MATHS MATTERS
Newsletter of the Australian Mathematics Trust
February 2016

Welcome to the new school year!

The Australian Mathematics Trust (AMT) is launching several exciting initiatives this year. Some of these initiatives, such as an online version of the Australian Mathematics Competition (AMC) and the free 2016 Online Computational and Algorithmic Thinking (CAT), are described in detail below. Our range of teacher workshops is also increasing—these will be advertised regularly through this newsletter and on the AMT website.

We are encouraging teachers to submit articles that we can share with *Maths Matters* readers. To kick the year off, Howard Reeves, State Director for AMC in Tasmania, has written an article on ways that teachers can identify and support gifted mathematics students in their classes. Read the article here.

Soon we will establish an online Maths Club, open to any school, to share free resources and activities for students of all ages. Watch this space!

Free entry to 2016 Online CAT

Existing AMT customers can enter the 2016 Online CAT for free! Given the growing curriculum emphasis on algorithmic thinking, this special offer provides a unique opportunity to expose students to this exciting new discipline.

CAT is an ideal way to introduce students to algorithmic thinking without the need for programming skills. Entrants have one hour to complete this fun online competition, which comprises 15 problems requiring mathematical and algorithmic thinking. Practice problems are available for students here www.amt.edu.au/informatics/cat/.

The 2016 Online CAT is on 22 March. However, the AMT will be flexible regarding the time that schools can run the online competition, with a time window to allow large numbers of students at a single school to sit the competition in manageable groups. Schools should contact us to make special arrangements. Learn more or enter your students now.

AMC online in 2016

For the first time, we are offering the AMC to schools online. The online version has the same questions as the paper version.

Schools should have a reliable internet connection with sufficient bandwidth to support as many students who will be doing the competition at any one time.

Students can participate in the competition on devices that have an internet browser, including PCs, laptops, Macs, iPads, Chromebooks and Android tablets. Schools can provide such devices or students may use their own (except mobile phones). No special software is required.

The 2016 Online AMC will be open for a limited time period to accommodate students in different time zones—about 36 hours beginning from 28 July. It is possible to run the competition over many sessions within this time window. However, the AMT prefers that all students who are competing in a particular division of the AMC do so at the same time. Schools that cannot run the online competition within the specified time should consider entering their students into the paper version of the competition instead.

Enter your students now!

Ready, GetSet, Go!

Did you know that we also offer GetSet CAT and GetSet AMC? These self-paced, online courses are designed to help students of all levels prepare effectively for CAT and the AMC. Students can get started quickly and easily, without teachers' assistance. We are offering each course for $2 per student to schools that bundle them with their respective competition entries. GetSet CAT and GetSet AMC normally cost $6 per student.

New sponsor for Olympiads

We are delighted to announce a new sponsor, Optiver, for our mathematics and informatics Olympiads.

Optiver is a market maker, offering trading opportunities on major global financial markets using their own capital at their own risk. They hire top talent at graduate and undergraduate levels with science, technology, engineering and mathematics (STEM) qualifications from the world's leading universities. Optiver employs over 900 people across offices in the United States, Europe and Asia Pacific—including past Olympians and students that have been involved in AMT competitions and programs.

Martina Carr, Grad Talent Scout People Leader at Optiver, said: 'Optiver is proud to announce our official sponsorship of the mathematics and informatics Olympiads in association with the AMT. We see the importance in getting involved in the advancement of Gen Z's future tech leaders and problem solvers. We want to promote the importance of STEM skills and opportunities for careers in this space. We have hired many former mathematics, informatics and science Olympians at Optiver. We see the passion they have to solve very complex mathematical problems. We look forward to joining the AMT on the exciting journey they are on over the next three years.'

Adjunct Professor Mike Clapper, AMT Executive Director, said: 'Our partnership with our new sponsor Optiver demonstrates one of the many pathways available to students who excel in mathematics or informatics. This sponsorship, together with the Australian Government's support, enables us to offer the highest quality training and support for our gifted young students. Optiver's sponsorship will be vital to maintaining the very high standards that we have achieved in recent years.'

Olympiad results

Two invitational Olympiad competitions have been held this year—the Australian Mathematics Olympiad (AMO) 9 – 10 February, and the Australian Invitational Informatics Olympiad (AIIO) on 11 February—and the results are in!

The AMT invited approximately 100 students to sit the 2016 AMO, and the top results are available on the AMT website www.amt.edu.au/mathematics/amocip-olympiad-program/amo-results/.

Forty-six students sat the AIIO, an online competition in computer programming, and we have published their results on the AMT website www.amt.edu.au/informatics/aiocip-olympiad-program/aiio-results/.

The best-performing students in these competitions are offered training in their disciplines. Then the AMT Olympiad Directors select teams of six and four students to represent Australia at the International Mathematical Olympiad in Hong Kong in July and the International Olympiad in Informatics in Kazan, Russia, in August, respectively.

New level for Enrichment

We are introducing a new level to Mathematics Challenge for Young Australians (MCYA) Enrichment called Ramanujan. This level covers estimation, special numbers, counting techniques, fractions, clock arithmetic, ratios, colouring problems and some problem-solving techniques.

Ramanujan will be the first level of MCYA Enrichment, an ideal program for capable students in years 4–5 and appropriate for students in years 6–7. Teachers can run the program over a 16-week period from April to September—results will be due by 3 October. All students will receive certificates that indicate their level of achievement.

Students will receive two books: Student Problems and Student Notes, which provides related extension problems. Teachers receive Student Notes and Teachers Guide, which contains the problems and solutions.

Ramanujan is named after Indian mathematician Srinivasa Ramanujan (1887–1920). Despite having very little formal training, Ramanujan is regarded as one of the greatest mathematicians of the 20th century. His story is so remarkable that it has been made into a movie, *The Man Who Knew Infinity*, starring Dev Patel (*Slumdog Millionaire*) and Jeremy Irons. We encourage teachers to recommend this movie to students, when it is released this year, to encourage their passion for mathematics.

We have also revised the Polya level to cover more topics including functions, symmetric polynomials, geometry, inequalities, functional equations, number theory, counting and graph theory.

The MCYA Enrichment is independent of the earlier Challenge stage. However, both initiatives provide challenging mathematical problems for students, as well as accessible support materials for teachers.

Top tips to solve any problem

A fantastic new e-book on problem solving, *8 Tips to Conquer any Problem*, is now available from the Kindle store. Written by Princeton mathematician James Tanton, the book lays out a proven roadmap for building mathematical problem-solving skills from an early age. AMT Executive Director, Adjunct Professor Mike Clapper, said that the book was 'an absolute must for every middle school student, educator and parent'.

8 Tips to Conquer any Problem provides a useful set of strategies and 'tricks' to help students solve a wide range of mathematical problems. Tanton presents 45 problems drawn from diverse topics to illustrate highly effective problem-solving tips. Ultimately, he seeks to pique students' interest in problem solving, awakening the Sherlock Holmes in them ('Watson, the game is afoot!').

Mark the event in your diary

You can download the AMT events calendar from our website so that your school doesn't miss out on its favourite competitions and programs!

All of our open events can be entered online. Remember to enter your students early to ensure that competition packs arrive before the day of the competition.

Information about Olympiads and invitational events, including the Australian Mathematical Olympiad Committee and Australian Informatics Olympiad Committee invitational programs, is available on the AMT website.

Schools can enter teams of four students for the International Mathematical Modelling Challenge (IM^2C). To learn more about this exciting new competition, visit www.immchallenge.org/