Analysis of Responses to our Consultation on Conditions and Guidance for AS and A level Mathematics and AS and A level Further Mathematics

April 2016

Ofqual/16/5918

Contents

Executive Summary

Our consultation about the Conditions and guidance for AS and A level mathematics and AS and A level further mathematics took place between 2nd December 2015 and 11th January 2016. The consultation questions were available to complete online or to download. A copy of the consultation is available at https://www.gov.uk/government/consultations/as-and-a-level-reform-regulations-for-maths-and-further-maths

There were 42 responses to our consultation – 26 from organisations and 16 from individuals.

The responses to all of our proposals were generally positive, however there were some specific comments and suggestions, particularly in the responses from subject associations and learned societies.

We have identified several distinct themes within the more detailed responses. Specifically, concerns were raised about:

- Our proposed regulations relating to the assessment of large data sets.
- The weighting of assessment objectives, and whether having different weightings of assessment objectives between AS and A level is desirable.
- The process for making decisions regarding the approval of non-core content in further mathematics.
- The expectations in terms of sampling the subject content for mathematics.
- The monitoring and evaluation of new qualifications once teaching has begun.

A number of respondents also raised concerns about the subject content – in particular the accuracy, layout and formatting of the proposed appendices to the content. These concerns – and other matters relating to the subject content – are outside the scope of our consultation. We have passed on these views to the Department for Education for it to consider.

1. Introduction

The consultation on the Conditions and guidance for AS and A level mathematics and AS and A level further mathematics

This report is a summary of the views expressed by those who responded to our consultation on the Conditions and guidance for AS and A level mathematics and AS and A level further mathematics which took place between 2nd December 2015 and 11th January 2016.

Background

New GCSE, AS and A level qualifications are being introduced in England. We have consulted on and announced our policy on the general design of these new qualifications. We have also set out our policy and technical arrangements for the subjects where first courses began in September 2015,[1] and for the subjects which will be introduced for first teaching from September 2016.[2]

We previously consulted on the arrangements for the assessment of GCE AS and A level mathematics and further mathematics,[3] and in December 2014 we confirmed that AS and A levels in both mathematics and in further mathematics would be assessed entirely through exams.[4]

This consultation focused on the regulatory arrangements that we must put in place to make sure that awarding organisations design, deliver and award the new AS and A levels in mathematics and in further mathematics in line with our policy decisions. This consultation also considered the assessment objectives for AS and A levels in mathematics and further mathematics.

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[1] New GCSEs in English language, English literature and mathematics, as well as new AS and A levels in art and design, biology, business, chemistry, computer science, economics, English language, English language and literature, English Literature, history, physics, psychology and sociology.
[2] New GCSEs in art and design, biology, chemistry, citizenship studies, classical Greek, combined science, computer science, dance, drama, food preparation and nutrition, French, geography, German, history, Latin, music, physical education, physics, religious studies and Spanish. New AS and A levels in classical Greek, dance, drama and theatre, French, geography, German, Latin, music, physical education, religious studies and Spanish.
[3] www.gov.uk/government/consultations/gcses-as-and-a-levels-new-subjects-to-be-taught-in-2016
[4] www.gov.uk/government/consultations/gcses-as-and-a-levels-reform-of-subjects-for-september-2016

2. Who responded?

We received a total of 42 responses to our consultation – 26 from organisations and 16 from individuals. All the responses were from individuals or organisations based in England or Wales.

Table 1: Breakdown of consultation responses

Personal / organisation response	Respondent type	Number
Personal	Teacher	11
Personal	Educational specialist	4
Personal	Student	1
Organisation	Subject association or learned society	11
Organisation	School/college	9
Organisation	Awarding organisation	3
Organisation	Other representative or interest group	2
Organisation	Union	1

3. Approach to analysis

We published the consultation on our website. Respondents could choose to respond using an online form, by email or by posting their answers to the consultation questions to us. The consultation included 20 questions.

This was a consultation on the views of those who wished to participate and while we tried to ensure that as many respondents as possible had the opportunity to reply, it cannot be considered as a representative sample of the general public or any specific group.

Data presentation

We present the responses to the consultation questions in the order in which they were asked.

The consultation asked 20 questions and each had a different focus. Respondents could choose to answer all or just some of the questions.

For some of the questions, respondents could indicate the extent to which they agreed or disagreed with our proposals, using a 5-point scale (Strongly agree, Agree, Neither agree nor disagree, Disagree and Strongly disagree), as well as providing comments on our proposals.

For these questions, we set out respondents' views using the 5-point scale. Where respondents provided further comments, we analyse these separately for respondents who agreed with our proposals, disagreed with our proposals, and expressed no preference.

During the analysis phase we reviewed every response to each question.

4. Views expressed – consultation response outcomes

In this section we report the views, in broad terms, of those who responded to the consultation document. We have structured this around the questions covered in the consultation document and provide analysis of the data broken down by stakeholder.

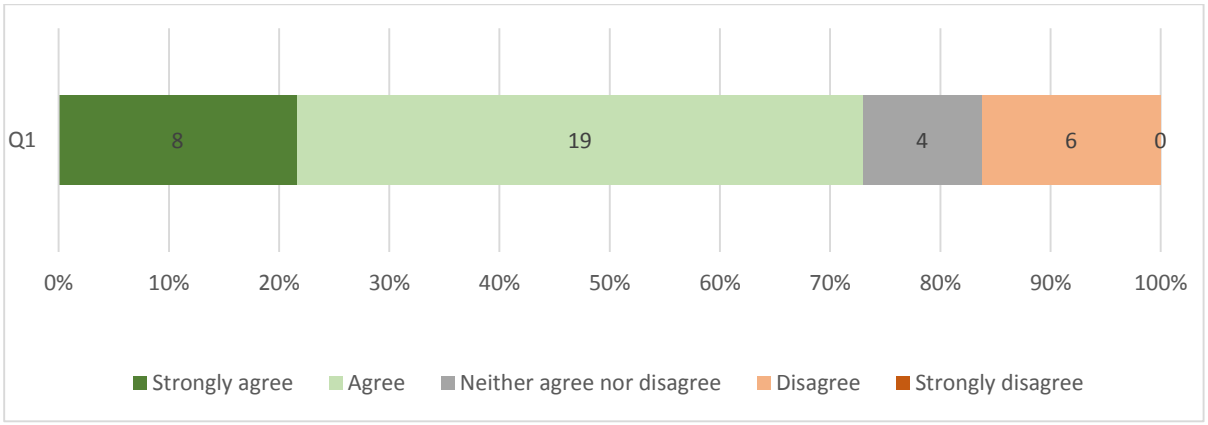
A consultation is not the same as a survey and the responses only reflect the views of those who chose to respond. Typically these will be those with strong views and/or particular experience or interest in a topic. What follows is a fair reflection of the views expressed by respondents to the consultation.

A list of the organisations that responded to the consultation is included in Appendix A.

Question 1: To what extent do you agree or disagree that the proposed assessment objectives are appropriate for AS and A level mathematics and further mathematics?

As illustrated in Figure 1, responses to this question were generally in favour of our proposal. Of those who responded to this question 27 agreed or strongly agreed that the assessment objectives were appropriate for both mathematics and further mathematics. Only six respondents disagreed with our proposed assessment objectives, and four neither agreed nor disagreed.

Figure 1 Overview of responses to Question 1



Of the respondents who agreed with our proposals:

- Three subject associations welcomed the movement of proof and notation to assessment objective AO2.

- An awarding organisation commented that the assessment objectives had already undergone significant re-drafting, and that this version reflected the intention of the subject content, covered the intention of the overarching themes and had been tried and tested in exploratory assessment materials.
- Two organisations, a subject association and a learned society, commented that the assessment objectives were appropriate, but expressed concern that it may not be clear that problem-solving should be assessed across the full ability range of students.
- Four respondents expressed overall agreement with the assessment objectives, but felt that the wording could be clearer, particularly in assessment objective AO3. One of the respondents, for example, found it difficult to distinguish between strands 1 and 3 in assessment objective AO3.
- One educational specialist thought that the wording of the assessment objectives was well thought-through and appropriate, but that care needed to be taken to ensure that the italicised text in the assessment objectives did not have the unintended effect of making assessments significantly more difficult than at present.
- One response from a learned society was supportive of the assessment objectives as currently worded, but was concerned that the application of the assessment objectives should be carefully monitored in live assessments.

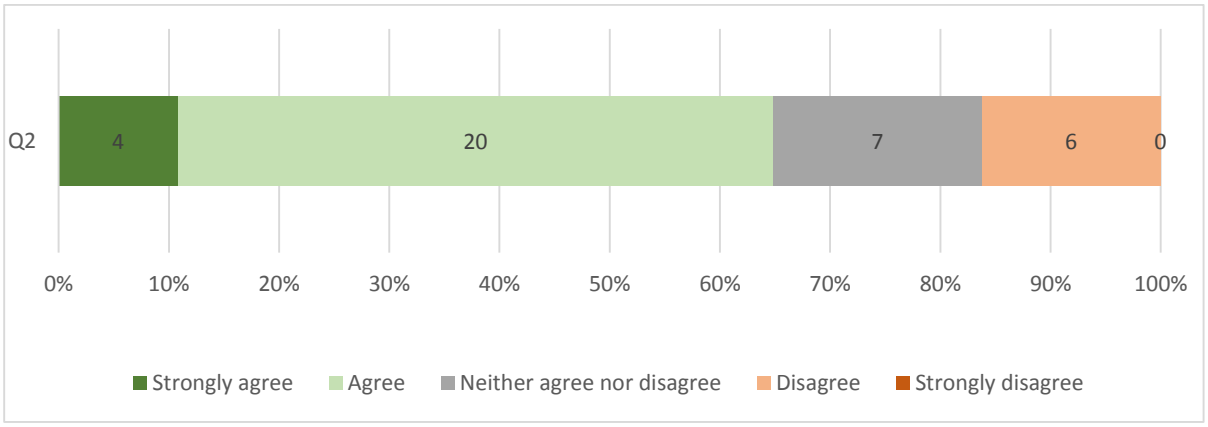
Of the respondents who disagreed with our proposals:

- Two teachers responded to say that the changes were unnecessary, and that they were concerned that the new specifications would prove too challenging.
- Four respondents, including three organisations, made specific suggestions for changes to the wording of assessment objectives. These included:
    - adding wording to assessment objective AO1 to emphasise the importance of speed and accuracy when carrying out routine procedures,
    - noting that none of the strands in assessment objective AO2 clearly related to the need to ‘interpret’, and
    - the suggestion that ‘use and apply notation’ should be included in the assessment objectives as a separate strand.

Question 2: To what extent do you agree or disagree that the proposed weightings of the assessment objectives are appropriate for AS mathematics?

Respondents were supportive of our proposals for the weighting of assessment objectives in AS level mathematics, as can be seen in figure 2 below. Of those who responded, 24 agreed or strongly agreed that the suggested weightings were appropriate. Six respondents disagreed with the weightings of the assessment objectives, and seven respondents neither agreed nor disagreed.

Figure 2 Overview of responses to Question 2



As part of our proposals regarding assessment objective weightings we suggested that a 2 per cent tolerance may be appropriate to allow some flexibility in the design of assessments. Five of the respondents who commented on this proposal, including two awarding organisations, welcomed this flexibility, however six respondents (most responding in a personal capacity) felt that this flexibility was not enough and could lead to predictable, formulaic exam papers. In contrast, one response from a learned society was strongly of the opinion that no flexibility should be allowed as this could lead to perceived differences in demand between exam boards, and so allow 'gaming' of the system by both exam boards and schools.

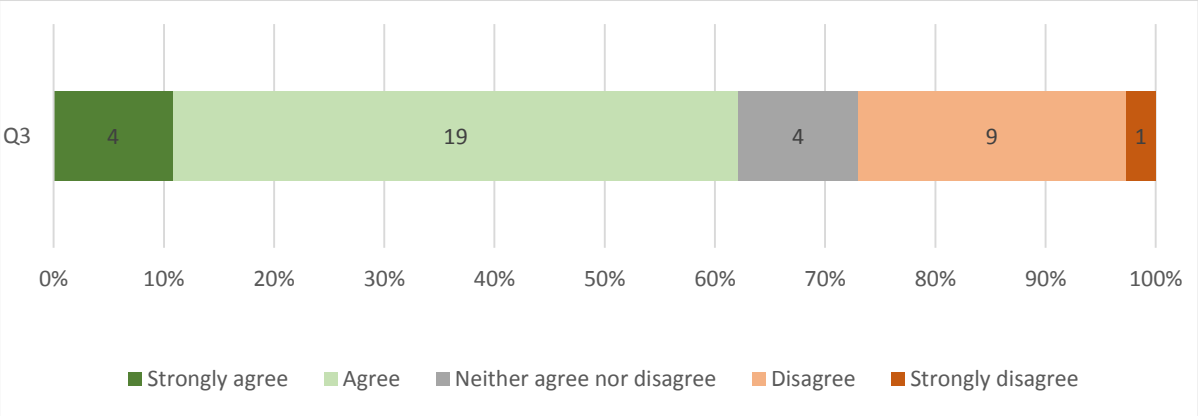
Two respondents, both organisations, welcomed the increase in the percentage allocated to assessment objective AO1 in comparison to earlier proposals. Eight respondents expressed concern that the italicised text in the assessment objectives would result in fewer assessment objective AO1-only focussed questions and that this would lead to an increase in the demand of the assessments. One awarding organisation commented on this issue specifically, stating that they felt that assessment objective AO1 had been increased sufficiently to ensure that this did not happen, however a different awarding organisation felt that without a further increase in the weighting of assessment objective AO1 the assessments would be skewed

heavily towards questions focussed on problem-solving and would not adequately discriminate between students.

Question 3: To what extent do you agree or disagree that the proposed weightings of the assessment objectives are appropriate for A level mathematics?

As illustrated in Figure 3, responses to this question were slightly more mixed. The majority of respondents to this question were in favour of the proposal – 23 respondents agreed or strongly agreed with our proposed assessment objective weightings for A level mathematics. Ten respondents disagreed with our proposal, and four neither agreed nor disagreed.

Figure 3 Overview of responses to Question 3



In line with our proposals for AS, we had also proposed a 2 per cent tolerance to allow some flexibility in the design of assessment at A level.

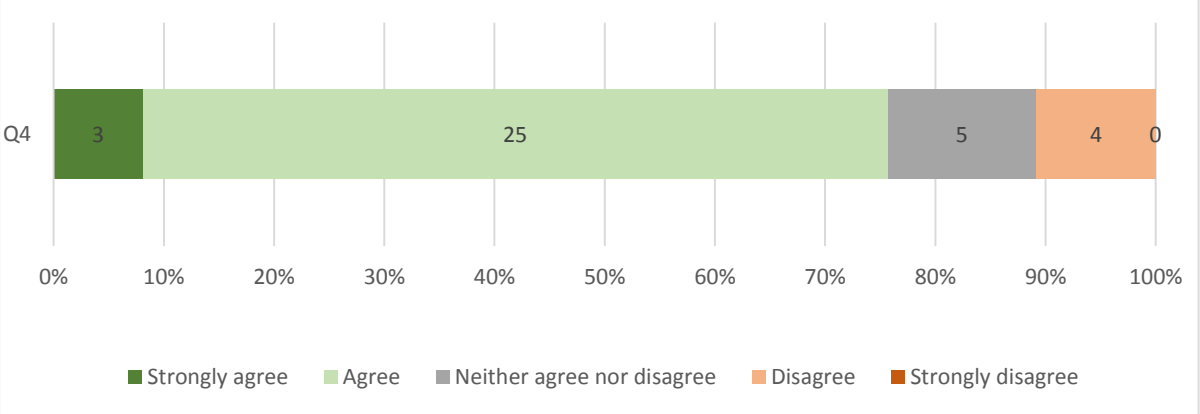
Responses to this question were similar to those for question 2 (see above), with the same issues raised around the weighting of assessment objective AO1 and the flexibility in weightings. Two responses, both from subject associations, raised an additional issue with the weightings. They suggested that as assessment objective AO1 is proportionally larger than assessment objectives AO2 and AO3, a larger tolerance should be allowed for this assessment objective.

There were also responses from two organisations, including an awarding organisation, that questioned the need for the proposed difference in weightings between AS and A level. Both suggested that the AS weightings would be appropriate for both AS and A level.

Question 4: To what extent do you agree or disagree that the proposed weightings of the assessment objectives are appropriate for AS further mathematics?

There was general agreement with our proposals for the assessment objective weightings for AS further mathematics, with 28 respondents agreeing or strongly agreeing with our proposal. Four respondents disagreed, and five respondents neither agreed nor disagreed.

Figure 4 Overview of responses to Question 4



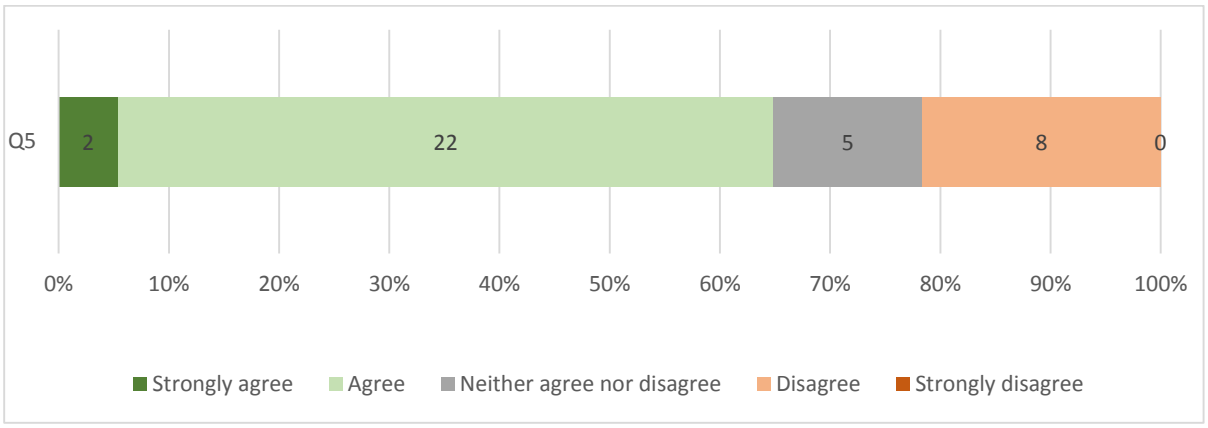
Responses to this question were similar to those for questions 2 and 3 with the same issue around the weighting of assessment objective AO1 being raised.

In addition, a number of respondents commented on the flexibility of the weightings for further mathematics. Our proposed approach to the flexibility of weightings in further mathematics differed from the approach taken in mathematics. In further mathematics we proposed that only assessment objective AO1 should be given a tolerance (again of 2 per cent), with the weightings for assessment objectives AO2 and AO3 expressed as minima. This allows for greater flexibility to take into account the range of possible non-core content in further mathematics. The majority of responses were, again, very supportive of the flexibility proposed and the opportunity for exam boards to tailor the assessment objective weightings to their individual approach to non-core content. One subject association was concerned that this flexibility would not allow comparability of demand across the optional content, and that this would lead to schools opting for 'easier' qualifications.

Question 5: To what extent do you agree or disagree that the proposed weightings of the assessment objectives are appropriate for A level further mathematics?

24 respondents agreed or strongly agreed with our proposals. Eight respondents disagreed, and five neither agreed nor disagreed.

Figure 5 Overview of responses to Question 5

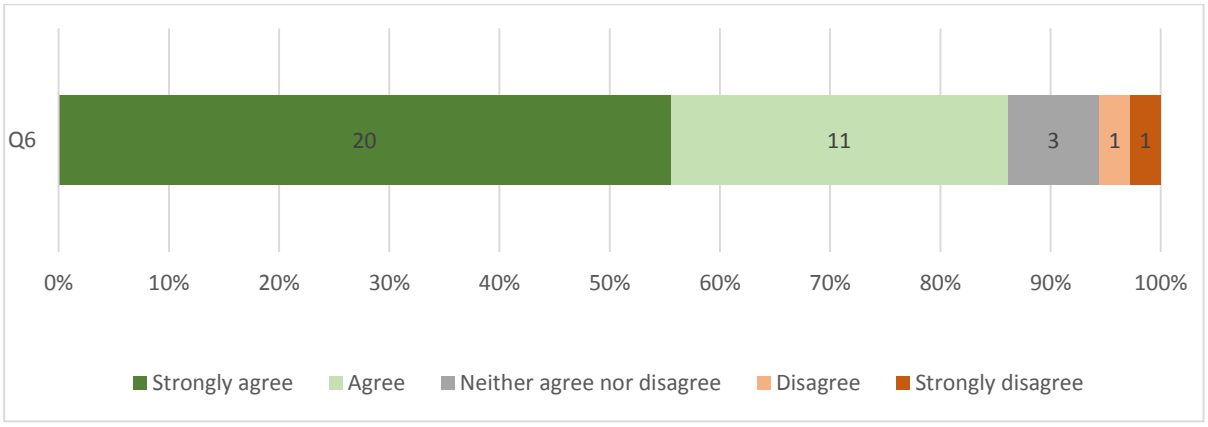


Respondents raised similar issues to those in questions 2, 3 and 4 above. Again, a small number of respondents questioned the difference in weightings between AS and A level further mathematics, and expressed the view that the flexibility of the weightings for assessment objectives AO2 and AO3 was inappropriate.

Question 6: To what extent do you agree or disagree that we should introduce a Condition which requires exam boards to comply with the relevant subject content – including the two proposed new appendices – and assessment objectives?

31 respondents agreed or strongly agreed with the proposal to include a Condition requiring compliance with the subject content and the assessment objectives. Only two respondents disagreed or strongly disagreed, and three respondents neither agreed nor disagreed.

Figure 6 Overview of responses to Question 6



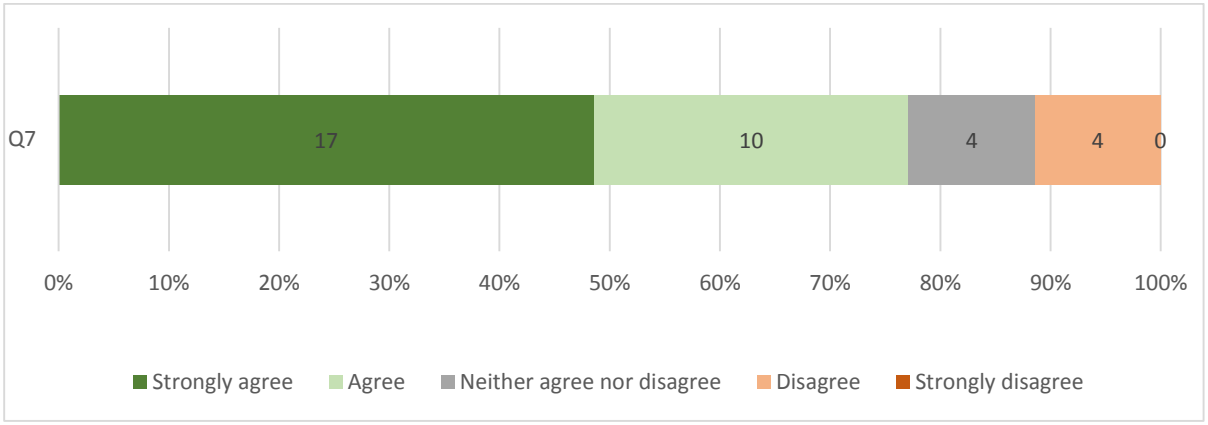
The majority of respondents expressed the view that the introduction of the Condition was necessary to ensure consistency between specifications.

However, one respondent, an education specialist, stated that they did not feel that the introduction of the Condition was necessary, and another respondent, a teacher, strongly disagreed with the introduction of the Condition as they felt that the current qualification should not be reformed as it was fit for purpose.

Question 7: To what extent do you agree or disagree that we should introduce guidance which clarifies that awarding organisations should explain and justify in their assessment strategies how their qualification design reflects the 'Overarching themes' and 'Use of technology' sections of the subject content?

There was general agreement with our suggested approach to guidance regarding the 'Overarching themes' and 'Use of technology' sections of the subject content with 27 respondents either agreeing or strongly agreeing with the proposal. Only four respondents disagreed with the proposal, and four respondents neither agreed nor disagreed.

Figure 7 Overview of responses to Question 7



Whilst responses to this question were generally favourable, 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.

Two teachers expressed their concern that that the guidance reflects a view that exam boards should be setting out specific advice on the ways that qualifications should be taught, and that the use of technology in the classroom was pointless if it was not included in assessment. There was also concern that the guidance was contrived, and that in practice it would not have the desired impact on teaching.

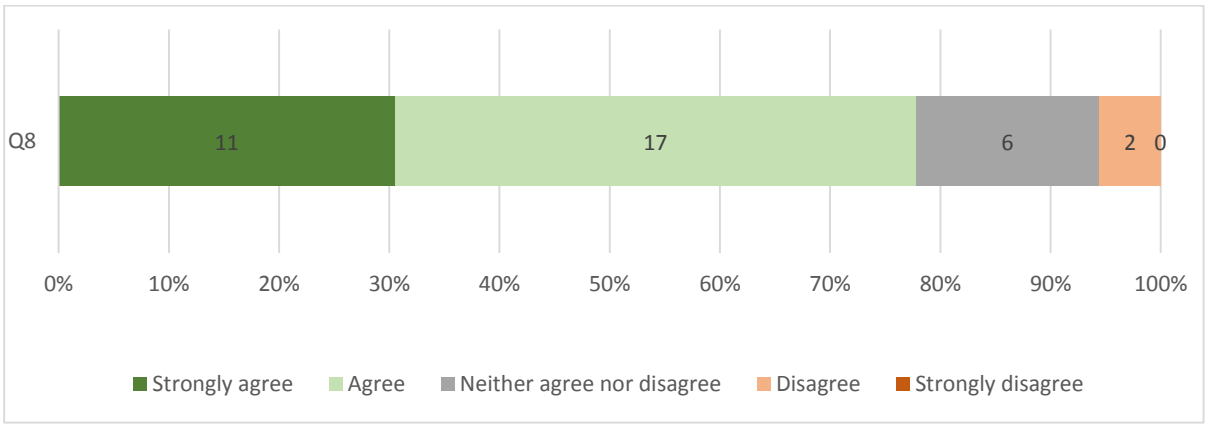
Some respondents expressed their strong disagreement with the proposal, as they felt that the appropriate use of technology could not be assessed without the use of non-examination assessment.

One organisational response asserted that mathematical problem-solving and modelling were better assessed through non-examination assessment. This respondent expressed the view that no attempt has been made to learn how technology could permeate assessment as well as the curriculum. They went on to predict that many learners will not have access to the full problem solving and modelling aspects of the intended curriculum and will not follow a curriculum permeated with the use of technology. The issue of whether there should be non-examination assessment in AS and A level mathematics/further mathematics was outside the scope of this consultation (see 'other issues' section below).

Question 8: To what extent do you agree or disagree that we should introduce guidance which clarifies how awarding organisations should interpret our assessment objectives?

Amongst those who replied to this question there was strong agreement with our approach to the guidance around assessment objectives, with 28 respondents agreeing or strongly agreeing with the proposal. Only two respondents disagreed with our proposals, and six respondents neither agreed nor disagreed with them.

Figure 8 Overview of responses to Question 8



The responses to this question were mainly positive, with the majority of respondents stating that they felt that the proposed guidance would assist in ensuring consistency between exam boards.

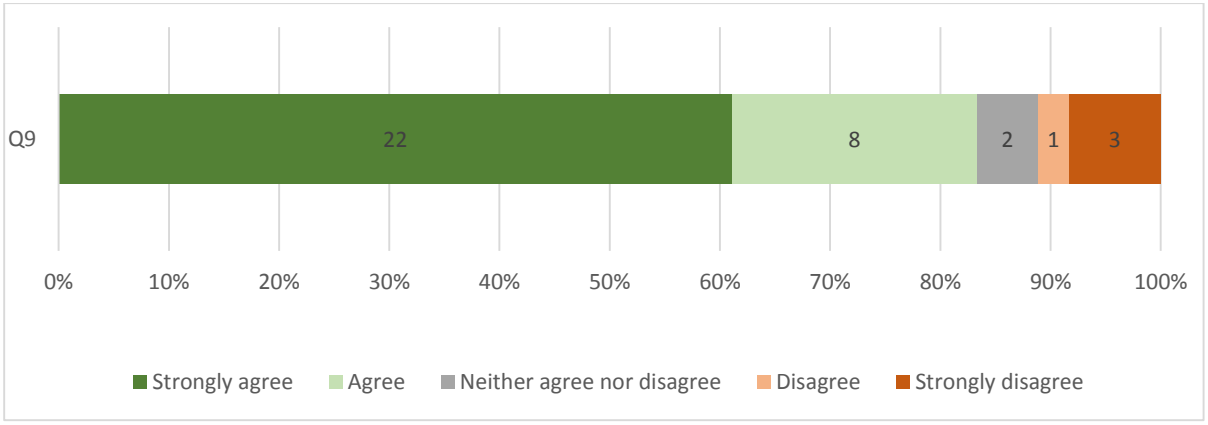
The exam boards all agreed that the guidance was useful, but they suggested areas where improvements could be made.

Two subject associations, and one individual respondent, were concerned that there was further prescription regarding the percentage of coverage within the guidance, for example the suggested proportion of modelling in assessment objective AO3. They thought that this was overly prescriptive, and indeed may be inappropriate in further mathematics depending on the non-core content chosen by the exam board.

Question 9: To what extent do you agree or disagree that we should allow the first exams for new mathematics A levels in summer 2018 (at the end of the first year of teaching)?

30 respondents supported the proposal that we should allow the first exams for new mathematics A levels to take place in summer 2018 (at the end of the first year of teaching, rather than at the end of two years of teaching). However, four respondents disagreed or strongly disagreed with the proposal, and two neither agreed nor disagreed with it.

Figure 9 Overview of responses to Question 9



The majority of respondents said that they agreed with the proposal on the grounds of fairness –students in subsequent years would be able to take mathematics in year 12 and further mathematics in year 13, and the view was expressed that the first cohort of students should have the same opportunity. Indeed, there was a positive response to the fact that the proposal recognised that mathematics and further mathematics were in a unique position amongst A levels, and that flexibility about the way in which schools teach and enter students for these qualifications was an important factor in maintaining the numbers of students taking them. Responses from schools who did not intend to follow an early entry model for A level mathematics also welcomed the proposal, as they felt that an extra set of exam papers would be a useful resource in preparing their students.

The awarding organisations were all strongly in favour of the proposal, and all said that their centres were keen that this arrangement should be put in place. One exam board noted that this provision would mean that the first cohort of students would be atypical, and that this brought with it some technical challenges in awarding. However, they were confident that they would be able to overcome these issues and award reliably, and that the exam boards were already working together on an approach to manage the issues.

A learned society, who expressed no preference on this proposal, stated that a more in-depth analysis was needed on the potential cohort likely to take the exam, and the

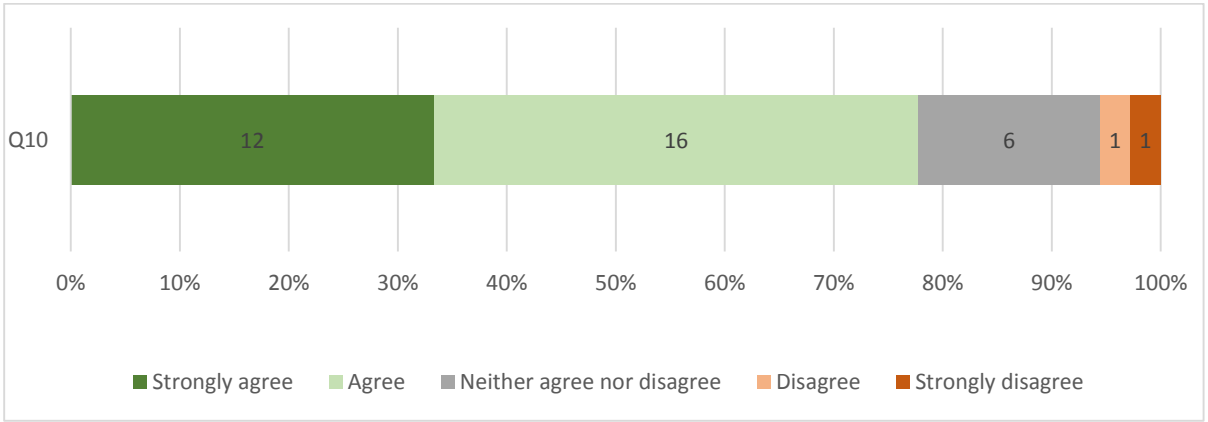
wider implications that this may have, particularly for awarding. They also raised concerns that allowing early entry could confuse the communications with schools about the reforms, and that timescales would be very tight to have assessments ready and teachers prepared for awarding in 2018.

Of those who disagreed with the proposal, two were concerned about the timescale of reforms, and thought it unlikely that teachers would be ready to deliver the qualification in time for a 2018 award as no textbooks or other resources were yet available. A further two felt that all A levels should only be available for examination after two years of study, both in 2018 and in subsequent years. They stated reasons of fairness, in particular for smaller centres who did not have the resources to enter some students after a year, and a concern that providing this in some centres and not others would lead to a decline in the numbers taking further maths.

Question 10: To what extent do you agree or disagree with our proposed approach to regulating the sampling of subject content in AS and A level mathematics?

28 of the 36 respondents to this question agreed or strongly agreed with the proposed approach to the sampling of the subject content. Two respondents disagreed with the approach, and six neither agreed nor disagreed.

Figure 10 Overview of responses to Question 10



Many respondents commented that they felt the proposed requirements are necessary to make sure, as far as possible, that there is comparability between awarding organisations, and that the subject content is not narrowed in any way. Some respondents did however suggest that Ofqual should monitor the way in which exam boards approach the sampling of subject content, to ensure that exams do not become predictable.

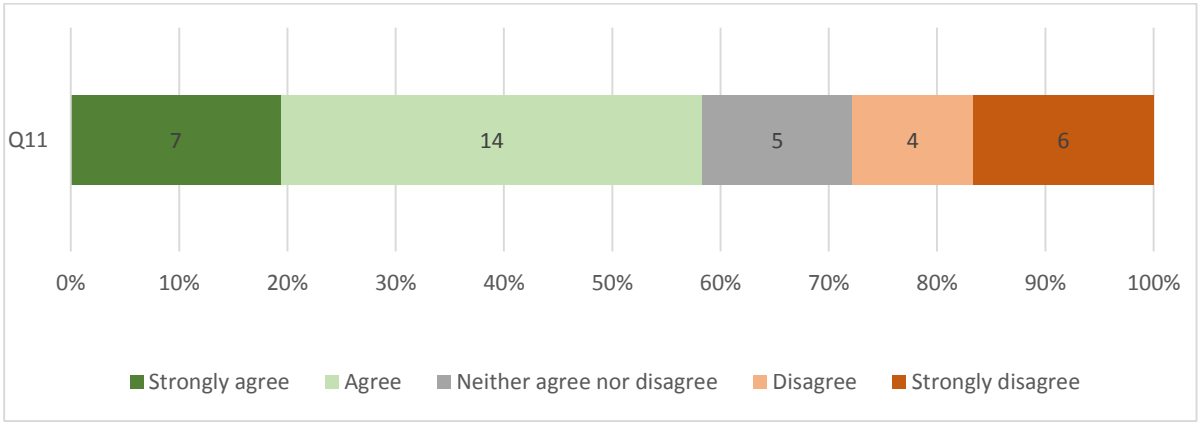
Only two respondents disagreed with the proposal; one awarding organisation and one subject association. These respondents disagreed with the proposal on the basis that, as currently worded, the requirements around sampling of subject content would

lead to the exam boards taking approaches which would be damaging to the nature of the subject. They suggested that the current wording of the requirements would force exam boards not to repeat the assessment of topics until all topics had been covered, and that this would lead to assessments becoming predictable over time. They also expressed the view that not all aspects of the subject content were of equal importance or applicability, and the proposed requirements did not reflect this.

Question 11: To what extent do you agree or disagree with our proposed approach to regulating the use and assessment of large data sets in AS and A level mathematics?

The majority of respondents to this question (21 of the 36 respondents) agreed or strongly agreed with our proposals. Ten respondents disagreed or strongly disagreed with our proposals, though many of the comments (see below) were concerned more with the inclusion of large data sets as a part of the subject content (which was out of scope for this consultation), rather than the proposed approach to regulating the use and assessment of large data sets in AS and A level mathematics. Five respondents neither agreed nor disagreed with the proposed approach.

Figure 11 Overview of responses to Question 11



Many respondents supported the intention to use large data sets in the A level mathematics course of study, and felt that it was a useful way to make the study of statistics relevant. A number of respondents, including some teachers, commented that if the subject content did not require the use of large data sets, then this would not be taught. However, some of these respondents raised concerns about the practicality of teaching and assessing the use of large data sets.

Six respondents (all organisations) supported the proposed guidance and the subject content requirements on the use of large data sets, but they, and several others, commented that separate guidance and training would be needed to prepare teachers for this new and potentially unfamiliar area of the syllabus. Two responses

noted the statement in the ALCAB report that the proposed changes would 'involve a change in classroom practice for some teachers and resultant training was needed'[5].

In addition, there were five comments regarding the need to use non-examination assessment to assess the skills associated with handling large data sets effectively. These included concerns that examination questions were likely to be artificial, and that the best way to assess an understanding of how to handle data would be through the use of non-examination assessment, so that students had access to technology and time to investigate the large data sets thoroughly and in a meaningful way.

Five respondents provided comments about the lack of exemplar questions relating to large data sets in the working group report[6]. These respondents were concerned that they could not see how any such questions could be created which would validly assess the use of large data sets. Indeed, one respondent was unsure which aspects of content could be reliably tested through the use of large data sets.

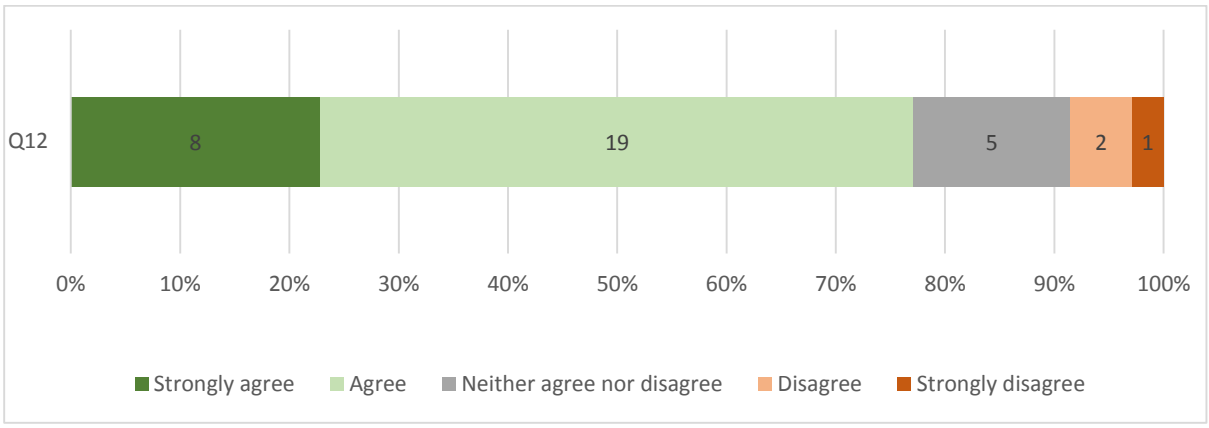
Each of the issues raised above (training and guidance for teachers, the inclusion of non-examination assessment, the absence of exemplar questions relating to large data sets and issues relating to the inclusion of large data sets within the subject content requirements) are beyond the scope of the consultation so we will not consider them further here (see 'other issues' section below).

Question 12: To what extent do you agree or disagree with our proposed approach to regulating non-core content in AS and A level further mathematics?

27 of the 35 respondents who answered this question in the questionnaire agreed or strongly agreed with the proposed approach to regulating non-core content in AS and A level further mathematics. Three respondents disagreed or strongly disagreed with the proposed approach, and five respondents neither agreed nor disagreed with it. However, we also received some narrative responses on this issue from respondents who did not complete the questionnaire.

[5] http://epc.ac.uk/wp-content/uploads/2014/11/4.-ALCAB-Panel-Report-on-Maths-and-Further-Maths.pdf
[6] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/481857/a-level-mathematics-working-group-report.pdf

Figure 12 Overview of responses to Question 12



Most respondents were pleased that the proposal would allow the exam boards freedom to innovate in terms of the non-core content which they can include in their specifications. They said this would allow for a diversity of approach and for content that students would find exciting and relevant. Indeed, two respondents said that this would potentially attract students to the further mathematics course and help to maintain numbers.

The majority of respondents, whilst supportive of the proposed approach, were keen that the level of demand of the optional content should be carefully monitored by Ofqual to ensure comparability between exam boards and to ensure that no 'easy option' was available.

Of those who disagreed with the proposal:

- Two respondents expressed the view that there should be no variation in terms of content or approach at all between the different exam boards to ensure that all students had the same experience.

- Another respondent, an organisation, was concerned that exam boards will be allowed to prepare content in a way that is not open to public scrutiny or comment, and that only a small number of Ofqual experts would be judging the appropriateness of the content that is produced. They were concerned that this could lead to a risk that qualifications that are not in the best interests of students would be developed.

- Three respondents, commented on the inclusion of 'decision maths' within optional content. One organisation expressed a strong view that the study of decision maths was inappropriate for AS and A level further mathematics, and that if 'decision maths' was included it should incline towards what is conventionally known as 'discrete mathematics'. Conversely, one respondent, a teacher, felt that decision maths should be available as an option as it was relevant and useful in a number of contexts.

The issues raised above relate to the subject content, and are beyond the scope of the consultation. We will not consider them further here (see 'other issues' section below).

Question 13: Do you have any comments on our proposed Conditions and requirements for AS and A level mathematics?

Question 14: Do you have any comments on our proposed Conditions and requirements for AS and A level further mathematics?

Seven respondents had further comments on our proposed Conditions and requirements for AS and A level mathematics and six respondents had further comments on our proposed Conditions and requirements for AS and A level further mathematics. The following views were expressed:

- Ofqual's rules for AS and A level mathematics and further mathematics should require that all assessment objectives are targeted across the whole ability range.

- Ofqual should ensure that all routes through the qualifications should be of comparable demand.

- Ofqual should put in place further regulations about non-core content in AS and A level further mathematics that builds on what has been set out in relation to applications in mathematics to ensure a consistent approach to the assessment of that content in further mathematics.

- Concern over the proposal not to include any requirements relating to the use of calculators.

- The requirements around the weightings of assessment objectives AO2 and AO3 in further mathematics must not allow the weightings of those assessment objectives to drop below 15% at A level, or below 10% at AS in any set of assessments. Any variation should be above those base levels for each assessment objective.

- A request that the Ofqual requirements for AS and A level further mathematics allow awarding organisations to add to the notation list in the new appendices to be produced by the DfE to ensure that all notation in the non-core content for this subject is covered.

- The requirements on 'Questions/tasks targeting large data sets' refer to 'Stimulus Materials'. One respondent queried whether this should instead refer to 'source materials'.

- The requirements on 'Questions/tasks targeting large data sets' should require the data set to be provided in advance in electronic form, and require exam boards to confirm the form in which the data set will be provided in the assessment (for example, confirming that data sets cannot be downloaded to a calculator and that hard copies will be provided for assessment).

- Concern that the italicised text which has been included in assessment objectives AO2 and AO3 may restrict access to AO1 marks, thus increasing the demand of the qualifications.

Other respondents provided comments that were not directly related to the proposed Conditions and requirements for AS and A level mathematics and AS and A level further mathematics:

- Ofqual needs to consider what information should be made publically available. The designation of assessment strategies as commercially sensitive means that detailed scrutiny of how awarding organisations interpret requirements like assessment objectives is not made available and so is not subject to public scrutiny.

- The overarching use of technology in mathematics is a laudable aim, but could prove very difficult to deliver, especially in large institutions. Appropriate technology may not always be a PC and may not always be Excel.

- Additionally several comments were made in relation to the subject content, including support being expressed for the proposal to add two appendices covering notation and formulae, on the basis that this would provide clarity to all users of the qualifications.

These comments were beyond the scope of this consultation, and we will not consider them further here (see 'other issues' section below).

Question 15: Do you have any comments on our proposed guidance for AS and A level mathematics?

Question 16: Do you have any comments on our proposed guidance for AS and A level further mathematics?

Fifteen respondents commented on the proposed guidance for AS and A level mathematics, and nine respondents commented on the proposed guidance for AS and A level further mathematics. The responses repeated issues raised under questions 13 and 14 (see above).

Question 17: Do you have any comments on DfE's proposed new appendices to the subject content for mathematics and further mathematics?

15 respondents commented on the proposed appendices to the subject content document. These comments have been passed to the DfE for consideration.

Question 18: We have not identified any ways in which the proposals for AS and A level mathematics and further mathematics would impact (positively or negatively) on persons who share a protected characteristic.[7] Are there any potential impacts we have not identified?

Four respondents provided comments in relation to this question.

The responses that related to protected characteristics were as follows:

- Students with a learning disability may find recalling formulae very difficult (even though they may be very competent mathematicians). Such students will be unfairly penalised and their exam results will not reflect their true ability in the subject.

- The linear structure and emphasis on modelling will deter girls from studying mathematics and further mathematics.

- One respondent raised a concern that certain smaller schools would not be able to offer A level mathematics in year 12 and A level further mathematics in year 13. They would instead have to offer the qualifications concurrently. The respondent was concerned that some smaller schools could contain larger proportions of students with protected characteristics (for example, disabilities), and that these students could be disadvantaged as against students at larger centres where the provision of A level mathematics, and A level further mathematics can be split between the two years. The respondent suggested that data must be analysed to ensure there is no risk of a negative impact on certain students due to the provision of these smaller schools.

[7] For the purposes of the public sector equality duty, the protected characteristics are disability, racial group, age, religion or belief, pregnancy or maternity, sex, sexual orientation, gender reassignment.

Two respondents raised issues that do not relate to protected characteristics, but rather to wider issues of fairness:

- One commented that the cost of more sophisticated calculators needed for the new AS and A level mathematics could disadvantage students from poorer backgrounds; and

- One noted that students who do not have access to computers at home, will find it difficult to complete 'big data' activities unless they receive sufficient computer time at school or in college.

Question 19: Are there any additional steps we could take to mitigate any negative impact resulting from these proposals on persons who share a protected characteristic?

Three respondents went on to suggest steps we could take to mitigate any potential negative impacts on those who share a protected characteristic:

- Allowing mathematical formulae to be provided to students in a Formula Booklet in their examinations, as happens at present, will enable students with certain learning disabilities, who as a result of their disability struggle to recall formulae, to demonstrate their true level of ability in this subject.

- If data suggests that a disproportionate number of students with protected characteristics attend smaller schools which can only provide AS and A level further mathematics by teaching it concurrently to AS and A level mathematics, then it would be necessary to prevent all students from sitting mathematics the year before further mathematics, in order to prevent this group being disadvantaged.

- Insist that schools and colleges ensure all students have access to IT.

Question 20: Have you any other comments on the impacts of the proposals on students who share a protected characteristic?

There were no responses to this question.

Other issues

As noted above, respondents to this consultation provided a number of comments that did not relate directly to our consultation proposals. These included:

- Comments relating to the subject content for AS and A level mathematics and AS and A level further mathematics, including comments relating to the use of technology within mathematics and further mathematics.

- Comments suggesting that non-exam assessment should be included within AS and A level mathematics and AS and A level further mathematics.

- Comments relating to training and/or resources which would be required for teaching.

- A comment suggesting that information contained within assessment strategies should be made subject to public scrutiny.

Appendix A: List of organisational consultation respondents

When completing the questionnaire, respondents were asked to indicate whether they were responding as an individual or on behalf of an organisation.

Below we list those organisations that submitted a non-confidential response to the consultation. We have not included a list of those responding as an individual; however all responses were given equal status in the analysis.

Advisory Committee for Mathematics Education (ACME)

A Level Mathematics Advisory Board (ALMAB)

AQA

Association of School and College Leaders (ASCL)

Association of Teachers of Mathematics (ATM)

Cambridge Mathematics Education Programme (CMEP)

Dean Close School, Cheltenham

Engineering Professors Council

Hills Road Sixth Form College, Cambridge

Institute of Mathematics and its Applications (IMA)

London Mathematical Society (LMS)

Mathematical Association (MA)

Mathematics in Education and Industry (MEI)

Mathematics Mastery

NRICH

OCR

Pearson

Royal Grammar School, Guildford

Runshaw College, Leyland

Sherbourne Girls School

Sir William Borlase's Grammar School

STEM Learning

St. George's College, Weybridge

Yateley School, Hampshire

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