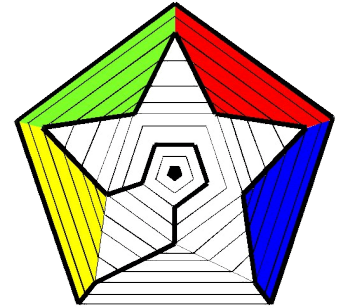


SHORT CIRCUIT

Canberra Mathematical Association Inc.

VOLUME 15 NUMBER 12 NOVEMBER 2024



NEWS AND COMMENT

On the last page of this edition you will find the results of the 2024 Canberra Maths Talent Quest.

Entries were received in several categories spread over school years 3 to 10. Thanks are due to Andy Wardrop for organising and running this program.

At the CMA annual general meeting, held on November 12 at Erindale College, the committee for 2025 was duly confirmed. The members are listed on page 4.

Thanks are due to the catering students at Erindale for a fine meal and convivial atmosphere.

At the AGM, president Bruce Ferrington acknowledged the four recipients of the annual CMA university (UC, ACU) awards for preservice teachers. Two of the new teachers were at the meeting.

CMA congratulates the four recipients:

Jeff Wyatt [Primary] (UC),
Kate Blackmore [Secondary], (UC),
Lillian Hume-Horton [Early Child-

hood] (ACU),
Thomas Hammond [Primary]
(ACU).

At a recent special general meeting of the Australian Association of Mathematics Teachers the AAMT constitution was changed to make the eight affiliates (CMA, MANSW, MAV, etc.) the members of AAMT rather than the individual people.

The consequences of this for the affiliates, particularly the funding arrangements, are yet to be determined. There is to be a working group formed to discuss the matter comprising eight representatives, one from each affiliate.

This newsletter will keep you informed.

Enough of this prevarication! It is time to enjoy your summer break. Short Circuit wishes you the best for the season. Come back safe and refreshed for the new year 2025.

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

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.

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**CANBERRA
MATHEMATICAL
ASSOCIATION**

CICADAS

In the November 13 edition of *The Conversation* there is an article by [Sam Baron](#), Associate Professor of Philosophy of Science at The University of Melbourne. The article can be accessed by clicking on this link: [Prime time for cicadas](#).

Cicadas, it seems, live hidden underground for most of their lives before emerging to eat, breed and die. The article explains that their life cycles have lengths that are prime numbers of years - 13 and 17 in the case of some broods from the US, and 7 in the case of the Australian greengrocer cicadas.

The emergence of the two American broods coincides once every $13 \times 17 = 221$ years. Remarkably, at this time all three types have emerged together - something that happens once every 1547 years.

The article explains the mathematics briefly and speculates about why the cicadas might have adopted this lifestyle, and why meshing gears tend to have prime numbers of teeth. The author suspects that these things have a common mathematical origin.

All this leads Sam Baron to wonder about the philosophical problem of whether mathematics is a human invention or whether it has an independent existence in the natural world.

Along similar lines, readers might refer for further reading to:

The Unreasonable Effectiveness of Mathematics in the Natural Sciences by [Eugene Wigner](#)

and

A Mathematician's Apology by [G H Hardy](#).

BOOK REVIEW

Tasmanian Aborigines: A History since 1803 by Lyndall Ryan, Allen & Unwin, Sydney, 2012.

Renowned historian, Lyndall Ryan, died in April this year aged 81. This book began as Lyndall Ryan's 1975 PhD thesis, published in 1981 as *The Aboriginal Tasmanians*. It had gone out of print by 1985 and a second edition appeared in 1996 with some new chapters and an introduction in which Michael Mansell is quoted on the subtle distinction in implication between 'aboriginal Tasmanians' and 'Tasmanian aborigines'. The 2012 edition recounts the same history as the earlier versions but the text is rewritten completely, warranting the new title.

On 26 January 1777, James Cook stopped at Adventure Bay, Bruny Island, and without much meaningful consultation, set about harvesting grass for his cargo of farm animals and timber for firewood. Cook records that during his encounters with the local inhabitants a musket was discharged and advances were made by his men towards the native women. Clearly, the elders of the Nuenonne band of the South East tribe on Bruny Island had good reason to wonder what trouble these pale visitors might portend. As it turned out, beginning a quarter of a century later, the 'Tasmanian aborigines were driven off their land so white settlers could produce fine wool for the English textile mills', to quote the book's cover notes.

Many of us learned in school that after Truganini died in 1876, the Tasmanian aborigines were extinct. As Ryan explains, this was not so. As well, the brutal war between the native inhabitants and the British government, and the deportations to the Furneaux Islands have been largely absent from the curriculum and hidden from view.

On reading *Tasmanian Aborigines: A History since 1803*, our Tasmanian correspondent, Ed Staples, commented:

'I was impressed with [Lyndall Ryan's] deep research, the detailed nation maps and illustrations,

and the other maps showing military posts, [the] “black line” field plans, and precise descriptions of G.A. Robinson’s trekking and [his] conciliation efforts. (Robinson was appointed by governor Arthur at the height of the Black War.). I’ve reflected a lot. [Many] Australians think, well, it’s history and you can’t change it, so get over it and move on. But you’d think differently if it was your family that was murdered, raped, and forced into offshore enclosures.’

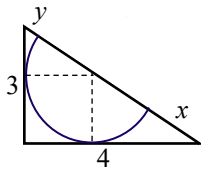
PUZZLES

1 Fun calculation

To the nearest second, how much short of a week is $100(e/\varphi)$ hours?

2 Bits of hypotenuse

A semicircle is drawn inside a right-angled triangle as shown. Find the lengths of the segments x and y .



What if the triangle has sides $A, B, \sqrt{A^2 + B^2}$?

PUZZLE SOLUTION from [Vol 15 No 11](#)

Hard polynomial

Given that, in the following equation, the coefficients p and q are integers, explain why

$$px^7 - qx^6 - 4px^5 + qx^2 - 8 = 0$$

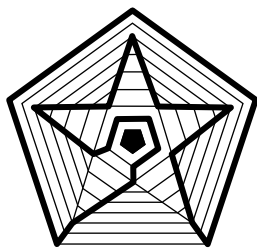
has no integer roots.

This one succumbs not to deep ideas about polynomials but to a relatively simple divisibility argument.

It helps if the equation is rearranged in the form

$$px^5(x^2 - 4) - qx^2(x^4 - 1) = 8$$

Each term is an integer. If x is an integer divisible by 3, then the left hand side is divisible by 3. If x is one more or one less than an integer divisible by 3, then the bracketed terms are divisible by 3. Hence, the left hand side is always divisible by 3. However, the right hand side is not divisible by 3 so there can be no integer values for x .



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

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

THE 2025 CMA COMMITTEE

President	Bruce Ferrington
Vice President	Aruna Williams
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	Theresa Shellshear
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	Jo McKenzie
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The Canberra Mathematical Association (Inc.) is the representative body of professional educators of mathematics in Canberra, Australia.

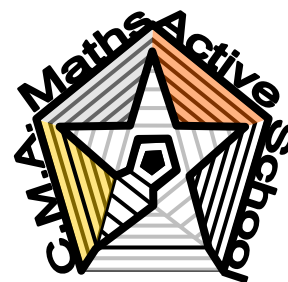
It was established by, among others, the late Professor Bernhard Neumann in 1963. It continues to run - as it began - purely on a volunteer basis.

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.

Radford College
Erindale College
Brindabella Christian College
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.



Short Circuit is edited by Paul Turner.

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CANBERRA MATHEMATICS TALENT QUEST 2024

Entries that were placed First

Year	Entry Type	Name of Students	School	Title	
3	class	3 Kumar	Canberra Grammar	Taxi Cab Investigation	1st
4	Small Group	Aaqil and Aaron	Canberra Grammar	Interior Angles Investigation	1st
5	Small Group	Emma Pham Izzy O'Brien Vritee Patel	Mother Teresa School	Gliese 12 B	1st
5	Class	5 Di Bartolo	Canberra Grammar	Coin Toss Investigation	1st
6	Individual	Giles Wyborn	Radford College	Maths Olympics Swimming Assignment	1st
6	Small Group	Alexander and Gareth	Canberra Grammar	Plastic Waste Production Investigation	1st
8	Individual	James Sutcliffe	Melba Copland	Angles in Soccer	1st
8	Small Group	Aidan Stollery, Ewan Piddington	Melrose HS	Flight Time Difference	1st
9	Individual	Nicolas Gonzalez	Melrose HS	Paddlepop Bridge Challenge	1st
9	Small Group	Nadia Torres, Reese Howe	Melrose HS	How hard would a serve have to be to kill someone?	1st
10	Individual	Oliver Bramble	Melrose HS	An in-depth statistical analysis into the probability of scoring a shot in an NBA game	1st
10	Small Group	Jason Duong, Callum Waugh, Jaydon Lau, Joseph Arundell	Melrose HS	Basketball Trajectory	1st

Entries that were placed second

Year	Entry Type	Name of Students	School	Title	
3	class	3 Coburn	Canberra Grammar	Maths Inquiry – board games	2nd
4	Small Group	Joshua, Edward, George and Lucas	Canberra Grammar	Pascal's Triangle Investigation	2nd
5	Small Group	Zoe, Emma, Khashvi, Scarlett, Isaac and Digby	Radford College	Everything is better than Maths	2nd
6	Small Group	Sofia Durbanov, Elena Quinn, Emily Toms and Lila Griffiths	Radford College	How Maths is Involved in Gymnastics	2nd
9	Individual	Owen Browne	Melba Copland	The Maths Behind the Physics and my Recovery from a Fractured Femoral Condyle	2nd
9	Small Group	Kavin Vijayakumar, Eamon Lang, Lachlan Lush, Caleb Crosby	Melrose HS	Shuttlecock Ignition Speed	2nd
10	Individual	Willow Wines	Melrose HS	Does Infinity Exist?	2nd
10	Small Group	Anna Henderson, Yenuri Waleboda	Melrose HS	A Monopoly on Maths	2nd