SHORT CIRCUIT

Newsletter of the Canberra Mathematical Association INC

VOLUME 8 NUMBER 4

AUGUST 2017

Coming Events:

August 19 *CMA Conference*
November 8 *AGM & dinner*

Wednesday Workshops:

October 18 *Kaleen Primary*
October 25 *Namadgi School*
4pm—6pm

NEWS AND COMMENT

The CMA Conference is coming!

...and it promises to be a good one. (See flier on page 5.)

To register, go to the conference page on the website and click on the Register Here button. This will send you a registration form, which you will need to open, fill in and e-mail back to us.

The Australian Association of Mathematics Teachers has commenced its search for a new Chief Executive Officer, to take up the position in 2018 when the present CEO Will Morony retires.

For details about the position and how to apply see page 3 or go to the News Section of the AAMT website.

MEMBERSHIP

Join or renew your membership for calendar year 2017

A membership application form can be accessed from the CMA website: http://www.canberramaths.org.au/index.html

CMA membership includes automatic affiliation with the Australian Association of Mathematics Teachers and a free AAMT journal.

Members are entitled to attractive rates for CMA professional development events and the annual conference.

CMA members may attend conferences of other AAMT affiliates, MAV, MANSW, etc. at member rates.

Note: Receipts for membership and other payments are sent out by e-mail. If you have paid for your membership but have not received a receipt or if your AAMT journal(s) have not been arriving, please advise CMA membership secretary, Paul Turner, or another committee member.

CANBERRA MATHEMATICAL ASSOCIATION

PUZZLES

1

This puzzle comes from Ed Staples.

Ed is moving to a new house. Its number in the street is 15 so, naturally enough, he wanted to know if there was anything special about the number 15.

It turns out that 15 is a Bell number, which does make it special. According to Wikipedia, Bell numbers are named after Eric Temple Bell who wrote the influential but somewhat criticised collection of essays, Men of Mathematics.

Bell numbers are the numbers of ways sets of objects can be partitioned. For example, the set {A,B} has two partitions:
{{A,B}} and {{A},{B}},

while the set {A,B,C} has five:
{{A,B,C}},
{{A},{B,C}},
{{B}, {A,C}},
{{C}, {A,B}} and
{{A},{B},{C}}

The notation is intended to convey the idea that partitions are sets of subsets whose union is the complete set.

The next Bell number is 15.

And, here is the puzzle:

Suppose there are three playing cards– Ace, King, Queen, placed face down in a stack. A particular kind of shuffle is permitted. The top card can be returned to the top or replaced immediately below any other card. This operation can be performed three times.

If the three shuffles are done randomly, what is the probability that the final order of the cards will be the same as the initial order?

We investigated this problem by constructing a tree diagram with 27 leaves. To extend the question to the case of four cards with four shuffles would demand a tree diagram with 256 leaves, which is a bit unwieldy. There has to be a better way of counting the number of successful sequences of shuffles.

And, here is the real puzzle:

What is the connection with Bell numbers, and why?

2

You may have seen, while surfing the web perhaps, a challenge to solve an equation of the form

$$\sqrt{x+n}+\sqrt{x}=n$$

where n is a given odd number. For example, a brief spell of staring at

$$\sqrt{x+3}+\sqrt{x}=3$$

should be enough to reveal the solution without the need for any algebraic manipulations.

However, what if we have

$$\sqrt{x+239}+\sqrt{x}=239$$

and it is claimed that there is an integer solution?

Try an algebraic method, if you like, or guess-and-check but the problem is really about a certain well-known series of numbers.

CONFERENCES AND EVENTS

CMA Conference, **Inclusiveness**.

19 August : ADFA. Keynotes—Bobbie Hunter (Massey), Chris Matthews (Griffith)

See page 5 of this newsletter

MAWA/STAWA Conference—**STEM Education**

28-29 September, Curtin University.

Call for presenters:

https://stawa.wufoo.com/forms/z1yyhepk1uqsucy/

NZAMT conference, **Back to the Future**. October 2017, Christchurch. Call for abstracts—click on the link.

Square Pegs 2017 **Dyslexia & Discalculia—What's the denominator?** Conference: 6-7 October, Hobart.

SHORT CIRCUIT

SUCCESS AT (IM²C) - VALERIE BARKER

The International Mathematics Modelling Competition (IM²C) is a modelling competition involving teams of secondary students from a number of countries.

The IM²C poses a real-world mathematical scenario, and each team works for several days using freely available material (from the web and other sources). At the end of this time, each team presents a report on their solution.

Lyneham High School had two teams of students who participated in the competition along with 43 other teams from 27 schools around Australia. This year's task involved scheduling an international conference for delegates from around the world, while minimising the effects of travel time and jet lag to maximise the productivity of the delegates at the meeting.

One of the teams, comprising Stanley Li (Year 9), and Wallace Tan, Ziqi Yuan and Simon Yung (all Year 10) are commended for their participation in this year's competition.

The Mathematics Faculty at Lyneham is delighted to honour the success of their other team, the **Year 9 team: Emi Callaway, Jessica Hill, Shannon Lanza** and **Enling Liao**. This team was one of the 8 **National Finalists**.

This is an outstanding achievement, which was recognised at a special Year 9 assembly by the presentation of awards to the team by Mr Ross Turner, the project director for IM²C at ACER (the coordinating body for the competition).

Congratulations to the team (the youngest of the finalists) on their commitment and the exceptional quality of their solution. Thank you to Mr Prasad and Ms Moore, the staff who coordinated and facilitated the teams' participation.

Lyneham High School's successful IM²C team with project director Ross Turner from ACER

AAMT—SEEKING A NEW CEO

AAMT is currently seeking a new Chief Executive Officer with exceptional leadership, management and strategic planning skills, and highly developed interpersonal and communication skills.

The CEO will have tertiary qualifications with experience in a leadership role in an educational organisation, and knowledge of key issues in mathematics education.

The CEO will deliver high quality leadership of AAMT, being responsible for implementing the policies of AAMT, maintaining its public profile and for managing the staff, property and resources of the organisation.

The CEO may be required to represent AAMT in high-level negotiations with government ministers, government departments, industry, and educational bodies.

For more information, along with instructions about how to apply, go to http://aamt.edu.au/News/Opportunities/CEO-Position

Applications close 31 August 2017.

NEWSLETTER OF THE CANBERRA MATHEMATICAL ASSOCIATION 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 2017 CMA COMMITTEE

President	Bruce Ferrington	Radford College
Vice Presidents	Bronwyn Welch	Canberra Grammar School
	Sue Wilson	Australian Catholic University
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http://www.facebook.com/pages/Canberra-Mathematical-Association/110629419011275

CANBERRA MATHEMATICAL ASSOCIATION

2017 *MATHEMATICS CONFERENCE*

MATHS for All

Saturday 19 August 9–5

Australian Defence Force Academy

Special 2017 offer: 2 persons for $70

for anyone.* Bring a friend!

Single registration: **$50 member**

$25 concession $70 non-member

****CMA is giving back some of the profit from previous conferences.***

Six sessions of talks/workshops for all levels

Great prizes Trade stalls Maths merchandise

Registration = All food + President's drinks

Details/registration: ***canberramaths.org.au***

Please register soon so we can cater for everyone.

See over for speakers and titles of talks

Bobbie Hunter ***Keynote***

Chris Matthews ***Keynote***

Andrew Crisp *The Mathematical World of Indigenous Australians*

Steve Thornton *The reSolve Dictionary of Curious and Interesting Algebra*

Margie Smith *Washed Away: Integrating STEM into the Mathematics Classroom*

Andrew Crisp *Mathspace for Schools*

Peter Fox *More Problems Worth Coding*

Chris Wetherell *Fractals, Modular Arithmetic and Spreadsheets*

Matt Skoss *Maths 300: Primary Focus*

Matt Skoss *Maths 300: Secondary Focus*

John Young *Masters of Flight at the Smallest Scales*

Fiona Foley *Inclusivity through the Proficiency Strands on the Australian Curriculum*

Sam Hardwicke *Mathematics Curriculum through Project-Based Learning*

Greg Clarke *Using IT to Support the Teaching and Learning of Maths*

Jamos McAlester *Curly Questions and Awesome Answers*

Brian Lannen *Great Expectations – Continuous Probability Functions*

Valerie Barker *Haiku, Piku - Creative Writing in Maths ... An Oxymoron?*

Brian Lannen *Proof by Induction - It works now, but next time?*

Heather Catchpole *Teaching about Today's STEM Careers*

Janine McIntosh *CHOOSEMATHS - Why did you choose Maths?*

Peter Fox *Making Mathematics Real with Data*

Sue Wilson *Maths Anxiety and Shame*

Theresa Shellshear *The Parents' Roles*

Bruce Ferrington *Patterns*

More to come