



THE WRITE ANGLE



A Letter From The Editors:

Founded in 2020, 'The Write Angle' is Exeter Mathematics school's official student newspaper. This is an accumulation of works from our students, run by a collection of student editors and technicians, posted on a fortnightly basis over the Winter and Spring terms. Here you can see articles, opinions and insights into life at EMS. We encourage all students to participate, whether by submitting articles or becoming a part time editor.

You have the freedom to write about what it is you are passionate about, so long as it can't be considered offensive or inappropriate. If you have any concerns about writing, come and talk to our editors and we will do our best to work with you, or simply email us your concerns. Our email is for submissions or concerns related to the school newspaper only, although biscuit related GIFs are also appreciated, Thank you.

Spooky Season is Upon Us!



Greetings all and welcome to the Halloween issue of the Write Angle! For year 12's spooky season came early in the form of October exams, whereas year 13's will have to wait for the spookiest of all November assessments (unless they need to sit entrance exams on November 3rd).

This is the season where the veil between order and chaos is at its thinnest, as can be seen by the increasing levels of untidiness within our school. Our resident ghost catchers have been worn thin this year, so do us a favour and do a quick tidy of any ghoulish related messes you spot around the school.

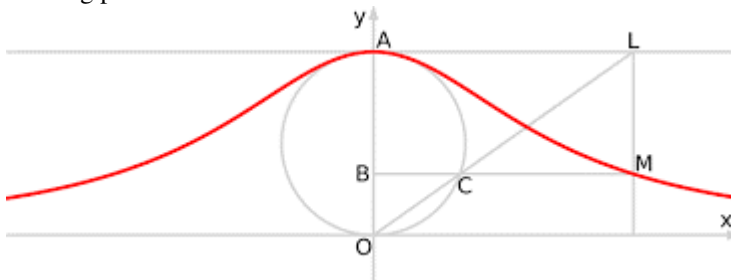
Happy Halloween (or equivalent)!

- The editors

The Witch of Agnesi



In mathematics, ‘The Witch of Agnesi’ is not in fact the cabin-dwelling hag you may have pictured. It is in fact the name of a cubic plane curve derived from two diametrically opposing points that lie on the circumference of the same circle. ‘The Witch’ is tangent to its’ defining circle at one of the two defining points on the circle’s circumference, and is asymptotic to the tangent of the circle that passes through the other defining point.



‘The Witch’ actually got its name from Maria Gaetana Agnesi - an Italian mathematician, philosopher, theologian and humanitarian. Perhaps disappointingly, Agnesi was not a witch, although in the 1700’s it would have been no sur-

prise if many rivals had perceived her as one. She was a woman of many accomplishments with the most prominent being Agnesi becoming the first woman to write a mathematics handbook, as well as the first woman to become a mathematics lec-

turer in a university. According to the history books, 'The Witch of Agnesi' was not christened out of spite from her jealous competitors and instead from a mis-translation of the Italian word for 'sailing sheet' in combination with her own name. The curve had previously been christened as "versoria" by Guido Grandi, an Italian monk known for his study of the rose curve and for the Grandi Series. Versoria in Latin is a word for sailing sheet, but in Italian the word closest to versoria is 'versiera' - meaning "she-devil" or "witch".

In its simplified form, The Witch is actually the graph of the derivative of the $\arctan(x)$ function. It is also useful in physics and also the application of probability theory, as a scaled version of The Witch is the probability density function of the Cauchy distribution. Other than that, there isn't much more to say about The Witch other than it's a pretty snazzy curve with a pretty spooky (if not slightly disappointing) name.

- Freya Dover

Medusa: Monster or Victim?



If you aren't familiar with the story of Medusa, it goes as such: Medusa was a mortal girl, a daughter of the sea gods Phorcys and Ceto. Her beauty attracted the attention of Poseidon, with whom she had a relationship. After becoming pregnant with his children in the temple of Athena, the virgin goddess herself became enraged and cursed her to become a gorgon. From here the perspective of the story changes to Perseus. Perseus was a boy who had been sent by the King of Seriphus to find and slay Medusa due to a whole host of family related drama that I simply do not have time to get into right now. He managed to do so, and left with her head as a trophy to be given to the goddess Athena.

In modern pop culture the figure of Medusa is that of an evil creature, ranging from cunning murderer imbued with the power to kill, to a simple mindless monster. Which unfortunately leaves us with a wildly inaccurate image of who Medusa actually was in the original story. While the telling of mythology is often told in an unbiased, factual way, more dramatic retellings almost always portray Perseus as a mortal hero fighting a vicious monster, the issue here is that Medusa was never any gruesome monster. In fact she was nothing but a victim, a helpless mortal

battered by the whims of kings and gods along with many mortals before her.

Being a mortal daughter of two gods, she was already born into heavy disadvantage. We are told that she was incredibly beautiful, which is what drew the attention of Poseidon. While it is unknown whether or not she wanted him as he wanted her, we can very confidently see the power imbalance between the two - a mortal daughter of a sea god against the definitive god of the sea. She became pregnant in a temple of Athena, goddess of virgins (amongst other things). While Athena could have been enraged with Poseidon, or stood to protect Medusa, she did neither, and instead took out her rage on the mortal who again could not stand against her in the slightest.

Medusa, cursed to turn men to stone, retreats to exile with her two gorgon sisters. Doing this, she saves countless people from suffering at the hands of the curse laid on her by Athena. Exile was never enough though, it seems fate in the form of an enraged goddess wanted to take more from her. The king of Seriphus became inspired to use her as a tool to further his own agenda, and sent the hero Perseus after her head. In the end, she was never given the chance to defend her-

self, and was slain in her sleep. Lastly, in death, her head was used on the shield of Athena, and her blood used both as a deadly poison and a miracle cure.

Medusa was a victim of those more powerful than her. Although her parents Phorcys and Ceto were gods, she wasn't protected. Poseidon, her lover (if you want to be as generous to assume they had a

consenting relationship) impregnated her and then left her to the rage of Athena. Athena, the goddess she served with her life, cast her aside without so much as a warning or redirection. The King of Seriphus could've left her alone, but sent Perseus after her, and finally Perseus, our *hero*, never gave her the chance to defend herself.

- Louie Bond

Jabez's Cooking Corner

A History of Chocolate Cake



The history of chocolate cake goes back to 1764, when Dr. James Baker discovered how to make chocolate by grinding cocoa beans between two massive circular millstones. A popular Philadelphia cookbook author, Eliza Leslie, published the earliest chocolate cake recipe in 1847 in *The Lady's Receipt Book*. Unlike chocolate cakes we know today, this recipe used chopped chocolate. During the 19th century, pastry chefs, notably in France and Austria, concocted sophisticated chocolate desserts to be enjoyed by the privileged elites.

For everyone else, chocolate in all its forms remained a rare treat, reserved for special occasions. It was not until the 20th century, as cacao prices became more affordable, that chocolate cake reached the masses. Today, there are many different types of chocolate cake, depending on the recipe and different types of chocolate used.

A Devilish Chocolate Cake

Ingredients

- 170ml of plant milk
- 1 tsp vinegar
- 200g sugar
- 140g oil
- 220g self raising flour
- 100g cocoa powder
- 1tsp baking powder
- 1tsp bicarbonate of soda
- 1/4 tsp salt
- 1tbsp coffee granules
- An icing flavour of your choice

Method

1. Pre-heat the oven to 180°C (accommodation inhabitants you know the drill, preheat at max and turn it down to 180°C when the red light finally decides to switch off), and line two cake pans with oil and baking parchment.
2. In a bowl combine the vinegar, oil, sugar and milk. Set aside.
3. In the bowl that you were previously told to set aside (trust nobody) sift in your flour, baking powder, bicarbonate of soda and salt, then fold the mixtures together carefully.
4. Dissolve the coffee granules in 2 tbsp of hot water and add into the cake mixture along with the cocoa powder.
5. Pour the batter into the tins and bake in the oven for 25 minutes until a fork poked into the center comes out clean.
6. Now, wait for the sponges to cool (sorry).
7. Decorate to your liking and grab a slice before you blink and the cake vanishes!

- Jabez Kent

Wii Sports: A History



Sport is both a defining and controversial topic within our society today. From corruption within governing bodies, to discrimination and violence spurred on by games - the way sport is presented in the media is often a cause of debate and disagreement. However, what if there was a way to enjoy these sports, without the pressure or competition of the negative culture that surrounds them in the media? In 2006 Nintendo had this same idea, to make sports more accessible to people of any background, and thus, Wii Sports was born.

In 2006, Wii Sports was developed for the release Wii system, with the intent of using its new motion control sensors in the remotes. The development was led by a developer called Katsuya Eguchi, famed for his work on other games like Animal Crossing and Star Fox. Originally, it was announced before E3 2006 to be Wii Sports: Tennis. However, this was expanded at E3 to include baseball, golf, and airplane. Before the release of the final game, this lineup underwent one further edit with boxing and bowling being added, and airplane being removed (though it was later included in the 2008

title Wii Sports Resort). On September 14th, it was announced that it would be included for free with the Wii console, and on 19/11/2006 Wii Sports was released in North America.

The game went on to be the 4th best-selling video game of all time, behind Minecraft, GTA V, and Tetris, selling just below 83 million copies to date. It is also the best-selling single-console title, although it was later also released for the Wii U. The success of this game led to the publication of a second title, Wii Sports Resort in 2008, which included only golf and bowling of the original sports, and a new 10 activities were made available.

Despite being a more family-oriented game, Wii Sports also has an impressive competitive side to it too. The current world record for most perfect games of Wii Sports bowling is held by John Bates, an 85-year-old American, who scored 20,000 perfect games. It also has a large speedrunning community, with the most popular speedrunning game modes being golf, all sports, and all sports: no baseball. The current record for the all sports speedrunning time stands at 7 minutes and

3 seconds, and the 9-hole golf record at 4 minutes and 36 seconds.

With this advent of e-sports, the focus turns to the disparity of recognition for athletes in virtual versus physical competitions. Should people competing for records and titles in games like Wii Sports be given recognition equal to that of professional athletes? Speedrunning events often come down to detailed and practiced strategies, for example careful choice of

clubs, and positioning shots to avoid replays in Wii Sports golf, whereas physical sporting events involve intense physical conditioning. Whilst this game and its community raise questions about the recognition of e-sports players, for now, Wii Sports is still undoubtedly one of the most pioneering games of its time, demonstrating the potential for motion controls to be integrated into gaming through virtual sports in the future.

- Nicholas Hall

Am I a Lesbian?



The “Am I a Lesbian? Master Doc” is a 30-page document that initially circulated on Tumblr in January of 2018. The blog post is divided into eight handy sections: compulsory heterosexuality, heteronormative societal conditioning, and same-sex attraction, featuring bullet point lists that help women and non-binary people to answer the question of “Am I a lesbian?”

The highly popular post among Tumblr’s LGBTQ+ community got removed by the website for ‘violating terms of service’ (sigh). Despite this, various users kept the lesbian master document alive online. There are numerous “Am I a Lesbian? Master Doc” Google Docs and PDFs that can be found on Twitter and Reddit. Most recently, the doc went viral on Tiktok as well, with various content creators talking about how the doc helped them come to grips with their own ‘lesbianism’ and attraction towards women.

The document, though written in an informal and conversational tone, dives into the rather complex topic of compulsory heterosexuality (comphet) and how it affects the way women and non-binary people

perceive their sexuality and even gender identities in relation to long-held societal expectations. It also focuses on past relationships with men and past experiences which could be signifiers of ‘lesbianism’, allowing readers to identify signs of comphet throughout their lives.

So, what is compulsory heterosexuality? Compulsory heterosexuality or comphet is a term that suggests heterosexuality to not be innate or “natural” but rather a political institution that is imposed upon women from a very early age as a means to disempower them. The “Am I a Lesbian? masterdoc” suggests that comphet easily ties in with the misogyny that causes a woman’s sexuality and even identity to be defined by their relationships with men.

Many lesbians feel a struggle between what they’ve been taught to desire (relationships with men) and what they really want deep down (relationships with women). The master doc argues that this looming societal conditioning is what forces lesbians to struggle with their sexuality for years, and what pushes them to get into dating men – despite being attracted to girls.

A copy of the masterdoc:

<https://www.docdroid.net/N46Ea3o/copy-of-am-i-a-lesbian-masterdoc-pdf>

- Daisy Williams

Divine Problems

This Weeks Problem:



So, you have 100 lockers (numbered 1 to 100, and all closed) and 100 people, and they line up outside the room. Then, the n th person in the line goes to each of the lockers that are labelled a multiple of n , and opens it if it was closed, and closed it if it was open.

Which number lockers will be open at the end?

Last Weeks Solution:

Firstly, imagine the numbers are in a circle, like on a clock face. you start with 1, 2, ..., n in clockwise order, and our two moves are:

swapping the numbers currently at positions "a o'clock" and "b o'clock" turning the clock face

notice that in fact you can swap any two numbers that are $b - a$ apart (for simplicity let's just assume $b > a$)

and in fact, you can swap numbers that are $2(b - a)$ apart, $3(b - a)$ apart, and so on, from repeatedly swapping

so now our question is: given a number, which other numbers can you swap it with

on the clock? after some experimenting, you'll see that you can swap two numbers if and only if they are a multiple of $\gcd(n, b - a)$ apart (hopefully this should be intuitive, but if you want a proper proof, look at the bézout's lemma)

so now back to our original setup. look at the numbers $\gcd(n, b - a)$, $2\gcd(n, b - a)$, $3\gcd(n, b - a)$ and so on. within these positions, they can swap any way you want, but they can't get out of that set of positions

the same goes for $\gcd(n, b - a) + 1$, $2\gcd(n, b - a) + 1$, $3\gcd(n, b - a) + 1$, ...

so you can think of it like there are different classes based on how far off a multiple of $\gcd(n, b - a)$ they are

so within the first class (the multiples of $\gcd(n, b - a)$) there are $\frac{n}{\gcd(n, b - a)}!$ ways to permute them, and the same goes for the rest of the classes

so the number of possibilities we can generate is $\frac{n}{\gcd(n, b - a)}!^{\gcd(n, b - 1)}$ finally, to get the probability, you just divide this by the total number of permutations, which is $n!$

so our answer is $\frac{n}{\gcd(n, b - a)}!^{\frac{\gcd(n, b - 1)}{n!}}$