Oxford Cambridge and RSA Examinations

OCR INTERMEDIATE FREE-STANDING MATHEMATICS QUALIFICATION IN FOUNDATIONS OF ADVANCED MATHEMATICS (MEI) 6989

Foreword

This pack contains OCR's Intermediate Free-Standing Mathematics Qualification (FSMQ) in Foundations of Advanced Mathematics (MEI) specification for teaching from September 2002.

The first certification is June 2003

This specification is approved by QCA, ACCAC and CCEA as a National Intermediate Level qualification

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SECTION A: SPECIFICATION SUMMARY

COURSE OUTLINE

Foundations of Advanced Mathematics (FAM) is a well-established MEI course which was first examined in 1993. FAM is a broad-based course covering arithmetic, algebra, graphs, trigonometry and statistics; this contrasts with other Intermediate FSMQs which look at self-contained areas of the subject in some depth. The treatment of the content and the examination questions demands a level of sophistication from students consistent with the start of advanced study and appropriate to applicants for many Higher Education courses.

OBJECTIVES

- To provide access to Advanced Subsidiary and Advanced GCE Mathematics courses for those who are not yet confident in being ready to undertake them.
- To provide mathematics for students taking advanced courses in other subjects and those preparing for Higher Education whose studies include a numerate element.
- To support the Key Skill *Application of Number* qualification.

ASSESSMENT

The assessment is by examination. It is set in January and June of each year, the question paper lasts 2 hours and consists of 40 multiple choice questions. The examination result is reported as a grade A, B, C, D, E or U.

KEY SKILLS

FAM covers the techniques needed by a student preparing for the Key Skill *Application of Number*. A grade in the range of E to A provides exemption from the external assessment for the *Application of Number* Key Skill at Level 2.

SECTION B: GENERAL INFORMATION

1 INTRODUCTION

1.1 Rationale

This course is designed to provide a route of progression for those whose needs are not well served by courses currently available within the National Framework of Qualifications.

Students wishing to access Advanced Subsidiary and Advanced GCE Mathematics courses but whose mathematics at present is not sufficiently strong for them to have reasonable prospects of success.

Some of this group will have recently taken Foundation Tier GCSE and obtained a grade C. However, there are also students who studied Higher tier whose long-term prospects would be enhanced by consolidating their work before progressing to AS/A2 level.

Additionally there are students returning to education after a break, who obtained good passes in GCSE or O level Mathematics some years ago, but have since forgotten much of the work.

There are also students who learnt their mathematics overseas. They may have studied different topics from those covered in GCSE and be unfamiliar with the technical use of English required by the subject.

Students taking advanced courses in subjects other than mathematics.

Many GCE students, taking sciences, business or social science courses are unable to fulfil their potential because they lack confidence in the use of mathematical techniques. The same is true of VCE students, particularly those taking business, science or engineering.

Students who are preparing to take a course in Higher Education which includes a numerate element (e.g. business, science, social science) but who are not formally studying mathematics.

The majority of students in this group are taking Advanced Subsidiary and Advanced GCE courses, a significant number are taking VCE courses and some are taking Access to Higher Education courses. These students are likely to have a similar mathematics background to that described for those in the first group.

All these students will enhance their chances of success in present and future studies by consolidating their mathematics at this stage with a broad-based course at an appropriate level.

FAM meets the needs of these students by developing and consolidating the techniques that they are most likely to use in their future studies. It is a broad-based course covering arithmetic, algebra, graphs, trigonometry and statistics. The treatment of the content and the examination questions demands a level of sophistication from students consistent with advanced study and appropriate to applicants for Higher Education courses.

1.2 Certification Title

This specification will be shown on a certificate as:

OCR Intermediate Level Free Standing Mathematics Qualification in Foundations of Advanced Mathematics.

1.3 Level of Qualification

This qualification is approved by the regulatory bodies (QCA, ACCAC and CCEA) as part of the National Qualifications Framework.

Candidates who gain grades E to A will have achieved an award at Intermediate Level.

1.4 Guided Learning Hours

It is anticipated that about 60 guided learning hours are needed to achieve this qualification.

1.5 Recommended Prior Learning

There are no prior requirements for this course. However, a typical student will have grade C or D at GCSE on entry, or equivalent qualifications.

1.6 Progression

This course is designed to provide a route of progression through the subject leading to AS/A Mathematics.
It will also help students prepare for some Higher Education courses with a mathematical expectation.

1.7 Overlap With Other Qualifications

There is considerable overlap between the content of FAM and Higher Tier GCSE. The topics involved are those that are particularly relevant to more advanced work. However, a different approach to the material is expected through a greater use of both vocational contexts and examples that are appropriate to post-16 candidates.

1.8 Key Skills Proxy

A grade in the range of E to A provides exemption from the external assessment for the *Application of Number* Key Skill at Level 2.

1.9 Restrictions on Candidate Entries

There are no restrictions.

1.10 Code of Practice Requirements

These specifications will comply in every respect with the revised Code of Practice requirements for courses starting in September 2002.

1.11 Status in Wales and Northern Ireland

This specification has been approved by ACCAC for use by Centres in Wales and by CCEA for use by Centres in Northern Ireland.

Candidates in Wales and Northern Ireland should not be disadvantaged by terms, legislation or aspects of government that are different from those in England. Where such situations might occur, including in the assessment , the terms used have been selected as neutral, so that candidates may apply whatever is appropriate to their own situation.

OCR will provide specifications, assessments and supporting documentation only in English.

2 SPECIFICATION AIMS

The stated aim of MEI is:

- to promote the links between education and industry in mathematics and to produce relevant examination and teaching specifications and support material.

The aims of this specification are to encourage candidates to:

- develop their understanding of mathematics and mathematical processes in a way that promotes confidence and fosters enjoyment;
- apply mathematical skills and techniques to solve problems in other subjects;
- recognise how a situation may be represented mathematically and understand the relationship between 'real world' problems and standard and other mathematical models, and how these can be refined and improved;
- use mathematics as an effective means of communication;
- acquire the skills needed to use technology such as calculators and computers effectively, recognise when such use may be inappropriate and be aware of limitations;
- develop an awareness of the relevance of mathematics to other fields of study, to the world of work and to society in general;
- build a firm foundation for further study;
- develop the skills required for the *Application of Number* Key Skill.

3 ASSESSMENT OBJECTIVES

A course based on this specification requires candidates to demonstrate their knowledge, understanding and skills in the following assessment objectives:

AO1 Recall, select and use their knowledge of appropriate mathematical facts, concepts and techniques in a variety of contexts. **30-40%**

AO2 Recognise and understand precise statements, logical deductions and inference; manipulate expressions. **40-50%**

AO3 Recognise and understand given mathematical representations of situations; interpret results from such representations. **5-15%**

AO4 Comprehend translations of common realistic contexts into mathematics. **5-15%**

AO5 Appreciate whether or not given information is reasonable and is given to an appropriate level of accuracy. **5-15%**

4 SCHEME OF ASSESSMENT

4.1 Structure and Availability

The assessment is by a single examination of length 2 hours. The examination will be held in January and June each year. First certification will be in June 2003.

4.2 Question Papers

The question paper consists of 40 multiple choice questions each worth one mark.

4.3 Calculating Aids

Candidates are permitted to use a scientific calculator in the examination for this unit. Computers, graphical calculators and those with computer algebra facilities are not permitted.

The use of computer software (e.g. spreadsheets) is encouraged in teaching.

4.4 Grading

The examination result is reported as a grade (A, B, C, D, E or U). At the time of setting each examination paper will be designed with the following grade thresholds in mind.

Grade	Design threshold (/40)
A	32
B	28
C	24
D	20
E	16

The actual grade thresholds will be determined by the awarding committee who will make reasonable allowance for any features of a particular paper that only become apparent after it is taken.

4.5 Notification of Results and Certification

Results will be sent to Centres in accordance with a published timetable. Candidates will receive a certificate entitled OCR Intermediate Level Free Standing Mathematics Qualification in Foundations of Advanced Mathematics.

4.6 Assessment of ICT

Candidates are expected to use calculators effectively, know how to enter complex calculations and use an extended range of function keys, including trigonometrical and statistical functions relevant to the course/content.

4.7 Differentiation

This course is targeted at a relatively narrow band of students. They will be differentiated by the outcome of assessment.

4.8 Grade Descriptions

Grade E

A candidate understands what the questions are asking and is usually able to select the correct methods to answer them. However, subsequent work is often marred by technical errors. The following statements might typically be associated with the work of a candidate at this level:

- Read and use mathematical vocabulary and notation.
- Round numbers to a sensible level of accuracy.
- Work with fractions, decimals and percentages.
- Understand the equivalence of fractions, decimals and percentages.
- Work with ratios.
- Substitute in algebraic formulae.
- Manipulate algebraic formulae, equations and expressions.
- Solve simultaneous linear equations.
- Work with sequences.
- Solve linear equations with integer coefficients.
- Plot the graph of a given equation.
- Solve equations graphically.
- Work with conversion and other real-life graphs.
- Recognise and use symmetry in geometrical shapes.
- Work with scale drawings and enlargements.
- Calculate perimeters, areas and volumes.
- Find the area and circumference of a circle.
- Use Pythagoras theorem.
- Use trigonometry in right-angled triangles.
- Use appropriate units including common examples of compound units.
- Collect data using a suitable sampling procedure.
- Work with and interpret common statistical diagrams.
- Calculate and use mode, median, mean and range.
- Calculate probability.

A candidate obtaining grade E has benefited from studying this course.

Grade C

The work of a C grade candidate shows all the positive characteristics of an E grade candidate and at times, but not always, those of an A grade candidate. Candidates' work will be associated with those statements listed for grade E and some, but not all, of those listed for grade A.

A candidate obtaining grade C should benefit from further study in mathematics.

Grade A

An A grade candidate almost always selects correct methods and applies them appropriately, usually with success. The work of an A grade candidate is characterised by a high level of technical accuracy. Candidates' work will be associated with those statements listed for grade E and additionally those listed below:

- Use mathematical vocabulary and symbols effectively.
- Write down everyday statements in mathematical form.
- Interpret mathematical statements in everyday English.
- Estimate realistic values for quantities.
- Check answers are realistic.
- Check answers by working backwards.
- Calculate the effect of accumulating errors.
- Work with indices and in standard form.
- Factorise and expand quadratic expressions and solve quadratic equations.
- Change the subject of an algebraic formula.
- Solve linear inequalities.
- Interpret the intersections and gradients of graphs and the areas under them.
- Know and use the graphs of the sin, cos and tan for any angles.
- Solve problems involving the use of sin and cos of angles up to 180°.
- Solve problems involving lengths and angles in 2-and 3-dimensions.
- Know vector notation and work with simple practical examples of vectors.
- Work with circles, sectors, cylinders, cones and spheres.
- Convert between units, including everyday compound units.
- Display data appropriately.
- Interpret statistical data given numerically or by means of a display.
- Draw conclusions from data.
- Work with cumulative frequency graphs.
- Recognise when data displays are misleading.
- Use relative frequency to estimate probability.
- Solve probability problems involving combined events.

A candidate obtaining grade A is clearly ready to study mathematics at a higher level.

SECTION C: SPECIFICATION CONTENT

5 SPECIFICATION CONTENT

FOUNDATIONS OF ADVANCED MATHEMATICS

Specification		Competence Statements
ARITHMETIC		
Numerical terms	FB 1	Know and be able to use vocabulary and notation appropriate to arithmetic at this level.
Numerical techniques	2	Be able to evaluate expressions.
	3	Be able to work with fractions.
	4	Be able to solve problems involving ratio and proportion.
	5	Understand and be able to work with percentages.
Equivalence	6	Understand the equivalence of fractions, decimals, percentages and ratios and be able to convert from one of these forms to another.
Indices	7	Be able to work with numbers in index form.
	8	Be able to use standard form.
Mensuration	9	Be able to use appropriate units.
	10	Be able to convert from one set of units to another.
	11	Be able to solve problems involving perimeter, area and volume.
	12	Be able to use scale drawings.
Accuracy	13	Know how to write any number to a specified number of decimal places or significant figures, or to some other level of accuracy.
	14	Be able to give numerical answers to an appropriate degree of accuracy.
	15	Be able to identify the effects of any accumulating errors on calculations.
Reasonable conclusions	16	Be able to comment on the expected order of magnitude of an answer and to decide if the answer is reasonable.
	17	Be able to establish reasonable upper and lower bounds for the answer to a problem.

FOUNDATIONS OF ADVANCED MATHEMATICS

Notes	Notation	Exclusions
Including real number, integer, factor, multiple, prime, power, root, reciprocal, LCM, HCF.		
Including negative numbers, brackets, powers; correct order of precedence.		
Including inverse proportion, the link between the ratios of the lengths, areas and volumes of similar figures.		
Including percentage change and 'reverse' percentage problems where 100% is required.		
e.g. ¾, 0.75, 75%, 3:1.		
$7^2 \times 7^3 = 7^5$ etc. The laws of indices for integer indices.		
Both large and small numbers.		
Including compound measures, e.g. metres per second, density.	e.g. ms^{-1}, kgm^{-3}	
Including between metric and Imperial.		
Including cylinders, prisms, cones, pyramids and spheres.		Frustum of a cone
Including nearest 10, nearest 100 etc.		
Accuracy appropriate to context including sensible rounding of calculator displays.		
By making rough checks. By using a context to consider the reasonableness of a result.		

FOUNDATIONS OF ADVANCED MATHEMATICS

Specification		Competence Statements
ALGEBRA		
Relationships	FA 1	Know and be able to use vocabulary and notation appropriate to algebra at this level.
	2	Be able to express relationships in symbolic form.
	3	Be able to write the rule for a sequence in symbolic form.
Interpretation	4	Be able to explain the contents of an algebraic expression in words.
	5	Be able to form an algebraic expression from a description in words.
Evaluation	6	Be able to substitute given numbers into an expression and evaluate it.
Techniques	7	Be able to simplify basic algebraic expressions.
	8	Be able to multiply out expressions involving brackets.
	9	Be able to use brackets to factorise expressions.
	10	Be able to factorise quadratic expressions.
	11	Be able to add or subtract algebraic fractions in cases when the denominator is a positive integer.
	12	Be able to rearrange simple algebraic formulae.
Solutions	13	Be able to solve linear equations.
	14	Be able to solve simultaneous linear equations.
	15	Be able to solve quadratic equations.
	16	Be able to formulate linear, simultaneous and quadratic equations.
	17	Be able to solve linear inequalities.
Checking answers	18	Know how to check answers to equations by substitution.

FOUNDATIONS OF ADVANCED MATHEMATICS

Notes	Notation	Exclusions
Including expression, constant, variable, term, coefficient, equation, identity, factorise, solve, root.		
Including simple relationships involving more than one variable e.g. $t = 3600h + 60m + s$		
Sequences based on linear (e.g. $n \to 2n + 5$), quadratic and exponential functions (e.g. $P=3\times2^{n}$).	$n \to 2n + 5$ or f(n)=2n+5	The use of e
e.g. $2(3x + 4y) – (x – 5y) = 5x + 13y$ $(2x + 3)(5x – 4) = 10x^2 + 7x – 12$		
e.g. $3x^2 + 12xy = 3x(x + 4y)$		
e.g. $\frac{5a-3b}{6} - \frac{2a+b}{4}$		
e.g. make t the subject in $v = u + at$; make r the subject in $A = \pi r^2$		The subject appearing more than once
e.g. $5x – 9y = 13$, $3x – 7y = 7$		More than two unknowns
By factorisation and by formula.		
e.g. $2x + 3 > 5x – 6$		Graphical inequalities

FOUNDATIONS OF ADVANCED MATHEMATICS

Specification		Competence Statements
GRAPHS		
Plotting	FG 1	Be able to plot data.
	2	Be able to draw graphs by constructing a table of values.
	3	Be able to construct and use conversion graphs.
Information	4	Be able to extract information from a graph.
	5	Know how to find the gradient (m) and intercept (c) of a straight line graph and how they are related to its equation ($y = mx + c$).
Solving equations	6	Be able to solve an equation in one unknown graphically.
	7	Be able to solve a pair of simultaneous equations in two unknowns graphically.
Gradient	8	Be able to estimate the gradient of a curve at a point by drawing the tangent.
	9	Be able to interpret gradient.
Area	10	Be able to estimate the area under a curve.
	11	Be able to interpret area.

FOUNDATIONS OF ADVANCED MATHEMATICS

Notes	Notation	Exclusions
The data may be given or found experimentally.		
$y=ax^3+bx^2+cx+d+ex^{-1}+fx^{-2}$ where at least three of the constants, a, b, c, d, e and f are zero.		
e.g. currency conversion.		
Including specific value, maximum value, minimum value.		Calculus techniques; completing the square.
Including finding m and c from a graph and from an equation.		
Point(s) of intersection with the x-axis.		
e.g. solve $x^2 - 5 = 0$ to 3 significant figures.		
Including rate of change.		
By counting squares or approximating as the sum of rectangles and triangles (or trapezia).		Formal application of rules e.g. the trapezium rule.

FOUNDATIONS OF ADVANCED MATHEMATICS

Specification		Competence Statements
TRIGONOMETRY		
Techniques	FT 1	Know and be able to use Pythagoras theorem.
	2	Know the meanings of sine, cosine and tangent.
	3	Be able to find sine, cosine and tangent of any angle.
	4	Know the graphs of $y = \sin x$, $y = \cos x$ and $y = \tan x$ for all values of x.
	5	Be able to use sine, cosine and tangent to find unknown sides and angles in right-angles triangles.
	6	Be able to find sides, angles and areas in figures involving more than one triangle.
	7	Be able to find sides and angles in non right-angled triangles using the sine and cosine rules.
Three dimensions	8	Be able to interpret drawings of three-dimensional objects.
	9	Be able to draw simple three-dimensional objects.
	10	Be able to calculate lengths and angles in three-dimensional objects.
Vectors	FV 1	Know and be able to use vocabulary and notation appropriate to vectors at this level.
	2	Be able to work with vectors.
	3	Be able to solve simple problems involving vector quantities by scale drawing and calculation.

FOUNDATIONS OF ADVANCED MATHEMATICS

Notes	Notation	Exclusions
Including the converse. The distance between two points in 2-D with given cordinates.		
Using degrees.		Radians
Including forms like $y = 5\sin x$, $y = \cos x + 3$		$y = \sin 2x$ etc.
The solution of triangles.		
Including scalar, vector, modulus, magnitude, direction, component, equal vectors, unit vectors, resultant.	$\mathbf{a} = 4\mathbf{i} + 3\mathbf{j}$, $\mathbf{a} = \begin{pmatrix} 4 \\ 3 \end{pmatrix}$	Vectors in three dimensions
Including addition, subtraction, scalar multiplication.		
Graphical representation of vector quantities e.g. displacement, velocity, force.		

FOUNDATIONS OF ADVANCED MATHEMATICS

Specification		Competence Statements
STATISTICS		
Collection	FS 1	Understand that data collection may require sampling.
	2	Be able to design and carry out a sensible sampling procedure.
	3	Be able to organise data
Display	FD 1	Be able to display data using pictograms, pie charts, bar charts, vertical line diagrams, frequency charts and line graphs.
	2	Be able to construct a cumulative frequency table and plot the corresponding graph.
	3	Know and be able to use standard conventions involved in data display.
	4	Recognise techniques and arguments designed to give a misleading impression.
Interpretation	5	Be able to describe the main features of a displayed data set.
	6	Be able to extract numerical information from a displayed data set.
Central tendency	7	Know the meaning of mode, median and mean and be able to find their values from a given data set.
	8	Be able to make judgements on the most appropriate measure of central tendency in a given situation.
Spread	9	Understand the concept of spread.
	10	Be able to find values of range and interquartile range.
Comparison	11	Be able to compare data sets.
Probability	FU 1	Be able to calculate probability theoretically when it is possible to do so.
	2	Be able to estimate probability as relative frequency.
	3	Appreciate that in everyday use probability is often estimated subjectively.
	4	Be able to find the probability of a complementary event.
Combined events	5	Be able to find the probability of more than one event, distinguishing between situations where it is necessary to add and to multiply.
	6	Be able to use tree diagrams to find probabilities.
	7	Be able to distinguish between situations where the second event is/is not independent of the first.

FOUNDATIONS OF ADVANCED MATHEMATICS

Notes	Notation	Exclusions
Determine appropriate groups/classes.		
Including histograms with equal class intervals.		Histograms with unequal class intervals.
Correct use of scales and axes.		
e.g. truncation of axes; use of mean of bi-modal data.		
Including trends.		
Including the use of statistical facilities on a calculator to find the mean.	Mean = $\bar{x}$	Questions requiring long calculations by hand will not be set.
		Mean deviation, standard deviation.
Range, inter-quartile range.		
		Formal tests.
e.g. situations involving coins, dice or cards.	P(heads) = ½	
Using data.		
e.g. outcomes of sporting events.		
	A′ is the event 'not-A'.	
First-then and either-or situations.		
Tree diagrams with two levels of branching.		
Drawing cards from a pack without/with replacement.		

SECTION D: FURTHER INFORMATION

6 OPPORTUNITIES FOR TEACHING

6.1 Problem Solving

The specification content is structured under the headings Arithmetic, Algebra, Graphs, Statistics and Trigonometry for ease of reference. It is not intended that these areas of work remain discrete since the content forms a coherent syllabus in which one area of work supports another.

In the real world mathematics is used by industry and commerce to solve problems. The mathematics involved is often quite straightforward so that many problems can be solved by confident use of the techniques in this specification.

Students should be encouraged to recognise and use mathematics as a tool in problem solving. Each of the following skills is part of the problem solving process. Therefore, together they should pervade the whole of the course:

- Identifying the mathematics in a situation.
- Making simplifying assumptions to allow work to begin.
- Selecting appropriate techniques.
- Carrying out the activities required by these techniques.
- Obtaining results.
- Checking the reasonableness of results.
- Giving results to a suitable degree of accuracy.
- Presenting results in an appropriate way.
- Drawing conclusions.
- Considering the validity of results.

These skills are all involved in the *Application of Number* Key Skill and so Foundations of Advanced Mathematics provides a suitable course to support that unit.

6.2 ICT

In order to play a full part in modern society, people need to be confident and effective users of ICT. Where appropriate, candidates should be given opportunities to use ICT in order to further their study of mathematics.

It is expected that candidates should be given the opportunity to:

- use spreadsheets to construct formulae and model situations;
- use databases or spreadsheets to present their findings and to display data;
- retrieve data from the Internet for use in statistics work.

Such opportunities may or may not contribute to the provision of evidence for the *Information Technology* Key Skill.

6.3 Spiritual, Moral, Ethical and Cultural Issues

Candidates are required to examine arguments critically and so to distinguish between truth and falsehood. They are also expected to interpret the results of modelling exercises and there are times, particularly in statistical work, when this inevitably raises moral and cultural issues. Such issues will not be assessed in examination questions.

6.4 Health Safety and Environmental Issues

The work developed in teaching this specification may at times involve examples that raise health and safety issues. These issues do not in themselves form part of the specification.

While the work developed in teaching this specification may use examples, particularly involving statistics, that raise environmental issues, these issues do not in themselves form part of the specification.

6.5 The European Dimension

OCR 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 assessments.

7 KEY SKILLS

Key Skills are central to successful employment and underpin further success in learning independently. This course covers the techniques needed by a student preparing for the Key Skill *Application of Number*. It provides opportunities to produce portfolio evidence for *Communication* and *Information Technology*. The wider Key Skills of *Working with Others*, *Problem Solving* and *Improving own Learning and Performance* may also be developed through the teaching programme associated with this specification.

A grade in the range of E to A provides exemption from the external assessment for the *Application of Number* Key Skill at Level 2.

8 READING LIST

The text book Foundations of Advanced Mathematics, ISBN 0340 65855 X, published by Hodder and Stoughton, has been written by an MEI team of authors to accompany this course.

9 ARRANGEMENTS FOR CANDIDATES WITH SPECIAL NEEDS

For candidates whose performance may be adversely affected through no fault of their own, teachers should consult the *Inter-Board Regulations and Guidance for Special Arrangements and Special Consideration.*

In such cases, advice should be sought from the OCR Special Requirements team (telephone 01223 552505) as early as possible during the course.

10 SUPPORT AND IN-SERVICE TRAINING FOR TEACHERS

To support teachers using this specification, OCR will make the following materials and services available:

- direct access to a mathematics subject team (telephone 01223 553116);
- specimen question paper and mark scheme, available from the Publications Department (telephone 0870 870 6622; fax 0870 870 6621; e-mail: publications@ocr.org.uk);
- a report on the examination, compiled by senior examining personnel after each examination session;
- the OCR website (www.ocr.org.uk).

In addition MEI (telephone 01373 824343) offer the following support:

- annual conference in July;
- INSET;
- local branches which meet two or three times a year;
- newsletters;
- MEI website (www.mei.org.uk);
- advice from mathematicians.