United Kingdom Mathematics Trust

Maths Challenges News

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In this issue

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United Kingdom Mathematics Trust
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Maths Challenges Humour

The death of one of the UK's favourite comedians, Ronnie Corbett, reminded me of the humour found in the Maths Challenge questions. Whilst I'm unsure that the children sitting the Intermediate Mathematical Challenge in 2010 would have fully comprehended this joke, I remember many a teacher saying how much it raised a smile. This remains one of my favourite challenge questions.

Intermediate Mathematical Challenge 2010, question 13

At Corbett's Ironmongery a fork handle and a candle cost a total of £6.10. The fork handle costs £4.60 more than the candle. What is the cost of two fork handles and four candles?

A £14.45 B £13.70 C £12.95 D £12.20 E £8.35

Inspiration for many of our challenges questions comes from real life. A furniture company's advertising leaflet was deliberately misinterpreted to form the basis of this question.

Senior Mathematical Challenge 2006, question 1

The promotion 'AMAZING! 20 % OFF ALL OUR BEDFRAMES' appears on the cover of the 2006 brochure of a well-known furniture company. If 20 % were to be taken off the length of a bedframe originally 2.10 m long, what would be the resulting length of the bedframe?

A 2.00 m B 1.90 m C 1.89 m D 1.78 m E 1.68 m

The problems groups often introduce humour through their use of names.

Junior Mathematical Challenge 2013, question 11

Usain runs twice as fast as his mum. His mum runs five times as fast as his pet tortoise, Turbo. They all set off together for a run down the same straight path. When Usain has run 100 m, how far apart are his mum and Turbo the tortoise?

A 5 m B 10 m C 40 m D 50 m E 55 m

We hope the challenges continue to stimulate and stretch your students mathematically, and the questions raise a smile! Do tweet us your favourite UKMT question @UKMathsTrust.

Entries to the 2016/17 Maths Challenges are now being taken. Entry forms will arrive in schools shortly or can be downloaded from www.ukmt.org.uk.

Diary dates for 2016/17

Maths Challenge		Follow-on round	
Senior	Tuesday 8 November 2016	MOG	Tuesday 11 October 2016
		Senior Kangaroo	Friday 2 December 2016
		BMO1	Friday 2 December 2016
		BMO2	Thursday 26 January 2017
Intermediate	Thursday 2 February 2017	IMOK Kangaroo	Thursday 16 March 2017
		IMOK Olympiad	Thursday 16 March 2017
Junior	Thursday 27 April 2017	Junior Kangaroo	Tuesday 13 June 2017
		JMO	Tuesday 13 June 2017

Team Challenge	Regional finals	National final
Senior TMC	to December 2016	Tuesday 7 February 2017
TMC	to April 2017	Monday 19 June 2017

Welcome to the new UKMT Chairman and to new staff

After six fantastic years of leading the Trust, we said a fond farewell to Professor Frances Kirwan, as her term of office as Chairman came to an end. To recognise her contribution, Frances was presented with a UKMT Outstanding Volunteer award by the incoming Chairman, Professor Chris Budd OBE. We thank Frances for all her work over the years, and welcome Chris to the helm!

Chris is Professor of Applied Mathematics at the University of Bath, Professor of Mathematics at the Royal Institution of Great Britain, and incoming Gresham Professor of Geometry. He is looking forward to leading the Trust, as he has a passionate interest in promoting mathematics to the general public, especially to young people.

We are pleased to welcome two new staff to UKMT HQ. Steven O'Hagan started in April in the new role of UKMT Deputy Director. If you contact the UKMT via phone, email or social media, Sara Liptrot is likely to be the person you hear from in her role as Receptionist.

Steven's interest in mathematics education goes back to his school days, when he co-founded a small educational publishing business producing teaching and study resources for Scottish qualifications.

After studying Pure Mathematics at the University of Edinburgh, Steven went on to complete a PhD in abstract algebra at the University of Glasgow. It was towards the end of his time as a research student that Steven started to volunteer with the UKMT. Since then he has organised summer schools, marked the Junior and Intermediate Olympiads and joined the Junior Mathematical Olympiad Problems Group.

For the past four years, Steven has been a teacher of mathematics at Hutchesons' Grammar School and at St Aloysius' College, both in Glasgow.

Sara graduated from Newcastle University with a degree in History in 2011. Since then she has enjoyed travelling, has worked as a bespoke round-the-world travel agent and led hikes and courses at an all-boys summer camp in Vermont. She will be temporarily returning to Vermont this summer as Head of Camp Craft – an honour that has not previously been given to a woman at this camp in their 95 year history. In her spare time Sara enjoys the cinema, live music and writing.

Publications snippets

The UKMT Yearbook details our activities and contains all the papers and solutions from that year's competitions. A complimentary copy of the 2014-15 Yearbook has recently been sent to all schools who participated in the challenges in that year. See shop.ukmt.org.uk to purchase additional copies.

What happens at a UKMT Summer School?

Last summer I was one of 40 young people across the UK to be selected to attend a week-long maths course at Oxford University due to our high scores in the Intermediate Maths Challenge. We would be staying in St Anne's College and having lessons in the Mathematical Institute across the road, creating a fantastic opportunity to gain an insight into Oxford, one of the world's most prestigious universities.

I would be mad to turn down such an opportunity but I was concerned whether I would get along with the others and whether I would be able to understand and keep up with the maths we would be doing. I needn't have worried! On arrival we were met with the friendly faces of the organisers who were there throughout the stay to answer any of our queries.

On the first night there were no scheduled activities so we could get to know one another and settle in for the week ahead, during which we were informed of both our groups – one of five teams of 8 for the morning lessons and one of two groups of 20 for the afternoon lessons. Each of the five teams had a 'senior' – someone who had been on the course before and had been invited back – who helped answer any questions we had and kept us on track during our lessons.

During the five days we were there, we covered topics from number theory and geometric proofs to the pigeonhole principle and infinity (and beyond...). My favourite sessions were the number theory sessions led by Dr Vicky Neale, particularly the ones on modular arithmetic, because although most of us had never heard of the topics we covered, the concepts were easy to grasp and the topics themselves fascinating. Although most of what I learnt on the course has not been directly of use to me in school, the principles of what we learnt have been extremely helpful to me in lessons.

In the evenings, we had scheduled activities from 7 to 9 o'clock and free time till 10 o'clock. Some of the activities included watching a documentary on Fermat's last theorem, a boat ride on the river and some game theory.

By the end of the week we had formed lasting friendships and found it hard to say goodbye. We have created a Facebook group to keep in touch and in December some of us met up over the weekend. All in all I enjoyed it immensely and would recommend anyone who is offered the opportunity to take it up.

Lottie Turner, 2015 Summer School attendee.

International success

You may have heard about the International Mathematical Olympiad (IMO), the most prestigious of international mathematics competitions (we're looking forward to hosting this in 2019!), but did you know the UK also sends teams of students to compete in the Romanian Master of Mathematics (RMM), the European Girls' Mathematical Olympiad (EGMO), and the Balkan Mathematical Olympiad? This year has been one of our most successful at overseas events. We congratulate the team of six at RMM for coming 2nd out of 20 in the team competition; the team of four at EGMO, coming 7th out of 39 participating teams; and for the team of six all returning home with medals from the Balkans. Good luck to the 2016 IMO team competing in Hong Kong in July!

Romanian Master of Mathematics Problem 4

Let x and y be positive real numbers such that $x + y^{2016} \geq 1$. Prove that $x^{2016} + y > 1 - 1/100$.

Mathematical Olympiad for Girls

Entries are now being accepted for the UK Mathematical Olympiad for Girls (MOG), which is taking place on Tuesday 11 October. Through MOG, we hope to encourage and inspire as many girls as possible to get involved in advanced problem solving.

Some students can be discouraged from taking part in subsequent activities if they have a negative experience through sitting an Olympiad paper when they are not ready for it. Hence we recommend that students who are entered for MOG are confident mathematicians. They are likely to have already achieved some success at UKMT follow-on rounds or in the mentoring schemes.

The paper contains five questions to be answered in two-and-a-half hours. We encourage all interested students to attempt previous MOG questions before entering the competition. Past papers can be found at https://bmos.ukmt.org.uk/home/ukmog.shtml.

MOG also forms part of the process to identify potential squad members for the annual European Girls' Mathematical Olympiad and other international competitions. Therefore, students should be eligible to be part of the UK team (either eligible for a UK passport describing them as a British Citizen, or will have completed 3 full years of full-time secondary education in the UK by the time they leave school).

MOG will be held on Tuesday 11 October. To enter your student, please complete the online entry form at https://www.surveymonkey.com/r/MOG_ENTRY. Your registration will be acknowledged and the paper sent by email to our registered Senior or Intermediate Challenge school contact on Monday 10 October. Entry to the competition is free of charge.

Sudoku

In Sudoku, every digit from 1 to 9 must appear in each of the nine rows, each of the nine columns, and each of the nine outlined boxes.

Enter our prize Sudoku! Entries are accepted from students and teachers, so do encourage others to enter. A draw from the correct entries will take place after the closing date and the winner will receive a book with a mathematical theme and a UKMT Megaminx. The winning name and affiliation will be published in a future edition of Maths Challenges News.

Please send entries (photocopies accepted) by the closing date of Friday 29 July 2016 to:

Sudoku, UKMT, School of Mathematics Satellite, University of Leeds, Leeds LS2 9JT

Don't forget to include your name, school name, and full school address!

Prize sudoku

		2		9		3		
8		5						
1								
	9			6			4	
							5	8
								1
	7					2		
3			5					
			1					