

SHORT CIRCUIT

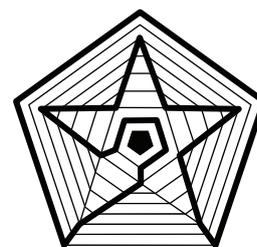
Newsletter of
the Canberra Mathematical Association INC

Coming Events:

February 22	Members Welcome Drinks, ACU Rose Garden
July 10-13	AAMT Biennial Conference, Melbourne
Friday August 16	National Mathematics Day 2013
Saturday August 17	CMA Annual Conference, Australian Catholic University
November 10	The 314th day of the year—Pi day!
November (13?)	CMA Annual General Meeting

PD sessions

25 Feb, Bonython Primary, 4-6 p.m.
20 May, Canberra College, 4-6 p.m.
12 Aug, Inspire Centre UC, 4-6 p.m.
28 Oct, Hawker College, 4-6 p.m.



VOLUME 3, NUMBER 4

DECEMBER, 2012

FROM THE EDITORS

In this edition we bring you dates of some CMA events for 2013, including Professional Development opportunities, the Welcome event, the Conference and the next Annual General Meeting. (See the separate page with this mail-out.) As well, you will find a list of the new Committee members, appointed at the recent AGM.

On page three we have published the first in a series of articles about ‘innovations’ in ACT schools. The editors are aware of some such developments but suspect there are others that would be of interest to readers.

We would very much like to hear from readers who have stories to tell about innovations in pedagogy that are being tried in their schools—particularly in the primary, high school and non-government sectors.

Publication of information of this kind is very much in line with one of the founding aims of CMA—to facilitate effective cooperation and collaboration between mathematics

teachers and their colleagues in Canberra.

As teachers we may wonder what motivates a young person to take up the study of science, technology, engineering or mathematics. The question has been explored by participants in an international *Interest and Recruitment in Science* project and is addressed in a report: *Starting out in STEM*, summarized on page five by Sue Wilson.

We may also wonder what motivates a young person to become a teacher and to continue in the job for 40 years. In particular, we take this opportunity to recognize and congratulate long-time CMA member **Jan Bentley** for doing just that from 1971 to 2012. Jan participated in many CMA events. She always attends the annual Conference and her fellow mathematics teachers have enjoyed catching up with her at those events. Jan receives a farewell from Dickson College on Friday 14 December.

Lastly, memberships for 2013 are now open. There are two newly-designed membership forms to choose from—one for individuals and one for institutions.

Best wishes to all for the holiday season.

MEMBERSHIP

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

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

A membership application form for the CMA can be downloaded from our website:

<http://canberramaths.weebly.com/>

Note:

Receipts for membership payments are normally 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 treasurer, Paul Turner, or a committee member.



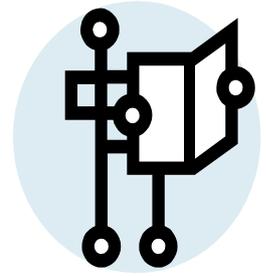
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PUZZLES

- This problem is a variant of the well-known one about the hands of a clock and when they coincide.
A few days ago, Jupiter was in line with Earth and the sun, with Earth in-between. It takes the planet Jupiter 4333 Earth days to orbit the sun and about 365.25 days for the Earth.
 (i) (Easy) How many times in a Jupiter year does this occur?
 (ii) (Harder) What is the interval in Earth days between these conjunctions.
 To make the job tractable, assume the orbits are circular and are in the same plane.
- One for the statisticians:
At a certain school all students study English and some study a second language. It is noticed that from year to year there is a strong correlation between the number of students studying a second language and the number who successfully complete their studies. Accordingly, the school leadership implements a campaign to boost the proportion of students studying a second language. The campaign is successful but there is no change in the completion rates. What happened?

*Astronomical
Clock Hands?*



*Figures can't
lie, but ...*

i-APPS

Wolfram Alpha

Wolfram Calculus

Redshift (astronomy)

Sky View (astronomy)

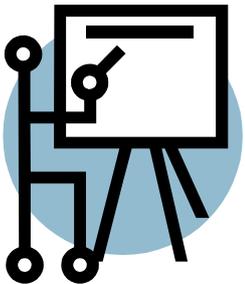
[FRANGO CAMERA](#) by Michael Barnsley

LINKS

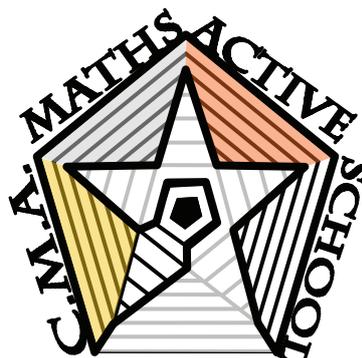
[Mrbartonmaths](#) resources, reviews, videos

<http://www.improve.edu.au/> makes quizzes and tests, useful for NAPLAN training, can be used with or without Scootle, from Education Services Australia.

<http://www.aamt.edu.au/Webshop> resources available from AAMT



MATHS ACTIVE SCHOOLS



Is yours a Maths Active School?

If not, talk to Jurek Paradowski about what it means and how it's done.

INNOVATIONS

*This is the first in a series of articles about innovative programs that are being tried in ACT schools. In this piece, Erin Gallagher explains what is happening at **Hawker College**. Erin was recently awarded the ACT child development award for providing opportunities to children through the implementation of this blended delivery model of mathematics education.*

Our educational approach is not just about teaching mathematics. It is centered on providing students with an opportunity to learn about learning.

There is much research (formal and anecdotal) that supports a shift to blended modes including online learning. Blended learning and Flipped Classroom models are reporting continued success in schools both in Australia and around the world. Emerging research clearly shows that students from these learning models are outperforming standard classroom delivery students, especially in areas of Mathematics and Science.

Our students don't have classes, and we don't have class rolls, (we keep attendance records through the use of a QR code and scanner). Maths is not time-tabled on a line, which increases flexibility for students choosing other subjects, and hence students have flexibility about when they **choose** to come to maths. This way they don't have to do maths last line on a Friday or first thing on a Monday if they don't want to. (Although, we are often chasing students out of maths 30 minutes after the end of a school day on a Friday). Our learning commons is a hive of activity, a buzz exists in the room that is difficult to explain. Every teacher who has visited has commented on being able to **feel the engagement**.

Now, more than ever before, students have access to the explicit requirements for the work to be completed in each and every week. These **explicit** instructions are provided in what we call a 'learning brief', which is provided online to students every Monday. The college still ensures delivery of the content required by the structure of the BSSS Mathematics Courses but our model has raised the bar on expectations of the work completed by students in

both quality and quantity. Students are accountable for their work and we expect it to be done well.

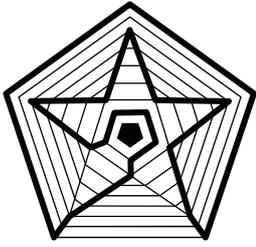
The content is provided online through texts, videos and applets such as Geogebra. (Some videos are sourced and some created on site. Our YouTube channel is HWKCmaths). Students are set practical components to complete such as text book questions or online quizzes and forums, and each week there is an investigation to complete that summarises the week's concepts. All work is accounted for and checked by staff for understanding and completion.

There are regular face to face lectures for conveying mathematical concepts. Students choose how they best want to use the face to face time (minimum 2 hours per week in the learning commons). Some prefer to work through questions and seek help from staff about the questions, whilst others prefer to use the time to read and watch material on the theoretical components and to seek clarification from staff about the concepts.

Whichever the choice, our teachers do an amazing job of personalising learning for students every minute of every day.

Is it working? We think so. Students are asking better questions. Deeper, richer and more meaningful connections are being made. On assessment items that are similar to those we have used in the past, we are getting an increase in high quality responses. By raising the bar on our expectations for mathematics at the college, students have risen to the challenge but most importantly because we make it explicit about how we as staff value mathematics, we find the students valuing it more as well.

More information on our maths program can be found at www.hawkermaths.com or <http://ezka29.blogspot.com.au/> or if you would like to visit or ask further questions please contact Erin Gallagher at Hawker College on erin.gallagher@ed.act.edu.au.



**NEWSLETTER OF
THE CANBERRA MATHEMATICAL
ASSOCIATION INC**

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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 1965. 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.

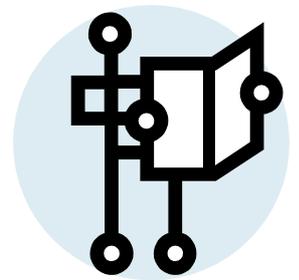
We're on the Web!

<http://canberramaths.weebly.com/>

THE 2013 CMA COMMITTEE

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Sue Wilson
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Radford College Junior School
Hawker College
Lake Tuggeranong College
Canberra Grammar School
Dickson College



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

REPORT: STARTING OUT IN STEM

As part of an international Interest and Recruitment in Science project (IRIS), a team of academics including our own Sue Wilson, has produced a report titled Starting Out in STEM. The acronym STEM stands for 'science, technology, engineering and mathematics'.

The authors of Starting Out in STEM are Terry Lyons, Frances Quinn and Nadya Rizk (UNE), Neil Anderson (James Cook University), Peter Hubber and Jan West, (Deakin University), John Kenny (University of Tasmania), Len Sparrow (Curtin University), and Sue Wilson (Australian Catholic University). It can be downloaded from

<http://www.une.edu.au/simerr>

A survey of 3,500 first-year science, technology, engineering and mathematics (STEM) students at 30 universities around Australia has found a high level of satisfaction with many aspects of these courses, but also some criticism of the quality of teaching. The survey report, *Starting Out in STEM* is the culmination of a study undertaken by a team of researchers from six universities to find out what motivates students to take university STEM courses and whether their experiences of these courses meet expectations.

The study was part of the international *Interest and Recruitment in Science* (IRIS) project funded by the European Commission.

<http://iris.fp-7.org/about-iris/>

The Australian data collection was supported by the Chief Scientist, Professor Ian Chubb, the Australian Council of Deans of Science, and the Australian Council of Engineering Deans.

The study had a particular focus on the decisions and experiences of young women in male-dominated STEM courses such as physics, IT and engineering. The study found no evidence that females in these courses felt discriminated against. In general, females were as positive as males about most aspects of these courses. The survey found that females were more likely than males to consider that STEM outreach programs had been important in their decisions to take engineering courses. The report recommends "greater government support for effective

'girls-in-STEM'-type outreach activities at the Years 9-10 level".

The data indicate that the most potent motivation for taking STEM courses is personal interest – sustained by good teachers who highlight the practical applications of learning. Females in particular tended to regard personal encouragement from teachers as having been important in their decisions.

Males and females were however equally critical of the quality of university teaching. Only 46 per cent agreed that they received timely feedback from lecturers, and just over 50 per cent agreed their lecturers cared whether they learnt anything or not. Students from a number of G8 universities were among the most critical of these aspects of teaching. This is concerning as students also said that personal encouragement and feedback from school teachers were among the most important influences on their decisions to take STEM courses at university.

Sue Wilson

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