

# 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](http://www.surveygizmo.com/s3/2461563/as-and-a-level-mathematics-and-further-mathematics-conditions-and-guidance).
- Email your response to [consultations@ofqual.gov.uk](mailto: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

## Your details

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 following information section.

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 answer all questions marked with a star\*

Name\*

[Dr Geoff Parks](#)

Position\*

[Chair, Entry to Engineering in Higher Education: Advisory Panel](#)

Organisation name (if applicable)\*

[Engineering Professors' Council](#)

Address

Email

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Telephone

**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)

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**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)

The Engineering Professors' Council (EPC) is the representative body for engineering in higher education. The EPC currently has 80 member institutions encompassing c.6,000 academic staff (permanent FTE).

**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

Through membership of the Advisory Committee on Mathematics Education (ACME)  
Outer Circle.

**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:

We believe that the first bullet point in AO1 (“select and correctly carry out routine procedures”) should be enhanced along the lines of “select and correctly carry out routine procedures quickly and accurately” to highlight the need to develop mathematical facility. Many students at present lack facility, although in principle they know what they should do. Mathematical facility is vital for Engineering.

It is also not clear where the ability to tackle problems that require strategy and multiple steps (as distinct from multi-step processes) is covered in the proposed assessment objectives. It seems to fall between AO1 and AO3. We believe this is so important that it should be stated explicitly somewhere in the ‘headline’ assessment objectives. The Scottish Advanced Higher includes “select and apply complex operational skills” and the examples in AO1 look more straightforward than this while those in AO3 make no explicit mention of multiple step problem solving. Perhaps AO3 should include “develop a plan for solving an unfamiliar problem that requires multiple steps”.

**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:

These look about right.

**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 look about right.

**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:

These look about right.

**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:

These look about right.

**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:

It is hard to object to this in principle. The key issue will be how well compliance is 'policed' in practice.

**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:

This seems a very important measure for ensuring that the relationships between subject content and assessment strategies are well-reasoned and transparent.

**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:

This seems an essential step in ensuring comparable standards are maintained across awarding bodies.

**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:

There are clearly good arguments on both sides. However, ultimately it seems profoundly unfair to treat one cohort of learners differently from those before and after them by preventing them from taking Mathematics A level in a year.

**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:

The principle behind the proposed approach is one we completely endorse. However, there is an obvious tension between wanting awarding bodies to “cover in their assessments all the subject content in as short a period of time as possible” and the need to avoid assessments becoming predictable. Ultimately assessments will only be unpredictable if there is a random element to the appearance of subject content year-to-year, and if there is a random element, then it cannot be guaranteed that a given area of content will be assessed at all in a specified period. To illustrate with a simple example: If a given topic is required to be covered in an assessment within a two-year period, then a rigid interpretation of this requirement means that if it is not assessed in Year 1, it is certain to be assessed in Year 2, thereby making the latter examination predictable. If, instead, the requirement is interpreted as meaning that there should be a 50:50 randomly determined chance that the topic will be assessed in a given year, then over a two-year period there is 25% chance that it will not be assessed at all. The exams will then be suitably unpredictable, but a naïve monitoring process could conclude that the awarding body was failing to sample subject content appropriately.

**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:

As with many of the questions in this consultation, the devil is in the detail. In this case the detail of the guidance provided. It is possible that “questions in exams ... designed to give a material advantage to students who have studied, and are therefore familiar with, the specific large data set(s) provided by the exam board” could be an entirely appropriate and fair test or equally they could become dangerously predictable. It is also vitally important that developments in this area do not exacerbate the existing and already unconscionably large inequalities between

schools and colleges in different parts of the secondary and further education sectors.

**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:

This is another case of the devil being in the detail. §3.32 mentions the needs of qualification users including higher education institutions (HEIs). In many respects, it would be better to minimize optionality so that incoming cohorts to HEIs had a greater amount of identifiable common knowledge. Further Maths serves many masters but that role can be addressed by having a wide-ranging core rather than a multiplicity of options. It is also in our experience rarely the case that schools and colleges are able to resource provision in such a way that learners are actually given option choice; instead, the options available to them are determined by the institution they attend. Thus optionality, in practice, often just serves to exacerbate educational disadvantage at the individual learner level. Where options are offered it would be extremely helpful to learners and their advisers if the titles (or subtitles) indicated their utility. Badging what a particular course is useful for may be the best way of communicating to potential students what curriculum they should choose.

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

- Yes  No

Not beyond comments already made in response to earlier questions.

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

- Yes  No

Not beyond comments already made in response to earlier questions.

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

Yes  No

Not beyond comments already made in response to earlier questions.

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

Yes  No

Not beyond comments already made in response to earlier questions.

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

Yes  No

A minor point but if the documents entitled "Mathematical Formulae that students are required to recall for AS and A Level Mathematics" and "Mathematical Formulae that students are required to recall for AS and A Level Further Mathematics" are to be formally published then the reference on page 1 of each to "Coordinate Geometry" should really be to "2-Dimensional Coordinate Geometry".

We would also question the educational value in requiring students to memorise all the trigonometric identities listed on page 2 of each document. These relationships are provided in the Mathematics Data Book given to Engineering students at the University of Cambridge.

**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.<sup>1</sup> Are there any potential impacts we have not identified?**

Yes  No

Not that we have been able to identify.

**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?**

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<sup>1</sup> '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.

Yes  No

Not that we have been able to identify.

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

Yes  No

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## 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

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**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