Draft GCSE subject criteria for mathematics

For first teaching from September 2010

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Contents

Introduction

1. GCSE subject criteria set out the knowledge, understanding, skills and assessment objectives common to all GCSE specifications in mathematics. They provide the framework within which an awarding body creates the detail of the specification.

2. Specifications must also meet the regulators' general requirements, including the common and GCSE criteria as defined in *The statutory regulation of external qualifications* (QCA/04/1293).

3. Subject criteria are intended to:

*   help ensure consistent and comparable standards in the same subject across the awarding bodies

*   ensure that the rigour of GCSE is maintained

*   ensure that specifications build on the knowledge, understanding and skills established by the national curricula for England, Northern Ireland and Wales, and facilitate progression to higher level qualifications in mathematics

*   help higher education institutions, employers and other stakeholders, such as learners and parents/guardians, know what has been studied and assessed.

4. Any GCSE specification that contains significant elements of mathematics must be consistent with the relevant parts of these subject criteria.

Aims and learning outcomes

5. GCSE specifications in mathematics should encourage learners to be inspired, moved and changed by following a broad, coherent, satisfying and worthwhile course of study. They should help learners to develop confidence in, and a positive attitude towards, mathematics and recognise the importance of mathematics to society. Specifications should prepare learners to make informed decisions about further learning opportunities and career choices.

6. GCSE specifications in mathematics must enable learners to:

*   develop mathematical functionality

- develop knowledge, skills and understanding of mathematical methods and concepts

- acquire strategies for problem solving and modelling

- adopt a critical approach towards solving problems

- select and apply mathematical techniques and methods in everyday and real-world situations, including financial and unfamiliar contexts

- reason mathematically, make deductions and inferences and draw conclusions

- interpret and communicate mathematical information in a variety of forms appropriate to the information and context

- use technology appropriately.

Subject content

7.   The content of GCSE specifications in mathematics must reflect the learning outcomes.

8.   GCSE specifications in mathematics must be consistent with the national curriculum key stage 4 programmes of study requirements in the orders for England and Wales, and the statutory requirements for key stage 4 in Northern Ireland.

9.   GCSE specifications in mathematics must enable learners to develop the knowledge, skills and understanding specified below. Content in **bold** is higher tier only.

- Real numbers, their properties and their different representations, including standard index form **and upper and lower bounds**.

- Rules of arithmetic applied to calculations and manipulations with real numbers, **including non-integral powers and surds**.

- Proportional reasoning, direct and inverse proportion, proportional change and exponential growth.

- Linear, quadratic and other equations in one unknown.

- Graphs of polynomial, exponential and trigonometric functions and their properties.

- **Graphs of simple loci**.

- **Algebraic methods involving quadratic equations, expressions and inequalities**.

- **Transformations of functions**.

- Properties and mensuration of 2D and 3D shapes.

- **Using trigonometry to solve triangles, including the sine and cosine rules, and in mensuration**.

- Angle properties of parallel and intersecting straight lines, and circles **including circle theorems**.

- Properties and combinations of transformations.

- **3D coordinate systems** only to define location.

- **Vectors in two dimensions** only to define translations.

- Conversions between measures and compound measures.

- The statistical problem-solving process/data handling cycle.

- Presentation and analysis of large sets of grouped and ungrouped data, including **cumulative frequency diagrams**, histograms **and histograms with unequal class intervals**.

- Scattergraphs, correlation, lines of best fit and their interpretation.

- Measures of central tendency and spread, **including standard deviation**.

- Experimental and theoretical probabilities of single and combined events, **including conditional probability**.

Assessment objectives

10.   All specifications must require candidates to demonstrate their ability to:

Assessment objectives		% weighting
AO1	Recall, use and communicate their knowledge of mathematics.	35–45
AO2	Demonstrate their understanding by selecting and applying mathematical methods in a range of contexts using appropriate terms.	30–40
AO3	Interpret and analyse problems and generate strategies to solve them.	20–30

Scheme of assessment

11.   GCSE specifications in mathematics must allocate a weighting of 100% to external assessment.

12.   Question papers in mathematics must be targeted at either the foundation or higher tier.

13.   Each scheme of assessment must allocate a weighting of 30–40% to assessment without a calculator.

14.   In order to qualify for the award of grades A*–C in England, candidates must achieve a functional skills qualification at level 2 in mathematics.

Grade descriptions

To be added.