

# *math* NEWS

## Guantanamo Bay Relocated

*Now known as FEDS Detention Centre*



*Volume 110, Issue 2  
Friday, May 29th, 2009*



**lookAHEAD****mathNEWS**

May 29	The comical mathNEWS issues gets us trapped in a jail.
June 08	The Writers of the Hexagonal Table convene to create issue 3.

**MathSoc**

June 08	Pi misaproximation day
Tuesdays	Movie Nights 7:00 in comfy
Thursdays	Games Nights 6:30 in comfy

**Math Faculty**

Questions about these?	See an Academic Advisor
Ongoing	Math faculty declares mathNEWS totally awesome

**CECS**

Last week	First round of job postings closed
June 2-18	First round of Interviews
Ongoing	Many many workshops, see them all at <a href="http://www.cecs.uwaterloo.ca/students/">http://www.cecs.uwaterloo.ca/students/</a>

**Miscellaneous**

June 04	Angelina Jolie's birthday
June 07	The first crusade begins (1099)

**It Started Violently...**

... With Kill Bill Volume 1 and 2 at the MathSoc movie night this past Tuesday, the 26th, starting at 7PM. Free food was served to those who attended the first night of the term. However, for those that missed out, don't be alarmed! Free food is served every MathSoc movie night, and there will be many more violence or romance (Note: That is not an exclusive or) filled nights in the future! Every Tuesday night in the MC Comfy lounge at 7PM.

This coming Tuesday, the 2nd, don't miss out on the classics Casablanca and Citizen Kane, starting at 7PM in the MC Comfy lounge!

Suggestions welcome at [movies@mathsoc.uwaterloo.ca](mailto:movies@mathsoc.uwaterloo.ca)!

Remember: FREE food and FREE movies. Who would miss out on that?

MathSoc Movie Director

**ISSN 0705—0410**

*mathNEWS* is normally a fortnightly publication funded by and responsible to the undergraduate math students of the University of Waterloo, as represented by the Mathematics Society of the University of Waterloo, hereafter referred to as MathSoc. *mathNEWS* is editorially independent of MathSoc. Content is the responsibility of the *mathNEWS* editors; however, any opinions expressed herein are those of the authors and not necessarily those of MathSoc or *mathNEWS*. Current and back issues of *mathNEWS* are available electronically via the World Wide Web at <http://www.mathnews.uwaterloo.ca/>. Send your correspondence to: *mathNEWS*, MC3046, University of Waterloo, 200 University Ave. W., Waterloo, Ontario, Canada, N2L 3G1, or to [userid.mathnews@student.math.uwaterloo.ca](mailto:userid.mathnews@student.math.uwaterloo.ca) on the Internet.

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

The editor(s): Athos, Pothos, Aramis: Rami Finkelshtein, John Stevenson, John Baxter

**mastHEAD**

To Whom This May Concern,

In lighter news, the suspects in custody are now confirmed dead. Wait, what? *mathNEWS*? Again? Damnit!

Another *mathNEWS*, another *mastHEAD*! I was tempted to write a quick article about France, but it would seriously be the most racist thing ever printed. Well, at least since the last issue. My articles weren't that racist, unless you are a small Asian girl and-or Mexican. (Yes, I know and-or means the same thing as or, being inclusive, but what if an artsie gets a hold of the paper? How long does it take to convince them of the correct use of logical operators in language?) Seriously though, I know it was racist. I know it was tasteless. Stop bothering me. I'm busy. Editing *mathNEWS*. \*sobs\*

\*regains composure\* So, where were we? Yes, another *mathNEWS*, another *mastHEAD*! Grab some Powerthirst and a spot by the fire, and prepare yourself for some seriously trivial writing! You will read as fast as KENYANS!

Also, there's a zombie on your lawn.

***mastHEAD* question: "ZOMBIES!! What do you do?"**

*"I'd first check what kind of zombies they were and then arm myself with their Achilles heel. Of course, I'd be eaten by then."* (42)

*"Protect the King! Hee Ho!"* (The Hee Ho)

*"Kill them with plants! Sting them! Flower Power!"* (The Queen Bee)

*"Start singing 'We can't take down umbrella, ella, ella, brains, brains, brains..."* (jzee)

*"I eated it. '-w- "* (o\_o)

*"History says: shotgun + chainsaw."* (The Unnatural Historian)

*"Grab a gun, spot another gun-toting stranded soul on a rooftop and have target practice."* (snippet)

*"Sell my annuities, flush my process table, and hope for the best!"* (j2simpso)

*"The flowers are a lie."* (Nadz)

*"Hunger for the flesh of the living"...* (inXSE)

*"Find three friends and make my way to Mercy Hospital."* (Angelo)

*"Get them to edit my mathNEWS articles."* (Tbor)

***"THRILLER!!"*** (StaticEd)

ImpulsEd

*"I'd choose buttercup, the manliest of flowers!"*



## PrezSez: Pi Misapproximation Day

*Because your president is blonde...*

As some of you may have noticed, contrary to what I wrote in the last issue of *mathNEWS*, Pi Approximation Day is **not** actually on June 7th. But, luckily for all of us, being President is all about covering your blunders with phrases that start with "Of course I meant to..." So on Monday, June 8th (even more approximately), MathSoc shall be holding a Pi Misapproximation Day in honour of this occurrence!

But wait, it gets better! By the time you read this, the MathSoc budget meeting will have been over, which means that the MathSoc dollars have been distributed among clubs, directors, and events in order to bring more entertainment to your student life. Also, we have some awesome publicity directors, who will be working hard to make sure you hear all about our events and other going-ons: so check out the whiteboard on the third floor, stop to read the pinkboard posters, and drop by the MathSoc office (MC3038) to sign-up for the mailing list.

A few consistent events to watch for are Movies Nights - Tuesdays at 7pm in the Comfy - and Game Nights - Thursdays at 6:30pm in the Comfy, both full of fun people and yummy (and free) food. So come out to relax from your homework and maybe even try a few new things and make a few new friends. Math has lots of really cool people in the faculty! =)

Cheers for now,  
Nadia Novikova

## WiMugrad Update

So it's a start of a new term, and we have recently elected all of our executives.

- Co-Chairs: Kendra Liu, Yvonne Chan
- VP Internal: Vanessa Wan, Arpita Patel
- VP Marketing: Zi Zhang
- VP Communication: Jasmine Chan
- VP Administration: Ritika Bhargava

Be sure to watch for our future events throughout this term! Everyone is invited! If you're interested in being involved in WiMugrad, e-mail us at [wimugrad@gmail.com](mailto:wimugrad@gmail.com), help is always needed! WiMugrad isn't only opened to the girls, guys are just as welcome!

WiMugrad  
Have a great Spring'09.

## Software and Innovation

*A 20 Year Perspective*

The 2009 Graham Medal seminar will be held in DC1302 on June 11. The guest speaker is the winner of the 2009 J.W.Graham Medal, Craig Eilser. He is the CORPORATE VICE PRESIDENT, ENTERTAINMENT CLIENT SOFTWARE at MICROSOFT CORPORATION. He will speak on Software and Innovation: A 20 Year Perspective.

Register by email [mathalumni@uwaterloo.ca](mailto:mathalumni@uwaterloo.ca) or call (519)888-4567 ext. 37747

## CSC Flash

*Almost as cool as the CSC em-dash... whatever that is.*

Spring has sprung, the grass is green... the CSC is actually clean! It's not a myth, the CSC has undergone some spring cleaning and is ready to welcome chairbeings of every kind to its little slice of MC space. We've scheduled lots of fun pursuits for the amusement of many so here we go:

- [Code] Party Like It's 1999! Relive the grip of worldwide technological mass hysteria! Well, you can pretend it's 1999 if you're insane enough or on the same stuff as some of our more "special" members. Come out and work on assignments, side projects, Hello World in the most obscure languages in existence, replacing an entire trivial pursuit deck with questions about obfuscated C and arguing with at least three people about each one (why not? You have all night!), or just chill with our various life forms. It's happening all night (for our more hardcore life forms) in the Comfy Lounge on Friday, June 5th. Keep an eye out for posters proclaiming the time or check out the website ([csclub.uwaterloo.ca](http://csclub.uwaterloo.ca)).
- Help! I'm being **pwned**! (*Don't worry, you only printed your working directory*) That's why our resident tutorialian kspaans is hosting Unix 101. He'll tell you what those seemingly random combinations of 5 or less letters do so that you don't think the command `cd` opens your CD drive. Time and place TBA, but I can tell you that it's on Tuesday, June 2nd. In case you didn't read it the first time, look out for informational posters or take a glance at the website ([csclub.uwaterloo.ca](http://csclub.uwaterloo.ca)).
- Upcoming events our planning types have only conceptualized in the sketchiest reaches of their sketchy minds (for extra-sketchy goodness!): SciFi night (more specific activities TBA) and SIGGRAPH night (wherein we watch some cool DVDs with some pretty pictures). Information will be on the website as soon as (a) someone invents a brain-to-website device or (b) our event detail generators activate the devices between the chair and keyboard. Again, the website is [csclub.uwaterloo.ca](http://csclub.uwaterloo.ca).

Calum T. Dalek  
Chairbeing Extraordinaire

## MCTF is not happening this Sunday

*Especially not at 11:59pm in Comfy*

We are once again not affirming that Math Capture the Flag does not in fact not happen, and this absence of existence is most poignant this Sunday at 11:59pm in front of the comfy.

We cannot deny that there will not be any kind of Capture the Flag type events played in the MC at the especially specified time shortly before Midnight on Sunday. The mere concept of such a thing is patently silly, and there is absolutely no need to turn up at the Comfy to be certain of their non-existence.

Sincerely,  
Not The Management

## Annoying Things Your Professors Do

Dear professor. Let me start by saying that I really do appreciate that you put up with all my quirks and teach me all that boring stuff (and don't fall asleep before I do). But enough is enough - I cannot put up with your quirks any longer. So listen up, and listen up now, and if you want to still have a sane student in your front row before the end of the term, fix it up!

1. **Show up late to class.** Seriously. Yeah, I get it. You had "meetings" - that's what they call it now. But if it's the third week of classes, "I forgot what time this class starts" is just not going to cut it anymore! And let me continue: if you're late once, alright, I forgive you. But you like your cash inflow, and I like my knowledge inflow - so seriously, set your alarm for five minutes earlier and **SHOW UP TO CLASS ON TIME**. After all, I made it, even though my previous class just ended on the other side of campus (and your office is in the next building over).
2. **Keeping the class late... because they were late!** Alright, so we're working on a schedule here: 10 minutes after your class ends, I've got a class on the other end of campus. Which means that, even if I run, I need the full 10 minutes to get there. If you have a problem with that, please discuss it with the registrar: I wasn't the one who set up my timetable. If I **did** have a chance to make my own timetable, it would have no morning classes, hour-long breaks, and free coffee (just like yours does!).
3. **Getting upset when students leave class after the class time ends.** Yes, you're still teaching. But you're 10 minutes over the class finishing time, which means I'm now 10 minutes late for my next class. Now, if what you were talking about was truly captivating (try any Fundamental Theorem, or the Axiom of Choice while you're at it), then I'd suck it up and stay (the chances of my next class being particularly exciting are just as low as in your class). But if I know what you're talking about, yes I will pack up my books and leave. And when half of the class gets up and walks out behind me, it probably means they're also late to the same class I'm going to. You know what that means? Stop teaching. Oh, and don't be late next time.
4. **Giving assignments on material you haven't taught yet.** You know why I show up to lectures? So you can teach me shit. If you put shit on an assignment and tell me to go "read the textbook and figure it out," that's not exactly teaching. If the class is behind, then hold up on the assignments, it's not that complicated (Changing the due date in your file will take an average of five clicks per assignment - that's five clicks per week. In the grand scheme of things, I don't think you'll even recall the "extra work" you put in.) But telling me to go and figure it out sounds like "I'm too lazy to teach this right now." Teach, or don't test.
5. **Assuming students won't be bored in class after learning your lecture by trying to do your assignment.** Yup, I learned your material. I happen to like the 2% to my final mark that this assignment gets, thank you very much. But **NOW** you decide to go and give the right lecture - sorry buddy, I already know what you're teaching because I wrote your as-

signment! Now, I'm gonna sit in the front row and yawn loudly in display of my lack of appreciation for having to do the assignment on the material you didn't teach in the first place. To avoid the yawns and glares, teach before you give the assignment. Try it - it really works!

6. **Assigning assignments "so you can learn" and enforcing marks and deadlines.** If you want students to "learn at their own pace" and "practice enough to learn the course material well", that's all fine and dandy. Give us lots of questions, solutions, and then feel free to laugh at the losers who don't take advantage of opportunities. But let's make something very clear: if you've made this paper worth marks and gave me a deadline, then it is **NOT** extra credit. It is **NOT** for enrichment, and it is **NOT** meant to be done "on my own time." It means it's worth marks, and I will read the textbook, stay up 'til 4am, and rip my hair out trying to finish it on time. If you then proceed to tell me that you assign the questions "for enrichment," damn right I'll be pissed off. If you're offering me marks, I want all of them; if you're offering me enrichment to my knowledge, then I don't want to be judged while doing it.
7. **Not giving a week to do an assignment.** Yeah, you know me well, I will definitely do the assignment on the night before it's due, even if it means staying up 'til 4am. But try, just try, to assign a deadline less than a week, and you bet I will whine and scream and rant until you extend it: it's a matter of principle. Because **OF COURSE** I will be doing my assignment on the weekend, so just to prevent wasting class time, just give me the weekend to do the damn thing. Trust me, there's one of you, and there's fifty of us: we're louder. You can't win.
8. **Considering putting up lecture slides on ACE substitutes teaching.** Newsflash: it doesn't. Oh, and putting up lecture slides on ACE, then putting them up on your overhead during lecture (while saying nothing) is **STILL** not teaching. Teaching is all about explaining how the heck that volcano-look-a-like graph made it onto your slides in the first place. Opening your mouth might help.
9. **Bringing in substitute profs.** You're off to a conference - that's cool. You'll be back in a week, and you'll be missed. And you left us with a surprise present, a substitute prof! Now, I remember the days of elementary school, where the game of "Drive Your Substitute Wild" was quite popular - we'd switch names, run around the class, throw paper balls at the back of their heads, and refuse to listen under any circumstances. But guess what? We grew up. And now we want to learn. So if you throw us an (a) incompetent prof who wastes our - and then your - time, or (b) very competent prof who looks at your notes, screams "what kind of idiot wrote this," and proceeds to teach us an easier and more effective method that just confuses your marker, then please be prepared to deal with the consequences. Better yet, just send in our grad marker to teach: we will tell him/her exactly what we need to know!

10. **Forgetting their supplies.** Do you teach in a room with a blackboard or a whiteboard? Chances are, you'll need something to write with. Are you using an overhead? Chances are, you'll prefer laser pointer or pointing stick. Please have all those ready on hand, and a back-up plan in case they fail. Back in first year, I used to carry on me whiteboard markers, chalk, and a laser pointer, but I no longer embarrass myself with being able to take those out of my backpack when you run out. So seriously, bring your own, I'm the one on a student's budget here. Oh and, another hint: to test your whiteboard marker, write on the board, step to the BACK of the classroom, and try reading what you wrote. If you can't see it, chances are I can't see it in class either.
11. **Giving vague instructions for handing in assignments.** Ok, I don't really know where "the drop box in E2" or the "fourth floor box" is, or I know where several boxes fitting that description are and wish that I could find one with the correct class label. Furthermore, I don't know how to "hand to [you] in class Monday" if I only have class with you on Thursdays, nor exactly what time "before midday" is. Please, please don't make the rush of handing in assignments more painful by not labelling drop boxes, assigning hand-in times when all the building doors are locked, or through other confusing instructions for getting in assignments. A bit of clarity can go a long way (aka a long way to your marker's office).
12. And a final one, **learn English.** Now, I didn't think I'd have to mention that one in this article, but turns out that there are different ways to not know English. Apparently, zeta and theta and eta shouldn't sound the same: make up your mind by drawing one on the board, and repeating it slowly several times. Define your squiggles verbally and visually before launching into a lecture to prevent the students from getting lost, frustrated, and blaming you for incompetence. Again, a bit of clarity can go a long way.

So hopefully some of the above can give you a few points and help us have a painless and stress-less term, and make sure I don't do prematurely bald by pulling all my hair out in class. In any case, hairballs on your classroom floor are probably a good reason to go through your office, dust off this issue of *mathNEWS* and reread my advice. Until we meet again!

The Front-Row Student

## Join MEF Funding Council!

If you're looking for a great way to get involved in school affairs, or just interested in seeing how the money from the Math Endowment is spent, then you should sign up to be on the Mathematics Endowment Fund Council! Volunteer opportunities also include being a member of the board, or even the fund director. How to sign up? You can pick up a form outside of MC3028 to be on the funding committee or print one off online from <http://www.student.math.uwaterloo.ca/~mefcom/home>. Leave your mark on the school by signing up today.

Michaelangelo Finistauri  
MEF Director, S09

## Open-Ended RPGs

### *Where Fallout 3 Falls Short*

My goal is to discuss what makes a quality Role Playing Game. Even this category can be broad and unspecific; I will therefore mainly discuss open-ended RPGs. Secondarily, I will be criticizing Fallout 3 as such a game. A few important qualities are:

- Open-endedness (less trivial than it may sound)
- Potential possession of property
- Romance

Open-endedness (OE) is indeed obvious; surely every open-ended RPG has this quality. But do they? Upon closer examination, most OE RPGs contain a story, supposedly hidden by the fact that there are many side-quests to keep you occupied. An example of this would be Fallout 3. If your only interest is the story, you won't be playing the game for very long at all. In order to counter-balance this, they present the player with a massive number of side-quests. These quests are then used to develop the player's character in so far as he/she gains experience, and gains some reputation as being evil or good. Yet these side-quests begin to feel meaningless as the story unravels. Few players would actually want to help a boy find his family when they can save the world instead.

Mass Effect has a more obvious issue with this. I was offered \$500 for performing some sort of illegal black-market job, yet I was earning more than \$1000 for each enemy I killed. If the side-quests feel meaningless, then the supposedly OE RPG becomes a story-driven RPG. And while this is not necessarily a bad thing, the game tends to wrap up very quickly. The player is left with the feeling that they could have played more if they were given the proper motivation.

Next, the potential for possession of property. This is something which is sorely lacking in many OE RPGs. Once again using Fallout 3 as an example, there is an important side-quest where the player can earn a house depending on their fulfillment of the quest, be it evil or good. Yet there are no more opportunities for the acquisition of property. The player's house becomes a place to save the game safely, and to dump their belongings. A much better example is Fable 2, where the player can purchase entire towns, rent out buildings for money, etc.

Lastly, if there is any specific quality an RPG can have which truly brings a person into the game, it is that the game must develop characters and allow for the possibility of a romance. In this case, Fallout 3 fails miserably. If the player begins the game as a male, a female best-friend character is introduced. There is then no possibility whatsoever of having any hint of a relationship. In fact, Mass Effect trumps Fallout 3 in this respect. At some point, a person gets tired of simply running around and killing irradiated animals. Something more is needed to bind the player to the game, and romance supplies this.

To be sure, there are more qualities that an open-ended RPG should possess. These are a few of the important ones, and I believe that I have shown that Fallout 3 falls short on at least two of these. Perhaps a reconsideration for 2008 Game of the Year is called for.

Evilmeat



**profQUOTES**

Who heard that song for the first time just now? Your lives are blessed!

McCarthy, MUS140

Mr. Absolutely Nice Guy looks a little homeless.

Greenaway, PSYCH101

Watson, among other things, was having an affair with his secretary.

Greenaway, PSYCH101

[Regarding sleep cycles and pregnancy] Same thing happens in menopause... except you don't get a baby.

Greenaway, PSYCH101

I have a cat. I like spending time with my cat. Yes, I am a crazy cat lady.

Kierstead, CS246

There is a little work done by the compiler. Blah, blah, blah, black magic.

Kierstead, CS246

[About using commas in C++ arithmetic] It's like a shotgun. Only skilled, trained people should use it.

Kierstead, CS246

Aargh! Thinking hurts! Make it stop!

Kierstead, CS246

Friendship is not transitive.

Kierstead, CS246

Friends are good friends. They know everything about you... They know who is on your naughty and nice lists.

Kierstead, CS246

23 is our approximation of infinity.

Orchard, CS370

[Regarding soft vs hard inequalities] I don't think I'm going to be that fussy... unless the marks in the course are too high.

Orchard, CS370

[After spending 10 minutes on an example] I'm not actually sure why that case is relevant...

Orchard, CS370

For every person fired, laid off, or fallen into the machinery in the month of April...

Smith, ECON102

Yes, you can express math concepts in English, a concept foreign to your math profs.

Smith, ECON102

I feel like I'm in a world where up is down and down is up. Or the world of quantum mechanics.

Smith, ECON102

In America, they do not sleep; they have too many Starbucks shops.

Smith, ECON102

I think the answer to your question is no, but I'm not sure what the question is.

Orchard, CS370

Thank god I have you to shout at tonight, or I'd have to consume an incredible amount of recreational alcohol.

Smith, ECON102

In America they said 'We'll get a black president when pigs fly!' and sure enough, less than 100 days after he was elected, Swine Flu!

Orchard, CS370

So let me define this just in case there's any cobwebs in memory, or leftover bits of alcohol from the weekend.

Sakhr, AMATH261

So what is "heat", apart from its meaning in animal physiology?

Miskovic, AMATH353

Since I still know nothing about this function, I might as well multiply it by an unknown constant!

Miskovic, AMATH353

This stupid (n) is called a de..? di..? da..? du! A dummy variable!

Miskovic, AMATH353

If you count subsets as sequences, you'll get a really small mark. You all know calculus. You're familiar with epsilon, right?

MacKay, STAT230



# Unnatural History

## Null Errors

In the beginning... there was Null.  
 Nada, Zip, Nothing, Ix-Nay on the 's' part.  
 In Null, there was nothing to do.  
 And for a time... it was good.  
 The Creator (call him Bob) then grew bored.  
 Bob spoke and did creatory things  
 And out of the Null, Bob begat the One  
 Bob could create anything from the One.  
 And for a time... it was good.  
 But the One was hard to write.  
 And while everything could be created with it,  
 One needed to remember any sequence of Ones was.  
 So Bob had One beget Zero.  
 Thus sequences that were a bajillion Ones,  
 Were now a half bajillion Ones and Zeroes.  
 And for a time... it was good.  
 Bob was concerned, for there was too much to remember  
 And things were ill-specified.  
 So Bob created programmers to specify things,  
 With strange names like Turing, Torvalds, Gates, and Wozniak  
 And Bob was happy, since he was lazy.  
 And for a time... it was good.  
 But soon, Bob grew pointy haired.  
 And the programmers were dissatisfied with the way he man-  
 aged.  
 Except Gates, who made unto Bob an Avatar.  
 And then Bob was overthrown, even by Gates for he was greedy.  
 And from the basic Units of Trees, Lists, Arrays, and Hashes,  
 Gates built a mighty empire on top of Bob's Creation.  
 However, Bob had a trick up his disposed sleeve.  
 Bob gathered the Null from before One, and cast it at the pro-  
 grammers  
 Null objects, Null references, and Null pointers, were unleashed  
 And to this day, haunt programmers the world over.

The Unnatural Historian

BARACK OBAMA'S RE-ELECTION  
CAMPAIGN



# There's a 0 in my Ln()

To the tune of "There's a Zombie on your Lawn"  
from Plants vs. Zombies.

## Chorus

There's a 0 in my ln(), there's a 0 in my ln().  
 There's a 0 in my ln(), don't want a 0 in my ln().

I know your range: real, large or small.  
 You are the inverse of exponential.  
 When you're together you are just 1.  
 I'm just a small value, but see  
 Me reach negative infinity.  
 You like the range of it, we don't like support.

I used to have base e. (Have base e)  
 There's inverse in my head. (Inverse head)  
 I have infinite support. (Infinite support)  
 We are undefined!

## Chorus

Maybe it's time to re-evaluate  
 I know you have a lot of things to equate.  
 ln()s are quite great for solving powers.  
 I'm bigger than zero so it don't matter,  
 You're not, so things can't get badder.  
 We're all screwed since it's now undefined.

I'm made by Mercator. (Who's Mercator?)  
 There's a slope on my graph. (On his graph.)  
 I differentiate. (Oh no no no no)  
 We are undefined!

## Chorus

Angelo

# Bug of the Fortnight

My apologies for the delay in writing a new bug of the fortnight. As it would appear, bug of the fortnight takes places less often than every fortnight. Therefore, from now on, this section will be called Bug of the Random. In any event, take a look at the following code snippet in C# and determine what horror lies in the code:

```
public class foo {
    public foo(string foo,string bar)
    {
        System.out.print(foo + ' , ' + bar);
    }
}

public class bar : foo {
    public bar(string cookie) {
        System.out.println(cookie); }
    public void testerFunc(ref type) {
        type += " caramel cookie"; }
}
```

The Randomizer

## Horrorscopes

**ACCOUNTING:** You realize that the electronic abacus has made the accounting profession obsolete, and the only reason accountants are still hired is so that there's someone to blame when the numbers don't add up. You switch into Applied Math - an equally useless major, but at least you won't rot in jail.

Your lucky number: \$80k income + \$60k expenses = \$10k profit.

**ACTSCI:** Your mother realized that Actuarial Sciences is just a fancy name for statistics and accounting, and now she doesn't love you anymore. She kicks you out of the house and you crash at a friend's place. Emotionally traumatized, you can no longer handle the pressures of a relationship and have a fight with your girlfriend over Skype. She coldly informs you that your tail probability is going to 0.

Your lucky number:  $P(|5 - e| > 0)$

**AHS:** One of your friends breaks his leg, so you apply your health science and put it in a cast for him. Your friend wanted to take advantage of free Canadian health care, but you insisted. The cast comes off after nine weeks, revealing his terribly misshapen leg. In a fit of rage, he rips off the leg and beats you to death with it.

Your lucky number: 6 feet under.

**AMATH:** After graduation, you land a job in the aerospace industry, working for Boeing. To your horror, you realize that your job is exactly like university - except that you'll get fired if you mess up. You spend the rest of your life crunching numbers, seeing psychologists, and stealing prescription painkillers from friends and relatives.

Your lucky number: 40 years of regret.

**ARTS:** You decide to major in English and minor in French, aiming for a government job translating parliamentary memos. The month before graduation, Quebec holds another referendum and secedes. You move there, figuring they'll need you to help them communicate with the rest of the world. As an English speaker, you are paid minimum wage and are required to live in a cardboard box.

Your lucky number: 8 francs/heure.

**BBA/BMATH:** You will meet a tall, dark stranger. He will propose a business venture in which the two of you wander uptown Waterloo, selling the watches you store in your trenchcoats. You will sense that this strange man is keeping something from you, but you can't turn down his lucrative offer. After several weeks, you find him dead in the gutter. You become the mobster kingpin of the watch-selling world.

Your lucky number: \$50 for a watch. \$20, are you crazy? No way I can sell for less than \$40. Alright, \$30, but you're breaking my balls here.

**C&O:** Discussion of Kirkman's schoolgirl problem makes you giggle. Unable to concentrate in class, you fail out and leave the university. No matter how hard you try, you can't stop thinking about the problem and Steiner triple systems. You gain a reputation as a lecherous old man, and are eventually arrested near a middle school.

Your lucky number:  $S(2, 3, 6t+3)$

**CS:** Ur 4|\\ 31337 |-|4xx0r, 101. U u53 ur 1337 5kzi115 2 p\\ V|\\ 3570|\\|i4, V\\|-|0 831i3\\3 i7'5 4|\\|07|-|3r (y84r|\\ |4g3|)|0|\\|. 7|-|3y 53|\\|) 4|\\ 455455i|\\ 2 p\\V|\\ ur |\\|008 455 4|\\|) |-|3 u535 (+ + 2 5|-|007 u i|\\ 7|-|3 f007, V\\|-|i(|-| 810\\V5 4\\V4y ur V\\|-|013 l3g!!one

Your lucky number: 5318008 (rotated 180 degrees).

**ENG:** Your plan to steal the Tie next semester will fail, so don't even try. Put your effort into stealing the Boar. This is a task best suited for Mechanical engineers and the like - gate reduction and circuit analysis won't help you here. Remember, Porcellino casts +5 Getting Laid on whoever rubs his nose.

Your lucky number: Circa 1978.

**ES:** You and your classmates hold a rally, trying to get Environmental Science recognized as a real science. Al Gore shows up in a toga and tells the CKCO reporters that you invented global warming and the interwebs. Later over an organic beer, Al confesses that he's never felt this way about anyone before. You sue him for sexual harassment.

Your lucky number: A \$4 million settlement.

**MATHBUS:** You start a Ponzi scheme, tricking innocent people into investing in Chia pets. "They're big in Japan," you say. You are audited unexpectedly, and your investors are informed that the grass is greener on the other side. You flee to New Zealand, disguised as a sheep. A month later you become separated from the flock and are mauled by a wolf.

Your lucky numbers: 1, 3, 6, 10, 15, 21 ...

**MATHSCI:** You don't read very well, and thought that you were majoring in Thematic Sciences. While your portrayal of King Lear is greeted enthusiastically by your classmates, the professor fails you. You manage to find your way into an Arts program, and you are the happiest you have ever been. After graduation you are poor and live in a box.

Your lucky number: 3 crazy daughters.





**PMATH:** You are starting to question your choice of a major. You feel that the purity of your math has been tainted. All you want is to feel clean again, but no matter how many theorems you prove you feel no better. In your dreams you feverishly recite Fermat's Little Theorem one hundred times while clicking your heels together, and wake up wearing ruby slippers.

Your lucky number: 12 (base forty).

**SCI:** You decide to major in Physics and be engrossed in quantum entanglement theory. You discover a highly reliable method of quantum decoherence for all the molecules in a large area, and build a replicator. You replicate yourself, and spend the evening with yourself in a seedy hotel. You get up to leave at the same time, and realize to your mutual dread that you were about to head to the same home.

Your lucky number:  $h/2$

**SOFTENG:** You become really confused by the difference between the Engineering and Math notations for the square root of negative one. You never grasped the need for imaginary numbers anyways, at least not when you're going to spend the rest of your life writing requirements documents and UML diagrams. You drop into CS before 2B.

Your lucky number:  $V = (-(R \wedge 2)) \wedge (1/2)$

## WARNING: Horoscopes may not be scientifically correct.

**STAT:** You squeeze in a biology course in an attempt to appear well-rounded. You calculate that the probability a single protein could form by chance under ideal conditions is approximately 1 in  $10^{61}$ . You try to tell everyone that there's no possible way they could actually exist, but are locked up in mental institution.

Your lucky number: 20 amino acids.

**UNDECLARED:** You hate free hamburger day at Harvey's. It's hard enough for you to choose from a menu - how can you possibly be sure that you're really creating the hamburger Your Way? You wonder, "WWFSD?" (What Would Frank Sinatra Do?). This confuses you even more, and your hamburger ends up with only mayonnaise. You bite off more than you can chew, eat it up and spit it out.

Your lucky number: #1 hit songs.

inXSE

You can read that as 'intense' or as 'in ecstasy', kids.

## Pickup Lines For ALL!

Its summer, AGAIN! And for you guys out there, the girls in short shorts must be driving you wild. You're asking yourself, "How can I set myself apart at a bar?", I know that's what I'd ask, were it not for my crippling fear of alcohol, women, and pretty much anything that involves leaving my room.

The answer? Math pickup lines! Now, you're saying, "Greg [Not my name, but whatever], *mathNEWS* has done tons of math pickup line articles before!" Well I say, "Piss off! I'm doing it, so read it!" Here is a list of my favourite pickup lines:

- Nice asymptote! *[I tried this one, the usual response is "That's right, you will get infinitely close but never touch this!" —RamEd.]*
- I may be being obtuse, but you're acute girl.
- Voulez vous Cauchy avec moi?
- My natural log is massive.
- I cardiod you.
- My vector space or yours?
- You have two nice maxima, mind if I solve for the minimum?
- I want to be the integral, so I'd be the area under your curves.
- Hey baby, let's go assume the parallel postulate.
- I wish I were your algebra homework, so I'd be really hard and you'd be doing me on your desk.

- I have a proof of the Riemann Hypothesis written on the inside of my pants.
- I don't like my current girlfriend, mind if I do a you-substitution?
- I can memorize any sequence of digits flawlessly. Don't believe me? Let's try it with your phone number.
- My love for you is like the slope of a concave up function, because its always increasing.
- Your beauty cannot be spanned by a finite basis of vectors.
- You and I are like logarithms, add us together and we'll multiply.
- I wish I was a derivative, so I'd be tangent to your curves.
- Hey babe, it looks like you're wearing the same pants as that girl over there, so lets just factor them out.
- You and I would add up better than a Riemann sum!
- Why don't we go back to my place? We can add a bed, subtract our clothes, divide your legs, and multiply!

Enjoy your summer, and whenever you get laid, think of *mathNEWS*!

The Magnificent Kevin

## The colour, not the Fruit

Hello my dear readers!

I hope you're having a great term up to now. I'm sure not! Anyway, I'm going to cut straight to this week's portion of my comedy routine. Remember, if you know anyone high up in mathSoc, hold them up for ransom in exchange for my comedy performance.

Ok, so here's a story that happened to me the other day. And this one actually happened. Yeah, I'll admit it, not every story I write is true, I tend to lie a lot. I should also mention the facts that I tend to repeat myself, I tend to contradict myself, I tend to repeat myself, I never contradict myself, and I tend to repeat myself.

Anyway, so as I was saying, I was trying to get to Toronto. So I went on the Greyhound, and I had to get to Charles Station because I missed the Greyhound that passed through the university. So I'm waiting for the bus, and the bus finally comes, but it doesn't say what bus it is, it's got "Have a Nice Day!" above the windshield instead of the bus. That doesn't help me! Stupid GRT.

Now, here's what I do, I pull off a Scooby Doo. I get on the mystery bus. Sadly, on the bus, I meet this friend of mine who likes to talk. She just talks so much, I totally forgot about the fact that I had no idea which bus I was on. Well, a while passes by, and finally my big-mouth friend gets off the bus. Then I realize I have no idea where I am. And I don't want to ask the driver, I'd look like an idiot. So I decide to ask the guy sitting across from me.

I ask him, "hey, where are we going?", so he looks at me weird, and then just moves to another seat. Isn't that rude? So I didn't know what to do. Then I noticed those booklets they have at the front of the bus with the times and stops, and finally realized I'm on the 12, which obviously doesn't get to Charles. It gets to Conestoga Mall. So eventually I get on the I-Express at Conestoga and actually make it to Charles Station, an hour after the Greyhound left.

At least it's summer though, the whole thing would've been much worse in winter.

I think I like the whole university thing much better during summer. All guys do, for obvious reasons. Hey, girls, if you don't want us looking at you, don't wear short-shorts. There's nothing more pretentious than a girl who wears hot clothes and then gives you an evil look when she realizes you're looking at her. By the way, I have no idea what pretentious means.

Besides, there's lots of other good stuff about summer. Like, you can walk around now. And see the wildlife of UW. The wildlife of UW consists primarily of geese, unfortunately. Is there a less beneficial animal on Earth? Geese are ugly, smelly, and loud. Kind of like Art students. And they do their stuff everywhere... I mean, come on, most animals go in the corner, or at cover it up in sand, or something. Geese just leave it all over the place. They're evil.

Then there are squirrels. They're so cute, aren't they? Well, as long as you don't get close and realize they're pretty much rats with a big tail. One thing I never understood- what do squirrels do in winter? They can't chill on the trees, they don't fly south... and I've never seen a squirrel dig a hole in the ground to hibernate or anything. They just disappear. I guess it's one of life's little mysteries, like why construction never ever ends. Ever.

I think the animals I like most on campus are the ducks. They're just cool. They do whatever they want, always getting to the most ridiculous places with no reasonable explanation. I'm pretty sure I once saw a duck in one of the small freaky rooms on the 6th floor of the MC. Ducks usually walk around in families, have you noticed that? There's the mom, and then the little ducks, and there's always this one little duck who gets away from the group. I once followed that little duck as he got lost, and eventually he turned around and asked "Are you my mummy?", I said yes, and I had a really nice dinner that night.

Orange Crush

## Dirty Looks

*Because not everything can be pretty*

Lately, I've been noticing that the proportion of people that are angry at you is proportional to how much power you actually have. When I first joined this "reputable" organization, I had no real work to do and no one really depended on me. As I began to take more and more of a leadership role I noticed something... People are assholes. Rancid assholes, that wish to stab you at every opportunity possible.

Now when you consider that 95 percent of communication is non verbal, you fall into a little problem of dirty looks. Not the kind of "good" dirty looks that you wish you would get from people other than your really ugly cousin.

Finishing that rant, here are the "types" of dirty looks I regularly get from other people:

- The "I just caused you more work" look:  
while not necessarily a mean look, this is most certainly a dirty look. They know their actions caused you anguish and they have no issues with it. They are gaining pleasure from your misery, and are therefore evil.
- The "I am imagining stabbing you multiple times" look:

This is the most common of the dirty looks. It involves squinting your eyes and releasing a small glare in the general direction of the target. Simple, effective and fun. Never a bad decision.

- The "I slept with your mother" look:

This look has been a staple look since the dawn of the millenium (the previous one, not 2000). It is categorized by the shifty eyes with the added bonus of a nice little look of "holier than thou".

- The "We had one wonderful night and then you slept with my sister" look:

This one is slightly reminisant of the "stabbing multiple times" look but with the added lightness of sexual gratification.

Hmmm, after getting dirty looks like these from just about everyone at the production gathering, I am thinking I should end this article.

Finkly

# Interesting Math

## Koch Snowflake

This fractal curve is quite easy to describe, and has an amazing property. Some of you who were here last year may recall my article “The (approx.) 1.585<sup>th</sup> Dimension” on fractals, in which I describe the Koch snowflake and write that the dimension of the object is  $\log 4 / \log 3$ , about 1.26. It has another interesting property — it is an object that encloses a finite area yet has infinite perimeter. Let us first define the Koch snowflake again. Begin with an equilateral triangle of side length 1. Recursively:

1. For each line segment, divide the segment into 3 segments of equal length.
2. Draw an equilateral triangle with base being the middle line segment from step 1), pointing outwards.
3. Remove the middle line segment (i.e. the base of the newly constructed triangles).

After one iteration, the shape is the outline of the Star of David. The Koch snowflake is simply the result of the limit as this process is carried out ad infinitum. Let us consider the perimeter of the snowflake. On each step, we replace each line segment with 4 line segments of one-third the length. Then the length increases by a factor of  $4/3$ . We start with a length of 3 since we have an equilateral triangle of unit side length, thus on the  $n^{\text{th}}$  step we have a perimeter of  $3(4/3)^n$ , which is clearly infinite as  $n$  goes to infinity.

As for area, notice an equilateral triangle with side length  $a$  will have height  $\sqrt{3}a/2$  (use the Pythagorean Theorem), so will have area  $\sqrt{3}a^2/4$ . Since by construction the Koch snowflake is obtained by adding triangles and never removing area, it suffices to sum the area of the triangles appended at each step, which is  $(\sqrt{3}/4)(1/3^n)^2$ . It remains to find out how many triangles of side length  $1/3^n$  we are adding at step  $n$ . Notice each line segment gives rise to another triangle. Adding a triangle yields 4 line segments, so we will have  $4^{n-1}$  additional triangles. We then add the area of the single original triangle to finish. Hence, the total area of the Koch snowflake is given by

$$\begin{aligned} & (\sqrt{3}/4) + (\sqrt{3}/4)3(1/9) + (\sqrt{3}/4)3(4/9^2) + (\sqrt{3}/4)3(4^2/9^3) + \dots \\ &= (\sqrt{3}/4)[1 + \sum_{n=1}^{\infty} 3(4^{n-1}/9^n)]. \end{aligned}$$

This infinite summation converges by the geometric series test, with limit  $(3/9)(1/(1-(4/9))) = 3/5$ . Therefore, the area is given by

$$(\sqrt{3}/4)[1 + (3/5)] = (\sqrt{3}/4)(8/5) = 2\sqrt{3}/5 < \infty.$$

There we go, something with finite area and infinite length.

### Gabriel's Horn

Let's take this concept to the next dimension. Let us find an object with finite volume yet has infinite surface area. For our object, we will use the revolution of a graph about the  $x$ -axis, so we mean here volume of revolution and surface area of revolution. First, perhaps we should review what these are for a func-

tion  $f$ . Using the disc method, we construct thin rectangles at  $x$  with height  $f(x)$ . Revolving creates a disc of radius  $f(x)$ , yielding an area of  $\pi f(x)^2$ . The volume of integration is obtained by integrating against  $x$ , to get the volume from  $a$  to  $b$  is

$$V = \pi \int_a^b f(x)^2 dx.$$

I'm not going to go over deriving the surface area formula here, if you're interested you can check out Pappus's centroid theorem; this is simply the calculus version of it. We get

$$A = 2\pi \int_a^b x \sqrt{1 + (dx/dy)^2} dx.$$

Gabriel's Horn is constructed by considering the function  $f(x) = 1/x$  with the domain  $x > 1$ , and revolving about the  $x$ -axis. The volume and area on the interval 1 to  $b$  is

$$V = \pi \int_1^b 1/(x^2) dx = \pi(1 - (1/b)),$$

$$A = 2\pi \int_1^b \sqrt{1 + (x^4)}/x dx > 2\pi \int_1^b 1/x dx = 2\pi \ln(b).$$

As we take the limit  $b$  to infinity, we see that the volume is  $\pi$ , so is finite, and the surface area grows logarithmically, so is infinite. Now we have something with finite volume and infinite surface area. That is, Gabriel's Horn can be filled with a finite amount of paint, but it takes an infinite amount of paint to cover the surface. What happens if you then fill the horn with paint and pour it out to paint the inside? This paradox arises due to a difference in notions of dimension. I carefully avoided saying “finite volume of paint” or “infinite volume of paint”, because this implies 3 dimensions. Having an infinite surface area is a 2 dimensional property, so we could not talk about painting it with a “volume” of paint, necessarily. Hopefully you can now see why there isn't really a paradox now.

As a side note, I thought about revolving the Koch snowflake about an axis in an attempt to construct an object with finite volume and infinite surface area, but then I would have to parametrize the curve and do some nasty integration. Not so much fun, so I won't do it.

### Vince's problem(s) of the issue

1) Consider the Koch snowflake that was constructed by starting with the first equilateral triangle with points defined at  $(1/2, 0)$ ,  $(0, \sqrt{3}/2)$ ,  $(1, \sqrt{3}/2)$ . Find the volume and surface area of revolution about the  $x$ -axis.

2) Ok, just kidding. Here's a better one. Where  ${}_xC_y$  denotes “ $x$  choose  $y$ ”, compute  $\sum_{k=0}^{\infty} 1/({}_{n+k}C_k)$  for  $n > 1$ .

Vince Chan

v2chan@student.math.uwaterloo.ca

**I can't believe a comic  
couldn't fit into this area!**



## Headshot

*To the tune of Headlock by Imogen Heap*

Distant bickerings, there's a blue sniper beam  
The spawn time's bringing them all back again.  
Great adventures, faces in my crossair  
I'm going outside to take them all out.

### Chorus

You take too long to stop, got your face with a headshot.  
I don't believe I got a hit.  
You take too long to stop, got your face with a headshot.  
I get double the points for this.

Wear a different face, just someone like my team.  
Thrust a dagger in unexpected backs.  
With big intentions, still posted at my station  
Always get a shock from my Razorback.

### Chorus (2 times)

You've been jumping, you've been hiding.  
And you look half dead through my scope.  
Monitoring you, I must kill you.  
You get close and I'll toss the jar.

### Chorus (until end)



Angelo



## A Spy is here!

*To the tune of Disturbia by Rihanna*

What's wrong with me?  
Why am I dressed like this?  
I'm going killing now.

No more juice in the watch  
Can't even keep me cloakin'.  
Nothing heard, nothing said  
'Cause there's a knife in their back.  
There's cardboard on my head  
They think I'm their friend with it.  
Feels like I'm going to stab, yeah!

### Chorus

I'm a spy in the night to come and stab you.  
I can creep up behind you and look like you.  
A zapper in my hands, it can drain things too.  
I'm too far to stab you.  
Throw on your flame throwers; I'm in your base with your intel.  
Ain't gonna play nice, watch out, you think I'm a medic.  
Better think twice, your stream of shots will be halted.  
You can't be faulted because;  
You know that there's a Spy in here!  
It's like your back's holding a knife  
A Spy's in here! Am I stabbing you tonight?  
A Spy's in here! Ain't used to look-a-likes.  
A Spy's in here! A Spy's in here!

Many bodies on the floor, it's like they dropping like flies.  
Disconnectin' your warp, making engie's things die.  
I gotta get out and take this intel out.  
I'm too far to stab you.

### Chorus

Release you from this life you're in  
Trying to maintain that I'm infiltratin'.  
But you shout "Go! Go! Go!"  
I think your mother is oh, oh, oh.

### Chorus

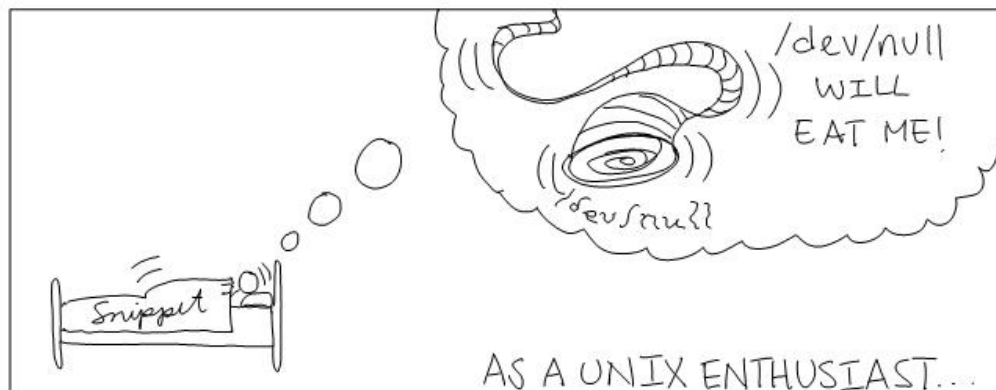
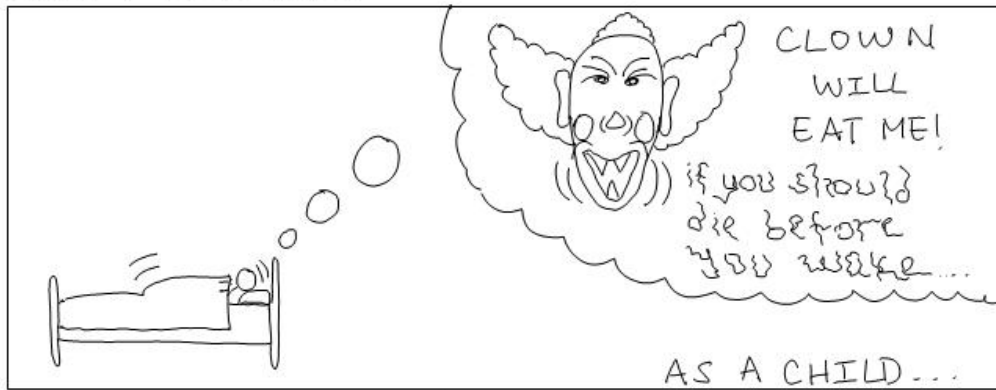
## Graduating?

*Then the Math Grad Committee needs your help!*

If you're going to be graduating within the next year and want to make sure that you leave with a big smile, then you should join up to help out with the Math Grad Committee! MGC is responsible for raising funds for and the organizing of Grad Ball! MGC also makes the Math Faculty's yearbook! If you want to have a great finish to a great academic career, and I know that you do, then send a quick e-mail to [mathgrad.2010@gmail.com](mailto:mathgrad.2010@gmail.com) and let us know what you want to do to help out.

Michaelangelo Finistauri  
MGC Chair, Graduating Year 2010

## CAN'T SLEEP...



mathNEWS



## The Many Forms of Professor's Integrals

$\int$	The Straight Line	"I operate on 1-Dimension"
$\int$	The Right Bracket	"I don't get paid enough"
$\sum$	The Reverse Z	"I lost my personality to calculus"
$\times$	The Invisible Man	"I ran out of chalk" OR ink"
$\int$	The Swirl	"I like Tim Burton movies"
$\int$	The Hypnotist	"I dropped too much acid in the 80's"
$\int$	The textbook	"I'm actually an arts prof"

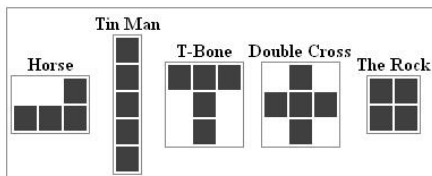
-Tbor

Page-o-Comics

## SIGHT

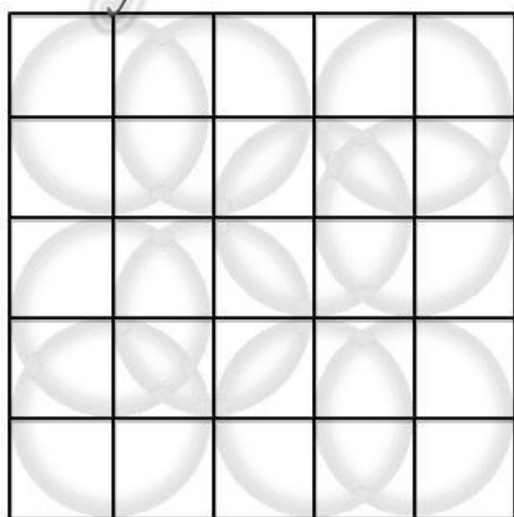
The precious 10x8 grid that we call home has been infiltrated. Signals intelligence tells us that the following agents are somewhere nearby, all they can tell us about their locations is

- How many squares in a row or column are occupied
- They've been ordered to disperse so they aren't touching, not even diagonally.
- Remember: they can rotate.



										2
										2
										2
										4
										3
										1
										3
										1
										5
										0
3	6	2	4	1	1	4	2			

## Umbrellas



Place the following 10 squares on the 10 circles so that the overlapping numbers match up.

1	2	1	1	6	8	8	4	4	5
1	4	0	1	3	6	5	4	1	2
7	4	4	0	5	4	5	6	2	7
5	1	4	5	2	5	4	3	7	5

Puzzles courtesy of euri.ca

## Drywaller

"Listen up. Our client isn't picky, as long as each square has the right number of walls surrounding it. Sounds a little tricky, but we didn't get to be the #3 drywall outfit in town by being lazy."

Also:

- There's a wall around the outside
- They want exactly 14 rooms

3	2	3	2	1	1	2	3	1	2
2	3	4	2	1	1	2	4	1	1
2	2	1	1	1	2	3	3	2	2
3	1	0	1	1	2	2	1	1	2
3	2	2	3	2	2	1	0	0	1
2	2	1	1	2	2	1	0	0	1
3	1	0	0	1	2	2	1	1	2
3	1	0	0	1	1	1	1	2	3
2	2	1	1	2	1	0	0	1	2
2	2	3	3	2	1	1	1	2	3

## From the Desk of the Queen

I'm trying to find something to write about right now. I'm just sitting on a roll-y chair, staring at the monitor, and then holding down the delete button, trying to find the right words to begin my sentence. Maybe I should just reminisce about last term and the beginning of term since I didn't write anything for the first *mathNEWS*. When this term started, I got to see a lot of my friends back again. Let's just say, my exponential distribution got stopped somewhere in a point and ever since, it just kind of stays constant or going down a little bit. Here, I'll give you a clue: it's about a creature that we should throw rocks at. I think I just figured out what I'm going to be writing in this issue. Since by being left alone by your significant other is not a fun feeling to have, so I'll write about what things you should or shouldn't do in a (long distance) relationship.

10. Don't just keep on rejecting his/her calls. If you do, you'll probably be better off ending the relationship.

9. If you keep on not replying his/her texts, he/she will probably think something is wrong since you don't care to reply to him/her, and to top it of, it might bother them that they can't do anything about it from far away.

8. If you don't try to at least give the effort to seeing him/her at least once every 2 weeks, I don't know what's wrong with you.

7. Don't try to hide the fact that you're in a relationship from your own friends, whoever they are, without a good reason. It gives the other partner a reason to doubt you even if there might actually be none.

6. Don't assume your significant other knows what you're thinking. They are not an oracle or a magic eight ball.

5. If you have an idea of when to visit them, tell them before making them feel guilty for meeting you the week before and not being able to see you the week after where you planned to come over.

4. Try to be there for him/her when they need you the most. Ask them how they are doing, even if you don't know what else to say. It's always nice to know that your significant other is concerned about your well-being.

3. An occasional phone call would be nice, and by occasional I don't mean once a month. Hearing the other person's voice can sometimes keep you sane. There's at least some sort of communication going on.

2. Don't always assume that they know how you feel. Sometimes, sharing can be a good thing and although what you share with them won't be the prettiest, your partner would be happy that at least you trust them with your secrets. If you miss them, tell them that you miss them. Don't just think that they will know it directly. You don't have to tell them all the time, once in a while would be nice. (Goes for any feelings that you have about them.)

1. When your partner shows up in front of your house uninvited, thinking of surprising you, don't just ditch them for no reason. They probably have a valid reason although they know that you have another plan in a few hours. Especially when it's your last day in town.

So anyways, that's my rant for this issue. Thanks for listening to me. I know some people might disagree with me, but that's my logic for right now. Ciao.

Queen B.