# ColAUMS Space

Newsletter of the AUMS | Issue 1, 2022

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## Upcoming events

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| Meet & Greet | - | 04/03 |
| Pi Day Doughnuts | - | 15/03 |
| IMC Maths Olympiad | - | 24/03 |
| Industry night | - | 29/03 |
| Pub Crawl | - | 06/05 |
| Women in Maths Day | - | 12/05 |

## Contact details

AUMS email
mathsatadelaide@gmail.com
AUMS website
aums.org.au
AUMS Facebook page
facebook.com/UofAMathsSociety
AUMS Instagram
@adelaideunimaths
Have an idea for an article or want to contribute? Contact the editor at colaums.space@gmail.com
**Need a membership?**
See us at our next event to sign up or use the link below!
Q PAY link

## Introduction

Hi and welcome to colAUMS for 2022! While we don't have the maths to explain why it still feels like 2020, we do have an awesome line-up of stories and puzzles to keep you entertained for the year. ColAUMS is back and better than ever with an awesome article about Pi in anticipation of International Pi Day (they made it a pubic holiday!) and a preview of all the events we have planned for this semester.
We have our first Meet and Greet of the year in week 1, a donut giveaway for Pi Day, Industry night, a Maths Olympiad, and the chance to get mentoring from students who have been there and done that! And of course, plenty of chances to eat pizza and make lots of friends! And a pub crawl, quiz night, maths ball and student talks all to come later in the year!
Thank you to all the new members that have signed on this year, we are looking forward to welcoming you to the AUMS family, and welcome back to our old members.

- *Kaitie Atkins, AUMS President*

## $\pi$ Day (3.14)

"Exploring pi is like exploring the universe", said David Chudnovsky, a mathematician (who built his own supercomputer to explore the inner infinity of pi).

Pi, denoted by the Greek letter "$\pi$", is a constant value used in maths that represents the ratio of a circumference of a circle to its diameter, which is just about 3.14...15...9265359... The beauty of pi is that the digits do not repeat as it is an irrational number, which is why the ancient Greeks struggled to comprehend it, considering pi to be a rational number.
Every year, Pi Day lands on 3/14. This year, Pi Day is on Monday, March 14. The fourteenth of March is also Albert Einstein's birthday, so altogether it's nothing short of a mathematician's delight. It is a day that combines fun, education and pie!

Curious who came up with the recipe for pi? The symbol for pi was first used in 1706 by William Jones and was later popularised by Swiss mathematician Leonhard Euler [1].

Dwelling on the applications of pi, it is the most useful and powerful number that we know of, used in Science, Geometry, Number Theory, Nature etc... Since pi's discovery, it has been used every day, for navigation purposes, to track population dynamics, study the structure of the eye, understand the structure and function of DNA, calculate the areas of the skin of the aircraft, calculate the number of death in a population and NASA even uses pi to calculate the size of craters, to figure out how much propellent a spacecraft has, or what an asteroid is made of!

Historians debate that the ancient pyramids of Giza were constructed using pi, the reason being quite obvious: the pyramids are geometrically perfect. The magic of pi makes all this possible!
Pi has 6.4 billion known digits; it would take a person approximately 133 years to recite all of them without stopping. Don't ever try to print out a billion decimals of Pi because it would roughly stretch from New York City to Kansas!

Food for thought:Mathematician: "$\pi$r2."Baker: "No, pies are round. Cakes are square."

*- Pavithra Bharatham Rengarajan, AUMS Committee Member*

## Puzzle

Try to solve the alphanumeric puzzle, where each letter is a unique digit between 0 and 9, and the leading letters (T and F) cannot be zero.

$$\begin{array}{rr} & TWO \\ & FOURTEEN \\ & FIFTEEN \\ + & TWENTY \\ \hline & FIFTYONE \end{array}$$

## Proof 101; 100 proof; proving process — some assembly required to make a pun

Writing a mathematical proof comes easy to some people. It never came easy to me. I could scratch around on a piece of paper and have something with deltas and epsilons, and the odd 'hence', and sure, it looked like a proof, but I really had no idea what I was doing most of the time. What a terrible mathematician!
Something I found useful was advice given to me by my second-year analysis lecturer. He stressed the need to check in with yourself when writing a proof: ask yourself, and if need be, write down the words "what can we do with this information? How does this help? Can we adapt the above argument to our current needs?" and such-like statements. There's no need to write down a James Joyce stream of consciousness about your innermost workings (you were only supposed to blow the bloody doors off, after all), but some remarks to remind you what you are doing and where you are going cost little, and can be the difference between grasping the idea, or having it slowly slip away.

Two Italian Job quotes in the one sentence? Surely that's too much, Tim? Never.

When writing a proof you will change tack several times, there will be dead ends, and you may go around in circles for a while.

I've never known success to come from clutching to notation, or introducing new sub-subscripts. But if you ask yourself questions such as "can I do the n=1 case?" or "what is the trivial or toy example of this case?" or even "do I regret my life choices up to this point" at least that's something. Then, by answering one of these sub-sub cases, you may notch up a win, and a wee bit of confidence. Oh, sure, the main proof remains, but when things line up and you get a win under your belt, all is right with the world...

Then there's the final product: a proof with lots of asides, questions, Italian Job quotes, near-circular arguments (ellipsoidal arguments) and the like. But so long as you get there, great! You don't need to give a copy-book proof that is boiled down to the fewest lines readable by a Turing machine. It doesn't matter how elegant your proof looks, as so as it works.Ha! I can hear the objections being raised already. But the quicker we can ditch this romantic notion of mathematics being elegant, aestethic, etc., the quicker we can get on with the rest of our lives — more on that next time.

*- Tim Trudgian, MathsFeed,*

*https://mathsfeed.blog/*