

**Glenys Stacey**  
Chief Regulator



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Dear Mrs McClure

**Re: GCSE Maths**

There has been some speculation about whether or not the recently accredited, new GCSE maths specifications are of the right standard, or the same standard. I thought it would be helpful to set out for you how things stand, so that you can be sure that we take these concerns seriously and are acting on them.

New GCSE maths is due for first teaching in September 2015, and first awarding in the summer of 2017, but of course work started on the new qualifications a good while ago. We took unprecedented steps last year, ahead of accreditation, to secure so far as possible that specifications submitted to us would be of the right standard, and will go on to deliver the Government's policy aims for maths: to ensure all students are more confident and competent in basic maths, and to properly stretch more able students.

The pre-accreditation work included, for example, agreements on the length of assessment, the proportion of calculator and non-calculator assessment, the tightening of the relative weighting of assessment objectives, much better wording of assessment objectives and the detailed mapping of content to assessment objectives.

It also included requiring exam boards to set out in an assessment strategy their approaches to assessment in the qualification. They are able to take different approaches, and indeed they have, as is apparent from their sample assessment materials.

At the heart of the debate, are the problem-solving requirements in assessment objective three ("solve problems within mathematics and in other contexts"). Again, the approaches of the Exam Boards differ here, notably, in the use of fewer, or more, words to set the context for the questions. More words can make questions more demanding – but they can do that without the question necessarily being more mathematically demanding. A complex scenario can require relatively simple maths to solve the problem. It all comes down to the quality of the questions, in all senses.

In our accreditation process, six independent maths experts looked closely at the different assessment strategies, sample assessment materials and mark schemes.



They considered question types, question style and approach to language. In their judgement, taking everything into account (including the ability of the assessments to differentiate sufficiently between candidates) they judged (so far as anyone is able at this stage) that all the specifications met out requirements. In our decision to accredit those specifications, we agreed with their recommendation.

Yet while we found each submission (in some cases after a number of resubmissions) sufficiently demonstrated that they could meet our requirements, that does not mean that they could not be improved before live assessments. We provided specific and general feedback to boards on areas where improvements should be made, and we are continuing to meet with them to develop further guidance on some aspects, most especially mathematical problem-solving.

It is challenging to judge demand<sup>1</sup>, and it is impossible to determine difficulty<sup>2</sup> at this point in time. It is only when exams run that we can see how different specifications actually work out and how difficult papers actually are. So what we can do and are doing is to run mock exams, to test what we can in as near a real environment as we can. We are arranging for some 4,000 sample students to sit exams made up of questions from the sample assessment materials. We will be looking at how students perform; how hard they find the maths in the questions, and also how their performance is affected by the presentation of the maths, for example the context in which it is set. We will look to see to what extent and how the assessments differentiate between students.

Not only that – to see how the specifications compare with each other, with current specifications and with similar international qualifications, over 40 independent PhD mathematicians are comparing the demand of questions here with questions from Shanghai, Massachusetts, The Netherlands, Hong Kong, Ontario, Hungary, New Zealand, Japan, Korea, Scotland, and from Cambridge International GCSE and O level. This will give us more information about the level of demand of each of the specifications and their international counterparts.

We are also testing how the questions from each set of sample assessment materials stimulate deep mathematical understanding, by having some 400 students work in pairs to solve the questions. Through their discussions and answers we will capture their thinking. Experts will then judge the quality of mathematical understanding elicited by different approaches to the assessment of problem solving.

We are doing each of these things simultaneously, and as quickly as possible. We want to know how these sample materials truly compare, how they truly perform. I have included a more detailed summary of our research in Appendix A. The boards have agreed to delay the publication of further sample assessment materials until after the results of this research have been disseminated, in order that they might reflect the accumulated evidence.

Our research programme should be completed by the end of April. If required, Boards will then update their SAMs. We understand that teachers may be keen to

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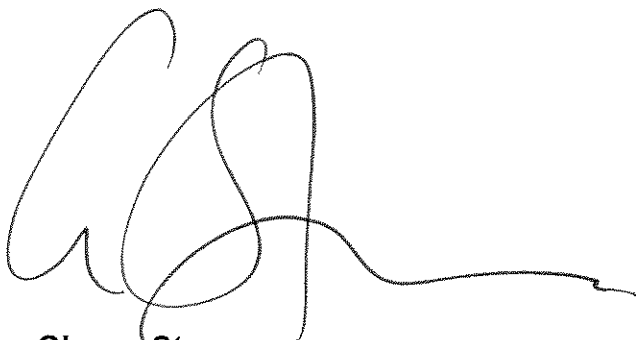
<sup>1</sup> A judgement of the cognitive processes the student has to carry out to answer questions

<sup>2</sup> The marks a group of students score when answering questions

select an Exam Board. None of this affects what is to be taught – the programme of study – as published by the Department for Education, and the specifications that have been accredited. We are writing to Heads of Maths in schools to keep them abreast of developments and will continue to keep them updated.

Indeed, as soon as we have more to report, I will be in touch again, but for now I hope you can see that we have done, and are doing, the right things.

Yours sincerely

A handwritten signature in black ink, consisting of several loops and a long horizontal tail.

**Glenys Stacey**  
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