

AS and A Level Mathematics and Further Mathematics consultation on Conditions and Guidance

How to respond to this consultation

The closing date for responses is 11 January 2016.

Please respond to this consultation in one of three ways:

- Complete the online response at www.surveygizmo.com/s3/2461563/as-and-a-level-mathematics-and-further-mathematics-conditions-and-guidance.
- Email your response to consultations@ofqual.gov.uk – please include the consultation title (AS and A Level Maths Consultation 2015) in the subject line of the email and make clear who you are and in what capacity you are responding; or
- Post your response to: AS and A Level Maths Consultation 2015, Ofqual, Spring Place, Herald Avenue, Coventry, CV5 6UB, making clear who you are and in what capacity you are responding.

Evaluating the responses

To evaluate responses properly, we need to know who is responding to the consultation and in what capacity. We will therefore only consider your response if you complete the information page.

Any personal data (such as your name, address and any other identifying information) will be processed in accordance with the Data Protection Act 1998 and our standard terms and conditions.

We will publish our evaluation of responses. Please note that we may publish all or part of your response unless you tell us (in your answer to the confidentiality question) that you want us to treat your response as confidential. If you tell us you wish your response to be treated as confidential, we will not include your details in any published list of respondents, although we may quote from your response anonymously.

Please respond by 11 January 2016.

Responding to the consultation

our details

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Please answer all questions marked with a star*

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The London Mathematical Society (LMS), founded in 1865, is the UK's learned society for mathematics. The Society's main activities include publishing journals and books, providing grants to support mathematics and organising scientific meetings and lectures. The Society is also involved in policy and strategic work to support mathematics and the mathematics research community. This work includes engaging with government and policymakers on mathematics education and research, participating in international mathematical initiatives and promoting the discipline.

Would you like us to treat your response as confidential?*

If you answer yes, we will not include your details in any list of people or organisations that responded to the consultation.

Yes No

Is this a personal response or an official response on behalf of your organisation?*

Personal response (please answer the question 'If you ticked "Personal response"...')

Official response (please answer the question 'If you ticked "Official response"...')

If you ticked "Personal response", which of the following are you?

- Student
- Parent or carer
- Teacher (but responding in a personal capacity)
- Other, including general public (please state below)

If you ticked "Official response", please respond accordingly:

Type of responding organisation*

- Awarding organisation
- Local authority
- School or college (please answer the question below)
- Academy chain
- Private training provider
- University or other higher education institution
- Employer
- Other representative or interest group (please answer the question below)

School or college type

- Comprehensive or non-selective academy
- State selective or selective academy
- Independent
- Special school
- Further education college
- Sixth form college
- Other (please state below)

Type of representative group or interest group

- Group of awarding organisations
- Union
- Employer or business representative group
- Subject association or learned society
- Equality organisation or group
- School, college or teacher representative group
- Other (please state below)

Nation*

- England
- Wales
- Northern Ireland
- Scotland
- Other EU country: _____
- Non-EU country: _____

How did you find out about this consultation?

- Our newsletter or another one of our communications
- Our website
- Internet search
- Other [Informed by ALMAB]

May we contact you for further information?

- Yes No

Questions

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?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Please explain your reasons:

It was better to have 'use and interpret notation correctly' as a separate objective. If it is to be included in AO2's 'use mathematical language correctly' it should be explicit. For example, 'use mathematical language and notation correctly'.

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

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Please explain your reasons:

A weighting around 60% given to standard techniques is reasonable. One issue for concern though is the discretion to vary by +/-2%. This appears a negligible change and may not leave exam boards much room to manoeuvre but may in fact lead to large perceived differences between exam boards and this may lead to "game playing" by schools and colleges.

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

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Please explain your reasons:

These are roughly what one would like to see, about half marks for the fundamental content knowledge and an even split between reasoning/explaining and problem solving. The discretion to vary by +/-2% is again a concern.

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

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Please explain your reasons:

The discretion in AO2 and AO3 weightings may lead to large perceived differences in exam boards. See above. This needs to be monitored carefully if adopted. The two objectives are of roughly equal importance and yet one may be worth 10% and the other 30%. That is too much of a difference.

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?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Please explain your reasons:

Similar concerns to Q5. The maximum possible difference is again 20 percentage points. This is too large.

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?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Please explain your reasons:

Agree, though see answers to later questions.

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?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Please explain your reasons:

If these are to be included then it is important that the rationale for the differences is made clear. The abuse of these and a “race to the bottom” by exam boards is a real possibility and hence some transparency is welcomed.

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?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Please explain your reasons:

Explaining assessment objectives as clearly as possible would promote consistency between awarding organisations, and help ensure that they are interpreted as intended.

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)?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Please explain your reasons:

To be consistent with how many schools like to provide their teaching of Maths and Further Maths, then the only reasonable option is to allow first exams in summer 2018. However, lack of familiarity with the changes may result in some assessment centres putting forward candidates who are inadequately prepared for the examination. This may result in poor performance nationally and subsequently a negative impact in the perceived difficulty of mathematics. Such an effect was seen with Curriculum 2000 and it took considerable time to reverse the decline in the popularity of mathematics. Therefore, special arrangements should be made to ensure that centres wishing to offer the exam in 2018 are correctly prepared.

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?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Please explain your reasons:

This regulation must be carried out by a transparently appointed group with mathematical expertise.

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?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Please explain your reasons:

See answer to Q15.

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?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Please explain your reasons:

The provision of a discretion for 50% of content needs to be monitored carefully to prevent “game playing”. See answer below to Q14.

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

- Yes No

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

- Yes No

Allowing approximately 50% of FM content to be set by the awarding body is welcome in that it could lead to interesting material and unforeseen innovations being presented. Realistically however, large differences, perceived or otherwise, potentially lead to “game playing” by both schools and awarding bodies. Steps should be taken to monitor and prevent this.

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

(X) Yes () No

Paragraph 8 in the Content Document on the Use of Technology states that a calculator must have “the ability to compute summary statistics and access probabilities from standard statistical distributions”. The latter part of this seems to rule out a basic scientific calculator as in general these cannot handle binomial or normal probabilities. Is the expectation that students and schools will have to move towards graphical calculators? The expense may disadvantage students from poorer backgrounds.

The requirement for large data sets is vague and problematical. Paragraph 9 of the Content Document states that students are required to be familiar with one or more specific large data sets. What does “familiar” mean here? More important is ‘should the data set be changed every year’? If not, then good schools and colleges will be able to predict likely questions and train their students accordingly (with the possibility that there is no real understanding of large data sets). This is like having a partially seen exam. However, changing the sets every year will be time-consuming for exam boards and for the teachers who produce materials that are only used once. It is unfortunate that there does not seem to have been a trial of the teaching and assessment of large data sets. Perhaps this should be done and introduced nationally at a later date.

Furthermore, there seems little that a student could meaningfully do with a large data set in an exam. Hence, the introduction of LDSs into the curriculum, though laudable, is rather underwhelming in practice and appears to have little to do with real large data and its analysis.

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

(X) Yes () No

See answer to question 15.

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

() Yes (X) No

The lists in Appendix C are inevitably incomplete; and the headings ignore the difference between a formula and an identity. We suggest that these headings should read:

"Mathematical formulae **and identities** that students are required to recall for AS and A level Mathematics **include:**" [proposed changes are in bold type]
and

"Mathematical formulae **and identities** that students are required to recall for AS and A level Further Mathematics **include:**" [proposed changes are in bold type]

For example, one might have expected to see

(i) the identity for the product $(a^x)(b^x) = (ab)^x$; or

(ii) the formula for the straight line passing through two given points (a,b) , (c,d) .

Inserting the word "include" allows for subsequent (internal) discussion and decisions concerning the many formulae which are directly related to, but not identical to, those in the current lists, and which should also not be given.

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.¹ Are there any potential impacts we have not identified?

Yes No

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?

Yes No

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

Yes No

¹ 'Protected characteristic' is defined in the Equality Act 2010. Here, it means disability, racial group, age, religion or belief, pregnancy or maternity, sex, sexual orientation and gender reassignment.

Accessibility of our consultations

We are looking at how we provide accessible versions of our consultations and would appreciate it if you could spare a few moments to answer the following questions. Your answers to these questions will not be considered as part of the consultation and will not be released to any third parties.

We want to write clearly, directly and put the reader first. Overall, do you think we have got this right in this consultation?

Yes No

Do you have any comments or suggestions about the style of writing?

Yes No

Do you have any special requirements to enable you to read our consultations? (for example, screen reader, large text, and so on)

Yes No

Which of the following do you currently use to access our consultation documents? (select all that apply)

- Screen reader / text-to-speech software
- Braille reader
- Screen magnifier
- Speech-to-text software
- Motor assistance (blow-suck tube, mouth stick, and so on)
- Other

Which of the following document formats would meet your needs for accessing our consultations? (select all that apply)

- A standard PDF
- Accessible web pages
- Large-type PDF (16 point text)
- Large-type Word document (16 point text)
- eBook (Kindle, iBooks, or similar format)
- Braille document
- Spoken document
- Other

How many of our consultations have you read in the last 12 months?

- 1
- 2
- 3
- 4
- 5
- More than 5