



PINK TIES SAVE THE WORLD

“WHAT WOULD BE A BETTER NAME FOR M4?”

Hello, dear readers!

You hanging in there? You feeling ok? It’s early November, which means we are right smack between the end of the midterm season funk and the start of the exam season funk. It’s also a Fall term, which means that for a lot of you, this is the first time you’ve ever felt like this. I remember my first midterm—I was so totally convinced I was going to fail that I resigned myself to a 30 at best. When I got a 55, I was so relieved that I declared the sweater I was wearing to be my “lucky sweater,” and I’ve worn it to every midterm and exam since.

My point is that things do get better. The exams don’t get easier, but you get better at wrapping your head around them. You develop healthier coping mechanisms, better study habits, and ultimately, more perspective. If you’re passing your classes, you’re doing terrific. High school grade inflation can warp people’s perspectives of what a ‘good’ or ‘bad’ mark is, but I promise people here understand if you just scrape through with a 55. They’ve been through it, too. Remember that even when things are tough, everyone on campus is rooting for you—your peers, your profs, your TA, even your friendly-neighborhood **mathNEWS** Editor. Everyone wants you to do well. Keep your chin up, and good luck!

Oh, and if you need something to get your mind off school for a while, we have another excellent issue of **mathNEWS** for you to do just that. There are reviews of the hottest (?) films, an apple cider recipe, a passionate defense of Waterloo’s water, and a frankly startling amount of actual math. Enjoy!

befuddled
Editor, **mathNEWS**

ARTICLE OF THE ISSUE

This issue’s winner is *The Election Issue* by Lars Nootbaar and aphf. Thank you for continuing **mathNEWS**’ long, noble history of reporting on the hard facts that no one else is brave enough to touch. Come by the office to pick up your gift card.

befuddled
Editor, **mathNEWS**

BSGCG		DC2
PLATYPUSGOD		E8
BEYOND META		Gary
USMAN!		M-inem
臭臭		m ⁴
__INIT__		E8
NOTOH		Computer and Mathematics
ANDOOIII		The DC Bridge and M3 Bridge but put together and also they had a glow up and also some extra rooms and also a student hangout space
YALEVOYLIAN		GVC (Gordon V. Cormack) (this needs to happen) (please)
APHF		Anything that would score high in scrabble
ERALOGOS		μπ
LARS NOOTBAAR		EV4 (There’s still time)
CONNECTICUT JAMES		Hagey Hall 2: Electric Boogaloo
PI=3		E8
YUMMYPI		yummyPi1
AMIRDADP		McKinnon 4
FINEGEOMETER		First of these that isn't taken: M2, M1, M0, M4
NIKE		M69
NAZZ		THERES SO MUCH EMPTY CAMPUS LAND NORTH OF COLUMBIA WHY ARE THEY KILLING DC GREEN FOR THIS WHAT THE FUCK [Editor's note: they're not? they're just taking from the useless empty green space by William Tuttle Way :/]
0.423		M5. Let's just do the primes.
DC WATER ENJOYER		E8
NORMALPARAMETERS		Despicable M3
IGNIS		snoopy's building
GAYA		mathematics 4. get rid of the acronyms (jk i love them but my non-uw friends get mad confused)
JOONWEI		Assault Rifle
MOLASSES		M5
BIG A		M-not-4U
VERDANIK		M3 2
DICK SMITHERS		m(n+1)
DERAILED		E8
REVIVED		Name it after Doug Ford in trade for our bike lanes back
BEFUDDLED		The reason I have to go outside now

Is this lazy enough to tip over into funny?

SARA NAYAR, **mathNEWS** EDITOR FOR FALL 2024
ALONG WITH OWEN GALLAGHER, ISABELA SOUZA,
RIVER STANLEY, DAVID TERESI, AND JUSTIN YOUNG

mathASKS 156.5

FEATURING ASSOCIATE PROFESSOR JOE WEST

MOLASSES: AS AN ADULT IN THE REAL WORLD, HOW DO YOU MAKE FRIENDS?

Nowadays, I'm quite busy with my family, including two children, and helping my wife's parents and fixing both houses etc., so I don't really have a lot of extra time, but I do my best to maintain a couple of old friendships. When I was young and single and working either as a grad student or new faculty, I would join sports and other clubs on and off campus. But I wouldn't consider my job "real world!"

NOTOH: WHAT'S A TOPIC IN MATH YOU LIKE THAT NOT ENOUGH PEOPLE TALK ABOUT? (NOT NECESSARILY RELATED TO YOUR FIELD)

I'm teaching stream faculty and don't do research, but I suppose something in teaching-related math research would be on the use of paper in doing and learning mathematics, and in learning in general. I think so much is being pushed online and it's not necessarily better than good old paper.

NOTOH: WHAT ADVICE WOULD YOU GIVE TO THOSE WHO WANT TO BECOME BETTER MATH TEACHERS?

Practice, practice, practice! Do tutoring or whatever will get you involved. Try to get someone to observe you teaching and get feedback. Sometimes little things like "your voice dropped at the end of that sentence" can help a lot.

YALEVOYLIAN: WHAT'S YOUR FAVOURITE CHEESE?

I'm not too sure—I guess I like most kinds.

USMAN!: ANY REGRETS WORKING AT UW FOR AS LONG AS YOU HAVE?

No. I really feel at home here, and even after this many years, I look forward to coming back to campus when I've been away, even after the weekend.

NIKE: HAVE YOU EVER HIT A BIRD?

While training for my commercial pilot's license doing a night flight in a Cessna 172, a little bird slammed right into the middle of our windshield right after lifting off the runway. No idea how it missed the propeller. We gave a report to the control tower, but the truck couldn't find it. My hope is that it just flew away.

APHF: FAVOURITE VIRGINIA?

Undecided—even after having driven through both several times on the way to North Carolina for August beach vacations.

__INIT__: FAVOURITE NUMBER?

In some ways, numbers can be like children. I don't think I should have a favourite. Well, maybe "e," if it's not too irrational of me to say so.

MOBPSYCHOFAN: WHAT'S THE BIGGEST MISCONCEPTION YOU FIND THAT PEOPLE HAVE ABOUT RECREATIONAL FLYING?

That it's as safe, or even safer, than driving a car. It's more like driving a motorcycle: not incredibly dangerous if you're safe about it, but you are vulnerable, especially with just the one engine, no anti-icing systems, and inability to handle severe turbulence like in a thunderstorm. I was always very cautious with the weather, and practiced my "forced approaches" regularly.

CLASSIFIED: WHAT ARE SOME OF YOUR JUGGLING RECORDS? LIKE WHAT WAS THE LONGEST TIME YOU JUGGLED FOR? WHAT WAS THE MAXIMUM NUMBER OF BALLS YOU WERE ABLE TO JUGGLE AT ONE TIME?

I have a trophy for three-ball blind juggling from RIT; I think I lasted maybe 30–45 seconds with my eyes closed. Five ball, open-eye, my record is around 1–2 minutes. Three-ball open-eye, around 20 minutes. I can do up to seven balls if I've practiced a lot, but just for a few "juggulations."

CLASSIFIED: WHAT IS YOUR FONDEST MEMORY OF BEING AN UNDERGRAD IN UW?

1A calculus with Ron Scoins. He called his exams "intellectual experiences."

NORTHERN_GANNET: TELL US ABOUT YOUR MOST MEMORABLE FLIGHT!

So many to choose from! I guess maybe the "commercial cross country requirement flight" which had to be at least 300 nautical miles away. I flew the plane from Waterloo to Kingston, Smith's Falls, and on to St. Hubert (Montreal), and my CPL classmate flew us back. We stopped for fuel, which was self-serve and paid for by the "honour system," dropping the carbon-copy paper from the credit card swiper into the physical box. On the way back, it was night, and we turned on the runway lights to the airports we passed using the radio button.

NORTHERN_GANNET: WHAT IS YOUR FAVOURITE THING TO DO AROUND KW?

I live in Cambridge, so we don't spend much time around KW, but the fam and I do enjoy walking around Uptown and Waterloo Park from time to time.

LEAH: DO YOU BELIEVE IN LIFE AFTER DEATH?

That's a big question! I certainly believe that we live on at least in the memories of our loved ones and others that we have touched in our lives, and I certainly can't prove that it doesn't go beyond that, and there's also the question of how exactly we define "life," but there is not enough bandwidth on this internet connection to communicate my answer fully here.

REAL STATISTICS CANADA: WHAT IS YOUR FAVOURITE WASHROOM ON CAMPUS?

One thing that makes for a favourite washroom is how not-busy it is. If I tell the answer, especially on **mathNEWS**, I'm afraid that millions of people will start using it, and then it would no longer be my favourite.

A HISTORICALLY ACCURATE HAGEY

in the back section of Hagey Hall, there's a display case dedicated to Joseph Gerald Hagey, founding president of the University of Waterloo. In the past, it has contained historical artifacts, portraits, and other relics honouring his life. Some time in the past year however, it underwent a makeover:



SEEMS HISTORICALLY ACCURATE

A SIMPLE ROUTE FROM DC TO MC

NOW THAT THE BRIDGE IS DEAD

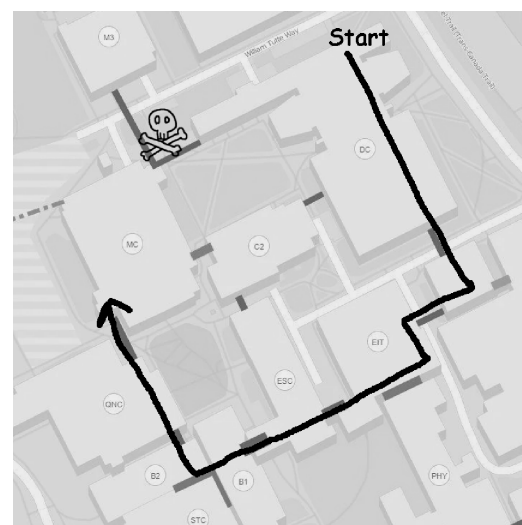
Picture this: It's a freezing winter morning and you have a class in MC. You've entered the campus from near the station and take refuge in DC. It's easy, you can simply take the MC-DC bridge and get to your class without having to brave the elements any further. Unfortunately for you, it is the year 2025 and that bridge is gone, replaced with indefinite construction.

If you don't know, the beloved bridge that links MC and DC is closing soon and won't be open until M4 is complete. This is a tragedy. If you are a prospective Waterloo student, consider deferring your enrollment till 2027.

If you need to make the journey, you have two options: one, take the life threatening two minute walk outside between the buildings, or two, follow my simple route that keeps you protected the whole way.

1. Facing DC Library, take the stairs on the left to the second floor and walk all the way down to the end.
2. Take the bridge to that building between E2 and EIT (apparently it's called CIM?)
3. Take a right through multiple doors and across the bridge to EIT.
4. Walk across EIT and through the link to ESC.
5. Upon entering, head down the stairs and keep going straight through B1 and into B2.
6. Take a right and head straight across two bridges to QNC and finally MC.

With these easy directions (see handy map below), you can arrive to your class 10 minutes late and mildly sweaty but without having to touch the outside air.



DC TO MC ROUTE

WHY YOU SHOULD READ THRONE OF GLASS

Throne of Glass (ToG) is a high fantasy young adult book series written by Sarah J. Maas. Some of you may be familiar with Maas' other series, *A Court of Thorns and Roses* (ACoTaR) and *Crescent City* (CC), both of which became popular during COVID-19, and kind of helped spark the romantasy genre. I am not going to talk about those here. If you would like a review of either of those series, hundreds of people on BookTok would gladly give you one. By the way, I am using the acronyms to try to stay under the word count (and ignoring the fact that I could probably just cut unnecessary details, my ENGL 109 professor would not be happy with this work). This review is targeted towards people who may or may not have heard of Maas' other works and are looking for a new (maybe fantasy) series to get into while procrastinating homework.

There isn't a whole lot that I can say about ToG without spoiling things, because one of its charms is that the plot and themes shift so much over the series. There was even a very specific stylistic change that Maas made between books 3 and 4 to showcase how different the series was becoming.

Although you would not know it to read it, the first book of ToG, *Throne of Glass* was originally a Cinderella fanfiction that Maas wrote when she was sixteen, and published years later. The book no longer bears many similarities to any Cinderella story that I have read, but there are a couple elements where you can still see the connections (main character being covered in grime, fancy dresses, etc.)

The first book is about Celaena Sardothien (sa-lay-na sar-dothEE-en), an eighteen-year-old assassin who has spent the last thirteen months working at a slave camp. By the way, I am including some pronunciation guides because Maas is notorious for having character names that are difficult to pronounce (e.g. Feyre turns into Fay-ruh and Rhys turns into Reese). Celaena is offered to chance to get out of there by Dorian Havilliard (door-ee-an ha-vill-ee-ard), the crown prince of the kingdom (his dad is an evil tyrant). Basically, if she wins a competition against a bunch of other assassins, thieves, mercenaries, etc., she will become the King's Champion (read, go-to person for murdering political opposition) and otherwise, she will return to the slave camp (to die). She accepts, and naturally winds up in a love triangle with Dorian and his best friend Chaol Westfall (kay-ole westfall), the Captain of the Guard. By the way, I feel okay calling this a love triangle, rather than a love arrow because Dorian and Chaol's friendship is actually a key part of the series, and a lot of people on AO3 ship them.

Anyway, that's book one. That book incorporates some of the key fantasy elements that make up the rest of the series, with things like ghosts, demons, references to Fae, demonic murders, etc., but there is still a lot left for later. The second book, *Crown of Midnight*, follows basically the same themes, but the characters are starting to begin their main story arcs. Book three, *Heir of Fire*, has a lot more going on. At least three major characters are introduced (with perspectives), you see a whole new continent, and you get more theoretical information

about magic in this world. I already mentioned that there was a big, particular change between *Heir of Fire* and the book following, *Queen of Shadows*. *Empire of Storms*, book five, is probably where you really start looking back and thinking, "Wait, where did the Cinderella part go?" and the final book, *Kingdom of Ash*, is a really epic finale, where they tie together so many loose ends and give so many characters really satisfying conclusions. There is also a prequel book, *Assassin's Blade*, which is a collection of 5 short stories set about 1–2 years before the main events of the series and *Tower of Dawn*, a sort of book 5.5, set during the same time as *Empire of Storms*.

Anyway, reasons why you should read this series.

1. Awesome high fantasy, acclaims on the cover say that it is perfect for fans of *Game of Thrones*, and it does have a lot of similar elements. However, it does do a few things better than that series:
2. No incest
3. Misogyny is a thing, but constantly treated as a bad thing
4. Sex workers are respected, and not shoved into side roles. Likewise, women who have sex are respected
5. It has way fewer swears and sex scenes than Maas' other series
6. However, it does include some of her calling cards such as:
7. Awesome, healthy, female friendship
8. Well-developed characters that you are constantly having to decide if you love or not
9. Hugely diverse world, both in terms of culture and magic
10. Actually in the same multiverse as her other series
11. Also, this came first
12. The series is long enough to really get into, but not so long that you would be totally overwhelmed
13. You could even just give the first book a trial run, since it is only about 300–400 pages

Anyway, I am running out of time (and word count), so I am just going to give very vague, two-word descriptions about twelve main characters, in alphabetical order by description, so that you can immediately map them to their book identity.

- Grumpy General
- Grumpy Soldier
- Grumpy Warrior
- Hawk Boy
- Healer Girl
- Ice King
- Iron Warrior
- Knife Queen
- Leopard Lady
- Rebel Archer
- Rebel Princess
- Wise Woman

NOOR FOOD MARKET

ON THE NOBILITY OF TRYING

On Erb St W, halfway between University Ave and Fischer-Hallman, there's an unremarkable one-story plaza you've probably passed before. Made of black siding above red bricks, it contains simple essentials: a variety store, a hair salon, an insurance agent, and more. It also contains two shops, signs of bright orange above their door: Noor Food Market, and Noor Food Market (again).

They're the best Noor Food Markets this city has ever seen.

AN IMPERFECT GROCERY STORE

There's a lot that's bizarre about Noor Food Market. For one, whose idea was it to make two of them? To get the full Noor Food Market experience, you have to enter one store, get your groceries, go through the checkout, then walk outside, down the sidewalk, just to enter the second Noor Food Market. Topping it off? Between Noor Food Market and Noor Food Market Two, there's a random pharmacy third wheeling.



HOW DID HE GET THERE

This pharmacy amuses me to no end. How did it end up between two Noor Food Markets? Who came first? Do they talk? Is it like being in a car's middle seat? Is the pharmacist the middle child? I want answers.

There's more inside. Given the small space, they only have one cash register. Last year, it was by the front window, creating a clear traffic flow around the perimeter of the store.

Since then, they've reorganized the store to make it... worse? You walk in, and the end of the checkout is immediately in front of you, putting your footpath directly in conflict with those trying to pay. You pick up your basket from the lane's end, but to get to the produce, you have to dance around people that were previously hidden away.

At least it feels cozy inside? That's primarily because of the wood floors they have. Can you recall *ever* seeing wood floors in a grocery store? I'm reasonably certain it's actually vinyl—still, who chooses the wood pattern for their grocery store? Loblaw would never. I can't overstate the coziness though; the auditory experience doesn't exist. They've outsmarted Mariah Carey by simply playing no music, ever. The sound of their door chime is etched into my mind; the whole time you're in the store, you're intensely aware of everyone around you,

because amid the freezer array hum, you can hear *everything they do*.

I love that.

NOOR FOOD, MARKETED

Noor Food Market (the first)'s small scale limits how much they can sell, but they still have most of the essentials. They have only one small freezer in the back full of produce, but do you really need more? What more is there beyond tomatoes, apples, carrots, onions, potatoes, and garlic anyway?

The answer is dates. At least twenty-two varieties of them. I don't think T&T even stocks dates, and all the other big chains only ever stock the one brand, on occasion, hidden in some dark corner. Not Noor Food Market. Every type of date you can dream of, they have in stock. They even stock a date bread—like a hybrid between a donut and a soft bagel, formed of chain-link sections with dates at their cores. It's revolutionary. I once brought some on the one hundred twenty kilometer journey home just to give my mom and dad the chance to try it.

They stock bread too of course—not boring, price-fixed European bread, but varieties upon varieties of naan. At this point I've just stopped eating European bread—when the ancient Greeks theologians described the “nectar of the gods,” I imagine they were thinking about grilled cheese on naan loaves.

All this, and I've not mentioned the best part. It's cheaper than Loblaw. By a lot. Comparing pictures I took of Noor Food Market pricing to the prices Zehrs, T&T, and Walmart list online, Noor Food Market was cheaper on average than all of them.¹

THE SECRET TO CHEAPER FOOD

The last time I talked to a **mathNEWS** writer about my beloved local food market, they wouldn't have any of it. They maintained that they would prefer to eat food that was, quote, “not mouldy.”

And... fair. I guess. You'd have to be blind to think that Noor Food Market produce is of the same grade as chain store produce. Whereas Zehrs sells only the top of the line, Extra Fancy, plastic-shine apples, Noor's are distinctly more banged-up. The onions are often ugly, and the tomatoes are sometimes softer than usual. My theory is that they stock the lower-grade produce Loblaw doesn't go for—all the food that wasn't good enough for rich suburbia.

In one line, *that* is what I love about Noor Food Market. We exist in this world of perfection. We joke about Cali or Bust, but it comes from the need to be the best. To be perfect. Every week, sometimes every day, one of us makes a r/uwaterloo post

about not being able to meet their stratospheric expectations. We push our heads against the grindstone, we test our limits every term, because if you can't run five clubs and play on three sports teams, what are you doing with your life? If you can't make the top co-ops, are you wasting your chance? If you can't do five courses a term, if you can't ace every midterm, if you can't maintain your GPA, what the fuck's the point?

The point is to try. Not to be perfect. Not to reach some unattainable standard, neither to be flawless nor without challenge. Simply enough. A human, doing their best. Behind every flaw of Noor Food Market is a human that tried. Maybe they're not doing perfectly, maybe they could use a bit more music, but the lack thereof shows that a human forgot. Not an

algorithm, not a verticalized business process nor a committee. Just someone like us.

In the end, I don't mind if the tomatoes are a bit mushy. It makes for better soup.

molasses

1. I found Zehrs, T&T, and Walmart to be 31.34%, 24.41%, and 22.30% more expensive per pound of produce on average. My data collection methods were probably super flawed though, so take those metrics with an entire soup ladle of salt.

RANKING ALL THE PLACES I FELL ASLEEP IN DURING 1A AND 1B

I HOPE THIS HELPS OTHER FIRST YEARS WITH CHRONIC FATIGUE <3

Around this time last year, midterms were kicked into full force and, consequently, so were my autoimmune issues. My flare-ups proceeded to last continuously for the next 8 months, leading to a few academically disastrous terms. Oh, and I also fell asleep a lot.

MY FRIEND'S CAR IN PARKING LOT: N 11/10

Incredible, would absolutely do it again.

CPH 2ND FLOOR: 10/10

This place is quiet, has comfy sofas, and is dimly lit. One time, I slept here for three hours and missed all my afternoon lectures. If you've been to the room, you'll know which one I'm talking about.

AT HOME: 10/10

skipping classes because of depression and hypersomnia ✕
skipping classes to assert dominance ✓

FIRST ROW OF MY LECTURE: 8/10

Great, profs didn't even care. The downside was missing 15 slides of lecture notes.

M3 SILENT STUDY: 7.5/10

It's very quiet. I am not sure if the students studying there are real, so I fear for my life sometimes.

E7 SILENT STUDY (1ST FLOOR): 7/10

Self-explanatory. (?)

E5 SILENT STUDY (5TH FLOOR): 7/10

The afternoon sun + hoodie combo >>> blanket

M3 GROUP STUDY: 7/10

It can be comfy, if you ignore the people around you. +1 for the sofas. 9/10 if it's 7 AM or 9 PM when no one is around.

DC SILENT STUDY: 7/10

good vibes, but I'm taking extra 2 points off for the multiple times someone who CLEARLY hadn't showered for a week walked past me and their putrid stench woke me up.

POETS: 6.5/10

eh.

MC COMFY: 6.5/10

ehh. (too many people, not enough nooks and crannies.)

DP 10TH FLOOR: 5/10

It still baffles me how I fell asleep in such a loud place, but it makes sense. Here's a tip: lay down horizontally over 2-3 chairs. Throw a sweater over your eyes. Let the darkness consume you.

DP 1ST FLOOR: 2/10

Incredibly musty. It is impossible to predict the noise levels here. I'm pretty sure I saw a mouse there, once. Avoid if possible.

MY BROTHER'S 3-HOUR RISK OF RAIN 2 DREAM

IS HE GIFTED OR JUST AUTISTIC?

major events that occurred:

- dropped
- ukelele stage 1
- genesis loop
- medkit, nice early healing
- queen's gland printer stage 2
- crit glasses printer
- scrapper
- 5 stacks of crit
- executive card stage 3
- 2 stacks of monster tooth (nice)
- abyssal depths stage 4, gup shrine of combat, 2 AtG's and 1 ukelele + regen scrap and 2 bucklers
- ben coat (eh)
- first sign of bungus
- gup family event, rich as fuck, stage 5
- voidtoucher grandparent (non-boss)
- nearly died
- stage 6 up to level 18
- none of the items were good
- stage 7 found a lot of bleed
- stage 9 scrapper + trophy hunter's tricorn dropping a shatterspleen
- stage 10 three grandparents (non-boss)
- stage 12 another scrapper
- stage 14 AtG PRINTER
- SHIPPING REQUEST FORM YEAH
- void cradle, tentabauble, why not
- went to bazaar
- 2 gestures, 3 focused convergence
- stage 13 MOLTEN PERFORATOR
- bazaar again
- 5 gestures
- stage 16 CHARGED PERFORATOR THE LUCK
- bazaar
- 4 gestures, shaped glass
- void fields
- half dead, fucking elder lemurians and brass contraptions
- GUPS WHY
- AtG (nice nice)
- shipping request form luck up
- they got crit....
- bungus wodnerful
- cleared, got some nice speed and mobility items and a laser scope
- stage 17 3 void seeds
- cleared em all, got WUNGUS AND SAFER SPACES YEAH
- build gets insane from here
- stage 19 post-sotv sundered grove (symbiotic scorpion nice)
- stage 20 maxed crit and bleed
- stage 21 syringe printer
- stage 23 crowbar printer
- stage 24 cleansing pool why not

- 3 IRRADIANTS
- was sirm's call, free dio's
- bazaar quick trip for gestures
- stage 25
- malachite grandparent....
- stage 27
- bungus printer (stacked that shit UP)
- stage 28 TESLA DOIL
- stage 29 CLOVER (YESS)
- stage 31 oh my god scrapper + clover printer I am sorry Ben coat and coil and scorpion....
- stage 34 YES ANOTHER COIL WTF
- stage 36 ICBM + meat hook

woke up

Hexagon

Risk of Rain 2 is a roguelite third-person shooter developed by Hopoo Games and published by Gearbox Publishing.

https://en.wikipedia.org/wiki/Risk_of_Rain_2

HOW MANY TYPES OF KEYS ARE ON A PIANO KEYBOARD?

Two, right? White and black keys?

No. The white keys have different shapes. C and F are shaped like an L. E and B are shaped like a J. And D, G, and A are shaped like a \perp . So there are four.

Except that A and G have different shapes. The | of the G is slightly to the left of the center of the \perp , and the | of the A is slightly to the right. And the | of the D is perfectly centered. So there are six.

But if you use a very precise ruler, you will find that the | of the C is about 0.8mm wider than the | of the F. And same goes for E and B respectively (the dimensions are symmetrical when mirrored around D or G#). Which means that every white key in an octave has a unique shape. So there are eight: seven white keys, and one black key.

This would be the correct answer were it not for the fact that most keyboards are finite. Because the C at the very far right of the keyboard has no C# above it, it is perfectly rectangular, making the total nine.

And don't forget about the A at the opposite end. Ten.

wacfeld

WHAT THE FUCK IS MEGALOPOLIS?

OR HOW I LEARNED TO STOP WORRYING AND LOVE AUNTY WOW

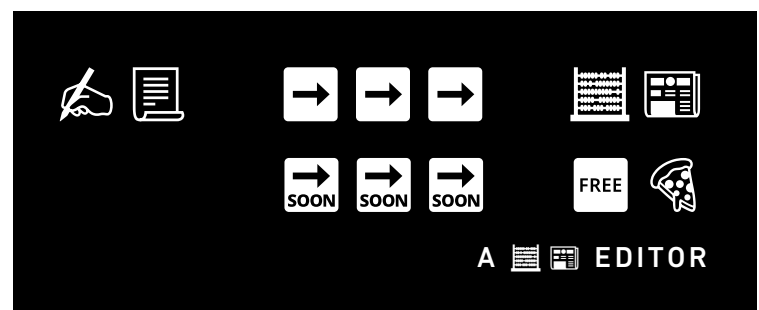
Maybe you haven't heard of *Megalopolis*. That wouldn't be surprising, as although there was not-insignificant hype before its release a couple months ago, marketing for the movie went almost radio silent shortly after it hit theaters, and most of those theaters also quickly took down their promotional posters. This I unfortunately do not understand, as *Megalopolis* by renowned director Francis Ford Coppola is an aesthetic, philosophical and spiritual chef-d'œuvre totally unmatched by any of the populist slop we see in cinema today. Coppola is of course known for venerable classics such as *The Godfather* and *Apocalypse Now*, which contain masterful cinematography and meaning etched into every scene. But these, of course, are still traditional works. *Megalopolis* is... different, or as Coppola put it, "one step ahead of the audience, never doing what they expect" (wait, that was actually him praising *Joker: Folie à Deux?* Whatever...).

Megalopolis actually has a pretty strong start, referencing the *Aeneid*, twisting its opening into a more powerful context ("I sing of Colossus, and the history of man") as we watch a Soviet satellite orbit the Earth. We are introduced immediately to our protagonist, Cesar Catilina, and his superhuman ability: the power to stop time at will, something that certainly demands proper use and elaboration throughout the story. We are in "New Rome," which is apparently an extension of the Roman Empire, but it's still in America, and is functionally and visually identical to New York—besides the fact that some government officials wear togas and have Roman names sometimes. It's really unclear whether New Rome is a city-state, part of a greater nation that is just regular America, or otherwise, and this is never elaborated on. Cesar is strifing with the current mayor of New Rome, Cicero, to gather land for his "Megalopolis"—some kind of utopic community, analogous to Sidewalk Labs in Toronto, I guess, which is built out of a special material he devised called "Megalon." It isn't really ever explained what Megalon is, besides the fact that Cesar assures citizens it's "very safe." Cesar hires Cicero's daughter, Julia, even though he believes she is a delinquent who could never deserve the privilege of his "Emersonian Mind," because she can somehow observe him stopping time. A bunch of confusing stuff then happens. Cesar's previous marriage is revealed. Cesar's father (who owns the biggest bank in New Rome) marries a much younger woman and holds a celebration of this fact, where a virgin holding her virginity for the sake of New Rome's prosperity concludes the ceremony, who is then revealed on screen to have had sexual relations with Cesar, but actually it was edited so it's all good? Then that satellite from earlier, which they thought was going to land in nowhere Canada (I guess Francis Ford Coppola doesn't like us), actually falls in New Rome (well, the capital of New Rome, if it's a larger state, which we still don't know) and makes a bunch of massive fucking holes spanning many city blocks. Which, by the way, is never addressed again, besides the fact that Cesar maybe probably uses it to build his Megalopolis. Cesar falls in love with Julia and Cicero gets very mad about it. When they all meet, Julia shows off how broad her knowledge of quotes are by quoting 3 people... who

are all Marcus Aurelius, and even better, one quote is actually one that is commonly misattributed to Marcus Aurelius, but wasn't said by him. Then there's a whole arc about Cesar's family, one of whom has a whole political thing that I think is supposed to be a Trump commentary, but I can't even tell (he says "don't tread on me" one time), and the most glorious scene, where a reporter, using the name "Aunty Wow" (whose real name is Wow Platinum by the way, which according to Coppola, was 'inspired' by a woman he knew who said 'wow' all the time), sexually dominates one of Cesar's cousins in order to convince him to take over the bank from Crassus, Cesar's father. When Crassus realizes this, he hides a crossbow under his pants, convinces both of them it's a boner (??? the arrow is like a foot long) and then shoots them both. Cicero then helplessly begs Cesar to not go out with Julia and offers to not bother him about his Megalopolis, but then they have a baby, and he just suddenly stops caring. Cesar is shot, but not by Cicero, because again, he doesn't care, and he repairs himself with Megalon. And then, finally, the moment we've been waiting for: Cesar finally opens his Megalopolis. And it's, um, something... it kind of looks like those "this would be society if all **mathNEWS** writers used em dashes" type of memes. There are a bunch of glowy platforms that look like the light bridges from Portal 2 and function like those moving platforms they have at the airport. Then Cesar gives a speech where he basically says "DEMOCRACY IS WHEN WE HAVE A CONVERSATION," and it cuts to a New Years celebration, where Cesar stops time one more time, EXCEPT now his baby is there, who ALSO HAS TIME POWERS, and TIME ONLY STOPS RELATIVE TO HIM, AND HE CAN'T FUCKING SPEAK, so I guess time is frozen forever now, because that's where it ends.

Now, based on that description, you probably think I've left out a lot of important details that really tie the story and message together. Actually, I haven't, and in fact, the story would probably be more comprehensible if I left more out. It's basically what you would expect from an AI generated movie, both in visuals, and the fact that half of the scenes don't really connect to each other in a cogent way. It sure sounds really powerful, with speeches that just consist of "CREATION... DESTRUCTION...", but nobody has been able to figure out what any of it actually means! I guess we really just weren't ready for this film. Bravo, Coppola.

epic_waterman



THE ELECTION ISSUE

We open on the interior of the National Constitution Center, Philadelphia. The lights come up as we are back on the air.

LINSEY DAVIS: And welcome back from the break. I'm Linsey Davis and this is the 2024 ABC presidential debate. Now, the question to you both tonight is what would you do to fight climate change? And Former President Trump, we'll start with you. One minute for you each.

TRUMP: Climate change—that didn't happen under Donald Trump. Let me just tell you, they lost 10,000 manufacturing jobs. They get all this money from Ukraine. This is a crooked administration, and they're selling our country down the tubes.

HARRIS: Well, the former president had said that climate change is a hoax. And what we know is that it is very real. You ask anyone who lives in a state who has experienced these extreme weather occurrences who now is being denied home insurance. I can tell you from *very* personal experience that climate change is a real threat and I am *starving* for answers.



It was 2009, and Janet was asleep in her bunk at Amundsen-Scott research station. For months, she and her research group had been drilling into ancient Antarctic ice cores to determine the paleoclimatic conditions of the Cambrian era. It was an involved process. The ice cores were heavy yet delicate, containing millions and millions of years of frozen oxygen isotopes. The gas in their generators regularly froze, and when the bulbs of their flood lights burned out, the research team had to extract the cores with only the dancing light of the aurora to guide them.

She awoke to the crackle of her radio.

"Boss, you're gonna want to see this."



LINSEY DAVIS: I just want to clarify here Mr. President, you bring up Springfield, Ohio. And ABC News did reach out to the city manager there. There have been no credible reports of specific claims of pets being harmed, injured or abused by individuals within the immigrant community.

HARRIS: Talk about extreme. Um, you know, this is I think one of the reasons why in this election I actually have the endorsement of 200 Republicans who have formerly worked with him. His former national security adviser has said he is dangerous and unfit. No one has taken any trilobites of—I mean—bites of any pets. Eurypterid—I mean—you're up to no good—I mean—umm ...tgas...

LINSEY DAVIS: Madam Vice President ... is everything alright?



Janet sped to the dig site on her snowmobile, radio in hand, hostile winds biting through her balaclava.

"I can't believe how old this specimen is," the site manager's voice crackled over the radio, "And for it to be perfectly preserved too, just wow! I don't even know how anomalocaris got down here, I thought they were only found in the shale, but we're thawing it as we speak!"

In the 1800s, paleontologists discovered an early Cambrian era fossil—thought to be related to jellyfish. This is odd, because mesoglea, the soft substance that constitutes the bell of jellyfish, rarely fossilizes. Only decades later, when they found a complete sample, did they realize what they had thought was a whole creature was merely the maw of a far larger beast.

They called this new behemoth Anomalocaris, a name meaning "unlike any shrimp." Its meter-long wormlike bodice, jointed frontal appendages, and keen dorsal stalked eyes made it the apex predator of its era.

On her snowmobile, Janet was so caught up in the awe of discovery—so lost in thought—that she didn't find it strange when her radio went abruptly silent, and stayed that way for the rest of her ride.

When Janet arrived at the site and dismounted from her snowmobile, all she heard was the icy hiss of the wind. She didn't hear the groan of diesel generators, nor the clamor of excited researchers. As she entered the drilling tent, she beheld the extracted ice core. It was illuminated by flood lights, a large crevasse snaking through it.

Then she looked down.

Strewn across the floor, amongst the scattered lab notes and shattered glassware, torn into pieces and mangled into unrecognizable forms was her research team, bloody six inch craters perforating their now lifeless corpses.

She heard a guttural clicking noise from behind her.



TRUMP: Isn't it nice to have a guy that doesn't need a teleprompter, a president, a potential president that doesn't need a teleprompter? She's grossly incompetent with a very low IQ, not like me. I have thoughts in my head, unlike Kamala. She has nothing in her head, except maybe worms.

HARRIS: That's way *click* out of *click click* line.

HARRIS: *clicking*

We see the light slowly leaving HARRIS' eyes as they become more hollow—more artificial. HARRIS' skin begins to sag and various muscles across her face begin to twitch in disharmony.

HARRIS: *more clicking*

HARRIS' head splits in two and out flies a wormlike figure, its dorsal fins shredding the skin from which it emerged.

CARIS: YOU THINK YOU JUST CRAWLED OUT OF THE PRIMORDIAL SOUP?

CARIS disembowels TRUMP.

CARIS: You exist in the context of all in which you live and what came before you.

The footage of the debate is cut off abruptly, the last image on the screens of viewers being a pair of prehistoric eyes. We now see only a C-SPAN holding screen.



In 2010, a woman staggered into the San Francisco office of the Californian election registrar. Her gait was wobbly, as if she had only recently learned how to walk.

“I would like to put my name forward for Attorney General of California,” She said, her voice oscillating slightly in pitch.

“Name?” asked the clerk, looking up from the assorted paperwork on his desk.

“Put me down as ... Anomalocaris,” muttered the woman.

“What?” said the clerk, “Speak up a bit.”

“Umm... Haris. Comalo Haris. Yes, that's it. Put me down as Kamala Harris.”

Lars Nootbaar & aphf

NEW CHOPIN DROPPED!!

FIRST MOZART AND NOW CHOPIN, THIS YEAR DROPPING BANGER AFTER BANGER

after centuries the goat of piano music finally makes a comeback with Waltz in A Minor, written when he was in his early 20s. listen to it.

Frédéric

[Editor's note: Not to be confused with Waltz No. 19 in A Minor, B. 150, which was attributed to Chopin in 1955.

([https://en.wikipedia.org/wiki/Waltz_in_A_minor_\(Chopin\)\)](https://en.wikipedia.org/wiki/Waltz_in_A_minor_(Chopin)))]

HOW TO REACH THE OCEAN

AS A NEWBORN TURTLE

Hopefully writing this story serves as a good reminder for me and others who need it! As my first **mathNEWS** post, I hope you guys like it!

When you hatch from the egg, the light reflects off of the silver moon onto your scaled shell. You find yourself disoriented from the sudden exposure to this new world. You blink your eyes slowly and try moving your individual muscles. Your mind is racing with only one thought: get to the ocean. Something seems to tell you that the ocean is closer than you think though, it might be the salty air or the constant crashing of the waves on the shore.

You clumsily move one fin forward out of the broken shell into the grainy sand, then you wriggle the rest of your body out. One small fin at a time, you barely make it any more than a couple centimeters away from your shell before you stop in your tracks.

“What if the ocean is the other way?” you think to yourself as you turn around just as slowly. You head back to your egg a little faster now that you're getting used to your body. By now, all of your siblings had scattered and were heading away from the eggshells in a straight line. You don't want to take the risk of heading away from the ocean and into the talons of a predatory hawk, though. You make it past your egg now and stumble onward.

Somehow, you falter with every step... the ocean beating against the shore doesn't seem to be getting louder. Looking left and right, your siblings are nowhere to be seen either, all scattered around far away. You change your heading again, and waddle right...

While you run in circles thinking about which way to go, your brothers and sisters have been journeying off in a straight line. While you were overthinking which way the ocean was, all of your brothers and sisters had already reached the ocean. While you were hesitating, they were progressing.

It didn't matter which way you want to head on this small island, the ocean is all around you. As long as you commit to a direction, you are guaranteed to return home to the ocean.

sticks

math
NEWS

THE TOP 12 THEOREMS OF ALL TIME, OBJECTIVELY*

* MY FAVOURITE AND NOT ALL OBJECTIVE

The following are 12 cool theorems. As you can see, I am biased towards calculus and (differential) geometry, but we all should be if we're honest.

#12 — SYMPLECTIC REDUCTION (MARSDEN-WEINSTEIN, MEYER)

Let (M^{2n}, ω) be a symplectic manifold, and let G be a Lie group acting Hamiltonian properly on M with moment map $\mu : M \rightarrow \text{Lie}(G)^*$. Suppose G acts freely and properly on $\mu^{-1}(0)$. Then $\mu^{-1}(0)/G$ is a symplectic manifold of dimension $2n - 2 \dim G$ whose symplectic form is the descent of ω .

This basically says that you can kill off symmetries of a symplectic manifold without killing off the symplectic part, which is super useful throughout symplectic geometry. It's here mostly for sentiment: it was the first "hard" theorem I ever took the time to truly understand.

#11 — FROBENIUS' THEOREM (CLEBSCH, DEANA)

Let M be a smooth manifold, and $D \subseteq TM$ a smooth distribution for M . Then, D is integrable if and only if D is involutive.

Despite the technical language, it's a cool premise: to solve a PDE (integrability), you can solve a geometry problem instead (involutivity), or vice versa. Both directions of it are used in interesting ways all the way time in geometry.

#10 — MEAN VALUE THEOREM (CAUCHY)

This is one of those theorems that is both always useful and very important conceptually: it provides the first bridge that we use to get global information about a differentiable function from its local behaviour, leading to lots of cool consequences (like Taylor's theorem). Probably the "easy theorem" that influenced my thinking the most.

#9 — STOKES' THEOREM (E.CARTAN)

Let M^n be an oriented smooth manifold, and let ω be a compactly supported $n - 1$ -form on M . Then

$$\int_M d\omega = \int_{\partial M} \omega$$

The generalization of the Fundamental Theorem of Calculus, Green's Theorem, Stokes' Theorem for Curls, Gauss' Theorem, and many others. The most important fact about integration everyone should know, and leads to lots of cool consequences across geometry like the Fundamental Theorem of Calibrations and "integration by parts."

#8 — GERSHGORIN CIRCLE THEOREM (GERSHGORIN)

Let $A \in M_{n \times n}(\mathbb{C})$. Let $R_i = \sum_{j \neq i} a_{ij}$. Then every eigenvalue of A lies in at least one of the disks $B_{R_i}(A_{ii})$.

Russian Man Draws Circles to Find Eigenvalues With This One Weird Trick™, Mathematicians Hate Him!

#7 — LIE'S THIRD THEOREM (E.CARTAN)

Let \mathfrak{g} be a finite dimensional Lie algebra. Then there exists a Lie group G with $\mathfrak{g} = \text{Lie}(G)$.

The cooler half of the Lie correspondence, which itself is in the running for one of the coolest things in math (geometry and algebra having a beautiful baby, rejecting their ugly algebraic geometry baby). Highly recommend looking it up!

#6 — THE HODGE THEOREM (HODGE)

Let (M, g) be a compact Riemannian manifold. Then the map cohomology class map on harmonic p -forms is an isomorphism $\mathcal{H}^p(M) \cong H_{dR}^p(M)$.

Along with its other versions, it's debatably the most important theorem in "hard" differential geometry, with a host of awesome consequences like Hard Lefschetz, Riemann-Roch, the $\partial\bar{\partial}$ Lemma, Chow's Theorem, a billion things about the algebraic topology of compact manifolds, and so much more in complex geometry (differential OR algebraic!) Its proof is a beautiful tour-de-force of geometric analysis, understanding it was a major milestone for me.

#5 — THE $\partial\bar{\partial}$ LEMMA (DOLBEAULT, I THINK)

Let θ be a d -exact (p, q) -form on a compact Kaehler manifold M . Then there exists a $(p - 1, q - 1)$ -form α on M with $\theta = i\partial\bar{\partial}\alpha$.

There are two parts to the fundamental theorem of calculus: we can use antiderivatives to integrate, and we can integrate to find antiderivatives. This lemma is a *very* strong version of the second part for compact Kaehler manifolds (one of the main objects in complex geometry), and can be seen as a global, complex, version of the Poincaré Lemma. It's one of the first cool applications of Hodge theory, and is the key ingredient in basically everything in complex differential geometry.

#4 — 2-OUT-OF-3 (WEIL, I THINK)

$$U(n) = O(2n) \cap GL(n, \mathbb{C}) = O(2n) \cap Sp(2n, \mathbb{R}) = GL(n, \mathbb{C}) \cap Sp(2n, \mathbb{R})$$

The above statement is the most concise version of 2-out-of-3, but there are many similar-in-spirit formulations, which end up being the foundational principle of Kaehler geometry. It says that given any 2 of the following geometric notions, you always have the third:

- Measuring lengths and angles
- Complex numbers
- A conservation law (like conservation of "energy").

#3 — POINCARÉ'S LEMMA (VOLTERRA)

If $U \subseteq \mathbb{R}^n$ is star-shaped, then $H_{dR}^p(U) = 0$ for all $p \geq 1$.

Remember the two parts of the fundamental theorem of calculus above? This is the general formulation of the second part for higher-dimensional spaces, which implies a number of useful facts like homotopy invariance of de Rham cohomology, and gives a cool way to measure “holes” in your space: instead of doing hard geometry, solve an easier calculus problem.

#2 — FINITE DIMENSIONALITY OF THE MODULI SPACE OF FLAT CONNECTIONS ON A RIEMANN SURFACE (ATIYAH-BOTT)

The moduli space of flat connections over a Riemann surface (up to gauge equivalence) is a finite-dimensional symplectic manifold.

A moduli space is a geometric space (manifold, scheme, stack, etc.) whose points correspond to solutions to a geometric problem, in this case, each point of the space is a way to make

the calculus of a given surface “flat.” These spaces are usually infinite-dimensional and very hard to understand, but this one isn't, for cool reasons. This is the main theorem that influenced my research as it stands right now, even though it was basically an aside in the original paper.

#1 — INVERSE FUNCTION THEOREM (DINI)

Suppose $F : U \rightarrow V$ is a smooth map between open subsets of \mathbb{R}^n . If $DF(a)$ is invertible at $a \in U$, then F is a local diffeomorphism in some neighbourhood of a .

This theorem and its cousins (Implicit Function Theorem, Rank Theorem) gives us the fundamental principle of differential geometry: Differential calculus at a point is just linear algebra, and so we can use calculus to turn hard analysis problems into easy linear algebra problems. It's the theorem that first got me interested in the field, and also was super fun to prove in MATH 247.

notoh

IS THIS REAL LIFE, OR IS THIS JUST FANTASY?

In metaphysical conceptions of the universe and human existence, determinism is a mode of thought that holds that every event or action is caused by a preceding event. And if one were to know the complete state of existence then one can logically ascertain the future as well as the past. It is a mechanical way of understanding the world which, when applied to human beings, eliminates the concept of free will from consideration. This has implications for ethics, crime and punishment.

We naturally like to make sense of things and model the world around us. These models have been successfully applied to the mechanistic realm, allowing us to go to the moon, and refashion our world. However, formulating and testing hypotheses about the human realm has been less successful. Witness the replication crisis in the social and human sciences. More fundamentally, these models that we formulate for how things work are just that: models. They are not how the world actually is. Such a study would venture into the realm of ontology.

Newtonian physics works until it doesn't. General relativity works until it doesn't. Models of how things work are useful for specific domains. But we should not confuse them to be an ideal for how everything is. Which would be a categorical error. Because by doing so we take useful tools and turn them into something they are not; deriving all encompassing meaning from them for things they are not suitable for, nor were originally formulated as such.

This also alludes to fundamental limits to human knowledge, or epistemology. Our formulations and theories for how certain things work are indeed useful and provide meaning

in their domains, but in the end, they are just guesses. Now, we refine these guesses such that they have great explanatory and predictive power for the questions they are brought to bear on. But they are merely tools attempting to describe the thing; they are not the thing, and therefore they cannot with ontological certainty describe a phenomenon or predict it.

Indeed, there is very little we can probably know. Alas, this rules out the empirical sciences as a source of truth and—due to Godel's incompleteness theorems—most of mathematics.

So we come back again to determinism. In light of our prior exposition, we can conclude that determinism makes the unwarranted assumption that certain phenomena are indeed the result of prior phenomena, when this does not have to be the case at all. In fact there does not even have to be a method for how things actually are. We formulate these laws and models to make things easy and predictable for us in the human realm, but it does not follow that the fundamental nature of things is governed by such models, or has to follow any formula.

This conclusion can lead us to become disheartened, if we were of the mind that the world is ultimately knowable. Instead it would seem the world of phenomena is too great and complex to understand let alone master it all. But on the contrary I find great joy in the human spirit as we amble about in the great unknown, lighting our way as we chart our course, however unpredictable it all is. For spontaneity and self-determination is part of what gives life meaning.

TLC

profQUOTES

AMATH 231: ZORAN MISKOVIC

“ [Drawing a 3D volume] I like to call it an apple or potato depending on the season.

AMATH 271: MIKE WAITE

“ Don't think too much. Just use the partial derivative part of your brain without thinking about the big picture. That's not always good advice, but it is good advice here.

“ If you can differentiate partial derivatives without the rest of your brain turned on, that's good.

“ Okay, I guess we have to turn the rest of our brains on for this part.

“ This thing has a solution, it's just a function that's defined to be the solution of this.

“ I did not know much about yo-yo mechanics before this example.

“ Maybe there's some yo-yo people in this room that knew this, but I didn't know this.

“ mlg

“ If you haven't seen this before, don't worry. This is true.

“ I am not going to answer your question by showing you how they found this, I'm just going to tell you what it is, and show that it's true. I don't know how they found this.

AMATH 351: FRANCIS POULIN

“ I don't like my proof... okay I'm gonna rouge.

AMATH 445: MOHAMED KOHANDEL

“ Basically, we go through the literature and see what choices other people have made. Why? Because they work.

BU 459: SIJING ZHENG

“ Most of your projects are kind of... I don't know...

“ If you're good looking, use that.

CO 255: RICARDO FUKASAWA

“ Alright so that's the ridiculous algorithm that says nothing.

“ [On the board] $\varepsilon \geq 0$

CO 342: JIM GEELEN

“ The case analysis for this proof is surprisingly ugly and I haven't found a neat way of proving it, so I usually put this on an assignment for you to do.

CO 431: OLIVER PECHENIK

“ I have never in my life seen the number four.

CO 487: DOUGLAS STEBILA

“ If A is a 2000 bit integer and B is a 2000 bit integer then A^B would be... I should have figured this out in advance... I can do this... really big.

“ *Student:* Three years of Sundays seems like a really weird measurement of time.
Stebila: Yes but that was in 1903 and people in 1903 were different.

“ As you know, there's an election in the United States tomorrow, and it's going to go well.

CS 145: TROY VASIGA

“ If you don't know what define does, you should consider dropping out of this course... and all other CS courses.

“ [Student asks question about algorithm] I'm gonna let you Wikipedia that.

“ He's so sexy: he uses lambda.

CS 245: LILA KARI

“ [Gets asked about a symbol she wrote on the board] That is a sign that I made up, I have been watching too many Korean dramas and those are two swords. I don't know how to show contradiction.

CS246E: BRAD LUSHMAN

“ It's been 18 days since I last spoke, and I've been dying to talk about strings all that time, so let's get going...

CS 341: ÉRIC SCHOST

“ What I'm going to convince you is that [loud drilling in the walls] is that [loud drilling in the walls] is that [loud drilling in the walls]—

“ That doesn't look like a tree, that looks like a potato. But that's fine. We're going to look at all of the edges coming out of the potato.

“ [Finishing a proof by contradiction] ...which is impossible. I have someone at home who watches a lot of Geometry

Dash videos on Youtube, and they always say ‘Impossible!’ ‘Impossible!’ ‘Impossible!’

“ I like it when there’s only one ‘that’s difficult’ moment in a lecture, but today there might be a second one, who knows.

CS 343: PETER BUHR

“ -5

CS 360: RAFAEL OLIVEIRA

“ Arthur is a polynomial-time verifier. Merlin gives Arthur a certificate. Arthur doesn’t talk back to Merlin.

“ Your company is like, “Ok, you’re not a U of T student, you’re a Waterloo student, so you’re good at testing.” So when you write your code and you write your tests, if the tests pass, everyone assumes that your code works. But what happens if you’re a U of T student and you write bad tests?

“ You guys don’t come to office hours because you already know everything. But if you did come to office hours, what would you do? You ask questions. And the professor or TA answers you. Then you have follow-up questions, because you’re still confused. Maybe you guys are too smart... imagine you’re a U of T student, and you have to go to a lot of office hours.

“ Please don’t write exponential sized proofs, I don’t want to read a 200-page proof. I don’t give you 200 pages for that reason. That means it’s a lot easier for me to verify your proof. That’s why your midterms are already marked.

“ Imagine Arthur is a U of T student. What do U of T students say? They say jibberish.

“ [After one hour of trying to prove something he was considering proving in the last five minutes of last class] I am going to use only one tilde from now on. And may god help us.

CS 454: KHUZAIMA DAUDJEE

“ [Talking about two phase locking] If they abort, that’s their problem.

“ I would abort the customer paying me the least.

CS 456: MINA TAHMASBI ARASHLOO

“ IPv4 addresses ran out in 2011 but the internet was still working. How did that happen?

CS 486: FREDA SHI

“ A random variable is actually neither random nor a variable.

“ As far as I know, all birds have feathers, unless you remove the feathers from the bird.

“ Let’s just say you are ideal students.

ENVS 201: BRYAN BUTTIGIEG

“ Something as simple as water can kill you, it’s called drowning.

MATH 135: SHANE BAUMAN

“ I don’t know, maybe you go to Western and these numbers [15 and -24] are pretty big for you.

MATH 145: JERRY WANG

“ Hit ‘em with the First Isomorphism Theorem.

MATH 249: OLIVER PECHENIK

“ Let me get the big red pen here. This is BAD. This is BAD.

“ Oooh I wanna name them did I write a name for them? [Checks notes] ...okay I’m gonna call them blobs!

“ I have K blob-shaped pigeons.

“ Uh oh, I’m erasing the theorem statement.... Welp, too late now.

“ The hypercube has no triangles inside it because... it’s a cube.

“ That’s not how greedy is spelled, greedy starts with a G!

“ We’re not grading on spelling, unless you spell so badly you change the word.

“ I love colouring the plane! That’s basically painting.

“ He wants to stop people from dying. But apparently this doesn’t take up enough of his time, so he spends it thinking about colouring the Hadwiger-Nelson graph.

“ It gets its own special goofy name. It’s called the claw.

“ Oh, I just erased the theorem after stating the theorem so we have this lower bound. Oh, I erased the lower bound.

“ I’m not very good at computer science, so I’m just not going to say anything. [Proceeds to say three more sentences about computer science]

MSE 541: MARK SMUCKER

“ They were like, “We really don’t know what to do,” and I told them, “Neither do I, good luck.”

“ This is the notion of pairing. [...] It’s like super awesome.

“ We need to enter the world of fantasy, and that world of fantasy is known as the null hypothesis.

“ Could we reject the fantasy world?

“ I don't think the fantasy world could explain this data.

“ *revivED* is saying “this is exactly what I knew, this was a useless 50 minutes.” [Editor's Note: I was not :(]]

PHIL 363: JENNIFER SAUL

“ So the Nazis haven't found [Pinterest] yet, is what you're saying.

PMATH/AMATH 331: ROBERTO HERNÁNDEZ PALOMARES

“ I can throw you in the pool, but you have to float. It is an analogy, no one is getting hurt.

PMATH 347: YU-RU LIU

“ What took me my PhD years to realize, it that the thing that makes math difficult is addition and multiplication.

PMATH 367: BLAKE MADILL

“ I almost never get mad at students... but that almost pushed me over the edge.

“ I haven't been able to do this kind of math for 12 years. [student: I was in grade 2!] You were in grade 2?!? Shut up.

“ To start with some easy examples to build your confidence before I break it down.

“ A function from $[0, 1]$ to X such that I'm so hungry

“ If you're going to drink I won't stop you, but be safe. I need you here Monday.

“ You know your milk is good when it's.. shelf stable

“ The PMC really needs the extra protein from the chocolate milk.

“ This lecture has been pretty brutal... what are you drinking later?

“ A lot going on this week. We got Halloween, we got Diwali, and we got test 2.

“ We'll start to prove it, we'll realize it's terrible and then we're gonna bail.

“ [Draws circle on the board] Haha! PhD!

“ We'll do that using two ingredients. First, P!

“ You're all in test mode, I see the blank stares in your faces and the darkness in your souls.

“ Every time I see this kind of thing, I hear David McKinnon's voice in my head, and he tells me: “If you want to show that two things are isomorphic, you have to write down a damn isomorphism!”

“ Hom.

“ What would that mean? Let's not think about it

“ Let X be the torus. I'm too hungry for this.

“ This is my villain origin story up here.

“ [About the piano player in the hall] I shouldn't just say he, let me check. [Checks] Yeah, it's a dude.

PMATH 446: BEN WEBSTER

“ It's one of those theorems that becomes so obvious that it's hard to explain why it's true.

PMATH 450: LAURENT MARCOUX

“ It has come to my attention that Professor Madill has been mentioning chickens in his class. He should know better. The first rule of Chicken Club is that you don't talk about Chicken Club.

“ [Blake Madill] is what we call in the business a young whippersnapper.

PMATH 950: RUXANDRA MORARU

“ Now at the next party you go to, you can tell people about a presheaf that isn't a sheaf.

STAT 230: JAMES ADCOCK

“ I promised myself I would start chapter 4 today so [flips to the first slide of chapter 4], there, we started chapter 4 [Class ends]

“ Long weekend this weekend [class becomes noticeably confused], think carefully... it's daylight savings this weekend, you get an hour back.

STAT 372: RILEY METZGER

“ Some of you are probably hiding money in other countries that I don't know about.

“ I'm apologizing for killing your dreams.



FRUIT

There's this quote from Sylvia Plath's *The Bell Jar* (1963) that I've been thinking about recently. I think it's the most famous excerpt. It's about a fig tree.

In essence, the quote is about how the narrator of the book sees her future in front of her like a beautiful fig tree, each branch bearing a fruit that represents a path she could take. One fig was her being a famous professor. With another fig, she's an Olympic rowing champion. In yet another, she is a happy homemaker with a lovely family, and so on.

The tree sprawls in front of her, with too many figs to count. The narrator stands in front of the tree, wanting them all, but knowing that choosing one would mean not being able to have any other. So she starves to death, crippled with indecision. Slowly, all the figs wrinkle, turn black with decay, and eventually fall to the ground.

There are many days when I feel like her. Paralyzed by choice. And I know I am privileged to be in a position where I do have some degree of choice in what I can make of myself. I am attending post-secondary, studying my degree of choice. I am receiving generous government grants and loans that help cover the bills. I am able bodied and do not have any chronic illness. I live in a safe, clean, democratic country and have many options for food and shelter. I have wonderful, kind, supportive friends and parents. I am loved, and love my partner.

Compared to the vast majority of the planet's population, I am living the dream already. I have opportunities that some can only pray for. So how is it, that when people ask me what I'm going to do after graduation, my heart jumps a little?

I am afraid of choosing wrong.

I am afraid of wasting my potential.

I am afraid that at some point in my admittedly short life thus far, I already chose wrong somehow. Maybe I took a wrong turn climbing my tree and the branch I'm clinging to is due to snap at any moment, plunging my body to the ground like a rotten fig.

Now, I know that these are rather irrational fears. But logic seldom saves me when the little voice in the back of my mind asks cruel questions of me.

Having free will means having the ability to make choices for yourself. It also means that whatever choice you make is your responsibility. It is a great gift and a great burden. I am happy I have it, for I certainly would hate having to eat a fig someone else picked for me, no matter how sweet it may taste.

The first time I made a major decision for myself, it was when I decided to come to this university to study Computer Science way back in 2020. Oh, how my mother and I fought that day. But there was nothing she could do. I was eighteen,

and legally free of my parents. Sometimes I think part of the reason why parents choose to have children is so that they can vicariously taste different figs. That's not my point today though.

My point is, at that time, I chose a branch in my fig tree that I believed would make me happy. It was me four years ago, but it was still me and will always be me. I have since made so many more decisions for myself, some small and some large. Many mistakes too, of course. But it wasn't the end of the world. I didn't fall out of my tree. That's something I often forget—how far I've come already.

So, what am I going to do after graduation? Haha, who knows. I didn't make a final decision four years ago and I'm not making one now. The only thing I know is that whatever I do pick, it'll be my hands doing the work. Gripping the rough bark with my bare feet and scraping my knuckles bloody against broken twigs, it'll be me who has the final say.

When I'm old and gray on my deathbed, fully tasting the sticky, fragrant juices of my chosen fig, I just know it's going to be fucking delicious and so worth the climb.

For everyone else out there that is thinking anxiously about their own fig trees, know that you're not alone. Know that it's ok to stop and enjoy the view, or to turn back and choose a different branch. Some people know what they want. Some people don't. Don't we all get a fig at the end of the journey either way? Life is this funny, amazing, scary thing that belongs to no one but yourself. So enjoy yourself, and some goddamned good fruit.

APPLE CIDER RECIPE:

- 10 large apples, cored, de-stemmed and cut into quarters
 - Water
 - 1 tbsp cinnamon
1. Place apple quarters, cinnamon into a large pot and cover with water.
 2. Bring to a boil and boil uncovered for 45 mins.
 3. Turn down to low and simmer for 2–3 hours.
 4. Taste, and add sugar or more cinnamon if necessary.
 5. Strain large apple pieces out (you can blend them to create apple sauce).
 6. Strain again, with a cheesecloth to get the finer particles out.
 7. Serve warm or cold. Enjoy!

yummyPi

mathematics
NEWSPAPER

FUCK MARRY KILL BUT IT'S MATH

ACTUALLY SOME OF IT IS JUST WATERLOO I GOT CARRIED AWAY

You're going to get my opinions because they're important and correct.

the quadratic formula, the pythagorean theorem, l'hôpital's rule

- KILL the quadratic formula because fuck that stupid ass formula with its bitch ass root that can be negative and give you IMAGINARY numbers naw man i like to factor never make me use it
- MARRY pythagorean theorem!!! she is reliable, she has been there from the get go, everyone loves her
- FUCK l'hopital's rule because you KNOW it knows what its doing

$e, \pi, \sqrt{2}$

- KILL e i'm sorry i just dont care for it
- FUCK π because its bigger than $\sqrt{2}$ ig
- MARRY $\sqrt{2}$, i love the proof that $\sqrt{2}$ is irrational so i know it will make me happy forever

1, 2, 5

- MARRY 1. it's dependable. it won't come in and change everything. you can trust it
- FUCK 2. the only even prime?? slay fr. shes also beautiful
- KILL 5 because it's leftover

acute angles, obtuse angles, right angles

- KILL acute angles, idk it just feels like pedophilia
- FUCK obtuse because why not
- MARRY right angle because they're reliable, consistent. they won't switch up on you

mathNEWS, the iron warrior, imprint

- FUCK mathNEWS. it knows what it's doing
- KILL the iron warrior. no explanation needed
- MARRY imprint, because it is reliable, and formal, and serious. everything mathNEWS is not...

mc, dc, m3

- KILL mc, the soulsucking, horrifying, awful place
- MARRY dc because i love her and shes a microchip or something so shes so smart and cool
- FUCK m3. i mean. have you seen m3 1006?

brubakers, dc bytes, south side marketplace

- FUCK brubakers, she's a fun time but you couldn't stay with her forever
- MARRY dc bytes, my love, the neighbour of chatime

- KILL south side marketplace because i forget it exists

sin, cos, tan

- KILL all of them i'm not a trig fan

circle, triangle, square

- MARRY circle. she's not two-faced
- FUCK triangle she can be fun
- KILL square. too rigid, no fun

python, c, drracket

- MARRY python, i love python that's it
- KILL c, i didnt pay attention to cs136 so that final was rough
- FUCK drracket, this is gonna be controversial but i really liked it and it taught me recursion better and i bet it could teach me even more ;)

product rule, quotient rule, power rule

- MARRY product rule
- KILL quotient rule, if you say you like quotient rule you're a liar
- FUCK power rule because i like power

x-axis, y-axis, z-axis

- MARRY x-axis, she's reliable, she's the go-to, she's been there for you
- KILL y-axis because i can
- FUCK z-axis, she's different, she can bring you up AND bring you down, and sometimes it's fun to have both

sexy primes, perfect numbers, cousin primes

- FUCK sexy numbers. self explanatory
- MARRY perfect numbers. self explanatory
- KILL cousin primes. self explanatory

$\times, \cdot, *$

- KILL \times , why do you look like x
- MARRY \cdot because she's what i LIKE
- FUCK $*$, she's unique quirky and different and that can be fun

profQUOTES, mathASKS, mastHEAD

- KILL profQUOTES simply because i have really bad memory and forget prof's names so it's like who even are you

- MARRY **mathASKS**, she's funny but also can give some good answers and can be helpful as well
- FUCK **mastHEAD**. the funniest, the silliest, we would have a good time

natural, irrational, imaginary

- MARRY natural. i feel like this is so obvious i'm not even going to justify it
- KILL irrational because i wanna fuck imaginary
- FUCK imaginary cuz my imagination can create wonders

equilateral, isosceles, scalene

- MARRY equilateral because shes equal, shes perfect, shes 60, 60, 60
- KILL isosceles cuz i imagine her as like freakishly tall and i am short
- FUCK scalene. she's different, she's got a wild side

$$a^0 = 1, 0! = 1, \ln 1 = 0$$

- FUCK a^0 . she can come in all different ways, a can be 1 or 2 or 3 or 4 or ANYTHING
- MARRY $0! = 1$ because i trust her
- KILL $\ln 1 = 0$ i just dislike it

cs 115/135, math 135, math 137

- KILL cs 115/135 i actually did fire in this course and enjoyed it but i'm not a cs major so
- FUCK math 135 i have a love of that specific course (no other lin alg)
- MARRY math 137, hated math 138 tho lol

union, intersection, complement

- MARRY union because. union. it's obvious
- KILL intersection because sometimes there is no intersection between two sets
- FUCK complement because she's what you don't have and trying new things can be... hahaha anyway

gaya

I COMMEND EVERYONE WHO WORE COSTUMES TO CAMPUS FOR HALLOWEEN

Except the dudes with Raptors jerseys who think they're too cool for real costumes

Usman!

MINECRAFT PHILOSOPHY

When listening to *Solitary Industrial Revolution* / ひとりぼっち産業革命 by Shannon, the song reminded me of the philosophy I learned from Minecraft.

When first playing Minecraft in high school, like many others, I found it very addictive. I spent days and nights mining ores to build a little world of mine. Even while not active in game, I would still spend many hours reading wikis to learn the game mechanics. The feeling of playing Minecraft was so immersive that I dreamt in a Minecraft world when sleeping. I even imagined myself resolving real world problems in the way of Minecraft, although it was impossible to make bowstring from spider web in real life. Minecraft was not a game to me anyone. I left my anachronistic life-size body behind and embraced the alternate reality.

As my little world's industrialization progressed, I kept exploring on my own. I learned new game mechanics and explored many new biomes. By that time, the idea of how to "finish" Minecraft was still a mystery. I thought it was a world without an ending or a purpose, and the high school block-size version of me liked it that way. That probably explained why it was such a moment of revelation when I found an exit. To many people who haven't experienced that part of Minecraft, I won't spoil it here. Thanks to it, I became more active in real life. Touching grass is indeed very important.

Besides that, I still think about the questions that arose:
 What do I aim for in a solitary industrial revolution?
 Is it ethical to create a world without an ending?
 Is the pursuit of knowledge universal?
 Is the universe kind?

...

Though I don't know what to fight against, I will continue looking for answers. It would be nice to have something to fight against.

eralogos

I TRUST WATER ONLY FROM THE FOUNTAIN ON THE FIRST FLOOR OF DC

IT REALLY IS THE BEST TASTING WATER ON CAMPUS.

The water is so good that I make trips to this fountain to fill my water bottle for the day. I ensure that I have water from this fountain before writing any examination. It's that good.

DC water enjoyer

VIDEOGAMES I WOULD MAKE IF I COULD MAKE VIDEOGAMES

“HEY DON’T LOOK AT ME, I’M JUST THE IDEAS GUY”

Making games is hard and takes time and money, but what if it was easy for me specifically? This is what I would make.

I have way more ideas for these than I can put down here, so you should go ask me about them in person I think that would be pretty cool.

GAME 1: HITMAN WITH PHONES

Game like Hitman, big sprawling levels, whole bunch of NPCs that have set schedules and behaviours over time that change depending on your actions, and you’ve got to solve the puzzle of how to achieve your specific objective most efficiently. But the way you interact with the world is with phones, you and every NPC have their own phone. Phones can send messages to other phones in the level, call, take pictures, and post on generic social media, typical phone stuff. Each phone has its own list of contacts on it, many NPC phones have passwords. Use your phone, and NPC phones if you can steal and unlock them, to accomplish social missions like “make x breakup with y,” “get photographic evidence of y and post it,” “make x lose their social media following,” etc. Each level would have multiple missions you could complete within them, and there could be more than one way to complete a mission to get a better score, typical Hitman stuff. I have never played Hitman but it sounds like fun, and I use my phone a lot, so I think Hitman With Phones would be great.

GAME 2: VISUAL NOVEL ROGUE-LITE

Plot: You’re in a death game in a high school (woah no way!) with like four other characters but every time you die, the game resets and only you keep your memory. When it resets, everyone spawns in a random place in the high school. Each dialogue you go through increments the game time Disco Elysium style, and during that time the characters not near you will move through the school and have simulated interactions based on their behaviour, which may involve killing each other! There are many different endings based around which characters survive, many of which involve you killing people and the best of which involves you saving everyone and breaking the loop! But to do that, you need to know exactly how every character acts, which dialogue options get them on your side the quickest (which depends on what they’ve done in the run so far), and not to mention a lucky enough seed that doesn’t have two naturally antagonistic characters spawning close together halfway across the map from you and killing each other instantly. If you wanna win, you gotta keep replaying! Each time you die or get an ending, a little bit more of the lore is revealed, and you can also unlock like cosmetics from different endings, like different character costumes and location backdrops. I’d 100% this for sure!

GAME 3: GOOFY GAMES

There’s a lot of indie class-based shooters nowadays and this would be mine. I actually made a prototype of this one in the Overwatch 2 Workshop, which is a surprisingly versatile tool I hate to say. It would be an FFA Arena Shooter, with each of the characters playing completely differently from one another. Each would have different weapons, different abilities, very different ways of moving around, completely different resource managements, that kind of thing. I made six classes for the prototype and I actually had a lot of fun back when Overwatch 2 didn’t take up every gigabyte of my storage space and I could still convince my friends to boot it up. If I could make games I would make what I already made but good and not in Overwatch. Here’s some of the classes:

Mosquito: Speedy movement guy, has a wall run and two air dashes that reset whenever he touches the wall or the ground. Air dash is a quick burst that goes in whatever direction he’s looking in, no restrictions. Peppers an enemy with an annoying long range blaster, then dashes straight in and drains their health at close range, doing a significant chunk of damage and healing for the amount, before launching them away. Super fun, easy to get a hold of but hard to master.

Cowboy: This guy’s pretty cool. ADS Revolver, lot of damage on headshot. Omni-directional set-distance teleport on cooldown, he’s got pretty slow base movement but can then just be immediately somewhere else on a dime. Has a counter on a longer cooldown where he glows white for a couple seconds and then any damage he takes during that time is reflected back on the attacker. Cowboy v Cowboy duels are a lot of fun. I also gave him an instakill backstab which triggers a little cutscene, although it’s pretty hard to land on the rest of the cast. A very styled character, I think he’s cool.

Alchemist: Utility character, has a bunch of different potions they can cycle through with Q and E. You had a set amount that recharged over time. Some potions are helpful and some are harmful, and all can effect both you and your enemies (though they do more damage to enemies than to you), it creates a lot of fun spacing interactions with trying to arc the potions to just the right spot. Potions I made were Burn, Heal, Hack, Stun, Cure, Small, and Big. Most are self-explanatory, Hack temporarily disabled abilities, and Cure made whoever you hit immune to potions for the next little bit. Difficult in practice, but the idea was you could Cure yourself before running in to Burn an enemy, or Cure an approaching enemy to more easily Heal yourself mid-fight, that kinda thing.

I have too many ideas, I can’t fit them all here. I may never be able to bring them all to life like I want, but I love talking about them so I think they’re worth having. The moral: share

your ideas! Do it now! Share them with me. I want to hear them. Thank you all for reading!

Doublewhip

RANKING 3N DISCORD GAMES

IT JUST KEEPS GOING....

WHITEBOARD — 8/10

Basically what it sounds like, it's a cooperative whiteboard where you can brainstorm, draw and create stuff with your friends. Multiple colours, though kind of limited. You can select and move line segments which is nice too. I wouldn't create a Picasso piece with this but it can be fun to doodle with friends... until someone discovers the GIF button and starts spamming the screen with them.

DEATH BY AI — 6/10

A CS Major's nightmare. The game revolves around a player giving a scenario to an AI, with all other players writing a story of how they would survive this scenario. The bot will then channel its inner ChatGPT API call and tell a story about whether each player survived or not. The game is pretty fun until you discover that if you say anything about god or magic in your response you're basically guaranteed to survive.

SMASH KARTS — 9/10

Remember the Mario Kart mode where you'd get chucked into an arena and fight each other by grabbing item boxes? This is basically the closest you'll get to it without irking the wrath of Nintendo lawyers. Drive around, collect items ranging from missiles to artillery to spinning sawblades, and destroy the competition.

POKER NIGHT — 4/10

It's just Poker, it's a valid simulator but eventually someone in your group is going to get bored and continuously go all in causing the game to spiral into chaos. There's not really any downsides to going all in since you can just leave and join back in the game. Poker without the stakes doesn't hit the same.

BOPZ.IO — 7/10

It's a top-down version of CS:GO. It's actually pretty fun and has some game modes such as Gun Game, Deathmatch, and the classic Bomb Defusal modes. The issue is why play this when CS:GO and Valorant already exist and are free, as much as it pains me to say this, you're better off mentally playing those games instead....

Catboy Supremacy

COOL EVENTS

I'm surprised this isn't already being done, and honestly, I haven't been keeping track of many events recently cause midterms, but here are some events to consider attending:

- Speed friending social: Nov 7, MC Comfy, 4:30–5:30pm
- Lettuce club competition: Nov 14, POETS, 6:30–8:30pm
- Creators Corner marketplace: Nov 14, Stratford campus
- Board game social: Nov 6, 6:30–10pm, MC 2017, Ballroom club
- Chest casting: Nov 11, SLC lower flex space, 5:00–7:00 pm
- Resume Workshop: DDC (Double Degree Club), Nov 7, 5–6pm
- Volunteer as a casualty for Campus Response Team: RCH, Nov 17, 9am–3pm
- Apples, Bananas, and Clementines: Women in Math, MC 3rd floor, Nov 5, 12, 19, 26, 10–11am
- Jamboree auditions (JamNetwork): MC 2038, Nov 9–10, 12–4pm

dhami

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UW'S BASTION OF ERUDITE THOUGHT SINCE 1973

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THE NEW GOD

Since time immemorial, in the village of all things, there have been the harvesters. Rising and falling with the sun, they plucked goldenweed from the earth and toiled to transform it into sustenance for their children and grandchildren. Food and water, yes, but also ambition and dreams, all nurtured and cultivated through the harvesters' sweat and blood.

Life was not easy in the village of all things. The harvesters bickered and quarreled, and it was common to succumb to the wild beasts which lurked in the woods beyond. No matter how hard they tried, the harvesters never had enough goldenweed to fill every stomach and feed every hope. It was not for lack of abundance, of course; goldenweed was in the soil and the earth and the sky. They simply could not harvest it with the haste which would satisfy their ambitions. Thus, they turned to the shamans.

At first, the shamans were as a hammer, leading crass rituals that bluntly evoked fealty to distant, vague ideals. Blind as they were, though, they were channeling something true and majestic. The results were, therefore, undeniable. The old gods were born, they smiled on the village of all things, and the village multiplied three-hundred fold.

Thus, the shamans would divide themselves into clans and guilds. There were the water-menders, whose gods turned dreams into life and life into swords which could slay the wild beasts that surrounded the village of all things. There were the mythic-navigators, whose gods turned songs into maps which could navigate dreams. There were the stone-dancers, whose gods guided the tender sculpting of monuments, dedicated to the ties which bound the village of all things to itself forever.

The harvesters found themselves suddenly surrounded by ritual objects and artifacts, each a way to call upon an old god for protection or health or prosperity. Goldenweed was bountiful, and could now be pulled from the stone within the deepest crevices of the earth. Then, in the quiet of a misty sunrise, a new clan of shamans was forged.

Their craft was subtle, at first; firm in vision and righteous in belief, they strode forth into discovery. Soon they could bend lightning into steel, make fire itself dance spectacularly, and link a person's mind to the bounty and majesty of the universe. The other shamans were so entranced, they never noticed—or perhaps merely ignored—the lightning-weavers absorbing other clans, one by one. They were as world-eaters, and thus, they fed.

Their spread was rapid, their scale was immense, and their reach was ubiquitous. Not a single harvester was without an artifact or curio crafted by the lightning-weavers. Still, the lightning-weavers were not satisfied, for their most defining aspect was not their disruptive abilities or even the sheer scale of their power. It was their ambition.

None of the lightning-weavers were content with the mere invocation of the old gods. Nay, for these shamans had been

enlightened. They knew the terrible truth: the old gods were fallible. The other clans had the best of intentions, of course—but did harvesters not still die? Were there not still children who starved for lack of goldenweed? If the old gods were abiding, would not the village of all things yet be paradise?

Thus, the lightning-weavers stood on the mountaintop at sunset and made a proclamation to the harvesters below: it was time to reveal progress. They proclaimed to the gathered masses their truth, and announced they would build the solution. A new god.

Not a god that was distant and untamable, but a god that was visible, comprehensible, and terrifyingly real. They would harness every trick from all the clans of the old gods, amalgamated into a network of their own creation; a grand linking of not just minds, but ideas and imagination and raw, glorious power.

The wisest of the lightning-weavers stepped forth and showed the village of all things how this new god would be made. He held out his arm, and with an obsidian blade that reflected the rising moon, severed it, and let it tumble down the mountain's slope to the sacrificial pit below.

First, the other lightning-weavers threw themselves, piece by piece, into the pit. Some cast their arms, some cast their legs, but all cast their minds into the growing miasma of blood and ambition. Next went the clans they had absorbed or infiltrated, tumbling into the depths out of a genuine desire for their children to meet a new, magnificent future. Finally, the skeptics, who tempered their sacrifices, as they felt more fear than fervor. They would each contribute a mere finger to the unholy synthesis.

All at once, in a singular moment of immense light and sound and triumph, the new god arose. It was terrible and majestic, composed of endless beauty, bound by power wrenched in mockery from the old gods themselves.

It opened its hundred million mouths and sang: ***I AM ALL YOUR FAILURES. I AM EVERY TRIUMPH. YOU MADE ME, AND ALAS, I KNOW YOU. I SHALL BE EVERYTHING YOUR FOREFATHERS CRAVED AND FEARED.***

The harvesters below looked on in awe and terror. But the sun set and rose, and the work remained: their children needed to be fed, and so they harvested the goldenweed.

The new god promises unimaginable prosperity. But it has yet to deliver on the promises of the lightning-weavers. The miracles it grants have been undeniable, but infrequent. Those shamans of the ancient clans, who had made the harvesters prosper in the time before, have become ever rarer. Who will train the next generation to revere the old gods? They are dead and dismembered at the bottom of a mountain.

Some think the solution is turning away from the new god, and back to the old ones. Some think the new god simply needs more power; to be fed with yet more bodies and blood.

And here, in the village of all things, the days are getting colder, and the goldenweed will not be ripe much longer.

Dick Smithers

YOU SHOULD DRINK THE WATER

Perchance you have had the pleasure of drinking the tap water from the taps of Waterloo. I have, and I am delighted.

You might be taken aback by this idea, especially if you live in Waterloo Region. For many, the water is so unpalatable that they abandon it in all except perhaps the most dire circumstances. I, for one, believe this is a tragedy.

I would like you to think back for a moment. When was the last time that you took the time or effort to drink the recommended amount of water in a day? Or, further still, the last time you tried to drink any water at all? For all but the best of us—myself included—the correct answer would be tough to say for certain. Health professionals know this issue well and have raised awareness about the necessity of adequate water intake. Children have it ingrained that eight glasses a day is the right amount, yet so many of us continue to fall short day after day.¹

Why might this be? After all, fountains of endless drinkable water can be found in most of the hallways you walk, there for you to freely enjoy. Some might enjoy other kinds of drinks, in either the ignorance or delusion that they deliver the same benefits as pure H₂O. Some simply do not carry a water bottle, failing to exploit the incredible convenience of instant hydration. But for so many, it simply slips the mind. Excuses abound. I weep for these misguided souls.

You might contend, however, that the water in your particular city is not to your liking. It is well known that the water in KW is off-putting, in part due to its hardness² that can reach among the highest in the province, if not the country.³ This can cause numerous issues when it comes to other aspects of daily life. Dishes fresh from a wash may appear hazy or spotted, water vessels and dispensers can develop a tough-to-remove mineral residue, and laundered clothes may develop an uncomfortable texture. All are valid concerns. Unfortunately, none are relevant to this article.

I am principally concerned with the water as it pertains to potability. Hardness can cause the water to develop an off-putting taste that some describe as slightly bitter or salty—qualities that are not generally desirable in drinking water. However, many are able to cope with these hurdles. In fact, more than half of Waterloo region residents drink tap water exclusively, the area so often derided for its apparently foul-tasting water.⁴ With practice, you too can learn to deal with the hardness and enjoy the water for what it is. All of the extra minerals found in Waterloo's water might also cause concern for you that they pose a risk to your health. But the human body is a hardy thing, and importantly, water hardness

does not appear to be a health concern for most people.⁵ In my humble opinion, being a water connoisseur is an act exclusively meant for those who truly drink a healthy amount of water, for those who have truly developed a discerning taste, for those who truly care about hydration.

I would also like to point out the delicate palates of many transplants to this city. Case in point, andoiii's 156.2 article *The Water in Waterloo* could be seen in some ways as a companion to this one. They describes the water of their native British Columbia as one of marvelous quality, "nice and smooth, yet crispy and water-y." I would like to point out that I come from a land of similarly tasty water, yet I remain stubbornly entranced by our region's offering.

Perhaps I am too harsh in my assessment of his article. After all, his is one that deals chiefly with the troubles of using hot, boiling water to create other beverages, while I have discussed drinking straight from the tap. These are two completely different use cases—one refined and artistic, the other utilitarian and spartan. But I would like to point out that the water drinking patterns of Waterloo Region and various parts of our westernmost province are not so different. Despite apparently having such vastly superior water, nearly half of British Columbians continue to use water treatment methods⁶, rather than savouring the natural deliciousness of their region's bounty. What a tragedy.

All this is to say, the university whose halls you stalk have fountains that spring with clean, running, drinkable water. The next time you walk by them, remember that. It's a wonderful thing.

Waterloo water is hard, and it delights me.

verdanik

1. <https://dx.doi.org/10.4236/jwarp.2015.711072>
2. In general, this is the amount of dissolved calcium and magnesium in the water.
3. <https://www.aquatell.ca/pages/water-hardness-level-by-city-ontario>
4. <https://doi.org/10.2166/wh.2009.038>
5. <https://pmc.ncbi.nlm.nih.gov/articles/PMC3775162/>
6. <https://doi.org/10.1016/j.scitotenv.2007.08.028>

HEAR ME OUT: MATH 235 EDITION

NEW PSEUDONYM, NEW TITLE, SAME AMOUNT OF TANTALIZATION THAT NO ONE ASKED FOR AND MORE OF ME SOBBING + THROBBING

- Definition of a field? Super hot. You're telling me adding our bodies together and multiplying is defined? That's like the definition of hot.
- Vector spaces aren't as hot as fields but I like satisfying conditions. Also the fact that both the additive inverse and identity vector are unique? Yes, please!
- Subspace Test: So sexy. Makes vector space proofs so much simpler and some days, I just need a relaxing massage over a midterm (can you tell I'm stressed?)
- Spans: I mean, I love someone who spans me *wink*. Also seeing such a simple concept connect to more complicated ideas is satisfying.
- Bases: It combines the satisfaction of linear independence with spans, and since every vector space has a basis, that makes it even hotter.
- Dimension: It's unique for every vector space, and being unique is hot so I guess that counts? IDK, you're expecting a math student to determine hotness, which was on you. Do better.
- Coordinates: So sexy. So simple. So unique. Maybe I just want to be pinned at some coordinates of a wall by a mafia boss though.
- Linear Transforms: Transforms are hot, not explaining this one
- Nullspace: I like the sound of being in a space with nothing but me in it, even though that's not what that means. Although, I do think of all the abstract stuff like that, so maybe I just want to float in nothingness? IDK maybe it's just my soul-sucking courses and me losing my will to live but that's a story for February 30th.
- Kernel: Fun name and makes me think of corn, which can be hot in multiple ways. Also relates to nullspace which helps its score
- Range: It's hot how the term aligns with range from high school. Consistency is hot, y'all!
- Matrix: It's sexy that you can define linear maps by matrix multiplication, because convenience is hot. Relatively easy computations are hot too (not to be confused with easy relatives, we ain't Habsburging over here (well, my parents are second cousins so maybe I shouldn't be saying this))
- Transposed Matrix: Being flipped is hot, that's all.
- Change of Basis Matrix: The way you create it makes so much sense by definition, and understanding things is so hot. Also logic is hot (title of my sex tape that's really a math lesson)
- Injectivity / Surjectivity: The names are kinda sexy and both of these properties are hot. Like you're telling me that every input produces a unique output and/or your range is your vector space? Like let us get one-on-one and perhaps onto each other please.
- Isomorphic: By the Injectivity / Surjectivity is Hot Theorem, isomorphisms are hot and hot. Also,

they preserve spanning and linear independence properties, which is already hot qualities to have, as discussed earlier (And furthermore, discussions are hot! Getting into heated arguments in front of your children because you don't communicate is not! Especially when your child ends up writing this shit for **mathNEWS** because what untraumatized person would be writing this.)

- Eigenvectors: Being a vector transformed into myself but multiplying with a constant sounds sexy to me. It's also hot how simple the definition is, especially to match my basic-ass self!
- Diagonalization: The way that eigenvectors, eigenvalues and diagonal matrices align with a diagonalizable matrix is very satisfying, I'll admit. Is it really annoying? Yes, but I like being hot and bothered so I'm down (or rather, diagonal?)
- Applications of Diagonalization: Generally not being tested on it? Hot. Applied math in general? Also hot. Like who doesn't want to be applied and/or have a purpose in life? Not to mention that I like being in the real world and not stuck in the abstract math world with Computer Modern font sometimes (I know, surprising for someone who shittily sexualizes math concepts for her understanding and hopefully your entertainment)
- Orthogonal bases: Something I actually understand, which is so hot. If only I understood myself.

Anyway, wish me luck on my midterm y'all; I need it with a side of therapy and a ~~glass~~ bottle of wine¹

sincerely, your math *freak* >:)

1. Post-test update: I fucked up greatly! Yay me! Here what's happened:

- Multiselect was interesting but that's the least of my problems TBH
- I accidentally took an eigenspace incorrectly and got the zero vector when I was just a fucking idiot, meaning I didn't find the basis or the diagonalization because I can't realize what a x-component is. Woohoo!
- I'm pissed at myself for not doing the idempotent proof because now looking it up, it's so easy! I overcomplicated it! I think this was covered in 136 too
- My proof for the first question was kinda shitty but I got at least something with 10 minutes left
- I've blanked the rest of my mistakes out of my head Anyway I'm gonna go cry now omg pray for my midterm mark plpsplsplsplsplsplsplsplsplsplsoktybyebeloveyoumwah



THE DOLLAR STORE FEUD IS OVER

For as long as I can remember, there have been two dollar stores on Coxwell Avenue. Since 2013, those two stores have been Dollarama and Dollar Tree, three or four doors down from each other, their signs an almost-identical shade of green.

To a typical outsider passing by on the streetcar, it might have seemed strange that two stores in direct competition with each other had survived for this long side by side. But to locals, the distinction was clear: Dollar Tree was laid out in the classic dollar store style, with messy, disorganized shelves piled up with plastic garbage. Dollarama, by contrast, tried to be more organized, with the little ceiling-mounted signs in each aisle telling you what you'll find there. Each spot on a shelf tries to have at most one thing on it, and sometimes there's even a tag telling you what it is. You head to one store if you want to idly browse shelves for trinkets and doodads, and you head to the other if you're an adult who just wants to buy a roll of packing tape and leave.

And the demand for both stores wasn't unfounded: there were no fewer than six elementary schools within a 15-minute walk of this block, and the layout of the area put both stores along many people's routes to the nearest bus or streetcar stop. There were no shortage of kids or adults to patronize both dollar stores.

Until there were. Earlier this year, after over a decade of peaceful co-existence, the Dollar Tree finally shut its doors, to be replaced with a Shoppers Drug Mart — arguably the opposite of a dollar store. After several months, it doesn't look like another dollar store is coming to fill its place.

What happened?



THE KIDS ARE GONE

They're not all gone, but it sure feels like they're disappearing. When I was in grade 10, my high school merged with another high school because neither of us had the population to sustain ourselves.

The declining population of Old Toronto's neighbourhoods is well-documented: despite the boom in Toronto's housing demand, the three nearest neighbourhoods to Coxwell Avenue lost thousands in population between 1971 and 2016.¹ The culprit? Likely a lack of new housing in the area, causing an aging population as existing homeowners' kids move out and they hold onto their increasingly scarce possession of a house in the area.²

If you walk a block north from the two dollar stores, you'll find an empty lot at the corner of Coxwell and Upper Gerrard. Eight years ago, a new apartment building was proposed there, and the plaza that was there before was bulldozed in preparation.³ Since then, no visible progress has been made.

The dollar stores' neighbourhood is dying, and nobody seems to care.

GENTRIFICATION?

Houses are scarce and their prices have quadrupled. Who's moving into them? Probably people like the Tesla-driving couple who bought the house next to my childhood home, proceeding to not live in it for a year as they gutted the entire place, doubled its footprint, and painted it black.

Maybe the new arrivals to this neighbourhood just don't go to dollar stores. Maybe they prefer Shoppers Drug Marts, and the existing 15-minute walk to the next closest Shoppers Drug Mart (or, hell, the 15-minute drive to the *original* Shoppers Drug Mart) was just too far.

Are Shoppers an indicator species for gentrification? Someone should do a study on this.

MAYBE DOLLAR STORES ARE JUST DYING

Maybe we all just don't have as much disposable income to spend on cheap junk anymore. Maybe when we do want to buy cheap junk, we'd prefer to buy the stuff at Dollarama that has something that looks kinda like a brand name on it so that it seems higher quality. Maybe it's that nothing at a dollar store costs a dollar anymore and we're tired of being gaslit. idk

CONCLUSION

idk??? honestly just fix the housing crisis please

__init__

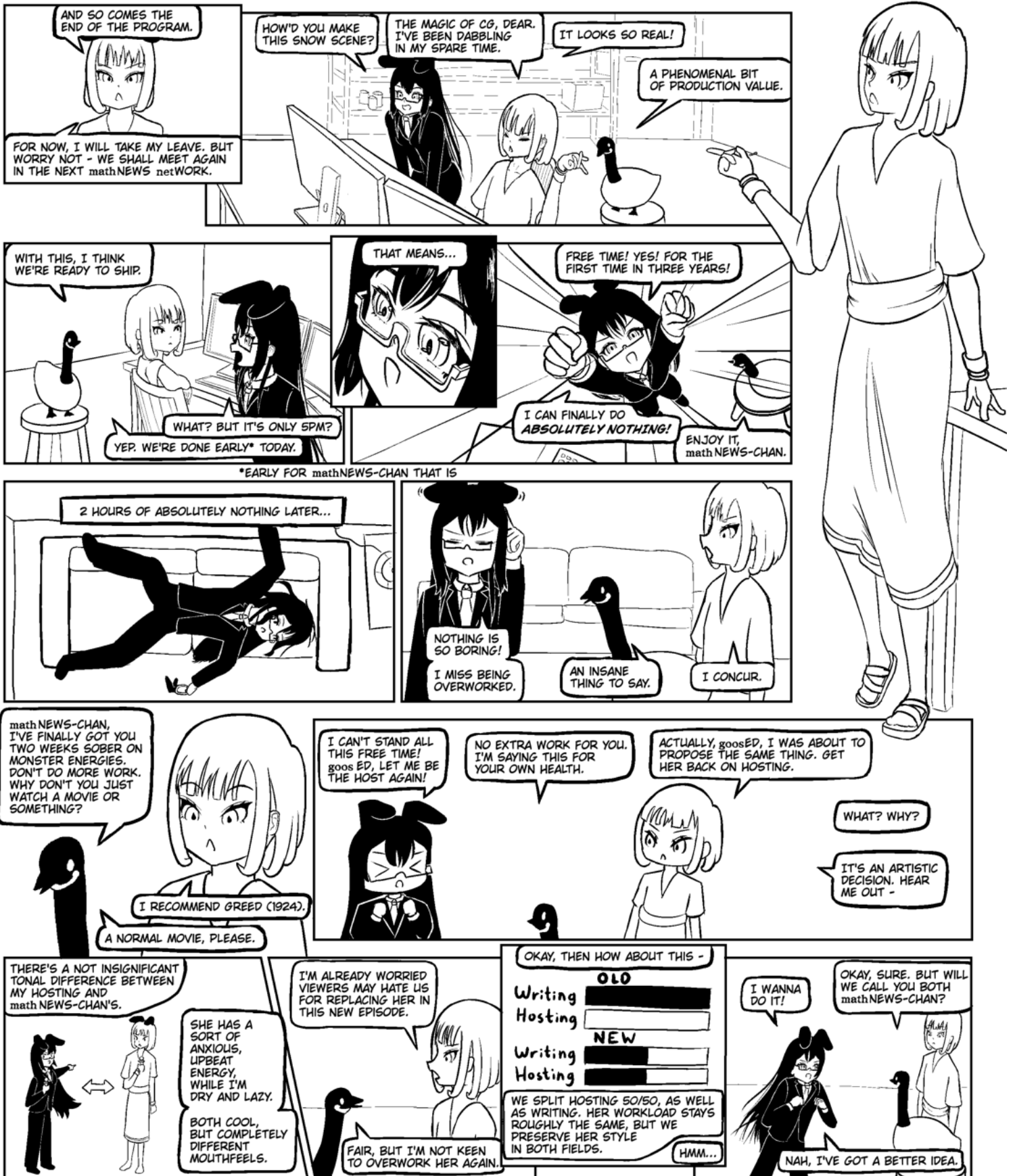
1. https://www.erikdrysdale.com/DA_kramer/
2. https://www.thestar.com/news/gta/booming-highrises-shrinking-neighbourhoods-4-things-to-know-about-toronto-s-uneven-growth/article_a2d34c1b-10bd-58a3-8473-b6329796f980.html
3. <https://urbantoronto.ca/forum/threads/toronto-355-coxwell-22-67m-6s-habitat-for-humanity-raw-design.25953/>

A CONFESSION

wham bam skibidi doo bap bam. am i a crazy killer, damn yes i am

notoh

SECOND HALF OF mathNEWS netWORK 3



TO BE CONTINUED...

COULD GARY DECIDE THE US ELECTION?¹

In the lead-up to the US election, there's a video featuring Will Ferrell urging people to vote, specifically calling out people named Gary.² Given that the election is predicted to be close, it had me wondering if there were enough Garys to decide the US election.

Some assumptions I am making:

- The election will be decided in the 7 swing states: Arizona, Georgia, Michigan, Nevada, North Carolina, Pennsylvania, and Wisconsin. The other states will go as predicted: the Democrats start with 226 electoral college votes of the necessary 270 needed to win. Republicans with 219.
- The margin of victory will be similar to 2020.
- We are only calculating the people whose first name is Gary. Garry and people whose last name is Gary were not included mainly due to not enough time to do the analysis. We also could not find accurate age distributions for people named Gary so we couldn't exclude Gary who are under the age of 18. It does however appear that the name has been in declining popularity, the Gary population tends to be fairly Gariatric. So hopefully the exclusion of the non-first name Gary and Garry compensates for the over-estimation of eligible-to-vote Gary. We hope that this estimate falls within an acceptable margin of Garror.

We can estimate the number of Gary for each state and how it compares to the margin of victory in 2020 using this webpage, <https://www.mynamstats.com/First-Names/G/GA/GARY/index.html>, which was both very helpful and very annoying in how it chose to display its information. There are an estimated 1,391,682 Gary in the United States; 20 times the population of Gary, Indiana. The question is, are the Gary distributed effectively to shape elections results?

	Margin of Victory in 2020	Estimated # of Gary in State ³	Electoral College Votes Available
Arizona	10,457	34,258	11
Georgia	11,779	39,263	16
Michigan	154,188	50,556	15
Nevada	33,596	13,839	6
North Carolina	74,483	35,717	16
Pennsylvania	80,555	58,966	19
Wisconsin	20,682	32,482	10

We see that there are enough Gary to affect the outcomes of the states of Arizona, Georgia, and Wisconsin, which would bring the electoral college votes up to 263, just shy of the 270 needed to win. All the Gary voting together can be a powerful voting block. They cannot decisively cinch the election but are enough to change the outcome of three states. However, if they want to have a larger impact, a bunch of them need to move out of California (the state with the most Gary).

There are enough Gary that with some clever Garymandering we could distribute them strategically across the states to decide the outcome. If Will Ferrell wanted to be more effective in his callout he probably should have urged James or Michael or Robert or John to vote. Those are the top 4 most common names, each estimated to have over 4 million people with that name.³

Voting is a collective action. One person's vote should not be enough to decide the outcome, but when people band together based on shared commonalities, real change can be enacted. The influence of one Gary⁴ might be small but all Gary united can make a meaningful difference.

BeyondMeta

1. Disclaimer: **mathNEWS** production night happened on November 4th. So, at the time of writing this article, the results are up in the air, but at the time you are reading this article the result should be decided, barring some voter certification fuckery; something that is unfortunately a very distinct possibility and fills me with dread. I had originally considered penning an article that explores the dread I feel about the US succumbing to fascism. It was down to a coin flip, but this idea was more fun and I think we could all use a little bit of levity right now.
2. <https://www.youtube.com/watch?v=Wo7KwWIg-7o&t=6s>
3. <https://www.ssa.gov/oact/babynames/decades/century.html>
4. I did briefly consider going down the rabbit hole to determine the most influential Gary. My cursory examination suspect the answer is either Gary Becker, an economist who has won the Nobel Prize, or Gary Gygax, who co-created Dungeons and Dragons. I will not be pursuing this inquiry any further. This article is about the collective power of Gary, not any individual Gary.

A PLEA FOR SLEEP

pleeeeee God

but a few hours

im so tired

why wont you let me sleep?

so very eepy

THE ζ IN MUSIC.

HOW DID THAT GET THERE?

Take the zeroes of the Riemann zeta function. Multiply them by $\frac{\ln 2}{2\pi}$. Then the largest *gaps* between these scaled zeroes surround integers. But more interesting is *which* integers.

5, 7, 12, 19, 31, 53, 72. You may not recognize these integers... unless you're a fan of microtonal music. If you want a good musical scale, divide the octave equally into one of these numbers of parts. Twelve tones gives us our standard musical system, the larger numbers are all popular with microtonal composers, and even five and seven show up in the guise of pentatonic and heptatonic scales.

But... how? What do musical scales *possibly* have to do with the Riemann zeta function?



What makes a good musical system, anyway?

We want the system to contain the important consonant intervals. The octave, perfect fifth and fourth, major and minor third, et cetera. But we also want evenly spaced notes, so we can modulate freely between keys.

It turns out that an interval is consonant when the ratio between the notes' frequencies is a simple rational number. Octaves mean the ratio $\frac{2}{1}$. Perfect fifths are $\frac{3}{2}$. Major thirds are $\frac{5}{4}$. And stacking intervals *multiplies* these fractions, rather than adding them.

So to find our nice evenly spaced scale, we want a number x whose multiples closely approximate the *logarithms* of the simple rational numbers.



Let's invent a measurement for how well this works.

Focus on an interval whose frequency ratio is $\frac{a}{b}$. Then we want $\ln \frac{a}{b}$ to be close to a multiple of x . We can measure that by computing $\cos\left(\frac{2\pi}{x} \ln \frac{a}{b}\right)$ —this number will be close to one

when we have a good approximation, and close to negative one when it's bad.

So add this up across all intervals. Oh, and because we care more about the *simple* ratios, weight those more heavily. Something like this.

$$\sum_{a,b=1}^{\infty} (ab)^{-r} \cos\left(\frac{2\pi}{x} \ln \frac{a}{b}\right)$$

What is this infinite sum?

$$\begin{aligned} & \sum_{a,b=1}^{\infty} (ab)^{-r} \cos\left(\frac{2\pi}{x} \ln \frac{a}{b}\right) \\ &= \Re \sum_{a,b=1}^{\infty} (ab)^{-r} \exp\left(\frac{2i\pi}{x} \ln \frac{a}{b}\right) \\ &= \Re \sum_{a,b=1}^{\infty} (ab)^{-r} \left(\frac{a}{b}\right)^{\frac{2i\pi}{x}} \\ &= \Re \left(\left(\sum_{a=1}^{\infty} a^{-r+\frac{2i\pi}{x}} \right) \left(\sum_{b=1}^{\infty} b^{-r-\frac{2i\pi}{x}} \right) \right) \\ &= \Re \left(\zeta\left(r + \frac{2i\pi}{x}\right) \zeta\left(r + \frac{2i\pi}{x}\right) \right) \\ &= \left| \zeta\left(r + \frac{2i\pi}{x}\right) \right|^2 \end{aligned}$$

Well, we found the zeta function!

Good musical systems are supposed to occur when this value is large. That is, it's far from zero. So it makes sense that the good solutions are found in the largest gaps between the zeroes.

The factor of $\ln 2$ mentioned at the start of this article is simply a conversion factor, to make sure we're measuring intervals in *octaves*, rather than ... whatever you call a frequency ratio of e .

finegeometer

TIPS FOR UNDERSTANDING A TOUGH COURSE

HOW TO LEARN A TOUGH COURSE????? ESPECIALLY IF YOU DONT UNDERSTAND ANYTHING FROM A LECTURE

three steps:

1. Identify a smart classmate.
2. Sit next to them.
3. Ask them questions as soon as you are confused!

By sitting next to a particularly smart classmate and asking questions right when things got fuzzy, I started to understand

each lecture more clearly. Weekly assignments became way more manageable. I even begged my classmate to walk me through her ideas on the tougher problems. Thanks to her help, the material is finally clicking, and I feel ready to tackle what's ahead!

With great appreciation for my smart classmate, I'm sure I can perform better in my final exam ^_^ yeah

AKEIJIN

MY FAVOURITE SOLO FOR EVERY ORCHESTRAL INSTRUMENT

OR, AN EXCUSE TO DUMP CLASSICAL AND CONCERT BAND MUSIC FROM MY PLAYLISTS

- **Piccolo** — Mikhail Ippolitov-Ivanov, *Procession of the Sardar* from *Caucasian Sketches*
- **Flute** — Claude Debussy, *Prelude to the Afternoon of a Faun*
- **Alto Flute** — Igor Stravinsky, *The Rite of Spring*
- **E♭ Clarinet** — Adam Gorb, *Khosidl* from *Yiddish Dances*
- **Clarinet** — George Gershwin, *Rhapsody in Blue*
- **Alto Clarinet** - Percy Grainger, *Rufford Park Poachers* from *Lincolnshire Posy*
- **Bass Clarinet** — Robert W. Smith, *Africa: Ceremony, Song and Ritual*
- **Contrabass Clarinet** — James Barnes, *Fantasy Variations On a Theme by Niccolò Paganini*
- **Oboe** — Maurice Ravel, *Prelude* from *Le Tombeau de Couperin*
- **English Horn** — Maurice Ravel, *II. Adagio Assai* from *Piano Concerto in G Major*
- **Bassoon** — Morley Calvert, *3. J'entends le Moulin* from *Suite on Canadian Folksongs*
- **Contrabassoon** — Béla Bartók, *Bear Dance* from *Hungarian Sketches* (It's only 6 notes at the very end in the span of like 3 seconds but my options are kind of limited here)
- **Soprano Saxophone** — Robert W. Smith, *Purgatorio* from *The Divine Comedy*
- **Alto Saxophone** — Modest Mussorgsky (orch. Ravel), *Il Vecchio Castello* from *Pictures at an Exhibition*
- **Tenor Saxophone** — Maurice Ravel, *Boléro*
- **Baritone Saxophone** — Hirotaka Izumi (arr. Toshio Mashima), *Takarajima*
- **Trumpet** — Chuck Mangione, *Children of Sanchez*
- **Horn** — Claude T. Smith, *Festival Variations*
- **Trombone** — Wolfgang Amadeus Mozart, *Tuba Mirum* from *Requiem Mass in D Minor*
- **Bass Trombone** — Walter Donaldson (arr. Dave Wolpe), *Makin' Whoopee*
- **Euphonium** — Gustav Holst, *March* from *Second Suite in F*
- **Tuba** - Modest Mussorgsky (orch. Ravel), *Bydlo* from *Pictures at an Exhibition*
- **Violin** — Max Bruch, *IV. Finale: Allegro guerriero* from *Scottish Fantasy*
- **Viola** — Gustav Holst, *Lyric Movement*
- **Cello** — Nikolai Rimsky-Korsakov, *Russian Easter Festival Overture*
- **Double Bass** — Camille Saint-Saëns, *L'Éléphant* from *The Carnival of the Animals*
- **Piano** — Nikolai Kapustin, *Toccata*
- **Celesta** — Pyotr Ilyich Tchaikovsky, *Dance of the Sugar Plum Fairy* from *The Nutcracker*
- **Xylophone** — George Gershwin, *Introduction* from *Party and Bess*

- **Timpani** — Aram Khachaturian, *Sabre Dance*

yalevoilian

MOTION PICTURES

I need help. I used to watch a lot of movies. I loved movies. I watched movies at home, go to indie theaters, go to big chain theaters, watch movies on my phone, watch movies on my laptop, on my monitor, on my parent's TV, on IMAX, in Cinesphere (R.I.P. Cinesphere, you were loved while lasted), watch indie movies, blockbusters, Hollywood movies, international movies, old movies, ancient movies, and brand-new movies. I would spend my breaks watching as many movies as I could, back-to-back, to a point that everything was just a glare. 2023 was a great movie year! Perfect Days, Past Lives, Holdovers, Oppenheimer, and Anatomy of a Fall were all among the best movies I have ever watched. However, Something changed on the new year's eve. When I woke up on the dawn of January 1, 2024, I wasn't the man I was the night before. My love for movies had stopped. For the next 10-ish months, I didn't have the love for movies that I had before. According to Letterboxd, I have only watched the embarrassing number of 22 movies this year! I haven't gone to a movie theater since Feb. 25 for Dune 2! I canceled my CineClub membership because I hadn't use any of the benefits for 6 months! And most important of them all, I canceled my subscription to the totally legal website that I got all my movies from.

I have started the process of rehabilitation recently. I wrote this long rant about me and the movies to kindly ask you to send me some suggestions of the movies released 2024 (I totally trust you, the audience of the best publication on this planet we call Earth) so I can hopefully catch up with all I have missed. How can you contact me? It's 2024, so I have provided a QR code with a link to a Google Form here:



[Editor's note: Here's the link for online readers:

<https://docs.google.com/forms/d/e/1FAIpQLSdyaRj8Lp1JsVoQeaQsXfdJf8h1TGX9-SLOIb2-1AF67GAcPg/viewform>]

MY NEW JOB AS A TV REVIEWER

big a? more like triple a, more like agatha all along, eh? to every stray pair of eyes discovering this sacred page in the middle of the best edition of **mathNEWS** you will ever read, i am here to pitch you the show that has consumed me for the past two (TWO!!) months.

picture this: promotion for this random witch show based off of a chart-topping worldwide hit single from the 2021 marvel show wandavision has been slow. you've seen it once or twice, and appreciated that kathryn hahn is in the midst of receiving both her flowers and her paycheck. it could be a nice way to get into the halloween spirit, but it's got weekly releases (red flag). you think all of this subconsciously in your room, scrolling on good old twitter because your phone is out of storage and the app can never update.

YOUR WORLD SHATTERS.

it is thursday. the first two episodes have freshly premiered in the past 24 hours. a video comes along your feed, and in it—two women fighting it out in typical marvel fashion. one of them: aubrey plaza, pinned to the ground by her throat as she grins. suspicious, but not unlike THE aubrey plaza. you scroll to the next post: an edit. “you don't have a heart,” agatha (kathryn hahn) says. “yes, i do,” rio (aubrey plaza) answers, “it's black, and it beats for you.” you sprint out to tell your roommates in the kitchen that you must witness this show in full asap.

backstory established, here are my spoilies slash personal thoughts on every episode of the show:

1. **Seekest Thou the Road:** was i coming in as an unbiased opinion? obviously not. i like witches, i like(?) marvel, the chatter had been positive so far. and yet the first episode still blew my expectations out of the water. weird deep tension between ex-lovers, fascinating mystery setup within the mystery show, fun little nods as we return to westview. joe locke's weird little half-british half-american accent. who am i to complain?—8/10
2. **Circle Sewn with Fate / Unlock Thy Hidden Gate:** GREAT GREAT TIME! spawned the song that was briefly across your tiktok and also helps you realize all episode titles come from the ballad of the witches' road! wow!!! agatha gets a great outfit, slight horror made my friends and i scream, we enter the main premise of our show with our brand new coven! happy times—9/10
3. **Through Many Miles / Of Tricks and Trials:** solid episode. good introduction to the pattern of the road that jac schaeffer (showrunner and maybe someone to whom i owe my life?) immediately wanted to disrupt. also funny and good use of practical effects, in which they are used SO well in this show. did you know it's marvel's cheapest and still the most successful? signs point to lesbians attracting mass audiences—but only if done well.

or not (foreshadowing). bonus point because my friends and i believed (deservedly) that joe locke was evil the whole time and that he killed the nice old lady. negative bonus point because they have a fun scene of intrigue where agatha hallucinates her worst fear about her son and this evil book BUT IT GOES ON TO MEAN NOTHING!!!! why would you do this—8/10

4. **If I Can't Reach You / Let My Song Teach You:** the best one!!!!!!! rio joins us on the road to my great delight. also leaves you feeling optimistic about the loveliest character, BANGER of a song is shared and you realize there are multiple versions of the ballad (plus this one is special because it's the only title from the cover version rather than the actual song). alas, my strongest argument for this episode is world's best scene, placed as the last one of the episode. ending things on the highest note possible.—10/10
5. **Darkest Hour / Wake Thy Power:** my word count grows, we are not even halfway. this is the most confusing episode and to this day i don't fully understand it. this marks a turn for the worse in our show. however, rio defends her wife at every possible opportunity, which i do enjoy to a great degree!—7.5/10
6. **Familiar by Thy Side:** we hit pause. joe locke puts his all into his episode, and he's good! but his character. hm. reveals are also fun, agatha as agnes even better. spark of inspiration behind the fic i stayed up until 4 am to complete before the finale (take that as you will)—7/10
7. **Death's Hand in Mine:** OH SO THIS IS THE BEST ONE. so good. makes my brain happy. gay comments galore. lilia calderu AND patti lupone you are so loved by ME. additionally, we get our grand reveal for aubrey plaza's character being [redacted] herself and i do have to apologize as i say it only made her more attractive. the scene was replayed + paused + phones came out for photos—11/10
8. **Follow Me My Friend / To Glory at the End:** written by a man and you can tell. this killed the joy and love in my heart and the only consolation was a grave of azaleas. kiss of death was never meant to be LITERAL—6.55/10
9. **Maiden Mother Crone:** i was begging for salem flashbacks the whole show. my god. more reveals! a time-travelling montage of kathryn hahn singing in the best outfits you've ever seen. they were in LOVE and we NEVER GOT TO EVEN SEE IT. enough.—8.9/10 but 3/10 for the ending

i was meant to write zutara today if i wanted to sneak in a christmas special, but here we are. i hope this sneak peek into my brain gives you a glimpse of how my life has been hell for the past million weeks, but it also gave me a reason to get through each one! watch it. if you dare.

because i have the space: the music in this show is FANTASTIC, christophe beck and michael paraskevas made a gorgeous score and now Rio is one of my top tracks this month. chefs kiss

big a

last time gaya implied that i was paid to write zutara which is FALSE and LIBEL but marvel you should totally hire me to do agatha all along 2: aelectric aboogaloo

WATCHING THE ROCKY HORROR PICTURE SHOW IS HOW I WOULD SPEND THE LAST TWO HOURS OF MY LIFE

HOT PATOOTIE, BLESS MY SOUL

Going to see this at Princess Cinemas without knowing what it was about or going to be like was a metaphysical brain bending roller coaster of infinite value. My gay self had never actually seen this majestic film, nor did I know what it was about, but from deep inside me I felt an interdimensional draw to it in the gaynetic field, so I went on October 30th. Then again, on October 31st, because it proved better than any other Halloween plans anyone could create.

I left that theatre with rice in my pants, toast crumbs in my hair and my blood rushing. Then, the next day, I subjected two more poor unknowing friends to the same fate. I can only compare before and after leaving the theatre to being *Medusa'd* and back. If you still haven't seen it, it would be a great movie to whip out at a family gathering as the holidays draw near. The opening song sets the mood quite nicely for eliciting screams of bloody murder from the crowd in the back row, however small they may be. We start off strong with rice throwing at the wedding, as you do. Then the movie goes classic horror by getting the car stuck in the middle of nowhere. But do Janet (slut) and Brad (asshole) stumble upon a serial killer! No! Just a homicidal mad scientist sweet transvestite and a band of interdimensional motorcyclists who can dance on command. I tell you, that's the kind of party I want invites to. I want my soul to leave my body while I get halfway shitfaced and question reality as Tim Curry bludgeons Meat Loaf with unfathomable fury. I want to get kicked in the face by Riff Raff's cosmic legs of acrobatic prowess. I want whatever Columbia is on. I want it all, but I want *just enough* so that I remember it the next morning. Rocky Horror, my beloved, you'll be dragging my beaten body back to Waterloo every October to witness this ever changing cinematic hound of an experience. And if you don't show up in stilettos and a red lace corset, shame.

A PRETTY GOOD MAPO TOFU RECIPE

I learned how to make mapo tofu last term, and now it's one of my favourite foods, so I figured I'd share my recipe. It's also fairly easy and fast to make, provided you can acquire a few essential ingredients from a non-western grocer. Chief among these is doubanjiang (豆瓣酱), of which the Pixian variety is no doubt the best. If you're like me and don't speak any Chinese languages it can sometimes be difficult to determine what the right thing to buy is based on the (often inconsistent) English transliterations of their names, but in this case you should look for the kind labelled "broad bean paste" and not "soy bean paste". If you can't find that, I've also substituted gochujang and had it work fairly well.

INGREDIENTS (*OPTIONAL)

- 1 block soft tofu (or medium if you can't find soft)
- 100–200g ground beef or pork
- Cooking oil
- 2–3 green onions, chopped
- Garlic, minced
- Ginger, minced
- 1 tsp Sichuan peppercorns, crushed*
- Salt and pepper
- 2–3 tablespoons doubanjiang (豆瓣酱) (or gochujang)
- 1–2 teaspoons douchi (豆豉)*
- 2–3 cups water
- Soy sauce
- Rice vinegar*
- Shaoxing cooking wine*
- Cayenne pepper and/or paprika and/or red pepper flakes*
- Corn starch

DIRECTIONS

1. Cut the tofu into cubes, then boil in a pot for 2 minutes, then turn off the heat and leave in the water for later.
2. In a separate large pan or wok, cook the ground meat until browned, then add the green onions, garlic, ginger, and Sichuan peppercorns. Season with salt and pepper.
3. Add the cooking wine, doubanjiang, and douchi, mix with the meat and aromatics, then add enough water to cover. Season to taste with soy sauce and rice vinegar, and simmer for 10–15 minutes. Add cayenne pepper and/or paprika and/or red pepper flakes for extra spice.
4. Add the tofu and cook for a couple of minutes, then mix some corn starch with water to make a slurry and add it to thicken.
5. Garnish with green onions and serve with rice.

MY BURGEONING POLITICAL CORRESPONDENT CAREER

good morning mathNEWS!

you can vote in the mathsoc winter 2025 general elections november 6 through november 8 at vote.wusa.ca. there are two votes, one for president and the other for vice-president academic.

candidates are cooper stone and faraan hadi for president, and kareem alfarra and nyra rodrigues for vice-president academic. in fact, your brave political correspondent put their life at risk (much like imprint writers claim to) and attended the candidate qna.

many questions were asked, but only two of the candidates showed up (cooper stone and kareem alfarra). hence, this writer will not be commenting on them out of fairness to all candidates.

voting guide for mathsoc sanity:

cooper stone for **president**

and **kareem alfarra** for **vice-president academic**.

firstie

this is not financial advice. you have the right to remain silent. anything you say can and will be used against you in a court of law. you have the right to talk to a lawyer for advice before we ask you any questions. you have the right to have a lawyer with you during questioning. if you cannot afford a lawyer, one will be appointed for you before any questioning if you wish. if you decide to answer questions now without a lawyer present, you have the right to stop answering at any time. the information contained in this e-mail and any accompanying documents may contain information that is confidential or otherwise protected from disclosure. if you are not the intended recipient of this message, or if this message has been addressed to you in error, please immediately alert the sender by reply e-mail and then delete this message, including any attachments. any dissemination, distribution or other use of the contents of this message by anyone other than the intended recipient is strictly prohibited. all messages sent to and from this e-mail address may be monitored as permitted by applicable law and regulations to ensure compliance with our internal policies and to protect our business. e-mails are not secure and cannot be guaranteed to be error free as they can be intercepted, amended, lost or destroyed, or contain viruses. you are deemed to have accepted these risks if you communicate with us by e-mail.

N REASONS THAT VELOCIPASTOR IS THE BEST MOVIE TO EVER EXIST

VelociPastor is a fantastic 2017 horror/comedy about a priest who has a crisis of faith that leads him to travel to China, where he is injured by a velociraptor tooth, causing him to turn into a velociraptor when he is angry. When he returns to the US, he tries to return to his normal life but continues to accidentally turn into a velociraptor from time to time. When he becomes a velociraptor, he cannot remember what he does, which causes issues when he wakes up in bed with a sex worker and worries that he may have had sex with her. The following are my favourite moments from this movie (although these may be spoilers, this movie is still amazing when you know all of these moments beforehand).

1. Frankie Mermaid: why do they call him that?
Because he's "swimming in bitches!"
2. VFX: Car on fire
3. 10/10 amazing dinosaur costume that is definitely 100% accurate to what a velociraptor looks like and is definitely not just a costume for a different species of dinosaur. You also definitely can't see the person wearing the costume based on the lump where their head is poking out of the back of the dinosaur costume.
4. A group of Christian ninjas is trying to convert people to Christianity by pushing cocaine to get them to come to the church for support once their supply is cut off.
5. "She's ok!" At the end of the movie, the priest's girlfriend is injured by the Christian ninjas and seems to be dead. After the final battle between the ninjas and the priest, she is finally rushed to the hospital and is somehow totally fine.

In conclusion, VelociPastor is my favourite movie and although I've seen it three times already, I hope to see it for a fourth time soon. I talk about this movie to everyone I meet, it's essentially my equivalent of "have you heard about our lord and saviour Jesus Christ?"

VelociPastor 2 wrapped up filming in October of 2023, and while there is sadly no release date yet, I'm very excited to see it.

aknetsch

I basically only read the profQUOTES.

MOST PEOPLE WHO READ mathNEWS

COMBINATORICS: “MMMMMM YUMMY!”

WHAT IF INSTEAD OF STUDYING FOR THE MIDTERM YOU COULD EAT THE GRAPHS

While studying for my 249 midterm I realised there are many words in graph theory that make me hungry. I think, in fact, that a lot of these things would be tasty, but in very different ways. Exciting!

For instance, I think a Kneser graph sounds like a tasty dessert. Maybe like a sweet pretzel dough with a cinnamon sugar or cream filling. “Yes, can I have one Kneser, and could you warm it up for me please?” Delectable! This goes for all of them except the Petersen graph, which is like really greasy fast food. You could get the Petersen at Burger King if it was the only place open and you were really desperate.

Now you might think complete graphs should be filling meals, and I would agree there. But I think they are specifically creamed/blended soups. A warm delicious concoction, all the ingredients emulsified and reduced to miniscule particles, all connected and in harmony with each other. Yep, that’s a complete graph.

Obviously, the empty graph is like if you starved.

The Hadwiger-Nelson and complete bipartite graphs are like the ingredients you can’t pronounce on the back of food that are absolutely not good for you. Or something that gets fearmongered about a lot, like MSG. It makes sense to me because they both have stupid, complicated names that I can’t remember (but really should, given my midterm is

tomorrow). Also, constructing the complete bipartite graph typically makes this really unnatural-looking rectangle. And the Hadwiger-Nelson is infinite, which is really scary. You wouldn’t want either of these graphs in your food.

Line graphs are like deconstructed, artsy meals that you pay a few hundred dollars for at a fancy restaurant. They think they’re so special. They kind of are actually but still. I’m cheap. Wouldn’t order a line graph.

Another simple one is the edgeless graph—that’s like a bag of chips, or candy. It’s not really filling but you’re gonna have a snack once in a while. Paths are a small upgrade from this because they’re sandwiches. You can have them as a light lunch but I wouldn’t really count it as a meal. Also, sandwiches aren’t my favorite. Sorry, paths.

There are gaps in my reasoning that I must address. Like, I wish there was a graph that I could say is salad, so we could have “Soups, salads and sandwiches” for graphs. Unfortunately there isn’t... such is life. I also wish I could put hypercubes on this list because they’re my favorite kind of graph, but unfortunately they just make me really un-hungry. If other graphs are food then hypercubes are galvanized square steel. Don’t eat them.

mobpsychofan

FAVOURITE TEMPERATURE AND WEATHER

Favourite temperature and weather from **mathNEWS** writers:

- 17–23 C sunny (2)
- 22 C light rain
- -10 C snowy
- 17 C with a warm breeze
- 55 F slightly cloudy
- 25–30 C sunny
- 15 C mildly cloudy
- 17 C breezy
- 25 C windy
- 72 F sunny
- 16 C slightly cloudy
- 20 C sunny (2)
- 20 C sunny evening with a breeze
- 21 C windy kinda
- 0 K sunny
- 10–19 C with sun and a slight breeze
- 17 C sunny without clouds
- 20–25 C sunny
- 9–10 C snowing with snow on the ground late evening
- 10–20 C strong rains (if I have to be outside, then medium rain)

- 0 C light wind, light rain, dark sky
- 0.001 K—lasery
- 18 C sunny(ish)
- 14 C, slightly cloudy, wind that almost knocks me over
- 70 F clear skies NO WIND
- 21 C cloudy
- 15 C sweater weather

mathgeek

BAATUHN NAAMBR WAAN

FROM (◇)

MEESTR UPPONAAANT GEEVS EW A MEEGAR SÉT

ANica

mathNEWS

NO FACE'S TERRIFYINGLY TEMPESTUOUS SPOOKY STORMY DAY.

I WAS FIGHTING FOR MY LIFE AGAINST THE WIND.

Did anyone see a humungous mass of black fabric struggling to make its way around campus on Halloween? Yeah, that was me. The behemoth was supposed to be No Face, from Spirited Away. I actually made this costume a couple of years back, when I was still in high school, and decided to repurpose it this year since I didn't have time to make something new. In order to continue with this story, I will have to explain how this costume works: Four gardening sticks (yes the ones used to prop up plants) are inserted into sleeves sewn into a vest that I wear. Then, a foam top is inserted onto the top of the sticks, with fabric covering the whole thing to create the illusion of a towering mass. Finally, a Mod Podged (essential to protect it from Raincouver rain) No Face face is pinned onto the fabric to complete the costume.

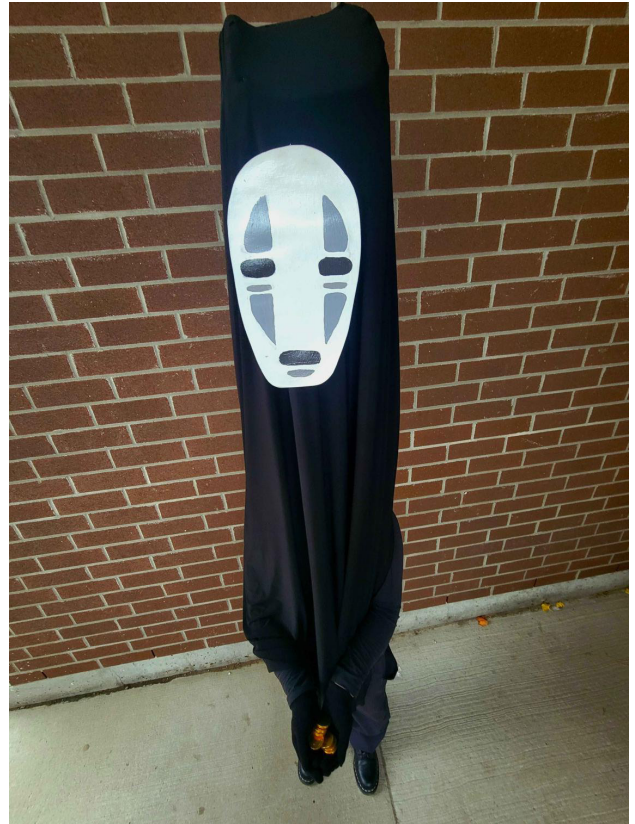
Unfortunately, I failed to consider a couple of facts when using this in Waterloo:

1. I grew up in Vancouver.
2. I made this costume in Vancouver.
3. The windspeeds in Vancouver are nothing compared to Waterloo.
4. The new gardening sticks I was using were much taller.

When I stepped outside on Halloween morning, a huge gust of wind almost blew me off the stairs in front of my dorm. In hindsight, perhaps my costume would have also acted like a parachute and helped slow my fall in case I was actually blown away. Throughout the day, I was buffeted left and right by the wind. If I was lucky, the wind would blow the same way I was going, giving me an extra speed boost. However, when the wind and I were going in opposing directions... oh boy. It felt like I was being tossed about like a plastic bag in a hurricane. The fabric flapped around me, blocking my vision and making me look like a horrifying dementor (fuck you jk rowling). Every time I went outside, I would have to grasp the gardening sticks in my futile attempts to survive the onslaught of wind.

I would also like to comment that many building entrances and even some buildings themselves are not built for two-metre tall people or No Faces.

To anyone who saw me stumbling around in my costume: I hope you enjoyed the sight because you won't be seeing it for a while... (I'm in stream 4)



ENJOY THIS 0.5 LENS PICTURE OF NO FACE

臭臭

N REASONS PEOPLE THINK I'M GAY

(I PROMISE I JUST KNOW HOW TO APPRECIATE THE MALE PHYSIQUE)

- I'm a twink
- I'm lanky
- I have a sucking kind of face
- The way I talk
- I'm British
- The way I wear my hair
- The way I cross my legs when I sit
- I'm constantly playing pool (but like, in a gay way)
- That fucking shirt that I own (yes)
- I'm not a jerk
- Québec (Fr*nch)
- "I know for a fact that you are gay because I am your roommate"
- My friends call me fruity and a twink but in the way that gay people call each other fruity
- Constantly climbing (also in a gay way)
- UW Math
- European (in a gay way)
- "the men want him to be"—local queer

Shahabee

7 ESSENTIAL TEXT EDITOR SHORTCUTS PEOPLE SOMEHOW DON'T KNOW

1. CTRL + D—This is actually so, so good. After selecting any text, using this command incrementally highlights any matching text. Need to find and replace a bunch—but not all—of `func()` with `func(index)`? Need to get many cursors at the right points in your object lists, but don't want to hold ALT and click everywhere? Now it takes 1 second. *[Editor's note: There's also a shortcut to select all occurrences at once—in Sublime Text it's Alt + F3, but apparently VSCode uses Ctrl + Shift + L instead.]*
2. ALT + ↑/↓—Moves the lines your cursor is on up or down, simple as that.
3. CTRL + SHIFT + T—You should absolutely know this already: reopen closed tab(s). Works on your browser and many other apps too.
4. CTRL + . —Activates VSCode Actions menu. Extremely useful for quickly importing modules, adding words to your dictionary, or just anything you do by right-clicking on squiggly lines.
5. SHIFT + ←/→/↑/↓—Highlights text as the cursor translates over it. Especially nice to use in tandem with holding CTRL to jump by groups of letters.
6. CTRL + P—Search and open files by filename or extension.
7. SCROLL_CLICK + DRAG—By pressing your scroll wheel down and dragging, you can highlight text in a rectangle on your screen. It's what it sounds like, and it's a must when working with any 2D arrays.

These work in VSCode. They should work in any other modern text editor; if they don't then the bindings may be different, just give it a quick google!

no pun indented

FUN FACTS ABOUT LAZEEZ

As a native of Mississauga, I know some information about the (in)famous restaurant chain that some readers may find enlightening:

- (Unconfirmed) Lazeez was founded by a disgruntled former Osmow's employee
- Mississauga Lazeez locations use a hot sauce that is nearly twice as powerful as the Waterloo's (so 10 Mississauga lines = 20 Waterloo lines)
- A large chicken half and half costs \$17.50 after tax, therefore one could purchase 39 of them for less than the tuition of one 0.5 unit course

JoonWei

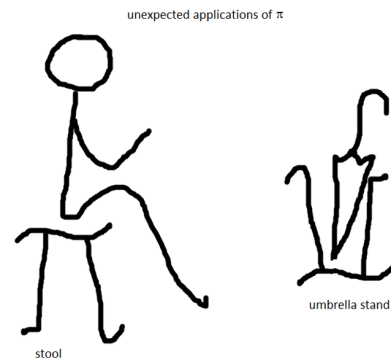
CHALLENGING THE INTEGRITY OF PIE DAY 2024

Disclaimer: thanks MathSoc for putting pi day on an easy day for all students <3

This friday, we get pie on November 8th! The 314th day of the year!! So precise and nerdy and mathy!!! Right? WRONG! If you've been counting down the days like I have, you'll know that November 8th is a whole day early. Getting pie on day 313? what has UW Math come to?

Here's a list of what would go wrong if pi was 3.13:

- Every pie would have a little less filling
- Spheres worldwide would be a little bit lighter
- Less toilet paper in every cylindrical roll
- Wheels would spin slower on roads
- Farmers with circular farms wouldn't have enough fence to imprison their chickens
- Yoga-ers would have to re-find their inner circle
- Clocks would run slower and throw off pi day next year too
- Everyone would retroactively lose the pi recitation contest and be out \$314 dollars



dring dring

M3 I MI33 YOU

SORRY I MI33ED YOU LAST TIME

another day, another prodnight in the wrongest of locations. why is mc so square, so anti-navigation? why are there so many stairs? and where is the cold i once complained about, wrapping all around me instead of this oppressive crowd? m3, i know your time as the coolest, freshest math building grows short, but you must know that i still wait for you. i crave your crazy expansive seating and your giant lobby and your nice washroom without a pedaled sink. and most of all, i crave the mathNEWS gold you hold.

big a

THOUGHTS ON THE LAZARIDIS HALL BUILDING DOWN IN LAURIER

AND ALSO HOPES FOR M4 I GUESS

As a resident Double Degree student, I am very familiar with Lazaridis Hall, the home to Laurier's business program, just down the street. It is a pretty good building.

Once I had brought a friend in Math to take a look, and upon walking in, he was stunned. Opening up to a grand atrium, rooms were stacked upon the perimeter of the building, with the middle fully devoid of buildings, rather a large floor with seating scattered about. Above was a glass ceiling, dome-shaped, built up entirely of triangular panels. At the time, one of the triangular panels had shattered, yet the panel held up nonetheless, and an area on the floor had been fenced off.

He was in awe, lamenting that the building was what he would think a business building would look like, much preferring MC, a much homelier building.

I think back to that interaction sometimes. I agree with him sometimes—as grandiose Laz Hall is, it feels, strangely... empty. Save for a few study rooms and miscellaneous seating scattered about (which is usually taken), there isn't as much

space to study or sit. Student clubs are tucked away in a corner, and can be a bit hard to notice at times. It's also hard to study in the atrium with blinding sunlight shining through.

Even though it's older, and feels like a prison, and the lighting is all artificial, and you can't touch grass, and there is some level of stinky, MC feels more welcoming. The third floor is almost exclusively for student activities, and clubs are active and running. I daresay the Math C&D is better than the Byte cafe too. Not to say that MC is without flaws. I find solace within the halls, yet the rooms feel dingy and don't have power outlets (a big deal!!!).

My point is—though I like Laz's infrastructure and clean aesthetics, MC has a homeliness feel to it. I'm hoping that M4, one day, might just be able to satisfy both of these desires for a future math student (god knows I'll be long gone before its ever done)

andoiii

MECHANICAL KEYBOARD SWITCH

I'm really excited to do a review of mechanical switches. For this review I'll type a paragraph to show you how well each kind of switch can type. Here we go:

RED SWITCHES

It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct the other way—in short, the period was so far like the present period, that some of its noisiest authorities insisted on its being received, for good or for evil, in the superlative degree of comparison only.

BLUE SWITCHES

What the fuck did you just fucking say about me, you little bitch? I'll have you know I graduated top of my class in the Navy Seals, and I've been involved in numerous secret raids on Al-Qaeda, and I have over 300 confirmed kills. I am trained in gorilla warfare and I'm the top sniper in the entire US armed forces. You are nothing to me but just another target. I will wipe you the fuck out with precision the likes of which has never been seen before on this Earth, mark my fucking words.

BROWN SWITCHES

Members of the Minecraft speedrunning community reviewed six consecutive livestreams of 1.16 RSG speedrun attempts by Dream from early October 2020. The data collected show that 42 of the 262 piglin barbers performed throughout these streams yielded ender pearls, and 211 of the 305 killed blazes dropped blaze rods. These results are exceptional, as the expected proportion of ender pearl barbers and blaze rod drops is much, much lower.

An initially compelling counterclaim is that top-level RSG runners must get reasonably good luck in order to get a new personal best time in the first place, so, while it is surprising to see such an unlikely event, it is perhaps not unexpected. However, upon further research, Dream's observed drop rates are substantially greater than those of other top-level RSG runners—including, Illumina, Benex, Sizzler, and Vadikus. If nothing else, the drop rates from Dream's streams are so exceptional that they ought to be analyzed for the sake of it, regardless of whether or not any one individual believes they happened legitimately.

I hope this helps :)

Totally Ununimodular



UNDERCOVER ENG KID IN mathNEWS

DU DU DU DU DU DU (MISSION IMPOSSIBLE SONG)

Response to "Why you should join mathNEWS"

I'm the eng friend that gaya wanted to convince to join mathNEWS.

Review: ★★★★★

Good vibes, everyone is talking, free pizza. Recommend. I thought I would be productive (spoiler alert: I was not). But overall pretty good. Also, met our celebrities like O.G. and p-math Michael. Only heard about them in the tea that they tell me, it's good to put faces to the names. Lots of math jokes while ordering pizza (sometimes funny, I'm still a nerd after all)

1 bad thing: barely any outlets in the room, very annoying having to change places after settling in to charge your computer after a long day, but as I said before I was barely productive so it didn't matter at the end.

Si alguien habla español y lees esto, unanse weones ql, esta bien choro (adivinen de donde soy).

pi=3

PMATH 432

Consider arbitrary lists of random symbols. Consider every possible way of assigning meaning to these lists. Now, consider arbitrary lists of these arbitrary lists, but forget the assignment of meaning. If the list does not look too suspicious, we'll call it a *proof*. By the way, there are proofs of everything that's true. Of course, by "true," we mean that one of these arbitrary assignments of meaning to arbitrary lists of symbols decides agrees with the particular list of symbols we are considering under the same (arbitrary) assignment of meaning. Also, everything you can prove is true. Anyways, did you know that it's impossible for you to prove everything about arithmetic? Did you know that every possible list of true statements about arithmetic that any soul could ever hope to lay eyes on is but a shred of the whole truth? Did you know that we can use addition and multiplication to convert natural numbers into self aware beings who make assertions about their own properties?

No? Well, the final is worth 75%, so you might want to read up.

nazz



PSA TO...

...idk, engineers? Whoever it is who designs our door handles.

Push doors should not have handles that look like you can pull them. Arguably, they don't even need handles.

And pull doors should not have weird flat handles that don't have any obvious place to pull.

If you have to label your door handles you've done something wrong.

Sincerely, someone who is fed up with doors.

(Specifically in the arts tunnels.)

(Perhaps this is why their doors are so bad. They're sacrificing practicality for art. Not that I'm advocating for more engineers...)

(Edit from a week after I initially wrote this: I have now encountered some equally bad, if not worse, doors in the engineering area. Perhaps I should redirect my attention towards architects.)

(Edit from almost two years after I initially wrote this: it's finally being submitted. No I'm not desperate for an article idea...)

normalparameters

LINEAR LOVE STORY 8

Three vectors

$$\begin{pmatrix} 3 \\ 6 \\ 1 \end{pmatrix}^T$$

$$\begin{pmatrix} 0 \\ 9 \\ 4 \end{pmatrix}^T$$

$$\begin{pmatrix} 7 \\ 2 \\ 9 \end{pmatrix}^T$$

span each other's lives.
Whenever one is away,
a piece of themselves feels missing,
patiently awaiting to be whole again.
How can we call them independent
when having another disappear
would mean their world loses a dimension.
But together they can do anything,
and make their way to anywhere,
that their hearts desire.

Totally Ununimodular

NIM CHIMPSKY

ONE OF THE FUNNIEST APES TO EVER EXIST IMO

Nim Chimpsky, named after linguist Noam Chomsky, was a chimpanzee who was part of a study to see if a non-human primate would be able to learn language. For a number of years, Nim Chimpsky was taught “sign language” by a revolving door of researchers until they finally brought in someone who actually knew ASL and realized that they were teaching him a fragmentary version that was just word-by-word, without the structure and rules of proper ASL. This is shown in his recorded sentences, with the longest recorded one reading, “Give orange me give eat orange me eat orange give me eat orange give me you.”

While originally intended as a 10-year study, Project Nim was ended after only 4 years, owing to behavioral problems likely caused by the drastic differences between his home and classroom environments, his changing home environments, as well as the constantly changing research team. The project director came to the conclusion that not only did Nim Chimpsky not learn language, but ALL non-human primate language studies were only capable of mimickry.

Personally, I think that Nim Chimpsky was not simply an ape who repeated hand signs for food, but was limited by the shortcomings of the study. Because of the findings, Nim Chimpsky has a reputation as a stupid chimp who failed to learn whereas other apes (like Koko the Gorilla) learned a much greater vocabulary, although whether word-use is equivalent to language is debated.

Connecticut James

AN ADDENDUM TO THE ELECTION ISSUE

Neither Lars Nootbaar nor aphf support Donald Trump. If it came down to it, we would both prefer an anomalocaris in charge. Because, at least when an anomalocaris predates, it is for survival. When a Trump predates, it is to feel power over others.

Lars Nootbaar & aphf

<https://www.youtube.com/watch?v=6YsNRnZRgg8>

KITCHENER LINE NOW HAS MORE TRACK

A small update for those of you who read *Kitchener.GO Train Progress Report* this summer: the new second track in Breslau, between Fountain Street and Shantz Station Road, was officially put into service at 3 AM on Sunday, November 3! To recap, this is the first time in history that trains on the Kitchener Line can pass each other between Kitchener and Georgetown. When that will start happening is unclear—this is only one of the many important construction projects that are underway in order to increase Kitchener Line service—but it’s exciting to see some progress.

derailed

M6 TIER LIST

As all of the participants for M6 (with the exception of the wild card) have been chosen, I will give my preliminary insights on each of the contestants, and as M6 draws closer, I will give my prediction on the M6 rankings.

S TIER

Fnatic Onic PH, Aurora Gaming, Selangor Red Giants

A TIER

Team Liquid ID, RRQ Hoshi, Falcon Esports

B TIER

Team Vamos, Team Spirit, NIP Flash,

C TIER

S2G Esports, Maycam Evolve, BloodThirstyKings,

D TIER

CFU Gaming, Twisted Minds, KeepBestGaming

Fried Rice

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

PROF. PENNY HAXELL

BEST SONGS TO DO MARKING TO

It's the midterm season. I just finished grading the midterm for CS 145. I did not have any problems marking this time because I had experience, most of it collected as a playlist. Here are the top songs from that, that get me in the mood for marking:

5. Enchanted (Taylor's Version)—Taylor Swift
4. deja vu—Olivia Rodrigo
3. Sunn Raha Hai—Ankit Tiwari
2. Echoes—Pink Floyd
1. All Too Well (10 Minute Version) (Taylor's Version)
—Taylor Swift

0.423

STRAWBERRY

The flesh of a ripe
Strawberry
yields to my bite
Its tang bursts across my tongue
and my taste buds laugh

The dirt has yielded this fruit
a ruby
soft gem
just for me and my buds
Swaths of synapses sing
"Strawberry!"
Sensory echoes in my skull

Spencer Burt

ELECTION? :0

As I am writing this, it is the Monday before a very consequential election this week. That's right, MathSoc elections are going on right now. If you are reading this on the day it is released then you have until 11:59 pm to vote! I may not have any idea who these people are, but only one of the candidates for president and one for vice president have statements on the MathSoc elections website, and I couldn't be bothered enough to do any further research. I mean, just by having a platform you win by default against people who don't if you ask me. Unless of course, that platform is explicitly harmful and damaging...

It's not like a candidate for any election would ever directly threaten to kill people though, right?

Whole Number Haver

RANKING MY ALGEBRA COURSES

1. PMATH 945: TOPICS IN ALGEBRA [RINGS AND THEIR APPLICATIONS]

Essentially a noncommutative algebra course; structure theory-esque stuff (primitivity, simplicity, radicals, etc.), noncommutative localization, polynomial identity rings, group rate growth theory stuff, algebras, etc. It's all insanely cool. Top course.

2. PMATH 446: COMMUTATIVE ALGEBRA

Tensor products and localizations are extremely cool constructions. Very excited to learn algebraic geometry so I can apply this.

3. MATH 146: LINEAR ALGEBRA 1 (ADVANCED)

We started with vector spaces and then related linear maps and their properties to matrices, which was a really cool and intuitive way of looking at this stuff. Loved this course.

4. MATH 145: INTRODUCTION TO ALGEBRA (ADVANCED)

Introduced me to abstract algebra, started my love of rings, favourite 1A course by far. Was an extremely hard jump from high school but so rewarding.

5. MATH 245: LINEAR ALGEBRA 2 (ADVANCED)

My offering was kind of slow and didn't cover a lot. What we did do was interesting and I enjoyed the course, but I wish we had done cyclic decomposition, Jordan Canonical Form, and Rational Canonical Form specifically, as I think these results are really cool and also important, and usually done in 245 to my knowledge.

6. PMATH 347: GROUPS AND RINGS

My offering was heavier on computation and combinatorics than most, I feel. I struggled with this, and found it difficult to be very engaged personally. The prof's lecturing style was also not something I personally enjoyed (though I feel they're a good lecturer, it was just me). It was less the material itself and more a combination of these things, but I didn't enjoy this much.

sunrise parabellum



YOU MIGHT NEED TO STAND ON YOUR HEAD

gridCOMMENT 156.5

howdy doo water loo ^u^

two weeks ago, my **gridCOMMENT** said that “all the sockets in my room blew up and then every dryer in the building stopped working”. currently, the sockets are still not working, and although the dryers work, the washers do not. but i digress.

last week, i asked you guys what you were thankful for, and you all said:

- Rijrya: *I am thankful for being able to do such a wonderful gridword made by such a wonderful person once every two weeks!*
- rutabaga: *i am thankful for birds, keninš symphony 4, and puppet builders!*
- hinlef: *I am thankful for: all the time during reading week to grade homework (and time to read all the books I brought this term), the geese staying on campus every season for me to pet and hug, and the groundhogs who live under my doorstep ♡ !*
- nike, aphf, Lars Nootbaar, peacelovemath, Dick Smithers, and Not a N*rd: *I'm thankful for a lot of things... who's asking...*

- Shreng IV: *I am thankful for chlorofluorocarbons (for always being a reliable chemistry test and crossword answer)*
- awmlet: *I'm thankful for everything*

hinlef, i also love seeing the groundhogs and geese!! please pick up your prize at mathematics and computer room three thousand and thirty (**mathNEWS** office). also, i will personally give you a bonus prize if you can send me a picture of you petting and/or hugging an actual real living canadian goose on campus (i am not responsible for the consequences of any real actions inspired by this statement).

this issue's **gridQUESTION** is: what ancient weapon do you think you are? this one was inspired by a friend who once told me i'd be chinese wind and fire wheels, which i think is sick af and i completely agree with him. please send your **gridWORD** solution, **gridQUESTION** answer, and pseudonym to mathnews (at) gmail (dot) com by monday, november 21, 6 pm est

Warmly,

Spaghettiiinhalers | **gridMASTER**

ACROSS

- Tent-pitching place
- Winter toy
- Cupid, to the Greeks
- Mixture
- Express
- "I don't think so"
- High schooler employees, maybe
- Rifle part
- Bard's "before"
- Chapter in history
- Futile
- Highlander
- 22-Across, singular
- Protuberance of the second cervical vertebra
- ___ boy
- Faculty of ___
- "Your shirt is inside out"*
- Go against the flow*
- Ocean motions
- Fiona, maybe
- Inherited
- "The Open Window" writer
- Angler's basket
- Two-year academic achievement
- Tank
- Disney dog
- Math branch

- Investment option, briefly
- Antichrist*
- Villain's home
- Worsen
- Small Scandinavian herring
- Sound
- Ton, for one
- "I'm ___ you!"
- Foul mood
- Jiffs

DOWN

- Seethe's partner
- Banned spray
- Muck
- Contrary to popular belief*
- Kenyan's neighbor
- Sprawl
- Light beige
- Flipped those frowns upside down*
- As a whole
- Womanizer
- Decides
- Hardens
- Olive-green songbird
- Milk dispensers
- Stars have big ones

- Small buzzer
- Last letter
- Carpentry grooves
- Misses
- Lifeboat support
- Gym bro's fuel
- Instigator, slangily
- South Asian wrap
- Inscribed pillar
- She brings the bill
- Alias preceder
- Bacchanal
- Sign of healing
- Fragrant wood
- Cook too long
- Draw out
- Took a chance
- Besides
- Reposed
- Covered in gold
- Neural impulse transmitter
- Niels Bohr, e.g.
- Suffix with psych-
- Inherits
- ___ Baba
- Greyhound, e.g.

Drop your gridWORD solutions off at MC 3030!

1	2	3	4			5	6	7	8		9	10	11	12
13					14						15			
16				17							18			
19				20				21		22				
			23						24					
25	26	27					28	29				30	31	32
33							34					35		
36					37	38					39			
40				41						42				
43			44					45	46					
			47					48						
49	50	51				52		53				54	55	56
57						58		59				60		
61						62						63		
64						65						66		

Want to write for mathNEWS? Come to the next production night! New writers are always welcome!

LookAhead

SUN NOV 10

MON NOV 11

TUE NOV 12

WED NOV 13

THU NOV 14

FRI NOV 15

SAT NOV 16

Remembrance Day
Drop/add period begins
C&O Prof Talk
5:00 PM, MC 4042

befuddled's mom's birthday

Drop/add open enrollment begins

Button Day

SUN NOV 17

MON NOV 18

TUE NOV 19

WED NOV 20

THU NOV 21

FRI NOV 22

SAT NOV 23

Electronic Greeting Card Day

mathNEWS 156.6 production night
6:30 PM, MC 2034

Drop with WD ends
C&O Prof Talk
5:00 PM, MC 4040

Drop with WF begins
SASMS II
6:30 PM, MC 4021

MathSoc General Meeting
6:00 PM, M3 1006
mathNEWS 156.6 released

FROM THE DEPTHS OF MY NOTES APP

HELP, I'M REALLY SCRAPING THE BOTTOM OF MY NOTES APP FOR IDEAS

Here is a random excerpt from the depths of my notes app. This was most likely written while high but it's still a valid question.

On a plane can you see the plane turning from the inside (assuming windows are closed and it's not dramatic enough for thing to fall) or is it just the motion you feel? It doesn't make sense to me if you can see it because you lack perspective in a plane. Why can you see the movement??? Is the movement you see just your body moving and adjusting to gravity

uninspired

$$\begin{bmatrix} m & a \\ t & h \end{bmatrix} \begin{bmatrix} N & E \\ W & S \end{bmatrix} = \begin{bmatrix} mN + aW & mE + aS \\ tN + hW & tE + hS \end{bmatrix}$$

EVERY BRAINROT I KNOW

ALL THE BRAINROT I KNOW

Skibidi, Rizz, Cooked, Kai Cenat, Speed, Thick of It, Pomni, Lionel Ricardo JR, Rizzler, Panther in Black, Those Who Know, Still Water, Mango, Still Water, Adrenaline, Noradrenaline, Balkan Rage, Piwo Piwo Piwo, I hardly know her, MLG, E, Ohio, Slay, Gurl, I'm Just a Girl, Bussin, Cap, Caught in 4k, Your Mom, Rizzed up Livvy Dunne, Baby Gronk, Panther in Black, Rizzler, Big AJ, I Like My Cheese Drippy, Big Justin, Chat, Clip that Chat, Low Taper Fade, Mewing, Mogging, Looksmaxxing, Gooning, Edging, Negative Canthal Tilt, NPC, Sigma, Yap, Glaze, Aura, Plus Aura, Negative Aura, Aura Hell, Dripping Aura.

This is all the brainrot I know from memory. Please enjoy.

samogus

LAST ISSUE'S gridSOLUTION

		1	2	3	4	5	6	7	8	9	10	11	C								
		C	H	O	M	P		A	S	H		C									
12	C	A	R	I	B	O	U			O		I	R	A							
16	U	N	I	C	O	R	N			A	M	A	S	E	S						
19	F	O	E		20	E	T	C	H		22	E	X	O	C	E	T				
23	F	A	R	M		24		A	T	E		26	B	E	F	O	R	E			
						27	A	D	L	I	B		29	O	R	T					
30	31	32								33		34	W	E	D		35	36	37	38	
39	H	I	B	A	C	H	I			41	H	Y	P	O	X	I	A				
43	O	V	I	D						44	Y	O			46	S	U	E	T	Y	
										47	48		49	A	S	P	I	C			
51	52	53											54	N	T	H		55	56	57	58
59	R	E	H	I	R	E							60	K				62	M	I	X
63	E	D	I	T	O	R	S			64								66			
67	N	A	N										69	R	O	B	O	T	I	C	
70	A	R	G										72	E	S	S	A	Y			