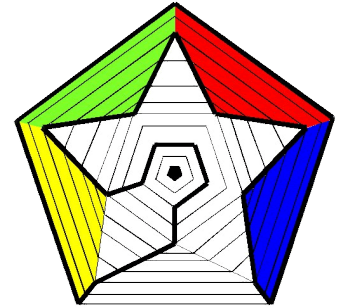


SHORT CIRCUIT

Canberra Mathematical Association Inc.

VOLUME 16 NUMBER 9

SEPTEMBER 2025



NEWS AND COMMENT

On page 2 there is a message about a research project currently being undertaken by Professor Amie Albrecht and Associate Professor Lisa O'Keeffe of the University of South Australia.

Teachers are asked to participate in a survey on the meaning of effective teaching in their own practice.

This is an opportunity for teachers to reclaim a small part of their agency in the profession of teaching.

Please find a moment to submit a response.

In a similarly serious mood, we point readers to an article by Chris Bonner and Tom Greenwell published in Inside Story. More details are on page 2: *Canada*.

The Australian Association of Mathematics Teachers has announced that it will discontinue publication of its two journals, Australian Primary Mathematics Classroom and Australian Mathematics Education Journal.

Analysis has shown that the publi-

cations are unsustainable and AAMT believes they are no longer the most effective way to connect with its members.

Instead, subscribers are referred to AAMT's social media channels and to the [podcast](#) series. The [newsletter](#) Highest Common Factor will continue and there is discussion about inputs from the Mathematics Education Research Group of Australasia.

How this and other recent changes by the AAMT will affect CMA members, and particularly the price of membership, is yet to be determined but will be a matter for consideration by the CMA council.

The Australian Academy of Science's program [reSolve](#) has announced new resources in Statistics for years 2 and 5. Click the link to see the full offering.

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
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YOUR VOICE - A SURVEY

What Does Effective Teaching Look Like in Your Classroom?

Teaching approaches are frequently discussed in media and policy, but teachers' voices are often missing

This 10-minute anonymous survey from the University of South Australia invites Australian mathematics teachers to contribute their classroom expertise to important conversations about mathematics pedagogy. This is part of a research project aiming to create a more informed understanding of the diversity of teaching practices used.

If you would like to share your experiences, please take the survey [here](https://unisasurveys.qualtrics.com/jfe/form/SV_ezVdDo8RM4XhZ9Y)

(https://unisasurveys.qualtrics.com/jfe/form/SV_ezVdDo8RM4XhZ9Y)

Research by Professor Amie Albrecht and Associate Professor Lisa O'Keeffe, University of South Australia

ATSIMA ACTION REPORT

After a summit meeting in Adelaide in 2024, called by the Aboriginal and Torres Strait Islander Mathematics Alliance and AAMT, CMA made an action plan for implementing the commitment statement that was agreed to by the meeting. (The commitment statement is on the front page of the CMA [website](#).)

CMA councillor Yuka Saponaro reports some progress. Yuka has developed a rapport with several First Nations mentors who have offered guidance, support and collaboration to create a cross-curriculum maths excursion resource.

Yuka has named the resource an Applied Analytical Maths Program. It uses First Nations pedagogical ideas to reduce maths anxiety and improve engagement. Yuka's presentations at the coming MANSW and ATSIMA conferences will be about the impact of this program.

As well, Yuka has attended the Aboriginal and Torres Strait Islander Education Symposium again

this year. A collaboration with her SA First Nations mentor has given her an opportunity, at one of the workshops, to continue raising awareness of the National Commitment Statement and CMA's role.

CANADA

Last year, a band of educators travelled to Canada to investigate why that country always seems to be ahead of Australia in school achievement and equity.

The visit produced a report, [Lessons from Canada: an equal school system is possible](#), and now an article, [Lessons for Australian schooling](#), by Chris Bonner and Tom Greenwell, published in Inside Story. The article contains links to the report and to much other relevant commentary.

There exists in this country an Index of Community Socio-educational Advantage ([ICSEA](#)), which is explained on ACARA's My Schools website. The educators who undertook the visit to Canada did so out of concern that the differences between schools above and below the ICSEA average are becoming very noticeable.

Bonner and Greenwell (among others) give a dismal assessment of the condition, particularly with respect to equity, of education in Australia. They point out some unfortunate societal consequences, but suggest that there may yet be hope. Their optimism comes from observations in three Canadian provinces, with differing education policies and contrasting outcomes, and with correlates in Australia.

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.’

CMA IN PRIMARY SCHOOLS

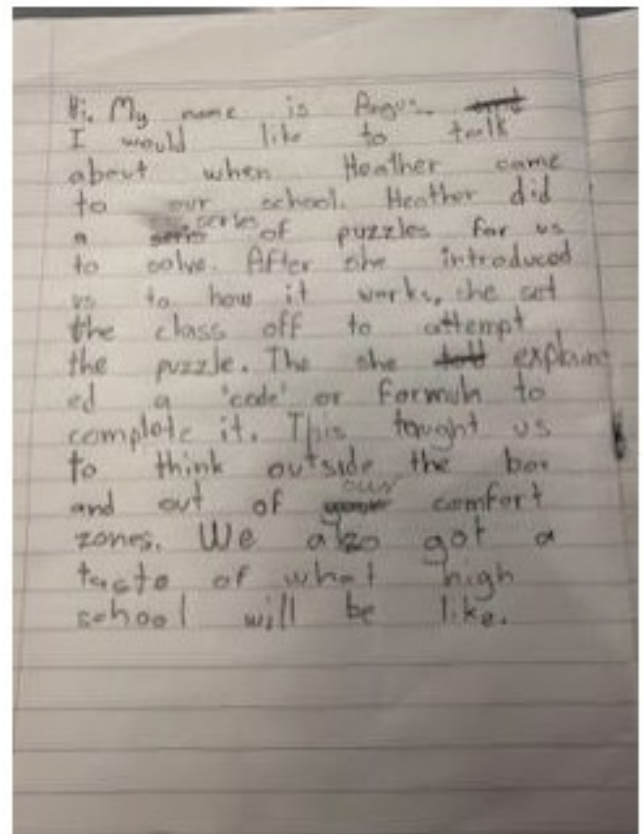
Recently the CMA sent a representative to Garran Primary School for their STEM project and to Wanniasa Primary School for a special maths morning.

Heather Wardrop developed a presentation focusing on the importance of mathematics and how it is a vital but hidden component in modern life. She presented some interesting problems, which the students completed in groups.

There was an entry point to the problems for all students, culminating in a discussion about the power of algebra to predict and explain everyday situations. She described the sorts of mathematics they could expect in high school and beyond, encouraging them to value their achievements in mathematics and in other subjects, pointing out that mathematical learning relies heavily on good skills in language.

The problems highlighted the importance of being able to think differently about mathematics and patterns.

A student from Wanniasa Primary School provided a reflection of their experience. It is reproduced to the right. The hand-written text is hard to read, so we have re-typed it below the facsimile.



Hi, my name is Angus

I would like to talk about when Heather came to our school. Heather did a series of puzzles for us to solve. After she introduced us to how it works, she set the class off to attempt the puzzle. Then she explained a 'code' or formula to complete it. This taught us to think outside the box and out of our comfort zones. We also got a taste of what high school will be like.

BAXTER 2025

The Mathematical Sciences Institute at the ANU will run a conference (8-11 September) to celebrate the life and achievements of Emeritus Professor Rodney James Baxter 1940-2025.

It will highlight Professor Baxter's extraordinary career and pioneering contributions to exactly solved models in statistical mechanics, which continue to inspire profound developments in key areas of mathematics and physics.

There is no registration fee but participants are asked to register.

Find out more on the [webpage](#).

MATHS LIKE A GIRL

[Teacher magazine](#) has an article written by Martin Westwell, chief executive of the South Australian Department of Education.

Westwell reminds readers of an advertisement that was launched in 2014 that highlights how girls' confidence can drop during puberty and how the humiliating messages society sends, often unintentionally, can have a significant impact. Click [Run like a girl](#) to see the ad.

A gender gap in maths peaks around year 4. Westwell asks, "Are we really signalling to girls that they 'learn maths like a girl'? It appears so."

PUZZLE SOLUTIONS from Vol 16 No 8

1. Egypt

What fractions, all different, are needed to make a sum adding to $10/11$?

One way to solve this is to repeatedly subtract the largest possible unit fraction, step-by-step. The procedure is known as the 'greedy algorithm'. Thus,

$$10/11 - 1/2 = 9/22$$

$$9/22 - 1/3 = 5/66$$

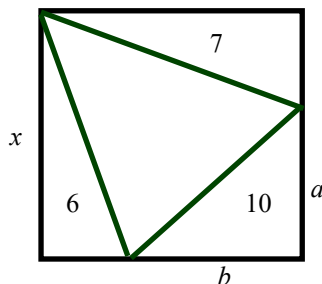
$$5/66 - 1/14 = 1/231$$

$$\text{So, } 10/11 = 1/2 + 1/3 + 1/14 + 1/231$$

An interesting question is whether the greedy algorithm always terminates. It could be that the steps go on indefinitely. Note that in the example the numerators in the remainders reduced at each step so that eventually a numerator of 1 had to be reached. Can you prove that this always occurs?

Wikipedia says the greedy algorithm always works but it does not always find the simplest solution.

2. Geometry to algebra



The areas of the three triangles in the corners of the square are 7, 10 and 6 units. Find the area of the central triangle.

We added labels to three of the line segments in the diagram.

Thus: $x(x-a)/2 = 7$, $x(x-b)/2 = 6$, and $ab/2 = 10$. From the first two of these equations, $a = (x^2 - 14)/x$ and $b = (x^2 - 12)/x$.

Then, using the third equation, we find $(x^2 - 14)(x^2 - 12)/x^2 = 20$, a quadratic in x^2 , the area of the square. That is, $x^2 = 42$.

The area of the central triangle must be 19.

3. Factorial

There exist three distinct numbers, each of which is equal to the number of decimal digits in its factorial. Find them.

It is useful to note that a number written in scientific form, for example 2.4×10^n , has $n + 1$ digits.

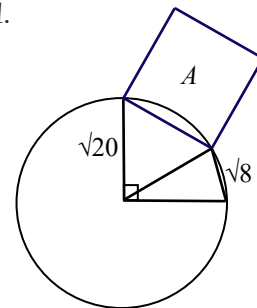
A calculator usually gives an approximation, in scientific form, to factorials with more than about 10 decimal digits. Thus, $14! \approx 8.7 \times 10^{10}$ has 11 digits.

By experiment it turns out that $21! \approx 5.2 \times 10^{19}$, has 20 digits, but $22! \approx 1.1 \times 10^{21}$ has 22 digits. Similarly, $23!$ has 23 digits and $24!$ has 24 digits. The next factorial, $25!$ however has 26 digits.

PUZZLES

1. Trigonometry perhaps?

Find the area $\mathcal{A}$.



2. Wolfram panic

What value of t makes this statement true? $2^t = t^{32}$.

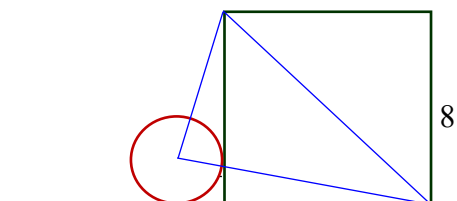
3. Function notation

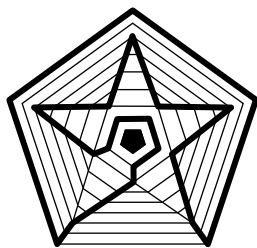
Suppose there exists a function f that maps real numbers to real numbers. Given $f(x+y) = f(x)f(y)$ and $f(2) = 5$, evaluate $f(5)$.

[The editor is aware of two distinct approaches to this problem that lead, fortunately, to the same result.]

4. Enough information?

The following diagram shows a square and a circle. Find the area of the blue triangle.





**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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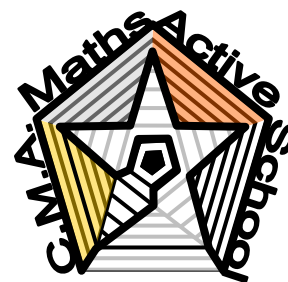
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Theresa Shellshear is CMA's COACTEA representative.

Bruce Ferrington is CMA's AAMT representative.



Short Circuit is edited by Paul Turner.

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