

From the Chief Executive

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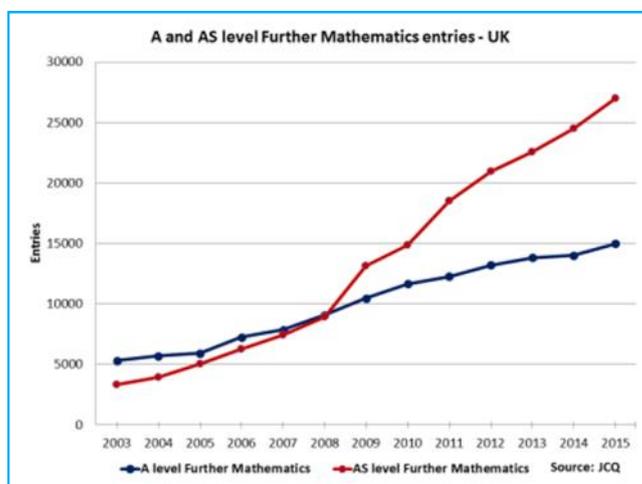
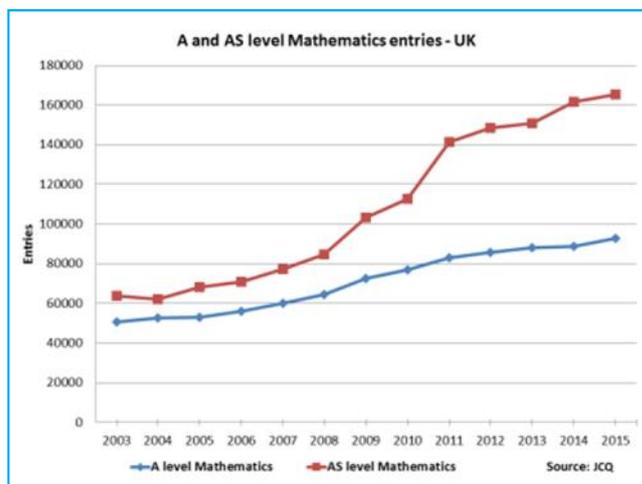
I hope you enjoyed the summer break and the new term has started well for you.

AS/A level Mathematics and Further Mathematics

News on A level uptake was very positive this summer, with record numbers of students taking the mathematics A levels and A level Mathematics establishing itself as the most popular A level.

The Further Maths Support Programme, managed by MEI, has made a major contribution to these continued increases. This year is the FMSP's 10th anniversary and Kevin Lord and his team continue to do a brilliant job – please see [Kevin Lord's article](#) for an update on FMSP activity.

Despite the continued growth in numbers of both male and female



students taking the mathematics A levels, the proportion of girls choosing to take them remains stubbornly fixed at around 40% of A level Mathematics entries and 30% of A level Further Mathematics entries. In other developed

countries the proportions of male and female students taking higher level maths courses are much more even. Please see furthermaths.org.uk/en/couraging-girls-maths to find out more, including work that the

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FMSP is doing to try to improve the situation.

Please see [Bernard Murphy's article](#) for details of how MEI is working with the University of Cambridge to provide CPD on the use of the Cambridge Maths Education Project resources, to help enhance mathematics teaching at A level.

GCSE Mathematics

New GCSEs: First teaching for the new maths GCSEs has now started, ready for examinations in 2017. The new GCSEs are intended to focus strongly on the aims of the new National Curriculum for Mathematics; fluency, reasoning and problem solving, so that students are better able to apply maths in life and work, and more prepared for higher level study. They are also designed explicitly to be more demanding than the current maths GCSEs and there is an expectation that schools will allocate more timetable time to teaching maths across Key Stages 3 and 4.

MEI is keen to help support schools and colleges to meet the

challenges posed by the new Maths GCSEs. Please see [Debbie Barker's article](#) for more information about our KS3 and KS4 professional development courses.

The FMSP is also supporting GCSE Maths, [running CPD courses](#) and publishing free resources to support the new Higher tier GCSE and provide inspiring [Extension and Enrichment](#), with the aim of helping to encourage more students to choose maths at A level.

GCSE re-sit: Following the recommendations of the [Wolf report](#), this summer an extra 30,000 seventeen year old students re-sat GCSE Maths. Next summer will see yet further increases as all post-16 students on full-time programmes with a D grade in GCSE Maths will need to re-sit. These increases are placing a huge strain on schools and especially on FE Colleges. The [GCSE re-sit page](#) on the MEI website gives details of our support for teachers of post-16 Maths GCSE re-sit.

I'm very interested to hear teachers' views on the GCSE Maths situation, how your

teaching is being affected by the changes, and what might be done to help. Please [email me](#) with your views.

Core Maths

Core Maths will be examined for the first time in summer 2016. The development of Core Maths was championed by MEI and we are very keen to support it.

The DfE funded MEI to develop resources to support Core Maths – these resources, branded 'Critical Maths', support all Core Maths specifications and are freely available via the MEI website.

MEI has developed [Core Maths specifications with OCR](#). However, our [Core Maths CPD](#) and teaching and learning resources are relevant to all Core Maths specifications.

Please see [Stella Dudzic's article](#) and the [Core Maths pages](#) on the MEI website for more about our work in Core Maths. Please see the [Core Maths Support Programme's website](#) for further information and support for Core Maths.

Exciting Work Upgrading Integral

MEI is currently engaged in extensive work to upgrade the Integral online learning platform and develop new, highly interactive resources to support the mathematics A levels. To learn more about this work, and information about MEI's new technology-based games to support students learning maths, please see [Richard Lissaman's article](#).

MEI Conference

The 2015 MEI Conference at Bath was a great success, with very positive feedback from delegates. If you didn't make it to this year's conference, please do your best to come next year. Please see [Bernard Murphy's article](#) for details.



Charlie Stripp
Chief Executive
[Email Charlie](#)

Professional Development for KS3 and KS4

This year we are expanding our Professional Development for teachers of key stages 3 and 4.

Teaching GCSE Mathematics (TGM) remains our premier offer for those new to teaching secondary mathematics.



FRESH is a suite of single professional development days that can be combined to create a year's worth of bespoke support for

the individual teacher.

FRESH is specifically designed to enthuse and refresh *experienced* teachers of mathematics; the idea developed after conversations with teachers who wanted to stay engaged in professional development with MEI after completing other courses with us.

FRESH addresses very specific areas of mathematics teaching, and the family of titles will be annually updated to reflect current issues and needs.

The standalone course days will be offered at three times throughout the academic year, starting in October 2015, and are being hosted by maths hubs and school alliances. At the time of writing,



the following courses all have confirmed dates and venues:

- ▶ *FRESH perspectives on geometry*
- ▶ *FRESH ideas for getting students using GeoGebra*
- ▶ *FRESH perspectives on planning mathematics*
- ▶ *FRESH strategies for embedding problem-solving*
- ▶ *FRESH strategies for assessment for learning*

Teachers interested in finding out more should visit mei.org.uk/fresh and schools and maths hubs interested in hosting a FRESH title should contact the course leader.



Debbie Barker
KS3 & 4 CPD
Coordinator
[Email Debbie](mailto:Debbie@mei.org.uk)



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Teaching OCR(MEI) Core Maths qualifications or Quantitative Methods

Online resources for both the OCR(MEI) Core Maths qualifications, Quantitative Problem Solving and Quantitative Reasoning, are available free of charge to centres, thanks to OCR sponsorship. Free resources for the Introduction to Quantitative Methods are also available. To get access to the resources, [register online](#).

The following free face to face CPD events are planned for academic year 2015-16. Booking is through the [OCR CPD hub](#)

Core Maths Training event

This morning event has the following aims:

- ▶ To introduce the two OCR(MEI) Core Maths qualifications and enable teachers to understand the relationships between them.
- ▶ To outline some models for delivering the qualifications in a school/college.
- ▶ To provide an introduction to some useful, freely available, resources for teaching the qualifications.

Core Maths Problem Solving event

This afternoon event has the following aims:

- ▶ To familiarise teachers with the problem solving cycles used in the OCR(MEI) Core Maths qualifications.
- ▶ To build teacher confidence in teaching through problem solving in Core Maths.
- ▶ To provide an introduction to some

relevant problems which can be used in teaching Core Maths.

It is possible to go to both events at the same venue on the same day.

There is also online CPD for the Introduction to Quantitative Methods available – book through [OCR's CPD hub](#)

If you want to know more about the Core Maths qualifications, the OCR Core Maths playlist on [YouTube](#) has videos from the launch event which give information about the qualifications and also videos of Core Maths lessons so you can see how they work in the classroom.

New AS/A levels in Mathematics and Further Mathematics for teaching from 2017

Development of new MEI AS and A levels in

Mathematics and Further Mathematics is continuing. We are now finalising specification content and working on specimen assessment materials. Thank you to those of you who have provided feedback through the survey and those who have trialled questions with their students. This has been really helpful to us in refining our thinking.



Stella Dudzic
Programme Leader
(Curriculum)
[Email Stella](#)

CASIO® MEI Conference 2015



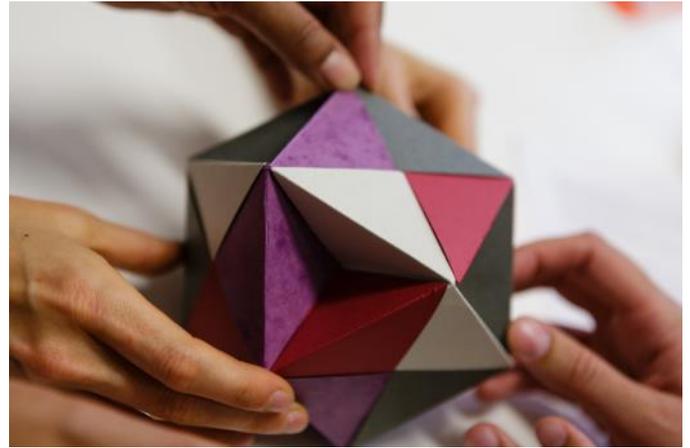
First of all, thank you to all of you who came to the conference and for your active and enthusiastic participation. Thank you also to the speakers; the feedback

from delegates was overwhelmingly positive.

Handouts from many of the sessions can now be downloaded from [mei.org.uk/conference15](#).

Many thanks to all of you who took the

trouble to fill in the evaluation form at the conference. The comments below are taken from the 53 forms we received. It is always reassuring to receive positive feedback and we were delighted to see that many of you found the



Cambridge Mathematics Education Project

considering using a Saturday afternoon slot to repeat some of the more popular sessions and we will have sessions devoted to coursework marking. If you have any other ideas please do let us know, and if you'd like to offer a session now is the time to get in touch.

The Cambridge Mathematics Education Project (CMEP) is a new initiative, funded by a grant from the DfE, which aims to enhance advanced post-16 mathematics education. Currently in the development phase, the project will provide innovative resources to help support and inspire

I hope to see you at next year's conference at the University of Bath from June 30 to July 2.

conference stimulating.

"All absolutely brilliant. My first time here and I will be back. Excellent speakers."

"As always there is a great variety and an excellent balance of talks"

"All sessions were brilliant, have learnt so much"

"I have had a great time exchanging ideas with fellow maths teachers. Great discussions. The sessions have been thought provoking and given me so much to take back to the department."

"The conference is not just for maths but treats us as a community. Well done MEI"

"Excellent as usual. Will definitely recommend as a good use of CPD budget for next year"

We always strive to make next year's conference even better and are already planning ways to do this. Those of you who made suggestions, and included your email address, will have received an email from me describing what we hope to do next year as a result. For example, we are



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teachers and students of A level mathematics and similar qualifications. The aim is to help to make post-16 mathematics a rich, coherent and stimulating experience for students and teachers.

MEI is running a series

of 2-day CPD courses entitled *CMEP: Using the resources effectively in your A-level classroom*. These courses are designed to maximise the impact of the CMEP resources in the classroom, and are free of charge to A level Mathematics teachers from state-

funded schools and colleges. The course includes access to the CMEP website for you and your school.

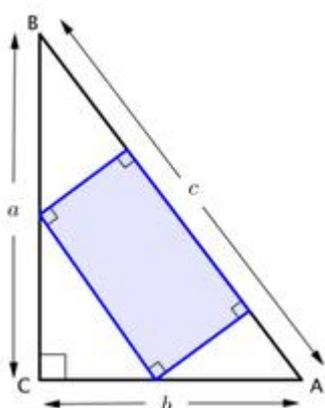
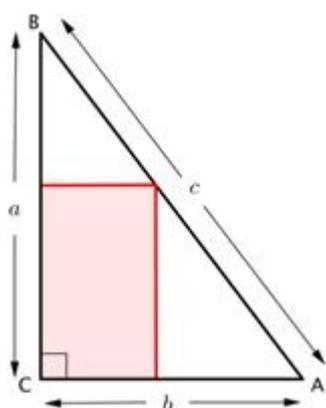
The dates for courses this term can be found at mei.org.uk/cmep and further dates will be added shortly.



Bernard Murphy
Programme Leader
(Teacher Support)
Email Bernard

A problem from the CMEP resources

What is the greatest area of a rectangle inscribed in a right-angled triangle?



How does your approach to each situation compare?

How does the area of the rectangle identified in each situation compare?

Integral A level Resources

New content has appeared in Integral over the summer and will continue to be added throughout 2015/16:

Walkthroughs are sequences of activities, most of which take place in GeoGebra applets, which students can follow independently, or in class, to explore the initial ideas in an area of mathematics. Walkthroughs have already started to appear in Integral and there will be complete coverage of A level Mathematics and Further Mathematics with more appearing throughout 2015-16.

You can try some Walkthroughs here:

- ▶ [Exact values and graphs of trigonometric functions](#)
- ▶ [Inequalities](#)

More is to follow as **Skill Packs** will begin to appear in Integral later this term. Skill Packs are series of examples and questions covering the basic techniques and formulae required for a section of learning. They will bring together many of the current interactive resources in Integral into a powerful tool where students can learn and practise.

During 2015-16, three levels of written exercise will appear in each section of Integral. The first level covers basic skills, the second level allows students to work to examination standard and the third will contain extension questions. Problem-solving questions will appear throughout.

Alongside this, work is underway to get Integral ready for the new A levels in Mathematics and Further Mathematics coming in 2017. As you will be aware, MEI

Recalling exact values

Remember **sin**, **cos** and **tan** which give the relationships between angles and ratios of side length in a right-angled triangle:

$$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$

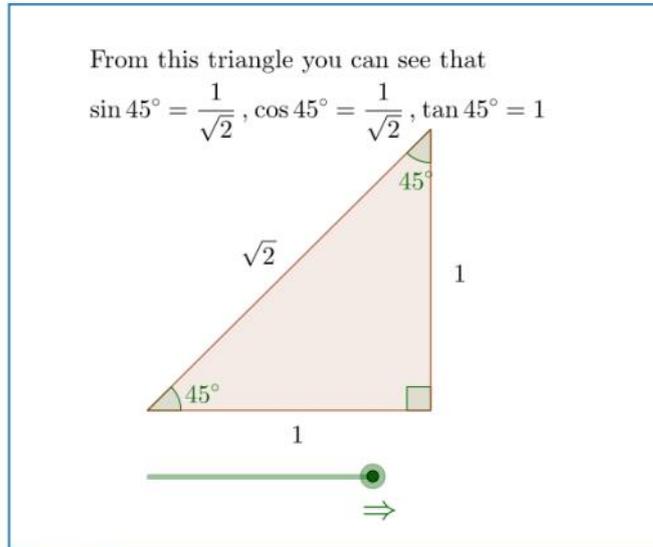
$$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$$

Here you'll look at a useful way to remember the exact values of $\sin 45^\circ$, $\cos 45^\circ$ and $\tan 45^\circ$.

Instructions

Move the slider to the right to see the method.

Read it through and then press **Finished** to move on.



Created with GeoGebra

Finished

Reset

questions to test basic skills through to multi-step problems and is suitable for anyone progressing to post-GCSE maths or revising for higher tier GCSE mathematics.

The game contains 230 questions, covering 22 topic areas. It includes, sorting and matching and drag'n'drop geometry activities, and access to maths help (this will be added throughout 2015/16) and a problem-solving finale.

Bridge It! will be available, free of charge, for beta testing in Autumn 2015.

Look out for details of Sumaze! and Bridge It! on the MEI website mei.org.uk/appsgames

Walkthroughs

plays a significant role in keeping teachers up to date and providing advice about curriculum change. This knowledge and experience is feeding into work to develop Integral.

To get more information about Integral, please visit integralmaths.org.

MEI apps and games: Sumaze! and Bridge It!

MEI has been working on a new maths puzzle game, called Sumaze!, and an online quiz game, called Bridge It!, to support preparation for higher tier GCSE mathematics and post-GCSE mathematics.

Sumaze! has been funded by the Sigma

Network sigma-network.ac.uk.

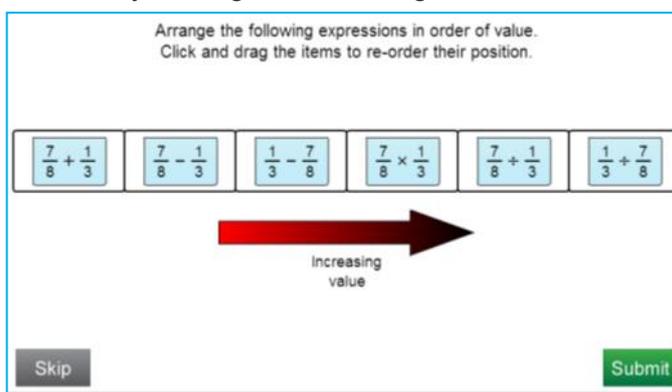
Sumaze!'s puzzles involve arithmetic, inequalities, the modulus function, indices, logarithms and primes.

Sumaze! will be available for Apple and Android devices, via their corresponding app stores, from Autumn 2015. Versions of the puzzles will also be appearing in Integral.

Bridge It! contains



Sumaze!



Bridge-It!



Richard Lissaman
Online Resources
Coordinator
Email Richard

September 2015

10 years of Further Mathematics Support

MEI has now been running the national Further Maths Support Programme, and its predecessor, the Further Maths Network, for more than 10 years. Over that period the FMSP has supported the teaching of A level Mathematics and Further Mathematics in schools and colleges and worked with thousands of students each year, enriching their learning and promoting the study of mathematics. During this period the FMSP has also provided professional development to thousands of mathematics teachers to enhance mathematics teaching at both A level and GCSE, providing CPD courses, teaching materials and enrichment for students. Improving students' experience of mathematics at GCSE level is vital for



increasing participation at A level.

The FMSP works with the Maths Hubs and other mathematics and STEM organisations to increase A level teaching capacity and to encourage student interest in mathematics, helping to motivate more students to choose A levels in Mathematics and Further Mathematics and ensuring they have the opportunity to do so.

The growth in participation in advanced mathematics over the last 10 years has been incredible. There was a further rise in the numbers of students taking AS and A level Mathematics and Further Mathematics this summer. Entries have increased for the twelfth consecutive year. Over 92 000 students entered for A level Mathematics this year and almost 15 000 also completed A level Further Mathematics. Growth in numbers taking AS Further Mathematics has also been dramatic, with a further rise of 10% since 2014. Mathematics has consolidated its position as the most popular A level choice in the UK.

This term, teaching of the new GCSE

Mathematics begins. The FMSP ran a series of one-day CPD courses focusing on the new Higher Tier content, which places a greater emphasis on problem-solving. The FMSP also trained more course leaders so that additional courses can be offered, organised by FMSP Area Coordinators and Maths Hubs. There will be a new round of two-day KS4 Enrichment and Extension courses, developing more active teaching approaches. All the FMSP KS4 courses aim to enhance the experience of students taking GCSE Mathematics to encourage students to continue studying mathematics at A level, furthermaths.org.uk/ks4eande.

Draft specifications for new A level Mathematics and Further Mathematics are due to be published in spring. The FMSP is preparing for these changes, developing new resources and CPD courses. The new A levels will place a greater emphasis on modelling and problem solving and the FMSP has developed support materials for these over recent years, furthermaths.org.uk/a-level-problem-solving.



The FMSP also organises enrichment events and support for sixth-form students, professional development for teachers and provides resources to support students preparing for higher-level problem-solving exams, such as STEP, AEA and the MAT. The FMSP is running a series of online sessions, starting in September, to help support students preparing for the MAT, furthermaths.org.uk/mat_support. Also this term the FMSP, together with the UKMT, organises the annual Senior Team Maths Challenge, furthermaths.org.uk/stmchallenge. This team enrichment event provides a great opportunity for students to demonstrate their problem-solving skills.



Kevin Lord
Programme
Leader (FMSP)
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Mathematics in Education and Industry

Supporting mathematics
education nationwide,
providing professional
development for teachers
and developing innovative
resources for the classroom

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MEI conference: conference.mei.org.uk

Integral mathematics resources: integralmaths.org

Facebook: facebook.com/MEIMaths

Twitter: twitter.com/MEImaths
twitter.com/MEIConference

About MEI

Mathematics in Education and Industry (MEI) is a membership organisation and a charity. Since the 1960s, MEI has worked to support mathematics teaching and learning. Any income generated through MEI's work is used to support mathematics education.

MEI emphasises understanding and enjoyment of mathematics and also highlights the importance of mathematics in industry and commerce.

MEI pioneers the development of innovative teaching and learning resources, including extensive online materials to support all major examination syllabuses.

MEI offers teachers of all GCSE and A level specifications a range of continuing professional development (CPD) courses, provides specialist tuition for students and works with industry to enhance mathematical skills in the workplace.

There is a network of MEI branches around the country, offering local support for teachers.

MEI's popular A level specification is administered by OCR, with MEI taking responsibility for the curriculum, and providing course textbooks published by Hodder Education.

MEI manages the government-funded Further Mathematics Support Programme, providing advice and

support for teachers of AS/A level Mathematics and Further Mathematics in schools and colleges throughout England.