THE WRITE ANGLE

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.

Current Affairs

The Funding of Hate speech

If you go on Instagram and search up the account @exeterstudentsforlife (ESFL) you will find a small community of Exeter university students that call themselves pro-lifers and believe that abortion is fundamentally wrong. The society states that they "advocate against abortion, promoting the dignity of human life and striving for its protection". This is a funded society, so why are they so controversial?

The Royal College of Psychiatrists found that women who are offered abortions are less likely to struggle with their mental health than women who carry unwanted or unintended pregnancies to term. Many people have abortions for lots of different reasons and it has been commented time and time again that it is no one's place to comment on those reasons as everyone's experiences are unique. An individual's human right to have autonomy over their body also encompasses freedom of choice regarding their right to abortions. Taking away freedom of choice in turn takes away one of our fundamental human rights, and from a moral standpoint no proportion of the population should be entitled to less rights over their bodies than the other.

Many arguments against 'pro-life values' comes down to the inclusivity of these ideologies. Freedom of choice legislations allow the inclusion of pro-life ideologies, as an individual's personal beliefs can only impact the choices they make. However, freedom of choice ideals are not encompassed in pro-life ideologies and therefore these 'anti-abortion-type' legislations are less inclusive of peoples differing beliefs.

Exeter Students For Life was founded by two men, both of whom do not and have not possessed uteruses in their lives. And yet, they felt strongly enough about their beliefs to form an official society at their university. Their decision of course was met with a lot of controversy amongst the student body. The society however, still stands.

So, where on earth are they getting their funding from? -For those of you who haven't heard of the students' Guild, it is essentially a students' council for the University of Exeter. The views projected in the (ESFL) directly violate the Guild's own code of conduct, considering that the existence of a society calling people who have abortions "sinners" discriminates against people that choose not to carry through with a pregnancy.

If you agree that the Guild and University should prioritise the wellbeing and safety of their students by taking appropriate action and abolishing this society then get involved. The views of the ESFL do not at all reflect the views of the university and as such should be viewed as two separate organisations. The problem many still have, is that the university is still endorsing these views through its funding of the society. There is currently a petition that you can sign, go online and search change.org – Guild funding hate speech, if you feel as strongly about this issue as thousands of other people do.

- Daisy Williams and Freya Dover

Jabez's Cooking Corner

The Bakewell Tart: A History

What we know as the Bakewell Tart started its life as something called the Bakewell pudding, a puff pastry dessert containing a layer of jam and a layer of eggy almond paste. The Bakewell pudding however, has no evidence of ever originating in the town of Bakewell. It had been rumoured that a variation of the bakewell pudding was first created in the White Horse Inn of Bakewell in 1820, but this Inn was in fact demolished in 1805. Spooky huh? Our modern day Bakewell tart came later in the 1900's when someone somewhere decided to replace the almond custard with Italian frangipane which later became known to be topped with icing and halved glacé cherries. (Although to be somewhat avant garde we have also included marzipan because "When in doubt, add marzipan." Said someone probably, somewhere in the general vicinity of Germany.)

This article was supposed to be a whimsical jaunt into what you can bake using Poundland ingredients - 'Supposed' being the key word in this sentence. Has anyone else noticed the drastic decline in the baking section of their local Poundland recently? Before last Wednesday we most certainly had not. In fact, it took visiting a total of three different shops of increasing societal standing (Poundland, Tesco, Sainsburys) before we could finally acquire glace cherries or roll out marzipan that cost less than £2.00. So with this disgraceful turn of events, let's get into the recipe.

A Pricier than Poundland Bakewell Tart Recipe by Jabez (and No-one else)

Ingredients:

For the shortcrust:

- 215g plain flour
- 130g vegan butter
- 20g sugar
- 2 tbsp cold water

For the filling:

- Whatever quantity of raspberry jam sparks the most joy
- 100g vegan butter
- 110g sugar
- Almond extract to taste (use the whole bottle I dare you)
- 200g ground almonds
- 120ml plant milk

For the top:

- A certain quantity of icing sugar that can neither be specified by man nor god
- Marzipan (see above)
- A pot of glace cherries (minus the half that go mysteriously ‘missing’)

Method:

1. Preheat your oven to 180℃ (If using accommodation ovens please multiply by 1.5 and then decrease to 180℃ before baking).
2. For the pastry, combine the flour and vegan butter in an appropriately sized mixing bowl until the mixture resembles bread crumbs. Then, slowly combine the cold water with the bread crumb mixture until the mixture can be pressed into a ball.
3. Place the pastry dough in the fridge and see step 4.
4. See step 5.
5. See step 4.
6. Continue referring to steps 4 and 5 for 30 minutes until your pastry has sufficiently chilled.
7. Grease a tart dish and line the bottom with baking parchment.
8. Roll out the pastry until it is roughly the same thickness as a £1 coin (two 1p coins will also suffice).
9. If you manage to transfer your pastry into the dish without any cracks forming then this is proof that you have been blessed by the gods of baking and you must sacrifice your first born child (or something of that nature). But anyway, when you have managed this gently press the edges of your pastry into the edge of your dish before putting in the oven for 15 minutes or until golden brown. (You could blind bake your pastry if watching the GBBO has made you feel like overachieving.)
10. While your pastry is in the oven, it is time to start on the frangipane!
11. In a bowl combine the vegan butter, sugar and your desired volume of almond extract until ‘light and fluffy’.
12. Next, fold in the ground almonds and plant milk until everything is incorporated then set aside.
13. Once your pastry has a nice golden tan, remove it from the oven and allow it to cool slightly.
14. Spoon your desired height of jam into the bottom or your pastry case, spreading evenly.

15. On top of your jam layer, transfer your frangipane mixture. Be careful to not accidentally mix the jam and the frangipane into each other.
16. Bake for a further 45-50 minutes at 180℃ to allow the frangipane to cook (don't worry if the middle is still slightly jiggly after this time as it will firm up when it cools).
17. After taking your tart out of the oven you have two choices:
    1) You can wait for it to cool a little bit and then proceed to eat it before you have the chance to decorate.
    2) You can wait for it to cool completely and create your very own work of art.

To be clear, these are both extremely respectable options.

18. If you picked 2) then yayy! You can now continue from step 18. If you picked 1), then please skip to step 21.
19. After you have allowed your tart to cool you can now add your marzipan layer. This step is probably the most simple so we will not provide instructions.
20. Once your marzipan is transferred you have free reign to do what you want as long as it involves the use of water icing and glace cherries. For our tart we simply used a cross hatching method for the icing and dotted the cherries in the negative space (obviously the superior method).
21. Now it is ready to enjoy! (whoop whoop)

- Jabez Kent

The Land of Maths

The Monster Group

Group Theory is a fundamental theory in mathematics which sets up rules for defining the symmetries of an object inside a special collection of values called a 'group'. A group is a set of values under a binary operation that conform to specific axioms, meaning that a group is a set of values that, when under a set action, conform to a selection of rules. These rules are closure (any combination of 2 elements within the set using the binary operation must also exist in the set), associativity (essentially saying that any 3 elements can be combined using the binary operation in any order), identity (there must be an element of the set which when combined with any other element, gives the other element) and inverse (for each element in the group there must be another element that when the binary operation acts upon them, it gives the identity element).

For instance, an equilateral triangle has a group of symmetries with 6 elements: a 0 radians rotation, a $2\pi/3$ radians rotation, a $4\pi/3$ radians rotation and then a line of symmetry from each vertex. Any combination of these rotations/reflections is still contained within the group. For instance, $2\pi/3$ radians rotation + $4\pi/3$ radians rotation = 0 radians rotation. They can be combined in different orders, the 0 radians rotation works as an identity and you can combine elements to give back the original shape.

In 2004, after a massive undertaking from hundreds of different mathematicians across the globe and a proof that spans tens of thousands of pages, the classification for all simple finite groups was born. This was a monumental discovery in the course of group theory as all groups can be split into a combination of simple groups- akin to prime factorisation of any number.

The basis of the theorem is that all finite simple groups fall either into 18 infinite families or one of the 26 “Sporadic Family” groups. This patched-together structure is particularly interesting and ironic for something that serves as the basis for something as simple and elegant as symmetry. An infinite family is an infinite number of groups with the same base structure. As an example, we have Abelian groups. Abelian groups are cyclic groups and are named after the Dutch mathematician Abel. This means the group is commutative. All finite Abelian groups fall under the first infinite family.

If we look at the “Sporadic Family”, they are sorted into 20 groups inside the “Monster Family” and 6 “pariahs”. The “Monster Family” (not to be confused with The Munsters or The Addams Family) is named after the biggest group in the “Sporadic Family”: The Monster Group. The Monster Group was first predicted by Bernd Fischer and then proven later by Robert Griess. The Monster Group has a colossal size of (drumroll please):

808,017,424,794,512,875,886,459,904,961,710,757,005,754,368,000,000,000

members, or approximately $8 \cdot 10^{53}$ with each member of the group being approximately 4.5 gigabytes in size. To clarify, finding huge groups isn’t that interesting. In fact, the group of permutations of 101 points is even larger than this. The unique and interesting thing is this finite group that doesn’t obey the other rules that other groups follow seems to randomly stop after $8 \cdot 10^{53}$ members.

Now, if we factor in what we discussed earlier, a group acts upon an object to give the object’s symmetries. So, what does the Monster Group act upon? In order to answer this, we need to look much further than traditional 3-dimensional space: 196,883 dimensional to be exact. As previously stated, each member of the group is approximately 4.5 gigabytes of data in a 196,882 by 196,882 grid (it acts on 196,883 dimensions when including complex numbers but on only 196,882 over a finite field of real numbers).

No-one quite understands what the monster is doing there but it has led to some interesting shifts in mathematics. For instance, in the 1970s, John McKay was shifting his field of study to Galois Theory and noticed that a number one bigger than 196,883 appeared inside the series expansion of a fundamental function relative to modular forms and elliptic functions. John Conway (an influential figure in the Classification of all Finite Simple Groups and the discovery of the Monster Group) called this relationship “Moonshine”. However, after these coincidences happened more and more frequently, a mathematician named Richard Borcherds proved there was a link and named it “The Monstrous Moonshine Conjecture”. This created a link between two seemingly different fields of mathematics.

Several mathematicians, including Conway himself, find the monster as a mysterious and fascinating object. Conway has been quoted to say "There's never been any kind of explanation of why it's there, and it's obviously not there just by coincidence. It's got too many intriguing properties for it all to be just an accident." And, with this new added level of October-mysteriousness, we can’t help but agree with Conway - nothing this interesting could be just an accident, could it?

- Nia

Devine Problems

You are given positive integers n, a and b
You then write the numbers 1 to n on a board in a horizontal line, in increasing order.
“Where is this going?!?” you ask. Well…

A ‘move’ consists of doing one of the following:
- erasing the leftmost number and writing it again on the right of all the other numbers
- swapping the ath number from the left with the bth number from the left

Given a random permutation of the numbers 1 to n, what is the probability (in terms of n, a and b) that it is one that you can end up having on the board after a finite number of moves?

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Read to the end and interested in joining? The write angle is open to all members and requires as much or as little commitment as you would like! We currently meet in Descartes every Wednesday between 1pm-2pm, plus there will be biscuits! So come along and say hello :)

THE WRITE ANGLE MEETINGS:

WEDNESDAYS 1PM-2PM

Everyone welcome!