



Maths Challenges News

Issue 47 February 2015

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Junior Maths Challenge

Problem-solving skills are notoriously difficult to teach and assess. Taking place on Thursday 30 April, the JMC is an hour-long multiple-choice paper that encourages pupils to think and tests their problem-solving skills!

The Junior Maths Challenge:

- gives your pupils the opportunity to compete against over 280,000 students in the UK;
- is straightforward to administer in school. Papers are sent back to UKMT for marking, and results which include detailed school performance and comparison against the nation are emailed to you within 4 weeks;
- recognises your students' performance. The top 40% of students nationwide receive a gold, silver or bronze certificate. Every school receives certificates to award to their best performers, and a downloadable certificate of participation is available to award to all participants after the event.
- provides an opportunity to highlight mathematics within your school, and an opportunity for an article and photo in the local press.

The best performers in the UK will be invited to follow-on activities including the **new** Junior Kangaroo, and the Junior Maths Olympiad.

Enter today by downloading an entry form from www.ukmt.org.uk.

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JMC 2012, Q7

A small ink cartridge has enough ink to print 600 pages. Three small cartridges can print as many pages as two medium cartridges. Three medium cartridges can print as many pages as two large cartridges. How many pages can be printed using a large cartridge?

A 1200 B 1350 C 1800 D 2400 E 5400

JMC 2014, Q19

Jack and Jill played a game for two people. In each game, the winner was awarded 2 points and the loser 1 point. No games were drawn. Jack won exactly 4 games and Jill had a final score of 10 points. How many games did they play?

A 5 B 6 C 7 D 8 E impossible to determine

Publications Snippets

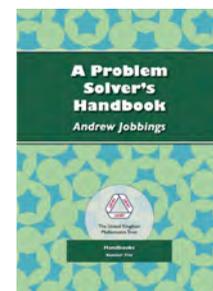
Junior Kangaroo

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Get Involved

Do you have any students that you expect to participate in the forthcoming IMOK Olympiad competitions, taking place on Thursday 19 March? *A Problem Solver's Handbook* is an informal guide to Intermediate Olympiads, not only for potential candidates for the Cayley, Hamilton and Maclaurin IMOK Olympiads but for anyone wishing to tackle more challenging problems. The discussions of sample questions aim to show how to attack a problem which may be quite unlike anything seen before. Solutions are also included.

Find out more and order online from www.publications.ukmt.org.uk.



Design a Poster

UKMT Contact Details

UK Mathematics Trust - a registered charity in England & Wales.
 UKMT, School of Mathematics, University of Leeds, LS2 9JT
 Tel: 0113 343 2339 Fax: 0113 343 5500 Twitter: @UKMathsTrust
 Email: enquiry@ukmt.org.uk Website: www.ukmt.org.uk

Diary Dates for 2015

Maths Challenges and Follow-on Rounds

Challenge	Date	Follow-on Round	Date
Intermediate	Thursday 5 February 2015	IMOK (Olympiad and Kangaroo)	Thursday 19 March 2015
Junior	Thursday 30 April 2015	JMO and new Junior Kangaroo	Tuesday 9 June 2015
Senior	Thursday 5 November 2015	BMO1 and Senior Kangaroo	Date to be confirmed

X + Y

In March 2015, the film “X + Y” will appear in cinemas all over the UK. This is a romantic drama, and explores a collection of intense personal relationships. One of the main characters is a teenaged boy (played by Asa Butterfield) who competes enthusiastically in UKMT competitions, and who dreams of going to the International Mathematical Olympiad. Several leading actors decorate the cast (Sally Hawkins, Eddie Marsan, Rafe Spall, Jo Yang). The film was made with the co-operation of UKMT and the IMO, and logos and flags appear accordingly. The film has secured international distribution contracts, and will be seen in many countries, and on airlines.

This film grew out of the BBC2 documentary “Beautiful Young Minds”, and the common director is Morgan Matthews. If UKMT were to make such a film (an exceptionally bad suggestion), the emphasis would be much more on the mathematics and less on the relationships. Morgan Matthews has become very interested in the way people on the autistic spectrum can prosper in mathematics. There has been a natural concern in the maths community that portraying some mathematicians as being less than socially fluent is dangerous, because it could lead to the misapprehension that mathematicians are all strange.

My personal view is that the prefix “mis” in the previous sentence can be deleted. All mathematicians are strange because they place such an exceptional value on thought, ideas and understanding. I think that the maths community should be proud of the way it embraces people on the basis of their enthusiasm for and interest in mathematics. University maths departments are happy places, where the socially adroit rub along in harmony with people who live in more private spaces. The trick is mutual respect and affection. This is equally true of UKMT maths camps. Most students are relaxed and outgoing, with the full set of skills that allow them to prosper in the teenage social maelstrom. Some others are not, but everyone gets along almost all of the time, united by a passion for ideas and ingenuity. We all know maths people who sometimes appear confused and nervous, but who have beautiful mathematical insights.

Things would be even better if women and all racial groups were richly represented in the maths community, and UKMT has done excellent work on the gender issue by founding the European Girls' Mathematical Olympiad and running the annual talent search examination, the UK Maths Olympiad for Girls. The mentoring schemes make an excellent education in mathematical problem solving available to all social groups. However, while social inclusion is very much “work in progress”, the incorporation of people on the autistic spectrum into the wider maths community seems to be a great success, and in my view, a cause for celebration.

Geoff Smith, Chair of the BMO and the IMO, University of Bath.

Disclaimer: Geoff was involved in assisting to make X plus Y, so his views are not impartial.

IMO 2019



In July 2014, the IMO Advisory Board approved the UKMT's bid to run the International Mathematical Olympiad in the United Kingdom in 2019.

The International Mathematical Olympiad (IMO) is the world championship of mathematics for secondary school students, and is a problem-solving contest held annually in a different country. The UK last hosted the IMO in Glasgow in 2002.

Primary Team Maths Resources

The 2015 set of Primary Team Maths Resources (PTMR) are now available. These resources are aimed at pupils aged 9 to 11, and are available free of charge to schools and colleges. The PTMR are designed to enable secondary schools to organise and host local team maths events for their feeder primary schools, but the UKMT does not seek to restrict their use. Schools may also choose to use the materials in other ways, such as for an end of term activity for their 11-13 year old pupils across the ability range. The resources contain more materials than would be needed for one competition, and materials for investigation, so schools can choose the most appropriate activities for them.

Some of the rounds will be familiar to those who participate in UKMT team events:

- Group Round
- Crossnumber
- Speed Test
- Logic Round
- Shuttle
- Relay
- Make a Number
- Open Ended
- Primary Kangaroo

Answers and guidelines for their use are also provided.

To obtain a set of these materials, please contact us by email only to enquiry@ukmt.org.uk. Material will be sent to you electronically. Previous years and sample material can be found at www.tmc.ukmt.org.uk.

2014 Group Round, Q1

The school 5-a-side football squad is made up of four boys: Peter, Tom, Mark and Robert, and four girls: Ursula, Kate, Malinda and Tina.

For the final game of the season, a team of three boys and two girls has to be chosen. However, unfortunately Mark will not play if Tina is picked, and Ursula will not play if Tom is picked.

In how many ways could a team be chosen for the final game of the season?

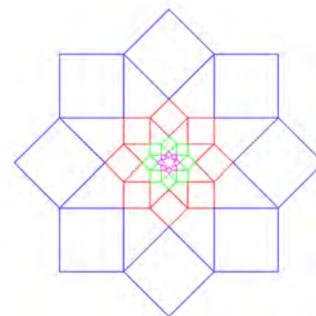
2014 Open Ended Picture, Task 2

What do you notice in this poster called “rings of squares”? Working in pairs, describe exactly what you see.

What geometrical facts can you deduce?

How much larger is a blue square with respect to a green square?

What are the sizes of the other coloured squares (the red and the purple)?



UKMT Teacher Meetings

“Some lovely ideas for use in the classroom - thank you!”

“Great all round, good value, thanks!”

“Really enjoyable and thought provoking”

(Feedback from 2014 events)

These Enriching Mathematical Thinking seminars provide a number of ways in which teachers can continue their professional development. All delegates will benefit from:

- Meeting other mathematics professionals from their region and beyond, with the time to discuss and exchange best practice;
- Developing ideas for making maths fun and engaging for students;
- An interesting day out of the classroom with ideas for creating an engaging and motivational learning environment;
- Receiving a delegate pack filled with resources to take back to the classroom, along with a CPD attendance certificate.

The events will be taking place in:

Aberdeen – Thursday 21 May
 London – Tuesday 23 June
 Oxford – Friday 26 June
 Cambridge – Tuesday 30 June
 Coventry – Friday 3 July
 York – Tuesday 7 July

Our speakers include Katie Chicot, James Grime, Rob Eastaway, Colin Wright, and representatives from NRICH and the National STEM Centre.

Look out for further details being sent to schools later this term, or see our website for information and a booking form. We look forward to seeing you at one of the events!



Photo from previous UKMT Teacher Meeting

Junior Kangaroo

The UKMT is introducing a brand new competition in June – the Junior Kangaroo. This one-hour, twenty-five question, multiple-choice paper will be for approximately 5,000 students who just miss out on sitting the Junior Mathematical Olympiad. These students are exceptional young mathematicians who should relish the chance to test themselves further, and it brings the Junior Maths Challenge follow-on competitions in line with the Intermediate and Senior Maths Challenges. Entry to the competition will be automatic, based on a student’s Junior Maths Challenge score. Schools will find out who has qualified for the Junior Kangaroo when their JMC results arrive. All participants receive a certificate.

Since this will be the first year of the Junior Kangaroo, we would be very pleased to receive feedback from schools. Please do get in touch if you have comments about this new competition.

Get involved!

Many of our volunteers first got involved in activities as wide ranging as running Team Challenge events; setting Maths Challenges papers; mentoring more able students; and organising Mathematical Circles, by reading about our activities in this very newsletter and contacting us. As a national charity, we rely heavily on the input and dedication of our volunteers to help us run a broad range of activities. We are always pleased to welcome new volunteers! To find out more about our current volunteer vacancies, please email enquiry@ukmt.org.uk. We’d love to have you on board!

There are other ways to get involved too. We would love to hear your feedback about UKMT activities that you and your students have been a part of. Or if you have any suggestions for articles you would like to see in future newsletters, or indeed if you would like to write a piece about how you use UKMT materials in the classroom, then please email us. We look forward to hearing from you!

Annual Student Poster Competition

UKMT’s annual poster competition is back! Can your students design a poster to advertise next year’s Maths Challenges? Entries are accepted from teams of students or individuals, and it is open to all school aged students.

The winning poster will be reproduced professionally and sent to all schools with the September 2015 Newsletter.

The poster must:

- Be on A2 paper in portrait orientation (not landscape)
- Include the words “UKMT Maths Challenges 2015-16”
- Include the dates: Senior Challenge -Thursday 5th November 2015
Intermediate Challenge -Thursday 4th February 2016
Junior Challenge -Thursday 28th April 2016

Traditionally, posters have been based on challenge questions although there is no requirement to do so. Previous challenge questions can be found on our website at www.ukmt.org.uk. It does not need to include our logo or that of our sponsor, but these will be added to the winning poster. We regret we are unable to accept electronic entries and we cannot return posters.



Winner of Sudoku 46:
Sophie Kermani, Croydon High School

Entrants should write their name, age and school (legibly!) on the back of the poster, but they should not be identifiable from the front. The winning names will be published, and the judges’ decision will be final.

Please send entries by the closing date of Thursday 2 April 2015 to:
Poster competition, UKMT, School of Maths Satellite, University of Leeds, Leeds LS2 9JT

NAME.....AGE.....

SCHOOL ADDRESS.....

.....POSTCODE.....