



Advanced Mathematics  
Support Programme®

## Level 3 maths update 2018-19

In recent years there have been many changes to A levels and other level 3 qualifications. This update provides an overview of the changes relating to maths for university admissions and academic staff.

As a result of post-16 curriculum and funding reforms in England, the number of AS/A level subjects taken by a typical sixth form student has reduced from 4 to 3. AS levels have been decoupled from A levels, leading to a significant drop in AS level entries across all subjects and, alongside funding changes, this has meant that fewer schools and colleges offer students the opportunity to take AS levels in Year 12.

New specifications for AS/A level Mathematics and Further Mathematics were introduced for first teaching in September 2017. The first entries for the new level 3 Core Maths qualifications, equivalent to an AS level, were in 2016.

The *Smith Review of post-16 mathematics*<sup>1</sup>, July 2017, recommended continued national support for Core Maths, AS/A level Mathematics and AS/A level Further Mathematics, including additional funding to sustain and increase provision for these level 3 maths qualifications. As a result, the *Advanced Mathematics Support Programme*<sup>2</sup> (AMSP) was launched. This is a government-funded initiative, managed by MEI<sup>3</sup>, which aims to increase participation in Core Maths and AS/A level Mathematics and Further Mathematics, and improve the teaching of these level 3 maths qualifications. It builds on the work of the *Further*



*Mathematics Support Programme (FMSP).*

In November 2017 the Government announced the *Advanced Maths Premium*<sup>4</sup> funding which is available to schools and colleges to support increases in level 3 maths participation. The funding amounts to an additional £600 per additional student (or £1200 for an additional student taking both A level Mathematics and Further Mathematics). This funding is in addition to that provided in the *Large Programme Uplift*<sup>5</sup>.

The Smith Review called on the Department for Education to “...*work with UK learned societies to encourage universities to better signal and recognise the value of level 3 mathematics qualifications for entry to undergraduate courses with a significant quantitative element*”. The AMSP provides information, advice and guidance about developments in level 3 maths to Higher Education Institutions, learned societies and subject organisations.

<sup>1</sup> <https://www.gov.uk/government/publications/smith-review-of-post-16-maths-report-and-government-response>

<sup>2</sup> <https://amsp.org.uk>

<sup>3</sup> <http://mei.org.uk>

<sup>4</sup> <https://amsp.org.uk/leadership/funding>

<sup>5</sup> <https://www.gov.uk/guidance/16-to-19-funding-large-programme-uplift>

**Email:** [highereducation@amsp.org.uk](mailto:highereducation@amsp.org.uk)

**Phone:** 01225 716492

**Post:** MEI, Monckton House, Epsom Centre,  
White Horse Business Park, Trowbridge, Wiltshire  
BA14 0XG

# Core Maths

Core Maths is an umbrella term for the following five level 3 maths qualifications, which are defined by the government's technical guidance<sup>1</sup>.

- AQA Level 3 Certificate Mathematical Studies<sup>2</sup>
- City & Guilds Level 3 Certificate in Using and Applying Mathematics<sup>3</sup>
- Pearson Edexcel Level 3 Certificate in Mathematics in Context<sup>4</sup>
- OCR Level 3 Certificate in Quantitative Reasoning (MEI)<sup>5</sup>
- OCR Level 3 Certificate in Quantitative Problem Solving (MEI)<sup>6</sup>

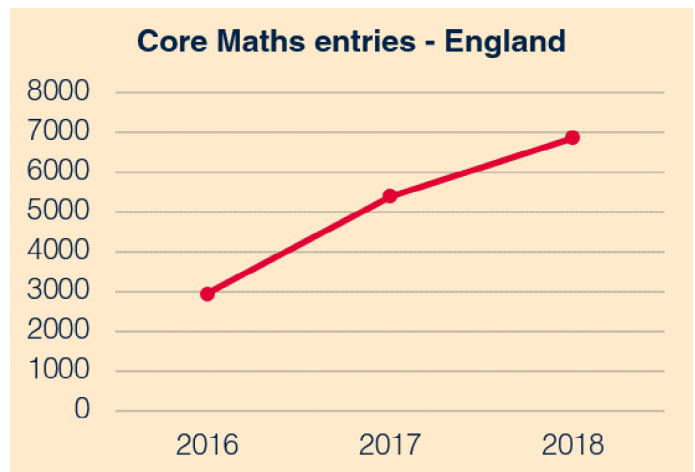
These qualifications are equivalent in size to an AS level qualification and have the same number of UCAS tariff points. All Core Maths qualifications focus on using and applying maths and include ideas and skills that support maths in other courses.

Entries for Core Maths have more than doubled from 2016 to 2018 with over 6800 students sitting a Core Maths exam in 2018.

Like AS levels, Core Maths uses an A-E grading system. In 2017 approximately 29% of students obtained a grade A or B; in 2018 this figure rose to 34%.

## Why should students study Core Maths?

Core Maths is intended for students who have passed GCSE Mathematics at grade 4 or better, but who have not chosen to study AS or A level



Mathematics. Studied in a single year or over a two-year period, it can be taken alongside A levels or other qualifications, including vocational courses.

Studying Core Maths helps students develop their quantitative and problem-solving skills. This is valuable preparation for many degree courses, particularly in subjects such as psychology, business-related courses, sports and social sciences, and natural science courses that do not require AS/A Mathematics.

Many universities have shown their support for Core Maths; however, few mention it in their admissions requirements which is where it would have the biggest impact on uptake. If Core Maths would be useful preparation for a degree course, please consider including it in your published admissions criteria, perhaps in a similar way to the EPQ, where a reduced offer is often made if the EPQ is included in a programme of study.

### All Core Maths qualifications include:

- interpreting solutions in the context of the problem
- understanding sources of error and bias when problem-solving
- working with data
- understanding risk and probability
- understanding variation in statistics
- using exponential functions to model growth and decay

### Most Core Maths qualifications also include:

- percentage change
- interpretation of graphs
- financial maths
- using standard units
- Fermi estimation
- the Normal distribution
- correlation, knowing it does not imply causation
- making and evaluating assumptions when modelling or problem solving

<sup>1</sup> <https://www.gov.uk/government/publications/core-maths-qualifications-technical-guidance>

<sup>2</sup> <https://www.aqa.org.uk/subjects/mathematics/aqa-certificate/mathematical-studies-1350>

<sup>3</sup> <https://www.cityandguilds.com/qualifications-and-apprenticeships/skills-for-work-and-life/english-mathematics-and-ict-skills/3849-using-and-applying-mathematics>

<sup>4</sup> <https://qualifications.pearson.com/en/qualifications/edexcel-mathematics-in-context/mathematics-in-context.html>

<sup>5</sup> <https://www.ocr.org.uk/qualifications/core-maths/quantitative-reasoning-mei-level-3-certificate-h866/>

<sup>6</sup> <http://www.ocr.org.uk/qualifications/core-maths-quantitative-problem-solving-mei-level-3-certificate-h867>

## AS/A level Mathematics

New AS and A level Mathematics specifications were introduced in England for first teaching from September 2017. The first AS cohort took examinations in summer 2018; the first full A level examination series will be completed in summer 2019.

There are 4 specifications:

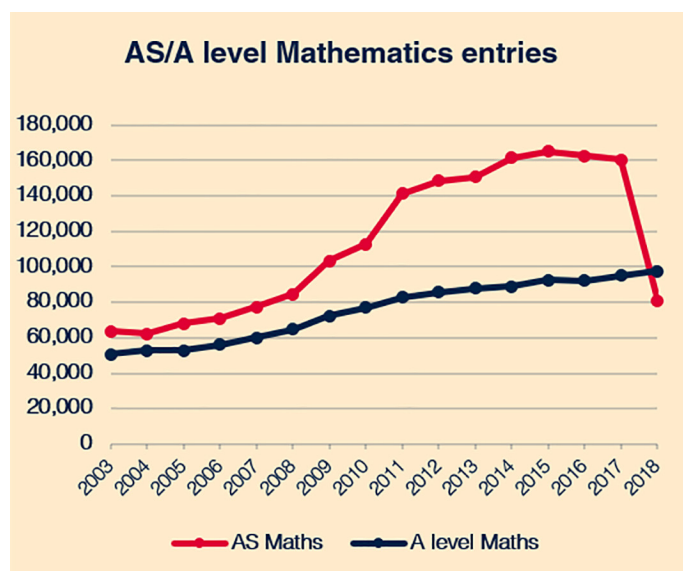
- AQA<sup>1</sup>
- Edexcel<sup>2</sup>
- OCR A<sup>3</sup>
- OCR B (MEI)<sup>4</sup>

The content of AS and A level Mathematics is 100% prescribed and common to all specifications. Hence, regardless of which specification students have followed, they will have covered the same topics:

- pure maths (about two thirds of the content, and similar in size and content to the previous core pure C1 – C4 modules),
- statistics (about one sixth of the content).
- mechanics (about one sixth of the content).

Decision/discrete maths is no longer included in AS and A level Mathematics, but it is available as an option in Further Mathematics.

Over the last 10 years the number of students taking A level Mathematics in the UK has greatly increased.



The decoupling of AS and A levels has resulted in a 49% decrease in AS Mathematics entries in 2018 compared to 2017. Whilst disappointing this is a symptom of both the decoupling of AS and A levels and post-16 funding changes. Across all subjects there was a 52% decrease in AS level entries compared to last year.

In 2018 over 97,000 students entered A level Mathematics, an increase of 85% since 2005; there are now more students taking A level Mathematics than any other A level subject. Of the students taking A level Mathematics just under 40% are female.

The table shows the entries in the UK for AS/A level Mathematics for 2018:

Qualification	Entries in 2018	Entries in 2010	Entries in 2005	% change since 2010	% change since 2005
<b>A level Mathematics</b>	97627	77001	52897	+27%	+85%
<b>AS level Mathematics</b>	81051	112847	68178	-28%	+19%

(data source: JCQ)



<sup>1</sup> <https://www.aqa.org.uk/subjects/mathematics/as-and-a-level/mathematics-7357>

<sup>2</sup> <https://qualifications.pearson.com/en/qualifications/edexcel-a-levels/mathematics-2017.html>

<sup>3</sup> <https://www.ocr.org.uk/qualifications/as-a-level-gce/mathematics-a-h230-h240-from-2017/>

<sup>4</sup> <https://www.ocr.org.uk/qualifications/as-a-level-gce/mathematics-b-mei-h630-h640-from-2017/>



## AS/A level Further Mathematics

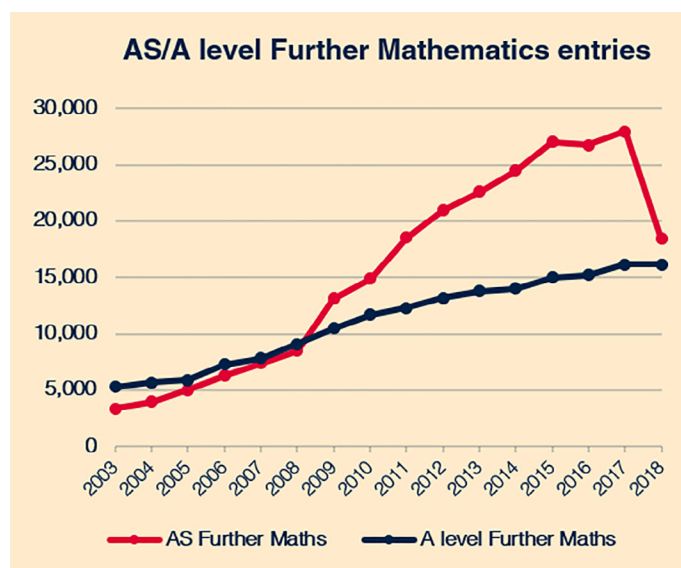
New AS and A level Further Mathematics specifications were introduced in England for first teaching from September 2017. The first cohort will take their final examinations in summer 2019.

There are 4 specifications:

- AQA<sup>1</sup>
- Edexcel<sup>2</sup>
- OCR A<sup>3</sup>
- OCR B (MEI)<sup>4</sup>

For A level Further Mathematics 50% of the content is prescribed pure maths content and common to all specifications. Students have some choice over additional applied and pure maths content that is studied depending on the school or colleges' choice of awarding organisation.

Over the last 10 years the number of students taking A level Further Mathematics in the UK has greatly increased. In 2017 over 16 000 students entered A level Further Mathematics, more than double the number in 2005. Of these students, just under 30% were female.



The table below shows the entries in the UK for AS/A level Further Mathematics for 2018. The decrease in AS level Further Mathematics entries is linked to the decoupling of AS and A level results. However this qualification includes valuable content that provides good additional preparation for many STEM degree courses. If your course is one of these, please consider including this in your published admissions criteria.

Qualification	Entries in 2018	Entries in 2010	Entries in 2005	% change since 2010	% change since 2005
<b>A level Further Mathematics</b>	16157	11682	5933	+38%	+172%
<b>AS level Further Mathematics</b>	18426	14884	5054	+24%	+265%

(data source: JCQ)

### Factors supporting increases in participation in level 3 maths:

- **More maths teachers, confident and skilled in teaching level 3 maths.** The AMSP provides professional development courses focused on improving subject knowledge and pedagogy to thousands of teachers. These have helped improve the teaching capacity in schools and colleges
- **A level Further Mathematics is more widely available to students in state-funded schools and colleges.** In 2004-05, less than 40% of the state-funded A level Mathematics providers in England had students taking A level Further Mathematics; by 2016-17 this proportion had grown to 70%.
- **Promotion of level 3 maths to GCSE students.** In 2017/18 the FMSP, the predecessor to the AMSP, organised over 150 enrichment events for 14-16 year olds for nearly 11 000 students from state schools. Over 50% of students attending these events were female.
- **Increasing information, advice and guidance to STEM, social science, business and economics degree courses.** Information provided on university websites and at HE open days encouraging the study of A level Mathematics is crucial in convincing students, teachers and school leaders of its importance.

<sup>1</sup> <https://www.aqa.org.uk/subjects/mathematics/as-and-a-level/further-mathematics-7367>

<sup>2</sup> <https://qualifications.pearson.com/en/qualifications/edexcel-a-levels/mathematics-2017.html>

<sup>3</sup> <https://www.ocr.org.uk/qualifications/as-a-level-gce/further-mathematics-a-h235-h245-from-2017>

<sup>4</sup> <https://www.ocr.org.uk/qualifications/as-a-level-gce/further-mathematics-b-mei-h635-h645-from-2017>