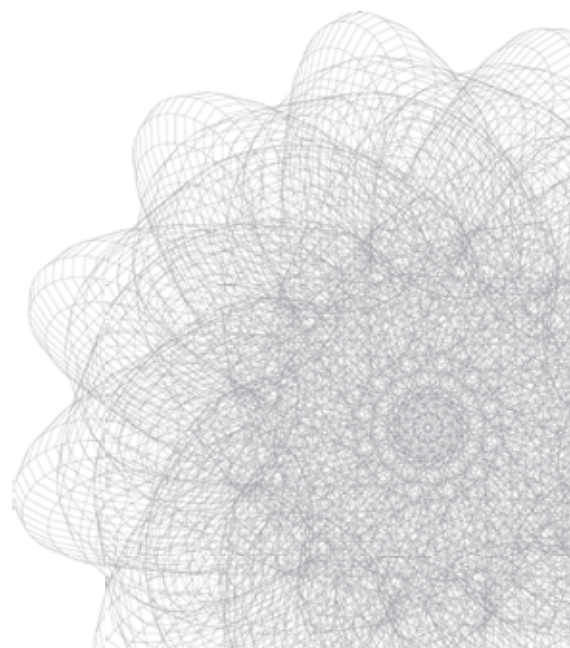


Understanding the UK Mathematics Curriculum Pre-Higher Education

– a guide for academic members of staff –

**Preview from [Notesale.co.uk](https://www.notesale.co.uk)
Page 3 of 30**



Contents

1. Background	3
1.1 The rationale for the document	3
1.2 Introduction and overview	3
2. Setting the scene: pre-higher education qualifications and study	4
2.1 Introduction to the main qualifications	4
2.2 Brief historical review of major developments	4
2.3 Where and how will entrants have studied pre-higher education?	5
3. Specific UK qualifications and attributes of students who enter higher education with them	5
3.1 General Certificate of Secondary Education	6
3.1.1 Overview	6
3.1.2 Subject knowledge and skills	6
3.1.3 International General Certificate of Secondary Education	7
3.2 Advanced Subsidiary and Advanced Levels	7
3.2.1 Overview	7
3.2.2 Subject knowledge and skills	9
3.3 Advanced Extension Award and Sixth Term Examination Paper	9
3.4 Free Standing Mathematics Qualifications	10
3.4.1 AS Use of Mathematics	11
3.5 Diplomas	11
3.6 Other qualifications	11
3.6.1 International Baccalaureate	11
3.6.2 Pre-U	12
3.6.3 Access courses	12
3.6.4 Foundation courses	12
3.7 Wales, Scotland and Northern Ireland	12
4. Useful sources of information (to keep up-to-date with pre-higher education developments)	13
4.1 References made in this guide	14
4.2 Additional references	14
4.2.1 Documents/information	14
4.2.2 Organisations	15
5. Appendices	17
5.1 Acronyms used in this guide (including appendices)	17
5.2 A Level Mathematics Numbers 1989 – 2009 (Source JCQ)	18
5.3 Overview of content in mathematics A Levels	19
5.3.1 What mathematics do students study in A level Mathematics courses?	19
5.4 Important dates for Mathematics (authored by Roger Porkess)	25

There is also a Welsh Baccalaureate qualification taken by a small number of students, see (12).

In **Scotland**, at age 16 students take Standard Grade examinations (roughly equivalent to the English GCSEs), at age 17 they take Highers (equivalent to AS Levels) and then at 18 Advanced Highers (equivalent to A Levels). It is worth noting that although many students do stay on to study Advanced Highers, students going on to study at a Scottish university can gain entrance having studied only Highers.

Grades for Standard Grades are on a scale from 1 to 7, where 7 is the lowest and awarded if the course was completed but the examination not passed. There are 3 levels of difficulty of papers: Foundation (grades 5 and 6), General (grades 3 and 4) and Credit (grades 1 and 2). Each level has two papers, one which allows a calculator and one which does not. Both papers assess knowledge, understanding, reasoning and enquiring skills.

There are also two Intermediate courses, Intermediate 1 and Intermediate 2, which can be studied instead of Standard Grades, or taken alongside Highers. The Intermediate 1 Course is equivalent to the knowledge and skills developed in Standard Grade Mathematics at Foundation level and the Intermediate 2 Course is designed to be equivalent to the knowledge and skills developed in Standard Grade Mathematics at General level. Their structure is similar to that of Highers (i.e. a one-year course split into units). Further detail can be seen in (13).

There is only one examining body in Scotland, the Scottish Qualifications Authority (SQA). It makes the following remarks about an Advanced Higher in Mathematics:

Advanced Higher Mathematics is designed to provide a broad understanding of algebra, geometry and calculus for those candidates wishing to develop the experience they gained through the Higher Course.

The Course will consolidate and extend the candidates' existing mathematical skills, knowledge and understanding in a way that recognises problem solving as an essential skill and that will allow them to integrate their knowledge of different areas of the subject.

There is also an Advanced Higher in Applied Mathematics, which enables students to study mathematics in real-life contexts and create and interpret mathematical models. However, the uptake for this is relatively low, with around 300 students studying it each year, see (14).

In **Northern Ireland** there are AS and A Levels in Mathematics and Further Mathematics. In 2009 approximately 2750 students studied A Level Mathematics, up from 2300 in 2004 but, again, relatively few study A Level Further Mathematics - 150 in 2009 (up from 140 in 2004). The examinations are provided by the Council for the Curriculum, Examinations and Assessments (CCEA), which is also the regulatory body.

STATISTICS

Correlation and Regression

- ✓ Product moment correlation
- ✓ Spearman coefficient rank correlation
- ✓ Independent and dependant variables
- ✓ Least squares regression
- ✓ Scatter diagrams

Data Presentation

- ✓ Bar charts, pie charts
- ✓ Vertical line graphs, histograms
- ✓ Cumulative frequency

The Binomial Distribution and Probability

- ✓ Probability based on selecting or arranging
- ✓ Probability based on binomial distribution
- ✓ Expected value of a binomial distribution
- ✓ Expected frequencies from a series of trials

Discrete Random Variables

- ✓ Expectation and variance of discrete random variables
- ✓ Formulae extensions $E(aX+b)$

Probability

- ✓ Measuring, estimating and expectation
- ✓ Combined probability
- ✓ Two trials
- ✓ Conditional probability
- ✓ Simple applications of laws

Exploring Data

- ✓ Types of data
- ✓ Stem and Leaf diagrams
- ✓ Measures of central tendency and of spread
- ✓ Linear coding
- ✓ Skewness and outliers

Hypothesis Testing

- ✓ Establishing the null and alternate hypothesis
- ✓ Conducting the test and interpreting the results
- ✓ Use of the binomial or normal distribution
- ✓ Type 1 and type 2 errors

Normal Distribution

- ✓ Properties (including use of tables)
- ✓ Mean and variance
- ✓ Cumulative distribution function
- ✓ Continuous random variables (probability density function and mean/variance)
- ✓ As an approximation to binomial or Poisson distributions
- ✓ t-distribution

Poisson Distribution

- ✓ Properties (including use of tables)
- ✓ Mean and variance
- ✓ Use as an approximation to binomial distribution

Chi-squared

- ✓ Introduction
- ✓ Conditions

Sampling/Estimation

- ✓ Randomness in choosing
- ✓ Sample means and standard errors
- ✓ Unbiased estimates of population means
- ✓ Use of central limit theorem
- ✓ Confidence intervals

Understanding the UK Mathematics Curriculum Pre-Higher Education

Year	Up to 16	16-19
1999	National Numeracy Strategy (primary schools)	New common cores at AS and A Level, now known as subject cores
2000		First teaching of new syllabuses to conform with Curriculum 2000
2000		Work starts on an MEI pilot programme to foster Further Mathematics
2001	Key Stage 3 National Strategy Framework for teaching mathematics to Years 7, 8 and 9 Introduction of data handling coursework at GCSE	Very poor results at AS Level Marked drop in retention rate for full A Level
2002		Large reduction in numbers taking A Level mathematics
2003		New subject cores for AS and A Level Mathematics
2004	The Smith Report: <i>Making Mathematics Count</i>	
2004	The Tomlinson Report on 14-19 Curriculum and Qualifications Reform (mostly rejected)	
2004		First teaching of new mathematics syllabuses, now known as specifications, introduced to overcome the problems caused by Curriculum 2000
2005		Discontinues the MEI Further Mathematics programme as the Further Mathematics Network (still run by MEI)
2006	First teaching of GCSE syllabuses that have changed from 3-tier to 2-tier	Uptake starts to rise under the new specifications
2007	First teaching of GCSE Mathematics with no coursework	
2009	Key Stage 3 National Curriculum tests discontinued	Uptake is the highest since 1989
2009		The Further Mathematics Network is replaced by the Further Mathematics Support Programme (still run by MEI)
2010	New GCSE syllabuses to start	
2010	Pilot of twin GCSEs to start	