



AS and A level Mathematics and Further Mathematics: Ofqual consultation on conditions and guidance

January 2016

1. About ACME

The Advisory Committee on Mathematics Education (ACME) was set up in 2002 by the Royal Society and the Joint Mathematical Council (JMC) of the United Kingdom. It was set up to provide advice on 3-19 mathematics education policy in England.

2. This response

Ofqual is consulting on:

- a revised version of assessment objectives in AS/A level Mathematics and Further Mathematics;
- its proposed approach to regulating AS/A level Mathematics and Further Mathematics;
- various draft subject-specific conditions, requirements and guidance.

In this response ACME draws on the expertise of the Committee, as well as the Outer Circle, 36 independent experts that provide ACME with a range of perspectives on mathematics education. To discuss the consultation, ACME hosted a roundtable on 11 December 2015 with representatives from across the mathematics and education communities, as well as from Ofqual and the Department for Education. This response highlights some of the high-level issues. More detailed responses have been prepared by mathematics learned societies, subject associations and other mathematics bodies.

3. Assessing AS/A level Mathematics and Further Mathematics

Assessment, rather than the subject specification, frames the ways in which learners are taught in the classroom. However, recent assessment arrangements do not always foster the skills that higher education institutions and employers need, such as confidence with unfamiliar problems and multi-step unstructured tasks.¹

It is therefore to be welcomed that a range of regulatory instruments² and statutory guidance³ has been proposed. However, a note of caution must be expressed. Many of these instruments require awarding organisations to set out in their assessment strategies how they will adhere to those regulatory instruments. Because assessment strategies are thought to be commercially sensitive, they are not made publically available. This means that detailed scrutiny of how awarding organisations are interpreting assessment objectives will not be widely publicly available. Ofqual needs to consider what information is made publicly available. This point is amplified in a number of the sections below. In addition, a clear communication plan from the Department for Education, Ofqual and awarding organisations is required.

¹ In 2013-2014 the A level Content Advisory Board (ALCAB) had a remit to look at the content of mathematics qualifications. However, they also acknowledged the intrinsic links between content and assessment. They noted that current examinations test speed and accuracy rather than mathematical ability, are too short to allow for in-depth and searching questions and questions can be highly scaffolded. They emphasised a shift towards problem solving, interpretation and testing understanding, requiring less-structured questions that test understanding and help to develop strategies for solving problems either in a purely mathematical or in an applications context, <http://epc.ac.uk/wp-content/uploads/2014/11/4.-ALCAB-Panel-Report-on-Maths-and-Further-Maths.pdf>.

² Awarding organisations must comply at all times with Conditions of Recognition, Ofqual's main regulatory rules and other regulatory instruments.

³ Awarding organisations must have regard to such guidance, but they do not have to follow this guidance in the same way that they must comply with the Conditions

4. Reflecting the subject content in assessment: assessment objectives and overarching themes

4.1 Overarching themes: ALCAB highlighted the importance of assessing problem solving and modelling skills and that further guidance was needed to ensure that these mathematical skills were learned and taught.⁴ ACME welcomes the Ofqual proposal to introduce guidance which clarifies that awarding organisations should explain and justify in their assessment strategies how their qualification design reflects the 'Overarching themes' from the subject content document. To ensure that skills such as problem solving and modelling permeate assessment, Ofqual must consider whether some of this information is made publicly available.

4.2 Assessment objectives: Assessment objectives should reflect the subject content and the overarching themes, incorporating what is most important and valued about that subject.⁵ At the ACME roundtable there was consensus that the proposed minor revisions and the weighting in the consultation document are broadly appropriate.⁶

The implementation of assessment objectives needs to be carefully monitored to make sure that they are adequately reflected in the setting and marking of examinations. ACME welcomes the proposed introduction of a regulatory condition to require awarding organisations to comply with the relevant subject content and assessment objectives. However, caution has been expressed, as in the past the assessment objectives set out in official documentation have been laudable, but they have been poorly implemented by awarding organisations.⁷

There are some concerns that the italic text set out in the proposed condition (pp. 18-20) may lead to atomisation in assessment.⁸ However, ACME also recognises that this will require awarding organisations to give more detail about the qualifications they intend to offer. Careful monitoring by Ofqual will be needed to ensure that examinations do not become atomised.

5. Regulation of sampling of subject content in AS/A level Mathematics

ACME is supportive of the introduction of core content in AS/A level Mathematics. It can make it easier for universities and employers to become more familiar with mathematical skills that a student should have learned.⁹

Ofqual proposes subject-specific rules requiring awarding organisations to cover all the subject content in 'as short a period of time as possible'. At ACME's roundtable, it was highlighted by participants that clear guidance from Ofqual was needed to ensure that the term 'as short a period of time as possible' was not misinterpreted by awarding organisations. Ofqual must also monitor qualifications carefully to balance the need for comparability across awarding organisations' qualifications and the avoidance of predictability over time.

⁴ See Footnote 1.

⁵ <https://www.gov.uk/government/collections/gce-as-and-a-level-subject-content>; <http://www.acme-uk.org/media/14317/final%20acme%20response%20-%20new%20a%20level%20regulatory%20requirements.pdf>.

⁶ It is also positive that assessment objectives 1 to 3 use the same overarching headings as those that are used in GCSE Mathematics, which will be useful for learners and teachers in terms of progression.

⁷ <http://www.acme-uk.org/media/19478/acme%20-%20september%202014%20-%20ofqual%20consultation%20a%20level%20final.pdf>

⁸ For example, the guidance could have the effect of encouraging awarding organisations to atomise assessment instruments. This would go against the intentions of the assessment objectives and potentially do great harm to the intended direction of teaching and learning in the subject.

⁹ [http://www.acme-uk.org/media/14294/acme%20response-%20dfe%20consultation%20on%20subject%20content%20\(final%20for%20submission\).pdf](http://www.acme-uk.org/media/14294/acme%20response-%20dfe%20consultation%20on%20subject%20content%20(final%20for%20submission).pdf). Core content also provides a helpful basis for progression and supports learners who move from one school to another where a different awarding organisation's qualifications may be taught.

6. Regulation of the use of large data sets in AS/A level Mathematics

ACME recognises the importance of the use of large data sets in AS/ A level Mathematics. There is potential for learners to gain a more in-depth understanding of mathematical skills useful for further study and work. It is important learners work with data sets that have not been cleansed, as set out in Ofqual's proposed guidance.

In the ALCAB report it was stated that 'the use of real, large data sets should permeate the teaching, learning and assessment of statistics in AS and A level Mathematics and Further Mathematics'. They noted this would 'involve a change in classroom practice for some teachers and resultant training was needed'.¹⁰ Professional development is crucial to the success of the proposed reform, given that that statistics modules have not previously been compulsory and the increased demands this will mean for teachers.

This reform would represent a significant change and requires investment in a detailed implementation plan. In addition, there must be careful monitoring of how this change is developing and adaptations made, if necessary.¹¹

7. Regulation of non-core content in AS/A level Further Mathematics

ACME is supportive of introducing core content in AS/A level Further Mathematics to ensure equality of provision and clearer understandings for employers and universities about what Further Mathematics offers.¹² Given that awarding organisations will still be able to determine the final 50% of content, it is sensible to introduce regulation as is proposed. Once again, careful monitoring will be required over time.

8. First exams for new mathematics A levels in summer 2018?

Ofqual proposes to allow the first examinations for new A level Mathematics in summer 2018 (at the end of first year of teaching). It is stated that this proposal is aimed at those learners that 'take mathematics A level at the end of year 12, followed by A level Further Mathematics at the end of year 13'.

Ofqual should undertake a more in-depth analysis of the size of the potential cohort and the wider implications of this proposal before choosing to proceed with this path. In ACME's view, this proposal would likely complicate the communication about the reforms and hamper their implementation. The timescales are also likely too tight for a change such as this to be carried out effectively. Although there may be short-term benefits for one cohort of learners, this would not outweigh the confusion and burden for learners, schools and teachers.

¹⁰ <http://epc.ac.uk/wp-content/uploads/2014/11/4.-ALCAB-Panel-Report-on-Maths-and-Further-Maths.pdf>.

¹¹ ACME welcomes the report that the Ofqual working group produced on Report on Mathematical Problem Solving, Modelling and the Use of Large Data Sets. However, although the report is a good first step and sets out desirable characteristics of large data sets, examples were not included, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/481857/a-level-mathematics-working-group-report.pdf.

¹² [http://www.acme-uk.org/media/14294/acme%20response-%20dfe%20consultation%20on%20subject%20content%20\(final%20for%20submission\).pdf](http://www.acme-uk.org/media/14294/acme%20response-%20dfe%20consultation%20on%20subject%20content%20(final%20for%20submission).pdf).