AQA

ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Functional Skills Certificate

Functional Mathematics
9305
Levels 1 and 2
Pilot Specification
2008

SPECIFICATION

Further copies of this specification booklet are available from:

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Background Information

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1   Introduction

AQA has been contracted by QCA to develop and pilot a free standing qualification in Functional Skills Mathematics. A pilot qualification based on this specification will be available for first awards in January 2008. First teaching to this specification commences in September 2007 for centres that have opted to participate in the pilot.

1.1   Levels

This specification offers Functional Mathematics assessments at Level 1 and Level 2 as described in the QCA (2007) *Functional skills standards: mathematics,* available at www.qca.org.uk

The Level 2 assessment requires skills and content equivalent to national curriculum mathematics Levels 1 – 6 and is identical to the Functional Mathematics assessment which is a part of the AQA pilot GCSE in Mathematics (9307).

The Level 1 assessment requires skills and content equivalent to national curriculum mathematics Levels 1 – 4.

1.2   Other Issues

All specifications must identify ways in which the study of the subject can contribute to developing understanding of spiritual, moral, ethical, social and cultural issues, European developments, environmental issues, and health and safety. Further details for this specification are given in Section 9.

2

Specification at a Glance
Functional Mathematics

This is the sole pilot free standing Functional Skills Mathematics specification offered by AQA. There is a pilot modular specification leading to a Mathematics GCSE including Functional Mathematics. There is also a pilot specification for GCSE in Additional Mathematics which is a linear specification.

Functional Mathematics Pilot (9305)	
Written Paper with pre-release material	
Section A (Calculator)	Functionality 3/4 of the assessment
Section B (Non-calculator)	Competency 1/4 of the assessment
1 hour 15 minutes duration	
Paper 1 (Non-calculator) Written Paper	**Competency** 2/7 of the assessment
40 minutes duration	
Paper 2 (Calculator) Written Paper with pre-release material	**Functionality** 5/7of the assessment
1 hour 15 minutes duration	

Level 1

Level 2

3   Availability of Assessment Units and Entry Details

3.1	Availability of Assessment Units	Examinations and qualifications for this pilot specification will be available in January and June each year with first examinations in January 2008.
		Examinations and qualifications will continue to be available on this pilot until a national qualification becomes available. At present this is expected to be for first teaching from 2010.
3.2	Entry Codes	Normal entry requirements apply, but the following information should be noted.
		This is a pilot specification and, as such, centres will be invited to take part with the maximum number of candidates and centres determined by the regulator.
		Both papers must be taken in the same series.
		More detailed entry information including closing dates for entries will be issued to pilot centres separately.
3.3	Private Candidates	This pilot specification is not available for private candidates.
3.4	Special Consideration	Special consideration may be requested for candidates whose work has been affected by illness or other exceptional circumstances. The appropriate form and all relevant information should be forwarded to the AQA office which deals with such matters for the centre concerned.
		Details are available from the AQA Website (www.aqa.org.uk). Centres contacting AQA should ask for a copy of *Regulations and Guidance relating to Candidates who are Eligible for Adjustments in Examinations*.
3.5	Access Arrangements	Special arrangements may be provided for candidates with special needs.
		Details are available from the AQA Website (www.aqa.org.uk). Centres contacting AQA should ask for the Candidate Services Department and a copy of *Regulations and Guidance relating to Candidates who are Eligible for Adjustments in Examinations*.
3.6	Language of Examinations	All components are provided in English only.

Scheme of Assessment

4 Introduction

4.1 National Standards

This Functional Mathematics specification complies with the following:

QCA (2007) *Functional Skills Standards: Mathematics*, available at www.qca.org.uk;

The QCA Assessment Principles for Pilot – June 2007 (Mathematics);

The GCSE and GCE A/AS Code of Practice;

The GCSE Qualification Specific Criteria;

The Arrangements for the Statutory Regulation of External Qualifications in England, Wales and Northern Ireland: Common Criteria.

4.2 Rationale

The free standing Functional Mathematics qualification is awarded to candidates who are able to demonstrate attainment against the national functional skills standards in mathematics at Level 1 or 2.

Functional Mathematics, as defined in *The Functional skills standards: Mathematics,* requires learners to have the skills and confidence to apply, combine and adapt their mathematical knowledge to new situations in their life and work. It has been described as applying straightforward mathematics in complex contexts.

In the standards, it is envisaged that differentiation is achieved not just through the technical demand of the mathematics required but also through the complexity and familiarity of the context in which the mathematics is presented, and the independence shown in tackling problems (see Section 8.1).

4.3 Prior Level of Attainment and Recommended Prior Learning

There is progression of material through all levels at which the subject is studied. This specification therefore builds on the Key Stage 3 Programme of Study.

It is also expected that candidates will have reached the required level of literacy through study at Key Stage 3.

4.4	Progression

This qualification is a recognised part of the National Qualifications Framework and is being developed to fit into the whole 14-19 Pathways programme. As such, Functional Mathematics provides progression from Key Stage 3 to post-16 study.

More generally, Functional Mathematics provides a sound basis for further study in the subject and associated subjects, at the next functional skills level or in other contexts.

5 Aims

The term functional should be considered in the broad sense of providing candidates with the skills and abilities they need to take an active and responsible role in their communities, in their everyday life, workplace and educational settings. Functional Mathematics requires learners to be able to use mathematics in ways that make them effective and involved as citizens and able to operate confidently in life and work in a wide range of contexts.

The aim of the mathematics standards is to encourage people to demonstrate their mathematical skills in a range of contexts and purposes. They are essentially concerned with developing and recognising the ability of learners to apply and transfer skills in ways that are appropriate to their situation.

They are written to be sufficiently flexible to be interpreted in a variety of contexts, for example in school and workplace settings and by a range of users. They provide the framework for assessment, rather than the detail, and as such need to be relatively context-free.

6   Process Skills

6.1   Introduction

For mathematics to be useful, learners must have the skills and confidence to apply, combine and adapt their mathematical knowledge to new situations in their life and work. They need the capacity to identify and understand the role that mathematics plays in the world and use mathematics in ways that enable them to function as effective citizens and benefit them in life and work.

Fundamental to individuals being able to use mathematics effectively in life and work is their ability to understand and make sense of mathematical information, to use and process that information, to interpret and analyse the results of their activity and to present this to others. These process skills form the basis of the functional skills standards for mathematics and apply at all levels.

6.2   Process Skills

These are the underpinning skills that are needed to be functional in mathematics. Developing these skills will provide the tools that learners will need in order to tackle situations involving mathematics in life and work. Process skills enable learners to:

- understand the situation
- choose and approach to tackle the problem
- formulate a model using mathematics
- use mathematics to provide answers
- interpret and check the results
- evaluate the model and approach
- explain the analysis and results
- apply and adapt this experience in other situations as they arise.

The key attributes of these process skills are presented below and should provide the framework for the delivery, development and assessment of functional mathematics.

Representing

Making sense of the situations and representing them.

A learner can:

- recognise that a situation has aspects that can be represented using mathematics
- make an initial model of a situation using suitable forms of representation
- decide on the methods, operations and tools, including ICT, to use in a situation
- select the mathematical information to use

Analysing	Processing and using the mathematics.

A learner can:

- use appropriate mathematical procedures
- examine patterns and relationships
- change values and assumptions or adjust relationships to see the effects on answers in the model
- find results and solutions

Interpreting	Interpreting and communicating the results of the analysis

A learner can:

- interpret results and solutions
- draw conclusions in the light of the situation
- consider the appropriateness and accuracy of the results and conclusions
- choose appropriate language and forms of presentation to communicate results and conclusions

7 Scheme of Assessment

7.1 Assessment Scheme

The Scheme of Assessment for Level 1 comprises a single unit divided into sections A and B.

The Scheme of Assessment for Level 2 comprises two papers taken in the same examination series.

Level 1

Written Paper

Section A – Calculator

45 minutes duration	25 marks

3/4 of the assessment

Section B – Non-calculator

30 minutes duration	20 marks

1/4 of the assessment

Assesses the process skills and content for Functional Mathematics at Level 1.

All questions are compulsory. A question/paper answer booklet will be provided.

Level 2

Written Paper
Paper 1 (Non-calculator)

40 minutes duration

2/7 of the assessment	30 marks

Assesses the content for Functional Mathematics at Level 2.

All questions are compulsory. A question/paper answer booklet will be provided.

Written Paper
Paper 2 (Calculator)

1 hour 15 minutes duration

5/7 of the assessment	60 marks

Assesses the process skills and content for Functional Mathematics at Level 2.

All questions are compulsory. A question/paper answer booklet will be provided.

7.2	**Assessment Structure: Level 2**	The assessment is in two parts, Paper 1 and Paper 2.

Paper 1 is a competency test assessing the content (see Section 8.7) in a straightforward manner with little or no context. It consists of 30 single-mark questions in a question paper of 40 minutes duration. The use of a calculator is **not** permitted in Paper 1.

Paper 2 is a functionality test assessing the content and process skills with questions placed in contexts which may be unfamiliar and may be drawn from everyday life, the workplace or educational settings. It consists of 2 questions worth a total of 30 marks where the context is presented in advance on pre-released data sheets, and 3 or 4 questions also worth a total of 30 marks where the contexts are less complex and presented as part of the examination. The question paper is of 75 minutes duration. The use of a calculator is expected in Paper 2.

7.3	**Assessment Structure: Level 1**	The assessment is in two parts, Section A and Section B.

Section A is a functionality test assessing the content and process skills with questions placed in contexts which may be unfamiliar and may be drawn from everyday life, the workplace or educational settings. It consists of 1 question worth 10 marks where the context is presented in advance on a pre-released data sheet, and 2 questions worth a total of 15 marks where the contexts are less complex and presented as part of the examination.

Section B is a competency test assessing the content (see Section 8.4) in a straightforward manner with little or no context. It consists of 20 single-mark questions. The use of a calculator is **not** permitted in Section B.

7.4	**Pre-released data sheets**	Pre-released data sheets will be sent to centres about 4 working weeks before the timetabled examination. Candidates will be able to work with their teachers in familiarising themselves with the contexts, clarifying any specialised vocabulary and considering the possible mathematics in the situation presented. Teachers will need to provide reasonable class time for this to happen. This should be at least one lesson but there is no upper limit on the time candidates can spend considering the data sheets.

The pre-released data sheets cannot be taken into the examination room. A clean copy of the data along with any further data required for the other questions will be issued to all candidates at the start of the examination. This sheet will not be collected in and marked so candidates should ensure that all working is presented in the question paper/answer book.

| 7.5 | Written Papers | The whole assessment at Level 1 and Level 2 is by written papers to be set and marked by AQA. |

The use of a calculator is not permitted in the following: Level 1 section B and Level 2 paper 1.

Slide rules, logarithmic tables and all other calculating aids are also forbidden.

In the Level 1 assessment, the written paper is divided into two sections as described above. Section A requires the use of a calculator and is issued to candidates at the beginning of the examination. After the time for section A has passed (45 minutes) candidates are instructed to stop working and place their calculators beneath their seats. Section B (non- calculator) is then issued. At the end of the examination, the two sections are tagged together and the scripts collected.

| 7.6 | Calculators | Candidates will be expected to have a scientific calculator. The calculator should have the following as a minimum requirement: |

Four rules and a square, square root, reciprocal and power function, brackets, a memory facility and appropriate exponential, trigonometric and statistical functions.

Further guidance on regulations relating to calculators can be obtained from *Instructions on the Conduct of Examinations*.

| 7.7 | Entry Policy | Although Level 1 will be awarded on the Level 2 assessment, candidates aiming to achieve Level 1 will find the Level 1 assessment more appropriate. |

Subject Content

8	The Standards

| 8.1 | Differentiation | This section identifies the level at which a candidate would be expected to apply the process skills and includes an indication of the performance, knowledge and scope required at each level. Levels relate to the complexity of the situation, the difficulty and range of mathematical techniques required to make sense of it, and the analysis and communication of findings. At each level, these build on and subsume the skills identified at the level(s) below. |

Levels are differentiated by the following:

	Complexity	Real-world situations, as they arise, are often quite complex. Identifying the separate areas of knowledge needed to tackle a situation, the steps needed to solve the problem and the accessibility of the problem itself (routine or non-routine) determines the level of complexity.
	Familiarity	This reflects the extent to which a problem or situation requires an individual to transfer skills and understanding developed in other contexts to relate and apply these to make sense of a new situation. In 'transferring' skills and understanding, the individual may need to adapt or extend these in order to tackle the problem effectively.
	Technical Demand	This reflects the range of knowledge, skills and techniques that an individual is required to draw on in order to tackle a problem. These are defined in various ways, for example, in the national curriculum levels. This may vary from a simple calculation to a thorough analysis of the practical situation.
	Independence	This relates to the level of autonomy that candidates apply to tackling a problem at each stage. It is closely related to a candidate's ability to select and apply problem solving skills so that at higher levels he or she can demonstrate the ability to select and apply mathematical skills independently.

| 8.2 | Level 1 Differentiation | The context may be less familiar than at entry level but is accessible to the candidate. The mathematics demanded are clear but with some non-routine aspects to the situation or problem. Methods and procedures may require selection and an organised approach. Models would need to be selected and adapted. Guidance is provided but autonomous decisions are required to find solutions. |

| 8.3 | Level 1 Performance | The standards at Level 1 are underpinned by the process skills detailed in section 6 of this specification. |

Candidates are expected to:

- understand practical problems in familiar and unfamiliar contexts and situations, some of which are non-routine
- identify and obtain necessary information to tackle the problem
- select and apply mathematics in an organised way to find solutions to practical problems for different purposes.
- use appropriate checking procedures at each stage
- interpret and communicate solutions to practical problems, drawing simple conclusions and giving explanations.

| 8.4 | Level 1 Coverage / Range | Content and skills are equivalent to national curriculum mathematics Levels 1-4, the adult numeracy standards and the application of number key skill, Level 1. |

Specifically, in the *Functional skills standards: mathematics* at Level 1 it is expected that the candidate can:

- understand and use whole numbers and recognise negative numbers in practical contexts
- add, subtract, multiply and divide whole numbers using a range of mental methods
- multiply and divide whole numbers by 10 and 100 using metal arithmetic
- understand and use equivalences between common fractions, decimals and percentages
- add and subtract decimals up to two decimal places
- solve simple problems involving ratio, where one number is a multiple of the other
- use simple formulae expressed in words for one- or two-step operations
- solve problems requiring calculation, with common measures including money, time, length, weight, capacity and temperature
- convert units of measure in the same system
- work out areas, perimeters and volumes in practical situations
- construct models and draw shapes measuring and drawing angles and identifying line symmetry
- extract and interpret information from tables, diagrams, charts and graphs

- collect and record discrete data and organise and represent information in different ways

- find mean and range

- use probability to show that some events are more likely to occur than others

- understand outcomes, check calculations and explain results.

8.5	Level 2 Differentiation	In some respects, the context is unfamiliar to the candidate and the situation or problem would need to be identified. The mathematics demanded may not be obvious in all situations and there will be non-routine aspects to the situation or problem. Methods may involve several steps and require identification of underlying mathematical structures and ways of describing them. Guidance may be provided but choices are independently made and evaluated.
8.6	Level 2 Performance	The standards at Level 2 are underpinned by the process skills detailed in section 6 of this specification.

8.6 Level 2 Performance

Candidates are expected to:

- understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations

- identify the situation or problem and the mathematical methods need to tackle it

- select and apply a range of mathematics to find solutions

- use appropriate checking procedures and evaluate their effectiveness at each stage

- interpret and communicate solutions to practical problems in familiar an unfamiliar routine contexts and situations

- draw conclusions and provide mathematical justifications.

| 8.7 | Level 2 Coverage/Range | The assessment of Functional Mathematics at Level 2 draws on content across all areas but is limited to content and skills equivalent to national curriculum levels 1–6, the adult numeracy standards and the application of number key skill, level 2. |

Specifically, in the *Functional skills standards: mathematics* at Level 2 it is expected that the candidate can:

- understand and use positive and negative numbers of any size in practical contexts

- carry out calculations with numbers of any size in practical contexts

- understand, use and calculate ratio and proportion, including problems involving scale

- understand and use equivalences between fractions, decimals and percentages

- add and subtract fractions; add, subtract, multiply and divide decimals to a given number of decimal places

- understand and use simple equations and manipulate simple formulae involving one or two step operations

- recognise and use 2-D representations of 3-D objects

- find area, perimeter and volume of common shapes

- use, convert and calculate using metric and, where appropriate, imperial measures

- collect and represent discrete and continuous data

- use and interpret for discrete and continuous data, statistical measures, tables and diagrams

- use statistical methods to investigate situations

- use a numerical scale from 0 to 1 to express and compare probabilities

| 8.8 | Further support | Support for the preparation of candidates for this new specification will be provided by AQA and its partners. |

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Other Issues

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9   Spiritual, Moral, Ethical, Social, Cultural and Other Issues

9.1 Spiritual, Moral, Ethical, Social, Cultural and Other Issues	Mathematics provides opportunities to promote:

- *spiritual development,* through explaining the underlying mathematical principles behind some of the natural forms and patterns in the world around us

- *moral development,* helping pupils recognise how logical reasoning can be used to consider the consequences of particular decisions and choices helping them learn the value of mathematical truth

- *social development,* through helping pupils work together productively on complex mathematical tasks and helping them see that the result is often better than could be achieved separately

- *cultural development,* through helping pupils appreciate that mathematical thought contributes to the development of our culture and is becoming increasingly central to our highly technological future, and through recognising that mathematicians from many cultures have contributed to the development of modern day mathematics.

9.2 European Dimension

AQA has taken account of the 1988 Resolution of the Council of the European Community in preparing this specification and associated specimen papers.

9.3 Environmental Issues

AQA has taken account of the 1988 Resolution of the Council of the European Community and the Report *Environmental Responsibility: An Agenda for Further and Higher Education* 1993 in preparing this specification and associated specimen papers.

9.4 Citizenship

A number of specification references, particularly those for Statistics, promote the skills of enquiry and communication. They also encourage the skill of participation and responsible action in the educational establishment and/or communication.

9.5 Avoidance of Bias

AQA has taken great care in the preparation of this specification and associated specimen papers to avoid bias of any kind.

9.6	**Health and Safety**	Aspects of the specification, particularly within Statistics provide opportunities to promote Health and Safety issues.

9.7   **ICT**

(a)   Pupils should be given opportunities to apply and develop their ICT capability through the use of ICT tools to support their learning in mathematics.

(b)   Pupils should be given opportunities to support their work by being taught to:

   (i)   find things out from a variety of sources, selecting and synthesising the information to meet their needs and developing an ability to question its accuracy, bias and plausibility

   (ii)   develop their ideas using ICT tools to amend and refine their work and enhance its quality and accuracy

   (iii) exchange and share information, both directly and through electronic media

   (iv)   review, modify and evaluate their work, reflecting critically on its quality, as it progresses.

9.8   **Other Issues**

Mathematics provides opportunities to promote:

- *thinking skills*, through developing pupils' problem-solving skills and deductive reasoning

- *financial capability*, through applying mathematics to problems set in financial contexts

- *enterprise and entrepreneurial skills*, through developing pupils' abilities to apply mathematics in science and technology, in economics and in risk assessment

- *work related learning*, through developing pupils' abilities to use and apply mathematics in workplace situations and in solving real-life problems.

Awarding and Reporting

10 Grading, Shelf-life and Re-sits

10.1	Qualification Titles	The qualification based on this pilot specification has the following title: AQA Level 1 Award in Functional Skills: Mathematics or AQA Level 2 Award in Functional Skills: Mathematics.
10.2	Awards	The Level 2 assessment will be awarded on a three level scale with candidates gaining Level 2, Level 1 or Unclassified.
		The Level 1 assessment will be awarded on a two level scale with candidates gaining Level 1 or Unclassified.
10.3	Re-sits	The qualification may be re-sat any number of times with opportunities in January and June.
10.4	Minimum Requirements	Candidates will be awarded a level based on the work submitted for assessment.
10.5	Awarding and Reporting	The procedures for Awarding Levels and Reporting Results to centres comply with the relevant Code of Practice issued by the Regulatory Authorities.
10.6	Overlaps with other qualifications	The Functional Mathematics assessment at Level 2 in this specification is identical to the free standing Functional Mathematics assessment at Level 2 which is part of AQA's GCSE Mathematics pilot specification 9307.
		Further information about the links between these subjects can be obtained from AQA.