SHORT CIRCUIT

NEWS AND COMMENT

There may have been some nervousness leading up to the 2022 CMA conference—would people come out given the risk of exposure to pestilence? However, on the day the turnout was excellent, suggesting that the annual conference remains an event that people are not easily dissuaded from attending. Long may it be so.

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The next important date on the CMA calendar is the Annual General Meeting in mid-November. It is important partly because it is the main opportunity for CMA members to put themselves forward to be councillors.

Your professional association, the CMA, is now 59 years old. It may appear to be in good shape but some of the more elderly councillors must be wondering whether there will still be a CMA or a Conference or a Short Circuit or a Maths Talent Quest or a website by the year 2027 when it will be 64. Much depends on the willingness of younger members to get involved and to learn the jobs. Please give this some consideration over the next two and a bit months.

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Constitutional changes are afoot for the Australian Association of Mathematics Teachers. The changes require a Special General Meeting.

Professional Associations like CMA in each state and territory are affiliates of the AAMT, and CMA members are automatically AAMT members.

If you wish to participate in the SGM you will need to register by next Friday.

See page 2.

Inside:

Coming Events:

AGM

Wednesday Workshops:
Check for notices sent separately.

→ **MEMBERSHIP**

Memberships run from 1 Jan to 31 Dec. each year. Membership forms can be accessed from the CMA website:
http://www.canberramaths.org.au

Membership of CMA includes affiliation with the Australian Association of Mathematics Teachers and a subscription to one of two AAMT journals.

As a member, you are entitled to attractive rates for the CMA annual conference and CMA professional development events.
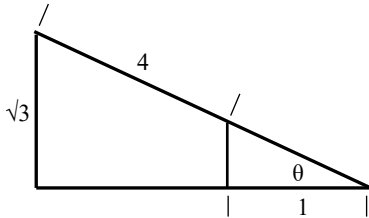
CMA members may attend conferences of the AAMT affiliates in other states, MAV, MANSW, etc. at member rates.

CANBERRA MATHEMATICAL ASSOCIATION

PUZZLES

1. Mischievous

This problem comes from Ekaveera Kumar Gouribhatla. While we found the solution the hard way, the author showed a somewhat easier method.


Find θ.

Remarkably, in radian measure the angle is a simple fraction of π and in degrees it is an integer. After finding a solution, the reader might ponder how the author devised the question in the first place.

2. Fiendish

By fiddling with a graphic geometry program, Colin McAllister came up with this puzzle, intriguing because the sides *a* and *b* seem to involve the square root of an integer. The lines *m* and *n* inside the triangle are medians. They are in the ratio 2:1, as are the angles A and B. Find *a* and *b*.
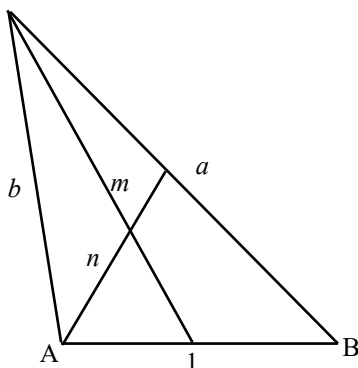
YEAR 12 MEDALS

College teachers—
Some of the CMA Year 12 Maths medals were not collected at the conference. These can now be obtained from:
  Valerie Barker in Aranda (0410 151 554) and
  Peter McIntyre in Kambah (0403 509 952).

AAMT SGM

AAMT Special General Meeting

CMA and hence, AAMT members, will have received the following notice together with the mentioned application forms. Videoconference facilities will be available for members who cannot attend in person.

NOTICE IS GIVEN that a SPECIAL GENERAL MEETING OF MEMBERS will be held at the offices of the Mathematical Association of Victoria, 61 Blyth Street, Brunswick VIC 3056 on Monday 5 September 2022 at 7:30 pm.

AGENDA

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

1. That the Association apply to Consumer and Business Services for transfer of registration of the Association to a corporation 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 Application Forms with Consumer and Business Services.

2. That, subject to approval by Consumer and Business Services of the application for transfer of registration to a company limited by guarantee, the Constitution be adopted as the new Constitution for the Association as a company limited by guarantee.

Clause 27.1 of the current constitution of the Association requires that a resolution to change the constitution must be passed by two thirds of members present and voting.

REGISTRATION

Online registration is requested for both in-person attendance and online attendance. Please go to https://aamt.edu.au/sgm-2022 to register to attend the SGM. Registrations will close at 5pm, Australian Eastern Standard Time on Friday 2nd September 2022.

PUZZLE SOLUTIONS from <u>Vol 13 No 8</u>

1.   Not the Monty Hall problem

There are two envelopes. One has X dollars inside and the other has 2X. You open one of the envelopes and then you are offered the chance to switch. Is it better to switch or not switch, or does it not matter what you do?

The answer depends on what use can be made of extra information gained on opening an envelope.

  Here, we must take X to be an integer. As such, it is even or odd, which is the vital information.

  The envelope containing 2X is selected with probability 0.5, and likewise for the envelope containing X. If the number in the envelope is odd, then 2X is certainly in the other envelope, and after switching, 2X has been obtained with probability 0.5. If the number in the envelope is even, it is 2X with probability 0.5 so that 2X is obtained with probability 0.5 × 0.5 = 0.25.

  Thus, the strategy of switching when the observed number is odd, gives a 0.75 overall probability of obtaining the 2X envelope.

  A simulation experiment confirms this.
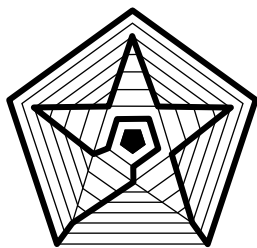
2.   A potato rings a bell

Ninety-nine percent of a potato's mass is water. If the potato is dried up so that it consists of 98% water, what is the new mass of the potato as a percentage of its original mass?

This is similar to a problem from an earlier Short Circuit, Vol. 13 No. 5, also with a counterintuitive solution.

Let P_N and P_O be the new and old masses of the potato respectively, and let the non-water component of the respective masses be S. Then, $0.01P_O = S$ and $0.02P_N = S$. It follows that $P_N /P_O = 1/2$ or 50%.
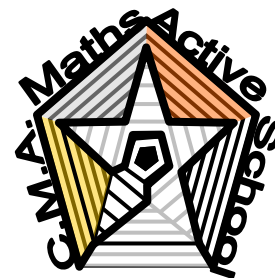
ABOUT THE CMA

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.

NEWSLETTER OF THE CANBERRA MATHEMATICAL ASSOCIATION INC

PO Box 3572
Weston ACT 2611
Australia

E-mail: canberramaths@gmail.com

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

THE 2022 CMA COMMITTEE

President	Aruna Williams	Erindale College
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	Andrew Wardrop	
	Sue Wilson	
	Yuka Saponaro	Amaroo School
	Jo McKenzie	ACT Education Directorate
	Joe Williams	

Theresa Shellshear is CMA's COACTEA representative.

Sue Wilson is CMA's AAMT representative.

Joe Wilson is the website manager.

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Find us on Facebook

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

CAREERS AND MATHEMATICS

Wind Turbine Technician

Context and relevance: Climate change and renewable energy can be uppermost for the modern student.

Activities for the Classroom:

These activities show the conversion of kinetic wind energy to electrical energy.

[The activities referred to are from the page https://onthejob.education/environments/wind_turbine_technician.htm.
The activities are accessed by clicking on the 'activities' icon on the left of the page.]

Activity 1: The Science behind frozen turbines – Retrieval Chart Strategy
Secondary

In this activity, students are to investigate the science and mathematics behind problems with frozen wind turbines and carry out a critical analysis.
[From The Conversation 5 March 2021.]

Activity 2: Mathematical Calculations and Wind Turbines

This is a collection of mathematical calculations from New Zealand, UK, China, Australia and Try Engineering and include:

Primary
2 Activities around Graphing and Wind Power

Primary, Middle, Secondary

Students are to design their own Windmill and test it out.

Secondary
These three activities are based on Wind Turbine Power calculations and were created by the Royal Academy of Engineering UK.
Middle

Wind Energy Math Calculations: Calculating the Tip Speed Ratio of Your Wind Turbine. Imperial measurements used. 9 Sample problems.

Primary

Hydro Australia presents activities for students in Years 6 & 7. The unit for Year 7s: This inquiry-based unit helps students discover the basic fundamentals of wind power technology by building and testing wind turbines. The challenge is to generate the greatest amount of electricity by varying the numbers, angles, sizes and shapes of turbine blades.

Middle, Secondary

A third activity is found here: "So how can Australia transform into a renewable energy powerhouse without leaving anyone behind? 6 Thinking Hats". While there is mathematics involved it is not specifically directed at mathematics.

Careers & Mathematics can be found at
https://onthejob.education/teachers_parents/Mathematics_Teachers/Careers_Mathematics_Index.htm

Contact Information

If you are investigating an aspect of mathematics or would like information about a person in that job, please contact me Frances Moore – I would be happy to hear from you.
Frances.Moore@onthejob.education

Mob 0410 540 608