the name alone should have been a red flag.

“Crush Social Eatery”. What kind of freak calls a restaurant a “Social Eatery”? It sounds like an alien came from space, saw a bunch of people eating and talking, and quickly categorized the location to file a report to the homeworld. It's so bizarre, sterile, and robotic. Not to mention the logo itself, which is the word CRUSH but with the U replaced by the 🍷 emoji. Any unironic use of emojis in real marketing makes me feel gross.

Unfortunately, those vibes don't go away when you enter the building. In fact, I would sum up the restaurant experience as like a warzone; the Social Eatery vibes are attempting to smother the LBB vibes, and you're stepping right into the middle of it. Unfortunately, the Social Eatery is winning.

Most (but not all) of the LBB theming has been stripped and replaced with the most faceless furniture and decorations I could imagine. Dark wood floors, dark wood tables, black leather chairs. The few new decorations are white signs with vapid food-related slogans in black lettering: “*FULL PLATES, FULL HEARTS*”, “*LIVE LOUD, EAT LOTS*” and the like. I don't think those are fully correct but that's only because the real messages were so generic that I legitimately forgot what they were before I could write them down.

But there were still some parts of the LBB experience that survived the Social Eatery purge. In the dark corners of the building, they still hang pictures of models posing with lobsters. They never took off the LBB logo imprinted on the window outside. The feeling is similar to when a Pizza Hut closes and becomes an insurance agency, but the building keeps the hat—you're always left with the echo of what was, the repressed sorrow of loss permeating all that you do.

The menu is another example of this thematic cowardice. It doesn't even pretend to have a cohesive brand identity, and is instead four different menus smushed together on a single double-sided sheet of unlaminated printer paper. It's like a ghost kitchen has dropped the pretense, and it really makes you feel disconnected from any of the brand's identities since they're all clearly just coming from the same place.

Oh, and there's also an inexplicable LED cube hanging from the ceiling in a corner. It's playing a looping video talking about brand activations, I think. The video was upside down, so I'm not sure. It doesn't really fit into this overall story I'm telling, but I couldn't *not* mention it.

Crush Social Eatery disappointed me, but it shouldn't have surprised me. The inevitable arc of modern capitalism is to chase infinite growth by subsuming everything interesting or unique into an indistinct sludge, designed to be minimally offensive and appeal to the highest number of people. Rising operating costs mean that the risk of *not* going broad is an existential threat to many businesses. I don't even really blame the owners for doing this—they're trapped in the collapsing capitalist system, same as the rest of us.

So anyway, that's what I think of Crush Social Eatery.

I feel like I'm forgetting something important. Something I really should mention in a restaurant review.

...eh, must be nothing.

Dick Smithers

TRIALS AND TRIBULATIONS OF (ATTEMPTING) TO STUDY AT HOME

FEAT. MY AWESOME FAMILY WHO I LOVE VERY MUCH, WHO STILL HAVE HUMAN FLAWS

I went into reading week with a plan. Go home for a few days, visit with my family on the weekend and in the evenings, and spend the daytime studying while my parents are working and my little brother is at school. Obviously, since I had a plan, it was inevitable that it would go completely out the window.

It started off well enough. My dad picked me up on Friday shortly after I finished taking care of the dishes and we traveled back halfway to my grandma's house before stopping for the night. We made it back home by noon on Saturday. Great, plenty of time left in the day. It's the first real day of reading week, I deserve a break. Total time spent studying: 0 hr 00 min.

Sunday I slept in until 11 am, undoubtedly recovering from my lack of sleep during the term. No problem, still plenty of time in the day. Wait, no—I keep forgetting it's Thanksgiving, so naturally I'm going to spend most of my time with the people I care about. We played a board game called Ticket to Ride¹, and even though I didn't win it was still fun. We also watched a couple episodes of the TV show² we'd been watching as a family before I moved. Total time spent studying: 0 hr 00 min.

Monday: It's the start of the week, great time to start studying for these major tests that are only ONE week away! What's that? It's a Professional Development day for my brother's school board? He's home all day voice calling and playing video games with his friends at his desk... which is in the living room... 5 meters away from mine. I tried. I failed. I ended up being my mom's chauffeur instead (she fractured her C2 in August going off a second jump in a row while mountain biking; she's had to wear a neck brace since but it could have been so much worse). We also had a rematch of the board game and watched a couple more episodes of the TV show. Total time spent studying: 0 hr 11 min.

Tuesday: Surprisingly, nothing came up during the daytime part of the day to prevent me from studying! I ended up reading the course notes up to the point that would be covered on the midterm for one of my classes, as well as working through a set of 20 practice problems. After that, I felt as though I had accomplished what I needed to for the day and so that's where I stopped. Total time spent studying: 2 hr 36 min

On Wednesday I was once again my mom's chauffeur so she could go in physically to teach a class at the college she works at. This time, however, I was actually able to stick around and went to the college library to study. It was very quiet when I got there, since it was early morning, and I was actually able to concentrate for about an hour... Until some idiot came up with the bright idea to sit RIGHT OUTSIDE the silent study rooms, right behind me, and work on a slideshow over voice call with his partner. I was there for about 2.5 more hours, and this guy would not stop talking. After about 15 minutes I gave

up and put my earbuds in to listen to music to drown him out. In this 3.5 hours, however, I did manage to make my own copy of notes from the first unit in the textbook for another class with pretty coloured pens to keep my attention though, so... success? I also went to my self defense class that night, and we got to use our "bad guy's" weight against them to flip them over our shoulder. I got to be flipped a few times. It was fun. Total time spent studying: 6 hr 06 min.

And then we came to Thursday, when I planned to do the first half of the trip back to campus. I was not able to study when I actually tried on Thursday (thanks, ADHD executive dysfunction), but at least I packed everything I needed to. I did, however, somehow manage to corner my brother and explain derivatives to him using the definition of the derivative while trying (and failing) to relate it to what he was learning in class (slope or rise/run, normal grade 10 stuff). But to use the definition of the derivative, I first had to explain how limits worked, and... You get the picture. Basically, I confused the hell out of my grade 10 brother by trying to explain grade 12 concepts to him. But hey, those are concepts being covered in one of my math courses, so that counts as studying, right? Anyway, the drive to my grandma's house went well, apart from me realizing about 2.5 hours in to the 3 hour drive that I *may* have forgotten my lanyard with my WatCard and room keys... Yeah, no studying took place that night.³ Total time spent studying: 7 hr 26 min.

The final day of this adventurous reading week was me driving for 2 of 3 hours as my dad was on a work meeting, followed by a (surprisingly quick) sequence of me getting a replacement WatCard and loaner keys from my residence front desk. Then, my dad took apart my laptop to try to disable my keyboard⁴ which took about an hour followed by grocery shopping. All of it was relatively uneventful and it was around 4:30 pm by the time I managed to unpack, and I took the rest of the day to de-stress from travel. Total time spent studying: 7 hr 26 min.

I hope you enjoyed reading about my reading week trials and tribulations, and hopefully you feel less alone if you have had a similar experience. I have another 3 midterms to study for that I've been procrastinating on, so I have to wrap this one up here. Best of luck on midterms!

sexy_software_babe

1. The Europe edition; I highly recommend any game from the series, if you're into board games.
2. If you're curious, the show is Angel, the Buffy the Vampire Slayer spin-off.
3. It ended up having been left on a table beside the downstairs living room couch. I vividly remember tossing it there when I got home so that "it would be close to the [garage] door and I wouldn't forget it." Ah, sweet irony.
4. Long story, ask me next mathNEWS prod night and I'll explain.

WORLDBUILDING SPEEDRUN: DISEASE EDITION

Quivering Fever (sometimes Human Quivering Fever; also known as Russian Dissident Fever due to the similarities in symptoms to nerve agent poisonings) is an infectious disease endemic to the Southern Ontario region of Canada. It is caused by the virus (or maybe fungal?) [SOMETHING tremulovirus], [INSERT COMMON VECTOR]. It is one in a family of six tremuloviruses, the only one that affects humans.

Initial symptoms include fever, becoming a **mathNEWS** editor, and red rashes surrounding the eyes. As it progresses, symptoms of vomiting, stiffness, memory loss, and hallucinations usually follow. Death is often due to slow asphyxiation, as the nervous system loses its ability to control respiration. [DEATH RATE?]. If intervention begins early, symptoms can be managed by [TREATMENT], which reduces the death rate to [RATE].

SIGNS AND SYMPTOMS

The period of time between exposure to the virus and onset of symptoms (incubation period) is usually 3–7 days. Within the first week of initial symptoms, patients usually present with a slowly worsening fever, and rashes in the eye area.

Symptoms resemble those of the flu for the first 1–2 weeks, developing into a lack of appetite, nausea, and vomiting. Joint stiffness follows, caused by the gradual loss of nervous system regulation; in some cases, when the virus affects the brain, patient may exhibit memory loss and hallucinations.

As the disease progresses, patients may develop some or all of convulsions, profuse salivation, profuse sweating, involuntary urination and defecation, and depressed respiration.

TREATMENT AND PROGNOSIS

[I STILL NEED TO FIGURE OUT OVERALL DEATH RATE]

Once nervous system dysfunction symptoms appear, the death rate of quivering fever rises to 98%. In some cases, spontaneous recovery without medical intervention has been observed.

CAUSE

Outbreaks usually start with animal-to-human transmission, most commonly when humans live in close proximity with high risk mammals such as pigs and bats. Contamination of human food sources have been found in many cases.

Human-to-human transmission is believed to be most common through saliva transfer, and blood contact in some cases. The risk for spread is highest in households where people share food and utensils without careful decontamination. Healthcare workers without access to proper personal protective equipment or sanitation are also at high risk, as the virus may be spread through touching infectious fluids and

then the face. Corpses remain infectious for up to 3 weeks after death, posing a threat to those handling human remains.

PATHOPHYSIOLOGY

uhh yeah idk it affects the nervous system I guess. uhhhh it affects the production of acetylcholinesterase.

The tremulovirus inhibits the production of acetylcholinesterase (AChE), an enzyme that catalyzes the breakdown of acetylcholine, a neurotransmitter. The lack of AChE causes a buildup of acetylcholine in the synapses, which puts muscles in a constant state of activation. Muscles are essentially paralyzed without being able to relax, and when the production of AChE is restricted enough, this leads to the loss of bodily functions which is the cause of many symptoms. The smooth and cardiac muscles responsible for the heart beating and breathing are also affected by acetylcholine crisis, which leads to eventual death by cardiac arrest or asphyxiation.

PREVENTION

A vaccine, VSU-QVSN-5, has been developed in China. In clinical trials of 300 000 people, it has been shown to have 40% efficacy after 3 doses, with minimal side effects. There is very little adoption of the vaccine due to its low efficacy, but it has been approved for use in high risk communities in China and parts of Africa.

CAREGIVERS AND HOUSEHOLD MEMBERS

yeah idk dispose of PPE properly ig

RapidEyeMovement



PROOFS: A LONG-FORM MATHEMATICS TEXTBOOK: A REVIEW

A MATH TEXTBOOK THAT PROBABLY WON'T MAKE YOU CRY

Proofs: A Long-Form Mathematics Textbook by Jay Cummings is probably quite unlike any other math text you have had the pleasure (or displeasure) of reading. This is a textbook, but one that I recommend reading for fun. This isn't some dense read, but a more rigorous, yet still casual vibe; the type to pause mid-proof to provide a picture of a puppy with the caption, "You got this!" As someone who claims math to be their hobby as well as their academic field, this was my introduction to formal proofwriting, textbook readings, and most of the syllabus in MATH 135.

Proofs intends to teach the reader how to write proofs, think like a mathematician, and share solutions to common homework problems, famous math theorems, and other interesting mathematical quandaries and lemmas. Chapters include topics such as direct proofs, contrapositive, set theory, logic, contradiction, induction, and functions and relations. In addition, it provides mini-chapters that serve as an introduction to more advanced mathematical realms, such as Ramsey theory, number theory, topology, sequences, real analysis, big data, game theory, cardinality and group theory (my favourite).

I read this book in the first half of my grade 12 year in high school, well before I covered any of these topics in class. For me, it was a glimpse into what math looks like at a higher level, and also to warn me about the difficulty of understanding certain concepts (I still do not understand modular arithmetic). For many of you, reading it now wouldn't have the same effect, but I still would like to convince you that it's a worthy read.

When covering topics in class there's a large pressure to get through material quickly and to focus on solving problems rather than understand how theorems came about and why they are the way that they are, and this textbook can fill that gap. I found it great for explaining the thought process behind many of the fundamental theorems we use, from the scratch work to the formal proof. It can help establish a firm foundation, give pro-tips about proofwriting and problem solving, give you a laugh when math seems so void of such humour, and approach math in a conversational way, as if the author weren't trying to lecture you, but have a real conversation. Because of this low style, it makes *Proofs* both approachable for a beginner mathematician, yet still enjoyable and comfortable for a more advanced reader.

If this sounds great to you but you just don't have any desire to redo the basics, then I would recommend another very similar book by the same author: *Real Analysis: A Long-Form Mathematics Textbook*. This covers many topics from real analysis (big surprise), and although I haven't read the entire thing cover to cover, from what I know about *Proofs* and the chapters I have read about differentiation and integration, it's a great more advanced read.

So, if you enjoy math and want a fun time, or you're taking MATH 135 and want some help, or you want to bolster your proofwriting foundations, then this is the book for you. If you know anybody interested in math and yet to cover proofs, then this is also a great recommendation for them and a great introduction to formal mathematics. It's uniquely affordable, being only \$17 on Amazon. If you want to read more, then you can check out the author's website longformmath.com. I hope you consider giving it a read and consider joining the minority of people who actually read math for fun.

Aspiro

N SCI-FI SHORT STORIES TO READ INSTEAD OF APPLYING TO CO-OP POSTINGS

Homecoming is Just Another Word for the Sublimation of the Self by Isabel J. Kim in *Clarkesworld*

- What if immigration worked like git forking?
- Featuring: diaspora feels, classical references, Shinsegae Department Store

Distant Stars by P. H. Lee in *Uncanny Magazine*

- Dark matter as a metaphor for familial estrangement
- Featuring: Mach's principle, break-through scientific discoveries, Hawaiian pizza

Words We Say Instead by Brit E. B. Hvide in *Uncanny Magazine*

- Sentient war ships, after the war
- Featuring: lullabies, hummingbird hearts, puppy-like war machines

The Things by Peter Watts in *Clarkesworld*

- The Thing, told from an alternate perspective
- Featuring: amogus, communion, assimilation

Mono no Aware by Ken Liu in *Lightspeed*

- You are the last seed of your own culture on a space ship at the end of the fucking world
- Featuring: Idealism, Go, broken kanji

WHY LEARN AN ALTERNATE KEYBOARD LAYOUT?

Most of the time, when people give arguments for learning an alternate keyboard layout, they'll cite something along the lines of "oh it has less finger movement so it's more efficient and you'll type faster" or "it's more ergonomic". While that may be true, this article won't be about that. It turns out that if you're not super serious about learning the layout, those benefits don't matter that much, and in fact my typing speed went down about 10% as a result of learning a new layout. Rather, I want to share the experience of learning a new keyboard layout and why I found it so fun.

While I'd been aware of Dvorak for several years, I'd just dismissed it until recently. A couple years ago though, I learned about Colemak. Colemak was a layout that promised to be easy to learn. It preserved the ZXCVC keyboard shortcuts, was similar to QWERTY, and there were websites online to slowly ease a potential user into it. I'm not sure why, but I decided that I was going to learn how to type in it.

At first, I failed pretty miserably. But going back to it after a few months, I promised myself I was going to learn it once and for all. I started using it to type up assignments and practised Colemak every day with a training website. After I got past that initial roadblock, I was actually seeing progress! Slow progress, but progress nonetheless. For the longest time I thought that the muscle memory I developed from years of typing in QWERTY was immutable, but here it was, disappearing a little more every day. While I still used QWERTY often, I was using Colemak more and more over time because it was just so fun to see myself getting better and better. Rewiring your brain like that is so incredible because it's something you wouldn't think is possible, but yet you can do it anyway.

In that mindset, I decided to just stop using QWERTY entirely to see how far I could go. This was a mistake, but I only realized it much later when my laptop's charger broke. I had to borrow a friend's spare laptop, which only had QWERTY, and at that point I was all the way back down to being pretty much entirely incompetent at QWERTY. I now was faced with another challenge, relearning QWERTY, which felt as much of a challenge as learning Colemak in the first place. Posts online had warned about this, but in my hubris I had ignored them. I felt pretty stupid at the time.

But if I could overcome that first challenge, why couldn't I overcome this next one?

Not one month later, I was back to being roughly the same speed at both layouts. Yet again, something I had thought at first to be near impossible, I had accomplished.

So today, what did I get out of the experience? I think that the biggest reason I enjoyed it so much was that I had proven to myself that I actually could change such a fundamental piece of muscle memory. It was so fun because you always think that there's no way you can do something at every step along the way, and yet somehow you do anyway. The enjoyment

of continually surpassing what you think you can do in an everyday fundamental task is something that I think everyone should experience, and that is why I believe everyone should try to learn an alternate keyboard layout.

hyperlynx

THE "PISS DRUNK" REVIEW

We have all heard of experiences from friends where they "had the best times of their life" when they were "shitfaced drunk". As a not-very-big enjoyer of alcohol, I was always curious. Does it actually feel that good? I always stopped myself when I started feeling tipsy, usually after 5–6 drinks. I never really loved being drunk except that it allows me to match my friends' energy. But after listening to all the super drunk stories, I wondered if my reason for not liking it much was because I was not drinking enough.

The main reason for not drinking more than a few was because, well, being a first-year, it's hard finding places/people where you actually do that. But now that I am a second-year, I was able to find a place with a decent amount of fairly responsible(?) and trusted(?) people with whom I could safely pass out if I needed to. So the Friday before reading week, I did it and here is the review:

It's awful. I do not know how people do it. I don't know why people do it. It peaks around 5–6 drinks and it stops being nice. But you keep feeling that drinking more will help. Spoiler: it doesn't. Even though I was drinking responsibly (keeping myself hydrated, eating properly, pacing myself), my stomach was acting up. I stopped when I felt like I was a few drinks away from throwing up. There were no blackouts or anything but the experience was not fun. It was like I was constantly fighting to be sane (not in a good way).

Overall rating: 2/10. I ended the night at 14 drinks. The hangover was not that bad because I was hydrated but sleeping felt like shit. It was so fucking hot. Ideally I would not do it again and I would also not recommend doing it unless you wanna experiment for yourself.

anon

Anyone got a joint or something to smoke?

PROF. TROY VASIGA

N THINGS TO DO OVER READING WEEK

SCIENTIFICALLY SHOWN TO BE THE BEST WAY TO USE YOUR TIME

- Read lmao
- Go outside and touch grass
- Reject grass and instead go to a hackathon at Laurier
- Treat the hackathon as a case competition with coding characteristics and then somehow win a category
- Go to Waterloo Public Square at 8pm “for fun” on Thanksgiving only to realize everything is closed
- Eat McDonalds for Thanksgiving Dinner (large fries as a treat)
- Go to Fairway on the ION, only to realize that it gives off almost the exact same vibe as Conestoga, then aimlessly walk around the CF Fairway mall before immediately going home
- Launching a hostile takeover of MC2065 at 10pm to maximize your success rate
- Become god (any pantheon)
- Destroy god (any pantheon)
- Perform Read Operations
- Perform Write Operations
- Accidentally stay up all night watching YouTube Lets Plays
- Lose touch with reality as you slowly realize the only thing between you and the void is the eternal slog and cycle of schoolwork that you despise, yet at the same time almost completely defines you as a person; and now with the absence of regularly scheduled classes your life has descended into chaos
- Miss all of your friends as they go home to their houses in Ontario while you (whose home is 3000 miles away) are left in the quiet streets of Waterloo
- It’s quiet uptown
- Eat McDonalds again, because why not and also the Monopoly event thingy
- Fry rice (no shrimp cook :())
- Read
- Breathe
- Seethe
- Weep
- Wonder why the above 4 options quasi-rhyme
- Watch (on YouTube) and get horrified by a person creating a fake language that uses linear algebra to ensure that you are always 1 mispronunciation away from speaking complete nonsense
- Wither from having 2 consecutive days of accounting problems and watching your eyes unfocus at the rows of numbers
- Wrealize this and the above 4 things all start with the letter W and thus you need to pivot
- Touch Grass and buy a week’s worth of groceries
- Take a Mental Break
- Unwind during some well-deserved offtime
- Punish yourself for relaxing too much by locking yourself in your apartment and forcing yourself to do more work to catch up and get ahead
- Read
- Sleep at 2am because hell yeah
- Annoy your friends on Discord
- Start a cult in the name of our glorious lord and saviour lambda
- Start a cult in the name of our glorious lord and saviour h
- Start a cult in the name of our glorious lord and saviour Gap (Pollnivneach Rooftop Course)
- Realize that by writing this **mathNEWS** article you’re channeling your own insanity and the extent to which Reading Week has had mixed outcomes in terms of mental stability is being reflected in the article you are writing
- Read

andoiii

N THINGS WHICH MAKE AMSTERDAM BETTER THAN HERE

- Dutch bikes are better
- Dutch bike locks are better they’re so fast and so effective so convenient such a smart design fuc
- roads are designed such that cars can tell when they are infringing on a pedestrian or cyclists’ right of way (unlike turning right here XDD ☹️) because crosswalks and bike lanes are often elevated from the road and in a different colour
- public transit is frequent enough that you do not need to think about the schedule unless it’s after midnight (I missed a tram and the next one was 6 minutes later)
- the speed limit on the highway is 100km/h but 120 at night so people actually respect the speed limit during the day
- because cars are constantly yielding to pedestrians and cyclists in the city, the drivers expect to yield and are not honking constantly or driving aggressively
- weed is legal* but can’t be smoked in public
- the architecture is pretty and good
- public transit trains trains trains transit bus tram transit aldjfleoiosdlf
- outrageously walkable, grocery store literally 2 minute walk from where i was staying, another one 7 minutes away
- old buildings lots of history

PERSONAL CHESS

IT'S NOT YOUR ORDINARY GAME OF CHESS

I used to think I knew how to play chess when I was a kid. Actually, I mean that I knew about the rules really well, but not the strategy involved to be able to win well. Well, it also turned out that the former wasn't the case, but it took an absurd amount of time for me to figure out.

First, I think it's good to get into the mindset of how I first got into "chess" as a kid.



I received my first chess set for my birthday in grade 3. The first Transformers movie had released not too long before, and because a friend's mom thought I was really into Transformers, the chess set I got was Transformers-themed. I didn't know how to play chess when I got the gift, but I was nevertheless excited about playing it, so I was taught the rules of chess right then and there, and played my first game thereafter.

My mom and my friend's mom explained the following rules to me in order:

- You capture pieces by landing on its space. You can win if you capture all of them.
- The pawn can only move one space forwards but captures diagonally in front of them.
- The bishop can move any number of spaces only diagonally.
- The rook can move any number of spaces only orthogonally.
- The queen is a bishop and rook combined.
- The king is like a queen in that it can move in every direction but instead like a pawn in that it moves only one space.
- The knight is the oddball which moves two spaces in one direction then one space orthogonal to it, or vice versa.
- If your king can be captured the next move, you must prevent that from happening. You need to always make sure the king can move away from being captured otherwise you lose.

A couple of these rules are correct, but you may notice some missing parts. Mechanics such as castling, en passant, pawn promotion, proper check and checkmate rules, etc., weren't given to me. I thought the initial rules were the complete set of rules. It's probably no surprise that there was a problem in the first game against one of my friend's older brother. Actually, it was in the first move.

He moved the pawn **two** spaces forward on the first turn, meaning he broke the "rules"—the ones that were just explained to me—so I called the adults in and they ended up siding with me. He argued with them saying he's not breaking the rules but after, he begrudgingly agreed to follow the "rules" with me. I was satisfied because from my view he decided to follow the "rules".

Eventually they realized they needed to explain a new rule:

- Pieces cannot go through another piece, except for the knight. You can't capture your own pieces.

Even though this wasn't part of the original "rules" given to me, even *I* realized how broken the game would be if every piece could jump over and capture other pieces.

The first game didn't end at all because it would have taken a lot of time to finish and there were other, better, birthday activities to prioritize. Another opportunity to finish a game would be hard to come by because, after the birthday, the selection of opponents were my family members, which in essence meant just my mom as she was the only one vaguely aware of how to play the game.

I got about as good as you can get at "chess" with the available opponents, which was not enough. The best I could do at home was to play "chess" against myself, swapping between each side. Occasionally, a friend would come over and try "chess" against me, or at school if a chess set was available. I would usually win because it's not hard to win against classmates who don't play chess.

When I say "win", it was never by checkmate. I would just end up capturing enough pieces for my opponent to realize they were far behind and give up.



This false sense of skill became destroyed when my mom suggested I go to this chess event open to kids at the local library and I agreed to go. I don't think it was that serious of an event but I still wanted to try my best. The one organizer seemed to be some serious chess person with some cool title. At least he seemed very kind and nice. My first real opponent seemed to know enough chess and took it way too seriously.

Of course, he started by moving a pawn **two** spaces which I thought was breaking the "rules", but when I complained about it, I was told by the organizer that that was allowed and he finally properly taught me that pawn rule. To be sure, he asked me to explain the movement rules to him, and so, he also taught me about castling which absolutely blew my mind was a feature.

As the game progressed, I also learnt about saying the word "check" when the king was about to be eaten instead of what I used to do which was to manually check if my king is attacked after every move.

I eventually captured every white piece, and I thought I won, which my opponent disagreed. I didn't understand why I didn't win yet because you can't win if you only have the king left.

I didn't know what checkmate (nor stalemate) was so my opponent tried to explain the concept but I didn't get it and eventually I made it so that his king could not move meaning I thought I won. He disagreed, so in comes the organizer again and he said this was a draw by stalemate even after giving me a second chance. I got super-disappointed while my opponent became super-happy with that ruling. The organizer tried to explain what checkmate was after but I still didn't understand it. Feeling drained of happiness, I played a couple more matches before I got bored and went home.

I just wanted to have fun. I didn't take any of this as seriously as my opponent, and in hindsight, I would say that he was probably super-annoyed with me.

It would take a couple years until I finally ended up properly learning chess because I'd given up on it for a while.



What does this all mean in the end? Well, on one part it probably means that you can't blindly trust nor follow your parents on every piece of information. It also means that if you decide to give someone a hard time for something they didn't even know that they didn't know, watch your back, because I could reach you from a continent away and whoop your ass ~~in chess~~ :3

boldblazer

P.S. Did you know? In CO 456, I got to make an anti-chess program that got mid results in a class tournament.

DOING THINGS IS HARD

First, you gotta have an idea. Then, you need to convince yourself that your idea is good and actually worth doing, and many ideas worth doing are with friends. So maybe the first step is actually to get friends but I will assume you already have some.

Then, you'll have to gather the courage to share your idea. This is hard, and maybe it shouldn't be. I guess I'm scared that no one would end up agreeing to my idea, for one reason or another. At some point, you'll need to actually plan. Planning is hard. People are busy, assignments exist and things just come up. It eventually comes to actually following through with plans. Best hope that no one forgets or sleeps in.

I mean, isn't it easier to just stay home? And even if you don't need to get other people... maybe your idea is doing homework, or going on a walk, or writing an article. Isn't it easier to not do things? Probably...

terminal

LOSERCORE: MUST-TRY FASHION

Recently, I've been enlightened by the hottest indie scene in fashion, *losercore*. It's simple: the closer to a loser you are, the better. More than just a distasteful graphic tee sporting your favorite family entertainment center, Chuck E. Cheese, losercore hinges upon the demeanor of the individual. Scrawny limbs, hunched back, and a tendency to divert gaze upon eye contact; the way you carry yourself really adds to the aesthetic.

Like all great ideas, dressing in losercore is not considered chic. What's more, a majority of readers will fail to emulate the style in its truest sense. That is, most of you will look like losers. Ironically (and confusingly) the goal of losercore is not to be a loser, but only to dress as one.

Frustratingly, like all complex things, losercore is closer to an art than a science.¹ A reliable heuristic would be if you get the urge to bully the trendsetter in question, but still think they're good-looking.

CommonDiyar

1. Rock Lee is a great example.

MATH PUZZLES: ANSWER KEY

QUESTIONS ON PAGE 16

- The empty set.
- Any singleton set.
- A zero-dimensional vector space.
- The ring of integers.

finegeometer

Ever wonder if actual people write the mastHEAD answers?

Come to a production night and find out for yourself!

A TOTALLY REAL mathNEWS EDITOR

OH BOY! A NEW MESSAGE FROM CECA THAT REQUIRES ME TO TAKE ACTION!

What an intriguing email title! I can't wait to click on it and read the email body, which will presumably contain this message of such importance!

They wouldn't just have the email tell me to log into WaterlooWorks to read the message, right? That would be silly! The message requires me to take action; surely they wouldn't want to slow me down from taking action by having to first sign into WaterlooWorks, find the part where the messages are, and figure out which one they're referring to. No: clearly they're concerned about whatever terrible event will occur should I not take action, and it would be in their best interest to make it as easy as possible to read the vital information they urgently wish to tell me.

I suppose there might be one reason they might direct me to read the message on WaterlooWorks: perhaps if the purpose of the message were to direct me to another page on WaterlooWorks, it could contain a link to that page, rather than a long list of instructions navigating me there. That would be a remarkably useful feat: a brilliantly innovative use of the modern HyperText Markup Language used for composing messages on WaterlooWorks. "HyperText" here refers to documents that are able to link to other documents, a massive paradigm shift from the age-old concept of a non-interactive document, newly enabled by computer technology. Given that the University of Waterloo is a pioneer in cutting-edge technology, one might hypothesize that they may be using WaterlooWorks to demonstrate new ideas such as HyperText, and in doing so making it even quicker and easier for me to take this all-important action.

But wait! An even better idea has occurred. Emails themselves support the HyperText Markup Language: in fact, just this morning I received an email containing a link to a webpage, sent by some tech-savvy user who clearly knows the ins and outs of the email-sending system. If CECA is forward-thinking enough to send messages containing links to WaterlooWorks pages, surely those same links can be sent in the emails they send me as well! Truly, there could be no possible reason for this email to not contain the important message that CECA wants me to see—it was ridiculous of me to even think that it wouldn't.

Anyway, I got carried away. I still haven't clicked on the email, but I'm just so excited about the culmination of technological effort that will enable me to read the message and take action as easily as possible after I do so. We really are living in the future!

__init__

CS MAJOR DISS TRACK

As an MC, you're like MC
While me? I'm more of an SLC
If I wanted shit lines I'd go to Lazeez
I'm on an academic mission, you're a global disease

So cheap your every meal's from CnD
Copy code so hard you're getting C&D's
Tripping policies just for C's and D's
Great grades, grad school ain't seein' these

Hygiene and marks aren't an exclusive disjunction
You prefer imperative 'cause you can barely function
Complaining hard about your no interviews
But Waterloo works, so the problem is you

What courses to pick? You just don't know
Your clueless indecision is starting to show
Like how you're unsure where your disses should go
It's cause you've never had that UW flow

Your resume's done in ChatGPT
Should call seventy-one on this profession embellisher
No wonder you keep dissin' on PD
'Cause you're the furthest thing from a professional developer

You're dropping more shit than the geese by V1
Spend all day inside, you barely see the sun
Week six yet your first assignment's still not done
You're a bigger letdown than that nude dude run

This is your third time total retaking 1B
While the rest of CS is leaving for Cali
Are you sure you're going to the right uni?
Here's a tip: Laurier's just right down the street

snowdozer

PRO MIDTERM TIP

If you are crying from midterms, you might as well do any overdue onion cutting.

aphf

(ACTUALLY) WINNING THE KEY CLUES CHALLENGE

get rekt

Biggest Fans of Blake

CHEEZ ITS MORE LIKE gridWORD

gridCOMMENT 153.3

new gridWORD!!!!!!!!!!!! omg!!!!!! :000000

last time i asked you, "who should be on the \$5 bill instead of sir laurier?" you responded:

- hv: *old sheldon*
- UW Unprint: *young sheldon*
- water: *Bobby*
- Rijrya: *my cat*
- nike: *spock (google spocking)*
- snowdozer: *jerma sus face*
- awmlet: *toopy and binoo*
- Partly Cloudy: *ur mom*
- sunnysideup: *I feel like a cat in a hat with a monocle would be a solid contender*

shout out to awmlet for the clap back to when i was like 5 years old watching toopy and binoo :’0 for the nostalgia, please

receive your \$5 CnD gift card from the mathNEWS office at MC 3030 (pls don't gamble it away at poker club)

great job everyone! it's always a pleasure to see so many solutions and i hope you have fun doing these!!!

the theme this time is: "sus", so please don't be sus amogus and just do your best as always ;o

this time i ask you, "how are you doing? :)"

send your gridWORD solution, gridQUESTION answer and pseudonym to mathnews@gmail.com by october 30th at 6pm, and i'll see you all next time!! :000000

bye bye :)

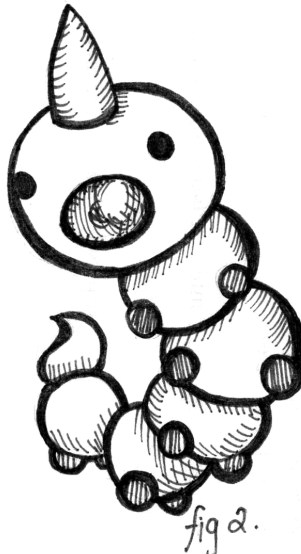
Wink wonk

ACROSS

1. Camp craft
6. Common amongst teens
11. Movie effect
14. Blow one's top
15. Convention table
16. Not at home
17. Someone who lives opposite the south western side of town
19. Fleur-de-___
20. Suspicious county of Brighton*
21. Like some shoes
23. Consumption
24. Zelda's money
27. Artist's stand
28. Hospital supplies
30. Late princess
32. Amer. fliers
33. Castle features
35. Asian aquatic plant
37. Winds blowing from the south
39. Diving bird
40. Basketball boo-boos
41. Nevada city
42. If they're dark, it's a game
44. Camper's purchase
48. Pakistani river
50. "___ well"
52. Caribbean, e.g.
53. Chasing party
55. Suspiciously against*
57. Fourth-to-last Greek letter
58. Most difficult to stand on because it is so smooth
61. Deception
62. Vietnam's capital
63. Express
64. Conclude
65. Fireplace
66. Not well-groomed

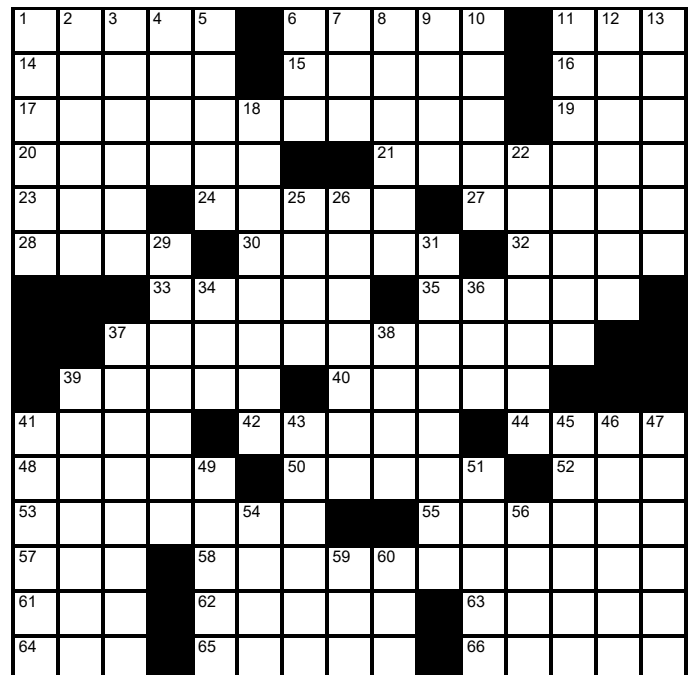
5. Aromatic solvent
6. Legal org.
7. Discouraging words
8. Ill-___ gains
9. Dish cooked in a pot
10. Paroxysm
11. Suspicious giant*
12. Old British gold coins worth 21 shillings
13. "... nothing to fear but fear ___"
18. Fluid that leaks out of blood
22. Stretched to the limit
25. Essence
26. Relaxing
29. In the mood
31. Using indirect references
34. Your and my

36. Black gold
37. Like some raisins
38. Throw, as dice
39. Violinist Yehudi
41. Make waves
43. Rowing a boat
45. Holdings
46. Finds a new purpose for
47. Bakery offering
49. Suspicious fish and rice*
51. Truth ___
54. Flamboyance
56. Baptism, for one
59. Neighbor of Ger.
60. Yummy, 3.1415...



DOWN

1. Suspicious population profile*
2. Excite
3. Baby bottle
4. Chooses, with "for"



SUN OCT 22	MON OCT 23	TUE OCT 24	WED OCT 25	THU OCT 26	FRI OCT 27	SAT OCT 28
Mother-In-Law Day National Nut Day		United Nations Day Consider Giving mathNEWS A Permanent Seat On The UN Security Council Day	International gridWORD Celebration Day		MEF Board of Directors/ W24 Executive Director applications open	
SUN OCT 29	MON OCT 30	TUE OCT 31	WED NOV 1	THU NOV 2	FRI NOV 3	SAT NOV 4
	mathNEWS 153.4 Production Night	Halloween 🎃 MEF Funding Council nominations due MEF project funding applications due (!)			mathNEWS 153.4 manifests	Check Your Blood Pressure Day Daylight saving time ends tomorrow

LAST ISSUE'S gridSOLUTION

1	I	2	N	3	I	4	T	5	A	6	T	7	E	8		9	F	10	E	11	A	12	S	13	T
14	M	O	M	E	N	T	U	M		15	C	O	A	T	E	E									
16	P	R	I	C	K	E	R	S		17	H	U	R	R	A	H									
18	O	T	T		19	Y	U	K		20	B	A	R	L	I	N	E								
21	S	H	A	22	M		23	P	E	24	C	A	N			25	A	C	E						
26	E	S	T	E	R		27		28	Y	A	R	D	S	A	L	E								
31	S	E	E	D	E		32		33	P	I	L	A	U											
	34	A	S	I	T	I	35	S		36	C	E	R	T	37	E	38	S							
							39	C	R	A	W	S		40		41	R	E	U	S	E	42	D		
							43	W	H	O	O	P	E	E	44	S		45		46	E	M	C	E	E
47	S	H	E				48	A	P	N	E	49	A		50	N	A	P	E						
51	H	A	R	52	V	53	E	S	T		54	A	P	P		55		56	L	A	P				
57	A	L	B	E	D	O					58	U	M	P	I	R	A	G	E						
60	R	E	A	G	A	N					61	P	A	L	P	A	T	E	S						
62	I	S	L	A	M						63	S	T	E	E	P	E	S	T						

A HAKKA NATION HAIKU*

WITH AN UNCONTROVERSIAL NUMBER OF SYLLABLES

In uni plaza¹
There is a see-thru window²
Inside a toilet³

Lars Nootbaar

- In University Plaza in Waterloo, Ontario (the one with the Williams, not Mel's Diner), particularly at the Hakka Nation restaurant under construction near the BMO (Bank of Montreal).
- The Hakka Nation restaurant is under construction, which means it has not replaced all of its windows. The window closest to Farah Foods is a see-through window that is a bit scuffed up from the renovations.
- Inside this window is an entire washroom. This makes a humorous visual as it is impractical for a washroom to have a large public-facing window.

N REASONS TO NOT WATCH TANNHÄUSER

AS IF ANYONE NEEDED CONVINCING

- opera, does anyone have time for that?
- 5 minutes of a song that just says "hello"
- first act is an orgy
- you need to understand either german or french
- bad protagonist gets redeemed anyways while the good character dies and it's supposed to be happy???
- wagner is actually kinda boring to listen to
- random pastoral girl is only there to fill time and you can tell the entire thing could have been half as long
- ok I must admit the song contest was actually entertaining
- the only interesting part was the song contest
- wagner was super racist and antisemitic