SHORT CIRCUIT

Canberra Mathematical Association Inc.

VOLUME 15 NUMBER 9 SEPTEMBER 2024

NEWS AND COMMENT

The umbrella organisation for mathematics teaching associations across the country, currently and affectionately known as the **AAMT**, is about to hold an **extraordinary general meeting**.

On the agenda are two items. One is a proposal to change the name of the organisation to *Maths Education Australia Incorporated*, and the other is to change the kind of legal incorporation of the organisation and to amend its constitution.

The full Notice of General Meeting may be found at the end of this newsletter. There is link to the proposed constitution change right at the end.

CMA members are members of AAMT and are entitled to attend the meeting and vote on the resolutions.

The date: Tuesday, 10th September, 7:30 p.m.

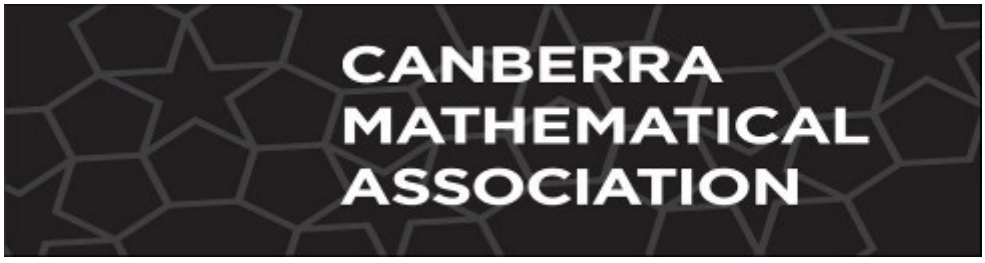
The National Centre for Vocational Education Research (NCVER) has published a report: *Is the die cast? Investigating the relationship between prior academic achievement and tertiary entrance performance.*

Key findings from the report are reproduced on page 2. The relationship with NAPLAN scores is interesting.

Another aspect of NAPLAN is the media frenzy that erupts when things look bad. A reader pointed us to a Conversation article by senior education lecturer Sally Larsen, who explains how interpretations of NAPLAN results by journalists can be misguided and unhelpful.

Looking further, we might wonder how in general factual observations or measurements of any kind can lead to very different responses. In the history of science, for example, one might cite the writings of palaeontologist Stephen Jay Gould on disputes about fossils, evolution and taxonomy. In education, contradictory opinions abound about pedagogical practices.

The term 'evidence based' deserves scepticism. 'Facts' stand little chance against a preconceived world-view.



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

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.

Inside:

IS THE DIE CAST?

A study with this title has been published by the National Centre for Vocational Education Research. Its authors are Ronnie Semo, Emerick Chew, Kate Dowling, Cameron Forrest, and Somayeh Parvazian.

It investigates, among other things, Year 9 NAPLAN scores as a predictor of students' likelihood of obtaining an ATAR. This link is to the full report.

The following extract is from the introductory section.

Students who perform well at school academically are more likely to complete Year 12 and experience smoother transitions from education to employment. However, disentangling the effects of prior academic achievement on later performance from other confounding factors, such as socioeconomic status, has proved difficult. This study uses data from the Longitudinal Surveys of Australian Youth (LSAY), in conjunction with data from the National Assessment Program — Literacy and Numeracy (NAPLAN) and MySchool, to consider the contextual factors that affect a student's academic trajectory. Using measures of students' academic achievement, demographic factors, information about the school they attended and subsequent outcomes, the study explores the association between students' academic performance at school and their schooling outcomes, as evidenced by their Australian Tertiary Admissions Rank (ATAR). It investigates whether Year 9 NAPLAN scores can be used to predict students' likelihood of obtaining an ATAR upon completing Year 12, and the likelihood of obtaining a high ATAR, controlling for several demographic characteristics.

Key messages

▪ As their NAPLAN scores increase, individuals from a high socioeconomic background are almost one and a half times more likely to receive an ATAR than individuals from a low socioeconomic background with the same increase in their NAPLAN score.

▪ Female students and those with a non-English speaking background are almost twice as likely to receive an ATAR compared to their male peers and those with an English-speaking background respectively, while Indigenous students are about half as likely as non-Indigenous students to receive an ATAR.

▪ Just two factors are associated with achieving a high ATAR: Year 9 NAPLAN performance and gender – students with higher NAPLAN scores are almost twice as likely to achieve an ATAR score of 90 or above; and female students are also almost twice as likely as males to achieve ATAR scores of 90 or above.

▪ Schools play a relatively small role in influencing tertiary entrance performance compared with the individual characteristics of the student, with only about 13% of the variation in a student's tertiary entrance score attributable to the school they attend.

▪ A position of socioeconomic advantage alone does not translate to exceptional academic success. Instead, strong reading and numeracy skills are key, regardless of a student's background.

INDIGENOUS LITERACY FOUNDATION

Indigenous Literacy Day/Week is coming up - from 4 to 7 Sept.
ILF link.

CMA WEEKEND WORKSHOP

On Saturday 17 August, a group of about 25 teachers from around Canberra meet at Radford College Junior School for a great time of learning. Two workshops were presented that explored very different areas of maths education:

Differentiation in the Maths Classroom – Bruce Ferrington led an interesting session looking at strategies and tasks that can be used to support the varied nature of learners in the classroom

Writing in Maths – Valerie Barker presented a very insightful view of how writing can be used and developed through maths tasks and to support maths learning

It was a great opportunity to spend a few hours on a Saturday morning, sharing ideas and reflecting on our own teaching experience. The catering was great and everyone had a very productive and enjoyable time.

Presentations from the workshops are available in the Resources section of the CMA website www.canberramaths.org.au

PUZZLES

1. Squares in reverse

Observe that $12^2 = 144$ and on reversing the digits, $21^2 = 441$.

The numbers 13 and 31 exhibit the same weird property with respect to their squares and these are not the only ones. Try 112 and 113.

Can you find any others?

2. Uncommon thought

This one came from an old Maths Trust booklet.

For which real values of b do the equations
$x^3 - bx^2 + 2b = 0$ and
$bx^4 - b^2x^3 + x^2 + 2b^2x - b^2 = 0$
have a common root? Find all possible answers.

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 2024 CMA COMMITTEE

President	Bruce Ferrington	Radford College
Vice President	Aruna Williams	Erindale College
Secretary	Valerie Barker	
Treasurer	Jane Crawford	Brindabella Christian College
Membership Sec.	Paul Turner	
Councillors	Peter McIntyre	University of NSW Canberra
	Theresa Shellshear	Australian Catholic University
	Heather Wardrop	
	Andrew Wardrop	
	Yuka Saponaro	Melba Copland Secondary School
	Jo McKenzie	ACT Education Directorate
	Jenny Missen	Lake Ginninderra College
	Morgan Murray	St Thomas the Apostle Primary
	Bernadette Matthew	Mother Teresa School

Theresa Shellshear is CMA's COACTEA representative.

Bruce Ferrington is CMA's AAMT representative.

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Find us on Facebook

http://www.facebook.com/pages/Canberra-Mathematical-Association/110629419011275

PUZZLE SOLUTION from Vol 15 No 8

A curly question

A plastic blow-up spherical model of the earth is suspended by a string from the ceiling of a classroom. An ant standing at the model's South Pole (upside down) begins to crawl up the globe but in a fixed direction, $N\,x°\,E$. Suppose it reaches the North Pole having done exactly one loop of the earth. What was the direction angle, x? What distance did the ant cover in going from pole to pole?

This question relates to the arts of navigation and cartography. The 16th century Flemish map-maker Gerardus Mercator would have considered problems like it. The thinking is still older.

The key is to imagine a projection of the points on the globe onto a cylinder wrapped around it tangent to it at the equator. Such a projection preserves angles between intersecting lines on the globe. There are several ways to do this, depending on the amount of north-south stretching of the cylinder. The one known as the Mercator projection has the height of the cylinder equal to the pole-to-pole axis on the globe.

In another option, consider unbending all the lines of longitude so that they appear as straight lines pointing north and south just touching the globe at the equator. The north-south lines lie in a cylinder. In this case, north-south distances are preserved as well as the constant direction angle of the ant's path.

The cylinder can be unwrapped to form a rectangle. The path of the ant is now represented by a diagonal line from corner to corner across the rectangle. Navigators call line segments on cylindrical projection maps, *loxodromes* or *rhumb lines*. (They look on a map like the shortest distances between points but on a spherical surface they do not usually correspond with segments of great circles and hence they do not represent least distances.)

The rectangle has height πR and width $2\pi R$, where R is the radius of the globe. Thus, the direction angle, $N\,x°\,E$, is the angle whose tangent is 2, which is about 63°.

To get the length of the ant's path, consider a small section of it over which the latitude changes by an amount ΔL. Thinking in radian measure, the arc-length along the meridian is $R\,\Delta L$. The corresponding length of the path segment is Δs. Over short distances these increments represent lines and the angle between them is the direction angle x. So, we have $\cos x = R\,\Delta L / \Delta s$ or $\Delta s = R\,\Delta L / \cos x$. Adding the small pieces together, we conclude that *the length of a loxodrome segment is given by the change along the meridian divided by the cosine of the direction angle.*

The path of the ant goes from 90° South to 90° North, so that its change of latitude is 180° (or π in circular measure). Hence, the length of its path is $\pi R / \cos(\arctan 2)$ which is $\pi R\sqrt{5}$.

This is, as one might expect, a little more than the circumference of the globe.

The Australian Association of Mathematics Teachers Incorporated

(Registration number A7405) (the **Association**)

Notice of General Meeting

Notice is given that an extraordinary general meeting of the Association (**Meeting**) will be held as per the following details:

Time: 7:30pm AEST **Date:** 10th September 2024

Venue: **Wotso Building, 490 Northbourne Avenue, Dickson ACT 2602**

Alternatively, members may attend the Meeting remotely via a teleconference, details of which are provided below.

Background

On 5 September 2022, the members resolved as special resolutions that the Association apply to Consumer and Business Services for transfer of registration of the Association to a company limited by guarantee and that a new constitution be adopted for the transfer of registration.

The Association has not implemented the transfer of registration and has suggested changes to the previously proposed constitution for the company limited by guarantee.

Business

The following special resolutions will be considered and put to members at the Meeting. The draft constitution for the company limited by guarantee (**Constitution**) as contemplated by Special Resolution 2 is annexed to this Notice.

Special Resolution 1 – Name Change

To consider and, if thought fit, to pass the following resolution as a special resolution:

> That for all purposes including section 24 of the *Associations Incorporation Act 1985* (SA) the name of the Association be changed to 'Maths Education Australia Incorporated' and the constitution of the Association be modified to reflect the change of name, on and with effect from when the Corporate Affairs Commission registers the alteration in accordance with section 24(7) of the *Associations Incorporation Act 1985* (SA).

Special Resolution 2 – Change of Incorporation

To consider and, if thought fit, to pass the following resolutions as special resolutions:

1. That the special resolutions resolved by the Association on 5 September 2022 be revoked;

2. That the Association apply to the Corporate Affairs Commission for the transfer of the undertaking of the Association to a body corporate under the *Corporations Act 2001* (Cth) as a company limited by guarantee in accordance with section 42 of the *Associations Incorporation Act 1985* (SA) by filing the required application forms;

3. That the name of the Association on its transfer of undertaking to a company limited by guarantee will be either:

    a. 'Maths Education Australia Ltd', if Special Resolution 1 is passed; or

    b. 'The Australian Association of Mathematics Teachers Ltd', if Special Resolution 1 is not passed; and

4. That, subject to approval by the Corporate Affairs Commission of the application for transfer of undertaking to a company limited by guarantee, the Constitution (with the approved name) be adopted as the new constitution for the Association as a company limited by guarantee.

The Special Resolutions will be passed if:

(a) at least two thirds of the total votes cast by members entitled to vote, in the case of Special Resolution 1; or

(b) at least three quarters of the total votes cast by members entitled to vote, in the case of Special Resolution 2,

are cast in favour as indicated by a show of hands unless a secret ballot is demanded in accordance with the Association's constitution. Each member present will have one vote.

A member may vote by appointing a proxy who is also a member to attend the Meeting and vote on its behalf. For the appointment of a proxy to be effective, the proxy appointment form must be received by the Association at least 98 hours before the Meeting or any adjournment of the Meeting (as applicable). Refer to the proxy form which accompanies this notice for further instructions. The Chair of the Meeting intends to vote any undirected proxies in favour of the Special Resolutions.

A member may submit a proxy form in any of the following ways. A proxy form is attached to this notification.

Post: GPO Box 626 CANBERRA ACT 2601 (Attn Chief Executive Officer)

Delivery: WOTSO Building, Suite 14 Level 2, 490 Northbourne Avenue, DICKSON ACT 2602 (Attn Chief Executive Officer)

Email: ceo@aamt.edu.au

REGISTRATION

Online registration is requested for both in-person attendance and online attendance. Please go to https://aamt.edu.au/sgm-2024 to register to attend the SGM. Registrations will close at 5pm, Australian Eastern Standard Time on Friday 6th September 2024.

FORUM

A forum will be held for interested members to discuss the proposed changes in advance of the meeting. This will be held on Monday 19th August 2024 at 7:30pm AEST. Interested members can join this Zoom forum via this link: https://us06web.zoom.us/j/83741266935?pwd=UTkFLjLfDCMxQkQGVtBxAze355jxys.1

By order of the Council of the Association

Allan Dougan
Chief Executive Officer
Date: 24th June 2024

Annexure – Proposed constitution for a company limited by guarantee

Proposed Company Constitution:
https://drive.google.com/file/d/1U0_zwAxjwjxHvxyejs8mCXyw31fwG_P_/view?usp=sharing