

SHORT CIRCUIT

Canberra Mathematical Association Inc.

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NEWS AND COMMENT

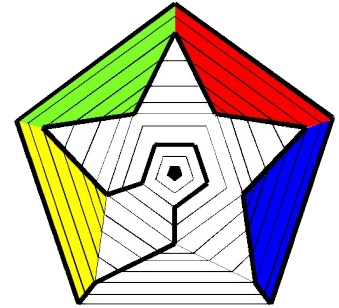
At the half-way point in the year, we might reflect that 10-year old students have progressed in their development by 5% since the beginning of the year. Relatively new teachers at age 25 have matured by 2% over the same period, while 50-year old teachers have become older and wiser by a mere 1%.

Plausible sounding but not particularly helpful insights of this sort are the essence of the piece on AI on page 2.

For teachers of students in year 11, now is the time to consider the National Mathematics Summer School for 2026. Information about this is also on page 2.

Consider also the Canberra Mathematics Talent Quest, (page 2).

Read on ...



NEWSLETTER

The CMA newsletter, Short Circuit, is distributed monthly to everyone on our mailing list, free of charge and regardless of membership status.

That you are receiving Short Circuit does not imply that you are a current CMA member but we do encourage you to join.

Short Circuit welcomes all readers.

CMA MEMBERSHIP

Memberships run from **1 Jan to 31 Dec** each year. Membership forms may be downloaded from the CMA [website](http://www.canberramaths.org.au): <http://www.canberramaths.org.au>

The benefits of Membership of CMA may be found on the website.

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**CANBERRA
MATHEMATICAL
ASSOCIATION**

NMSS 2026

The National Mathematics Summer School is a program for the discovery and development of mathematically gifted and talented high school students from all over Australia. Participation is restricted to about 75 students who have completed Year 11 in school.

NMSS 2026 will take place from 4 to 17 January. The school is set to run as usual at the Australian National University, with all students and staff in residence on campus.

On the [NMSS](#) website there is a new centralised, online application form. The [application](#) process has now opened for students currently in Year 11.

On clicking the [application](#) link, an information page will appear on which the student will find an Application Form button. This brings up the application form. On submission, the form goes to the NMSS director and subsequently to CMA for selection of the local participants.

The application deadline has been set to Friday 29 August. A student is required to list the email address of their nominating teacher and the submission of their form will trigger an email request for the teacher to complete an online nomination form within a few days.

Queries from students, parents or teachers, may be sent by email to the NMSS director, Professor Norm Do at admin@nmss.edu.au.

CANBERRA MATHEMATICS TALENT QUEST 2025

Students throughout the ACT put considerable time and effort into mathematics assignments and projects and they now have a means to get local or even national recognition and encouragement for their work.

Go to the CMA webpage or click this [link](#) to get the details.

AI DISQUIET

CMA's Hobart correspondent, Ed Staples, noticed a car numberplate [ED 7219](#) in the TV series Bay of Fires, shot in Tasmania.

Being himself an Ed and recognising 7219 as a permutation of 1729, the Hardy-Ramanujan number (the smallest number that can be expressed as the sum of two cubes in two different ways), he asked his AI whether 7219 had any special properties, particularly to do with sums of squares.

Yes, said the AI, it can be expressed as $73^2 + 50^2$ or as $53^2 + 64^2$.

As the reader may check, the AI is, in this instance, a filthy liar. (The same reader will notice the anthropomorphism here and throughout this piece. It is the [Eliza effect](#).)

Ed wonders who could be feeding the AI such scurrilous nonsense and how it could make such a manifestly false statement.

A charitable explanation could be that the AI is dyslexic and also unaware of the distinction between squares and cubes. More likely, it just makes stuff up that sounds right.

Ed says, 'The uninitiated could easily be sold on its answers—the way it tells it—a direct, definitive, no nonsense, confident announcement, and yet it's all garbage. Misinformation in general via these things is leading us into a very scary world.'

The question we face is how we are ever to distinguish between statements generated by an AI that are true, merely plausible, or blatantly false.

This disquiet relates particularly to the varieties of AI that people access on their personal devices. Typically, these AIs have no mathematics engine. They are not reliably logical or truthful.

In a [book review](#) published in The Conversation, University of Queensland research fellow Luke Munn explains that 'Rather than actually understanding a concept in all its social, cultural and political contexts, large language models carry out pattern matching: an illusion of thinking'. Researcher Emily Bender has called them '[stochastic parrots](#)'

reflecting their utter dependence on the particular sets of data they have been trained on.

But AI is not one thing. More specialised AIs may possibly have real virtues, but the publicly available sort of generative AI has no ‘buyer beware’ sign attached. ‘Making stuff up that sounds right’ is about as much as can be expected.

It is of concern that users may be misled through being unaware of this limitation. Students getting help with their homework and workers in government and industry court bad consequences if they fail to engage their human critical faculties with what is being produced by generative AIs.

In asking Google’s AI about the number 7219, Ed believes he may have confused the machine. A human might see that 7219 is a prime number that is one less than a number divisible by 4 and therefore (omitting some reasoning) it cannot possibly be the sum of two squares. The AI, however, deciding to give an answer pleasing to the user, has made something up.

An AI in a more fanciful mood might have said, ‘Because there is a face of the moon that we never see, the number 7219 cannot be expressed as a sum of squares’. This, though grammatically correct and true as an implication in formal logic, would also be misleading.

MATHS ANXIETY

Teacher Magazine of June 13, from ACER, has an [infographic](#) of insights from PISA 2022 about students’ anxiety about mathematics.

Results from the Australian states to six questions are shown alongside the OECD averages.

A focus on comparisons reveals that in four of the six questions Australian students are hardly different from the OECD average, while for the other two questions, Australian students are considerably less likely than average to ‘worry that it will be difficult for me in mathematics classes’, and Australian

students are somewhat less likely than average to ‘feel anxious about failing in mathematics’.

However, a focus on the percentages themselves, rather than the comparisons, suggests that across the OECD students have an alarmingly high level of mathematics anxiety. For example, 65% ‘worry that I will get poor marks in mathematics’.

It may be argued that the design of the questions partly explains the responses the students made. Students may well be anxious about a host of things, mathematics among them, making their responses somewhat predictable, and the PISA test itself is likely to signal stress for a student.

Whatever the case, maths anxiety is without doubt something to deal with in the classroom. It becomes a significant issue when it inhibits students’ ability to learn and their enjoyment of the subject.

PUZZLES

1. Age difference

[This question appeared in last month’s edition of Short Circuit but due to this editor’s failure to understand 18th century American English, it was wrongly posed and had no solution. Here it is again.]

Isaac Greenwood’s 1729 book, titled ‘Arithmetik Vulgar and Decimal: with the Application Thereof, to a Variety of Cases, in Trade and Commerce’ contains the following problem about a husband and wife.

‘... [suppose] *One* is *Three* times as old as the *Other*, and after *Fifteen* years, that the *One* would be just as old again [i.e. twice as old] as the *Other*. *How old* was each of Them when they married?’

2. Sums of two squares

Explain why no odd prime number that is one less than a number divisible by four can be expressed as the sum of squares of two integers.

PUZZLE SOLUTIONS from [Vol 16 No 6](#)

1. Fixed point

Three numbers a , b and c are in arithmetic progression. The linear relation $ax + by + c = 0$ has a straight-line graph. It is claimed that the line always passes through a certain fixed point. Identify the fixed point and explain why it exists.

The numbers a , b and c can be expressed as a , $a+k$, and $a+2k$ respectively. So, the linear relation is $ax + (a+k)y + a+2k = 0$. Thus, $a(x+y+1) + k(y+2) = 0$. By putting the brackets equal to zero, we see that this is true for all k and all a when $(x, y) = (1, -2)$.

2. Age difference

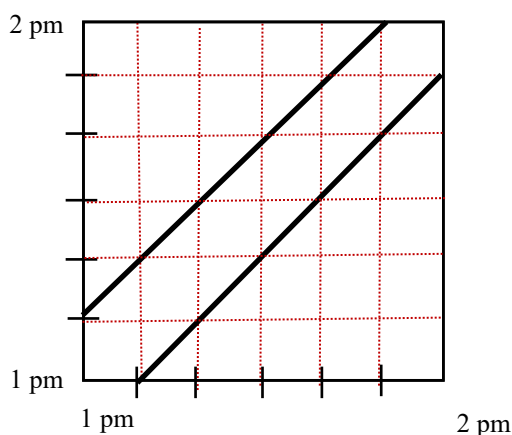
See page 3.

3. Unlikely meeting

Two friends set up an appointment time between

1 p.m. and 2 p.m. They each decided to wait for the other no longer than 10 minutes on arriving sometime within the hour. How likely are they to meet?

Set up a pair of axes showing the possible arrival times of the two friends. There will be a region of the graph containing the points representing arrival times such that the meeting succeeds (... the region between the sloping lines in the graph below.) Points outside this region represent arrival times such that the friends fail to meet. The area of the region of success relative to the whole area is the probability that the friends will meet.

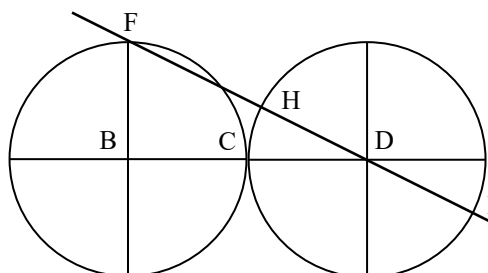


The probability that the friends meet is $11/36$.

4. Circles and a ratio

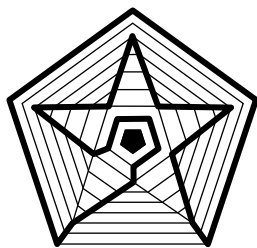
Two equal circles are centred at B and D and the radius $BC = CD$. Point F is at the top of (B) and the line FD crosses (D) at H and I.

What can be said about the ratio HI/FH ?



Let the circles have radius r . Then $HI = 2r$. $FD = r\sqrt{5}$, and so, $FH = r\sqrt{5} - r$. Thus, $HI/FH = 2/(\sqrt{5} - 1)$.

That is, $HI/FH = (\sqrt{5} + 1)/2$ or the special number φ .



**NEWSLETTER OF THE CANBERRA
MATHEMATICAL ASSOCIATION INC. INC**

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We're on the Web!
<http://www.canberramaths.org.au/>

ABOUT THE CMA

The Canberra Mathematical Association (Inc.) is the representative body of professional educators of mathematics in Canberra, Australia.

It was established by, among others, the late Professor Bernhard Neumann in 1963. It continues to run - as it began - purely on a volunteer basis.

Its aims include

- * the promotion of mathematical education to government through lobbying,
- * the development, application and dissemination of mathematical knowledge within Canberra through in-service opportunities, and
- * facilitating effective cooperation and collaboration between mathematics teachers and their colleagues in Canberra.

THE 2025 CMA COMMITTEE

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Vice President	Aruna Williams
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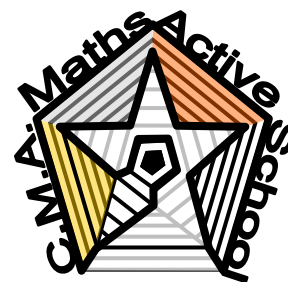
University of NSW Canberra

Australian Catholic University

Melba Copland Secondary School

ACT Education Directorate

Mother Teresa School



Theresa Shellshear is CMA's COACTEA representative.

Bruce Ferrington is CMA's AAMT representative.



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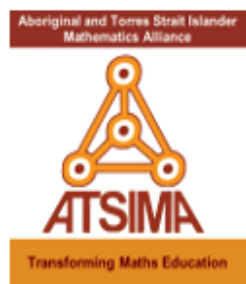
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AAMT POSITION PAPER

[Pedagogy in Mathematics.](#)

In the latest [Strength-in-Numbers](#) podcast, Allan Dougan and Catherine Attard discuss the recently released position paper.

COMMITMENT STATEMENT



Our responsibility is to drive a cultural shift to make a systemic difference in mathematics education for Aboriginal and Torres Strait Islander learners.

We commit to:

- truth-telling which recognises the past and builds capacity for the future
- building relationships by listening to and learning from and with Aboriginal and Torres Strait Islander Communities
- creating sustainable partnerships based on trust and respect
- leading and supporting culturally responsive practices and
- advocating for a shared understanding of success.

In doing so, we agree to be unwavering and accountable in actioning this commitment to achieve positive outcomes for Aboriginal and Torres Strait Islander learners.

ATSIMA CONFERENCE

ATSIMA's [biennial conference](#) will be held 1–3 October 2025 on (Lunawuni) Bruny Island, (Lutruwita) Tasmania.

The theme is: *palawa kani pumili waranta rrala* Our Language Our Strength.

‘...As mathematics educators, we need to ensure that we value language within the teaching and learning of mathematics.’

NAIDOC

From Belco Arts: NAIDOC in the North is a celebration of Aboriginal and Torres Strait Islander Culture through story, song, art, dance and ceremony.

