

Decisions on Conditions and guidance for AS and A level mathematics and further mathematics



In December 2015 we published a consultation about the rules and guidance we proposed to put in place for new AS and A levels in mathematics and further mathematics.

This consultation set out draft Subject Level Conditions, requirements and guidance which would apply to all new AS and A level qualifications in these subjects.

We have reviewed the responses to the consultation and are now announcing our decisions. We are also publishing a detailed analysis of the responses alongside this document.¹

Assessment objectives for AS and A level mathematics and further mathematics

Following feedback on a previous consultation,² we made a number of significant changes to both the wording and weighting of our proposed assessment objectives. As such, we sought further views on our revised assessment objectives through this consultation.

The majority of respondents supported both the proposed wording and weighting of our assessment objectives. However:

- some respondents proposed very specific changes to the wording of the assessment objectives; and
- two respondents (a subject association and a learned society) were concerned that it may not be clear that problem-solving should be assessed across the full ability range.

Our view remains that – overall – the assessment objectives on which we consulted reflect the intention of the subject content (and, in particular, the overarching themes

¹ www.gov.uk/government/consultations/as-and-a-level-reform-regulations-for-maths-and-further-maths

² www.gov.uk/government/consultations/gcses-as-and-a-levels-reform-of-subjects-for-september-2016

set out within it), but we have made minor drafting changes to the wording of AO2 and AO3 in response to the comments made.

Tolerances around assessment objective weightings

To avoid undesirable impacts on assessment design, we proposed to allow exam boards limited tolerances (± 2 per cent) around each of the assessment objective weightings.

A number of subject associations suggested that our proposed tolerance should be increased for AO1, mainly to reflect the significantly higher weighting of AO1, but also to allow exam boards to access the full tolerance available for AO2 and AO3 simultaneously.

The consensus view of the exam boards, however, is that a ± 2 per cent tolerance for all three assessment objectives is sufficient to mitigate the risk of distorting assessment design.

Our view is that we should set the lowest tolerance possible which mitigates the risk of distorting assessment design. Given the views of exam boards, we have decided to confirm our proposal of a ± 2 per cent tolerance for all three assessment objectives (in mathematics) and for AO1 in further mathematics.

We have also decided to include an additional requirement which makes clear that the exam boards should be targeting the required weightings, and only using the tolerances when it is necessary to support good assessment design.

Conditions and requirements for AS and A level mathematics and further mathematics

Content requirements

We proposed that all reformed AS and A level qualifications in mathematics or further mathematics should comply with the subject content requirements published by the Department for Education,³ and with our assessment objectives. This includes the addition of the two proposed new appendices to the subject content which were included in the consultation.

The majority of respondents, over 85%, agreed or strongly agreed with this proposal.

This is the approach we have taken for all other reformed AS and A level qualifications, and given the responses we have received to this consultation we see

³ www.gov.uk/government/publications/gce-as-and-a-level-mathematics and www.gov.uk/government/publications/gce-as-and-a-level-further-mathematics

no reason to take a different approach for mathematics. We have decided to confirm our consultation proposals.

Sampling of subject content in AS and A level mathematics

We proposed to introduce requirements setting out the approach exam boards should take to sampling the subject content within their assessments – and in particular a requirement that exam boards should sample the full range of the subject content within the shortest time period that is reasonably practicable.

The overwhelming majority of respondents supported our proposals, noting they were important to ensure comparability between exam boards, and to avoid narrowing the subject content.

Some respondents expressed concerns that – over time – our approach could lead to predictable assessments, and that our requirements assumed all subject content statements were of equal importance.

The wording of our requirements intentionally gives exam boards flexibility to sample the subject content in a way which takes account of the differing importance of the subject content statements, ensures full coverage of the subject content over time, and avoids predictable assessments. It is for exam boards to explain and justify their chosen approach in their assessment strategies.

We have therefore decided to adopt these proposed requirements unchanged.

Non-core content in AS and A level further mathematics

We proposed to introduce requirements for exam boards to explain and justify the non-core content they have included in their further mathematics specifications.

Most respondents supported allowing exam boards freedom to innovate in the non-core content included in their specifications, and welcomed the fact that there would be diversity of approach.

But some respondents raised concerns about:

- how the level of demand of the non-core content would be monitored to ensure comparable demand between exam boards, and that there was no ‘easy option’, and
- the potential for involvement of the subject community in the development of non-core content.

Our view is that the concerns about the level of demand of content are already addressed by other rules. The subject content for further mathematics requires all

non-core content to be at the same level of demand as the core content, and our existing rules for all qualifications require all optional routes to be at a consistent level of demand.

Similarly, our rules for all qualifications require exam boards to consider the needs and views of qualification users (including the subject community) when developing their qualifications – and our proposed requirements included specific additional rules designed to address this concern for further mathematics.

We have therefore chosen to adopt our consultation proposals unchanged.

Guidance for AS and A level mathematics and further mathematics

Guidance on assessment objectives

We proposed to introduce guidance clarifying the interpretation of our assessment objectives. The majority of respondents agreed with our proposals, but some suggested changes to the wording to improve clarity.

In response to feedback, we have made the following changes to our guidance:

- reworded some definitions, strands and elements for consistency and clarity,
- made clear that some elements of AO3 should only be targeted where appropriate to the question/task. Questions on these elements need not appear in an exam board's assessments every year, but should be covered in the shortest period of time that is reasonably practicable (and without making the assessments predictable), and
- for further mathematics, revised the suggested weighting of questions/tasks targeting modelling within AO3 to reflect the different approaches exam boards could take to non-core content.

'Overarching themes' and 'Use of technology'

We proposed to introduce guidance which clarified that statements in the subject content relating to 'overarching themes' and 'use of technology' should be interpreted primarily as indicating the desired approach to teaching and learning, but that assessments and qualifications should be designed in a way which supports these intentions.

Whilst responses to this question were generally favourable (over 75% of respondent agreed or strongly agreed with our proposal), and respondents were supportive of the desire to integrate the use of technology into the teaching of mathematics, some concerns were raised about the impact that our guidance would have on assessments.

We have considered both points of view here carefully. We remain of the view that that our proposed guidance supports the curriculum intention, but without being overly prescriptive.

We have therefore decided to adopt our proposed guidance in full.

Use and assessment of large data sets in AS and A level mathematics

We proposed to introduce guidance which clarified our expectations of the large data sets which awarding organisations should provide to schools. This guidance also clarified that questions/tasks in exams should be designed to give a material advantage to students who had studied the prescribed data sets.

Many of the responses to the question raised issues outside the scope of the consultation, which we cover under 'Other issues' below.

We have considered all responses carefully, but remain of the view that our proposed guidance will support the curriculum intention to change the teaching of statistics, while still promoting good assessments. But we have made minor drafting changes to our proposed guidance in response to feedback.

First examination for A level mathematics

We proposed that the first examination for the new A level mathematics should take place in summer 2018, at the end of the first year of teaching. This is to allow (but not require) students beginning their studies in 2017, and who are taking both mathematics and further mathematics, to take their examinations in mathematics in one year and in further mathematics a year later, in line with some current practice and as students will be able to in subsequent years.

Over 80% of respondents agreed with this as a matter of fairness and to ensure comparability year on year. But some respondents commented on possible technical challenges associated with awarding, and that it could lead to confusion for schools.

We remain of the view that it would be unfair to prevent the first cohort of students from taking the new A level in mathematics after a single year's teaching, when all subsequent cohorts will have this option.

We have therefore decided to confirm our consultation proposal, which means the first examinations for the new A level mathematics will take place in summer 2018.

To give effect to this decision, we will need to make minor changes to the Qualification Level Conditions which apply to legacy⁴ and new⁵ AS and A level qualifications in due course. These changes will simply make clear that the Qualification Level Conditions for new AS and A level qualifications will apply to the new mathematics A level.

Other issues

Respondents raised two main issues which were outside the scope of the consultation:

- the need for appropriate teacher training to support the teaching of statistics using large data sets; and
- the need to assess students' statistical skills using non-exam assessment.

We have already considered the need for non-exam assessment in AS and A level mathematics and further mathematics in response to our earlier consultation. None of the responses to this consultation raised new issues, and do not change our view that all of the subject content for AS and A level mathematics and further mathematics can (and therefore should) be assessed through exams.

Next steps

Alongside this document, we have published the following documents which formally introduce our rules and guidance for AS and A level mathematics and further mathematics:

- *GCE Subject Level Conditions for Mathematics*⁶
- *GCE Subject Level Guidance for Mathematics*⁷
- *GCE Subject Level Conditions for Further Mathematics*⁸
- *GCE Subject Level Guidance for Further Mathematics*⁹

⁴ www.gov.uk/government/publications/gce-qualification-level-conditions-for-pre-reform-qualifications

⁵ www.gov.uk/government/publications/gce-qualification-level-conditions-and-requirements

⁶ www.gov.uk/government/publications/gce-subject-level-conditions-and-requirements-for-mathematics

⁷ www.gov.uk/government/publications/gce-subject-level-guidance-for-mathematics

⁸ www.gov.uk/government/publications/gce-subject-level-conditions-and-requirements-for-further-mathematics

⁹ www.gov.uk/government/publications/gce-subject-level-guidance-for-further-mathematics

In parallel with this consultation, we also consulted on new rules for regulating the use of calculators in all new GCSEs, AS and A levels.¹⁰ We will be publishing our decisions on that consultation in due course.

¹⁰ www.gov.uk/government/consultations/regulating-use-of-calculators-in-new-gcses-as-and-a-levels