United Kingdom Mathematics Trust

Maths Challenges News

Issue 50 February 2016

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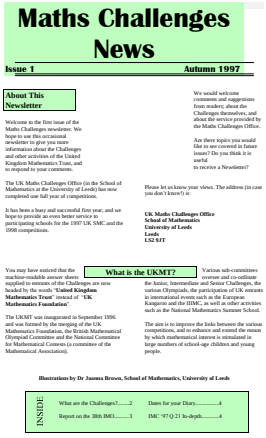
Issue 50

October 2016 sees the 20th anniversary of the incorporation of UKMT, and we'll look back at the history of the Trust in the coming year. Eagle-eyed readers may note another milestone that is the 50th edition of Maths Challenges News. To celebrate, MCN has a new look which we hope you find more reader friendly. Times have changed since the first edition which was published in late 1997 (see the front cover pictured). Recent editions can be found online at http://www.ukmt.org.uk/about-us/newsletters/. Maths Challenges News is published three times a year. Do contact us if there is anything you would like featuring in future editions.


Maths Challenges News

Issue 1 Autumn 1997

About This Newsletter

Welcome to the first issue of the Maths Challenges newsletter. We hope to use this occasional newsletter to give you more information about the Challenges and other activities of the United Kingdom Mathematics Trust, and to respond to your comments.

The UK Maths Challenges Office (in the School of Mathematics at the University of Leeds) has now completed one full year of competitions.

It has been a busy and successful first year, and we hope to provide an even better service to participating schools for the 1997 UK SMC and the 1998 competitions.

We would welcome comments and suggestions from readers, about the Challenges themselves, and about the service provided by the Maths Challenges Office.

Are there topics you would like to see covered in future issues? Do you think it is useful to receive a Newsletter?

Please let us know your views. The address (in case you don't know!) is:

UK Maths Challenges Office
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You may have noticed that the machine-readable answer sheets supplied to entrants of the Challenges are now headed by the words "United Kingdom Mathematics Trust" instead of "UK Mathematics Foundation".

The UKMT was inaugurated in September 1996 as a name formed by the merging of the UK Mathematics Foundation, the British Mathematical Olympiad Committee and the National Committee for Mathematical Contests (a committee of the Mathematical Association).

What is the UKMT?

Various sub-committees oversee and co-ordinate the Junior, Intermediate and Senior Challenges, the various Olympiads, the participation of UK entrants in international events such as the European Kangaroo and the IDMC, as well as other activities such as the National Mathematics Summer School.

The aim is to improve the links between the various competitions, and to enhance and extend the means by which mathematical interest is stimulated in large numbers of school-age children and young people.

Illustrations by Dr Joanna Brown, School of Mathematics, University of Leeds

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UKMT Symposium

Over 40 UKMT volunteers, Trustees and staff came together at the end of October for a weekend focusing on our current activities and future plans. There were lively discussions about the Maths Challenges, Primary Team Maths Resources (see page 3), Mentoring schemes, and Summer Schools, and views were expressed about how we can support UK teachers and schools in a climate of economic uncertainty, difficulty in teacher recruitment, and fast paced changes in the world of education and technological advances. UKMT Council now has the task of looking deeper at the great ideas arising from the Symposium, and making these a reality!

If you would like to be involved in this sort of event in future, or find out more about volunteering for UKMT in any other way, please see our current volunteer vacancies at http://www.ukmt.org.uk/about-us/getting-involved/.

Enter the Junior Maths Challenge

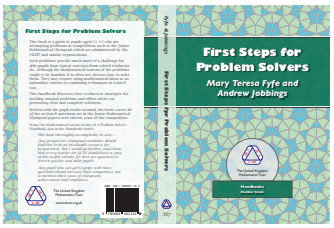
The Junior Mathematical Challenge (JMC) takes place on Thursday 28 April. Help develop your students' problem-solving and reasoning skills by entering the JMC. Full details including an entry form can be found at http://www.ukmt.org.uk/individual-competitions/junior-challenge/.

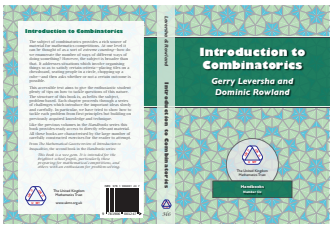
Diary dates for 2016

Maths Challenge		Follow-on round	
Intermediate	Thursday 4 February 2016	IMOK Kangaroo IMOK Olympiad	Thursday 17 March 2016 Thursday 10 March 2016
Junior	Thursday 28 April 2016	Junior Kangaroo JMO	Tuesday 14 June 2016 Tuesday 14 June 2016

Team Challenge	Regional finals	National final
TMC	to April 2016	Monday 20 June 2016

Publications snippets - new books out now!





'First Steps for Problem Solvers' by Mary Teresa Fyfe and Andrew Jobbings is written with the young reader in mind, with the intention of giving them satisfaction and confidence in solving what may be unfamiliar problems from the Junior Mathematical Olympiad (JMO). The book has two major strands: how to solve problems, and how to write solutions.

The emphasis throughout is on solving problems, and all the section B problems posed in the JMO from 1999 to 2015 are included. Readers are very much encouraged to "have a go", referring to the solutions provided only when absolutely necessary. The solutions not only describe how to tackle a problem, in addition the authors try to explain how to write good solutions in mathematics.

The problems are gathered together by topic. Each topic includes a 'worked' example, which aims to elucidate both how to solve the problem and how to write a solution.

The layout of the book is such that the reader can choose to concentrate on an individual topic rather than work sequentially from start to finish. The book also provides some reference material by way of useful facts, techniques and theorems, as well as a glossary of commonly used mathematical terms.

The subject of combinatorics provides a rich source of material for mathematics competitions. At one level it can be thought of as a sort of extreme counting – how do we enumerate the number of ways of different ways of doing something? However, the subject is broader than that. It addresses situations which involve organising things so as to satisfy certain criteria – placing tiles on a chessboard, seating people in a circle, chopping up a cube – and then asks whether or not a certain outcome is possible.

From Introduction to Combinatorics

How many six-digit numbers are there in which adjacent digits differ by at most one?

The numbers $1, 2, \ldots, n^2$ are placed in any order on the cells of an $n \times n$ chessboard. Show that there are two neighbouring cells whose contents differ by at least $n+1$.

'Introduction to Combinatorics' by Gerry Leversha and Dominic Rowland introduces the reader to important ideas slowly and carefully through a series of challenges. The aim is to show how to tackle each problem from first principles but building on previously acquired knowledge and technique.

To find out more, or to purchase these new books and other UKMT publications, please see http://shop.ukmt.org.uk/.

Primary Team Maths Resources

The UKMT Primary Team Maths Resources (PTMR) are produced annually with the aim to facilitate secondary schools in running maths events for feeder schools. The 2016 material will be available to request from February. Schools may choose to use the materials in other ways and the UKMT does not seek to restrict their use. For example, a primary school may use the materials to run a competition directly with their own pupils, or a secondary school may use the materials as an end of term activity for their Year 7 or 8 pupils.

The PTMR are freely available from UKMT. So, it is possible that students from a particular school may use the materials, and then come across them again at a later date, say, at a regional event run by another school.

Relay Round, question A4

On the menu of our local café all the toasted sandwiches were £6.75. For an extra £1.00 you can add a cup of soup.

Six friends all ordered toasted sandwiches and two of them also had the cup of soup.

What was the total amount paid by the six friends?

Primary Kangaroo, question 3

When Pinocchio lies, his nose gets 6 cm longer. When he tells the truth, his nose gets 2 cm shorter. When his nose was 9 cm long, he then told three lies and made two true statements.

How long was Pinocchio's nose afterwards?

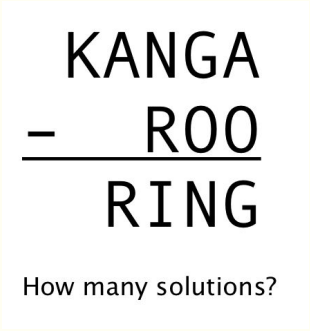
A 14 cm B 15 cm C 19 cm
D 23 cm E 31 cm

To obtain a set of the new 2016 PTMR along with full instructions for their use, please contact the UKMT via email at enquiry@ukmt.org.uk. Further details can be found at www.ukmt.org.uk.

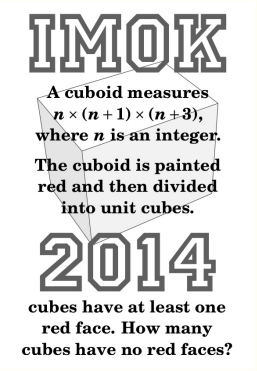
Keyfob problems

Did you know that each year since 2005 the UKMT has produced a key fob which is given to all Intermediate Mathematical Olympiad and Kangaroo (IMOK) participants? Each key fob contains a mathematical problem.

2005 Keyfob problem



2014 Keyfob problem



All the past problems can be seen at http://www.arbelos.co.uk/keyfobs.html. Hints and outline solutions are also provided.

Association Kangourou sans Frontières

The Association Kangourou sans Frontières (AKSF) is an independent association, whose purpose is to organise the annual international maths Kangaroo contest with the aim of promoting mathematics among young people around the world. The name sounds strange, but recognises the fact that the organisation was developed in France and inspired by the Australian Mathematics Trust.

Each year over six million school pupils aged 5-18 from more than 50 countries across the globe take part at various levels. So when you take the Kangaroo you are part of a huge community of maths students! The UKMT has been involved in Kangaroo activities for many years and uses the hour-long multiple-choice papers (in English) mainly as a follow-on competition to the Intermediate Challenge, but also as inspiration for the Senior and Junior Kangaroo papers.

Teacher Meetings

Are you looking for mathematical CPD for teachers? Come along to our Teacher Meetings! These are taking place in Belfast (10 June), Cambridge (27 June), Cardiff (24 June), Edinburgh (20 May), Leeds (1 July) and London Greenwich (21 June). We have a great line up, including session leaders Matt Parker, Ben Sparks, Katie Steckles and Colin Wright.

Booking forms will be sent to schools and colleges shortly, and are available to download from http://www.ukmt.org.uk/outreach/teacher-meetings/

Annual student poster competition

Can your students design a poster to advertise next year's Maths Challenges? Entries are accepted from teams of students or from individuals, and the competition is open to all school-aged students. The winning poster will be reproduced professionally and sent to all UK secondary schools and colleges with the September Newsletter.

Poster competition rules

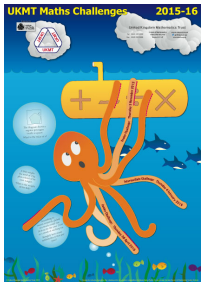
1. Use A2 paper in portrait orientation.
2. Include the words "UKMT Maths Challenges 2016–2017".
3. Include the following dates.

Senior challenge	Tuesday 8 November 2016
Intermediate challenge	Thursday 2 February 2017
Junior challenge	Thursday 27 April 2017

4. Write your name, age and school details (legibly!) on the back of the poster.These details should not be written on the front.

We regret that we are unable to accept electronic entries and we cannot return posters. The winning names will be published, and the judges' decision is final.

The submitted poster does not need to include our logo, or the logo of our sponsor—these will be added to the winning poster.



Last year's poster is shown above. You can see all the posters at http://www.arbelos.co.uk/ChallengesPosters.html

Please send entries by the closing date of Friday 1 April 2016 to:

Poster competition, UKMT, School of Mathematics Satellite,
University of Leeds, Leeds LS2 9JT