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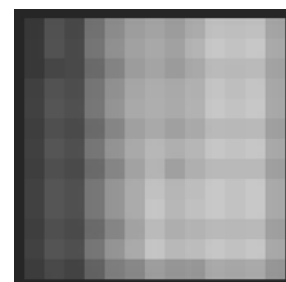
INTERMEDIATE FSMQ

6989

# FOUNDATIONS IN ADVANCED MATHEMATICS

**COMBINED MARK SCHEME  
AND REPORT FOR THE UNITS**  
JANUARY 2005

FSMQ/AS



6989/MS/R/05J

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All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

The report on the Examination provides information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the syllabus content, of the operation of the scheme of assessment and of the application of assessment criteria.

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RECOGNISING ACHIEVEMENT

MARK SCHEME AND REPORT ON THE UNITS (6989)  
JANUARY 2005

## Foundations of Advanced Mathematics – 6989

There were 780 entries for this session, slightly less than last year. The mean mark was 24.6, very close to that in January 2004. The minimum mark scored by two candidates was 8 and the maximum of 40 was achieved by two candidates.

There were 8 questions for which one candidate offered no answer, but these were scattered throughout the paper so this did not provide evidence that candidates found the paper too long or too hard.

I commented last year that in one question no candidate offered one of the options as an answer, and that I thought this was unusual. In this paper there were 5 such questions! (Option A for questions 2, 5 and 23 and option B for questions 6 and 15).

In a number of questions the wrong answer was offered by more candidates than the right answer.

Q16 (Vectors) The most popular answer was C. Presumably many would have tried  $\tan^{-1} \frac{4}{3}$ , getting an angle different to that given. This would have followed a failure to realise that the modulus of a vector is not the sum of the components.

Q17 (Roots of quadratic equations). An equal percentage thought that response A and D are false. The correct response was A. The roots of the equation in D are 5 and -4 which differ by 9.

Q38 (Simplification of algebraic fractions). In a multichoice question one of the obvious distractors is found by failing to take the subtraction of a negative quantity as the same as adding the positive value of that quantity. So in the numerator  $3d - (-5d) = 8d$  (giving A as the correct response) with the incorrect  $3d - (-5d) = -2d$  being a little more popular (and offered as response C).

Q39 (Trigonometry). 1% more thought that  $\cos \theta$  did not have two roots in the range  $0^\circ < \theta < 360^\circ$  (was it because they thought there was only 1?) than the fact that the value of  $\sin \theta$  is always less than 1. (Is this because they thought that, for instance -2 is not less than 1?).

Two questions came very close to falling in this category!

Q21 (discrete data from a vertical line graph) Very nearly as many thought that the mean is not 2.15 (and by default that the median is 3?) as responded correctly that the median is not 3. Were these candidates working on the discrete values 1, 2, 3, 4 and 5 rather than the fact that the graph gives multiple values of each number?

Q32 (Probability) Incorrect responses here are based on the idea that the first card is picked first and so there is a greater chance of a given person becoming the chairperson than the secretary. This would make B true and D false which is the wrong way round. 38% got this question right and 37% chose the wrong response.

These questions are all typical of those likely to be answered badly due to misunderstandings by the candidates.

As in previous sessions I offer a summary of questions and topics with the approximate percentage of candidates giving the correct responses. As I noted in my last report, the giving of the correct response may not be because the candidate understands the question and can discern the errors being made in the distracting responses. Attempts are made not to offer distractors in such a way that the correct response is the "odd man out" but our perception of typical errors might result in that happening.

	<b>Question</b>	<b>Topic</b>
91 – 100%	2	Arithmetic
	5	Coordinate geometry
	15	Arithmetic - sensible units
	23	Algebra - interpretation of graph
89 – 90%	6	Statistics - random sampling
	8	Arithmetic - standard form
	12	Algebra - substitution
	20	Algebra - factorisation
71 – 80%	1	Arithmetic
	3	Arithmetic - large numbers
	4	Arithmetic - exchange rates
	19	Arithmetic - error bounds
	29	Algebra - simultaneous equations
	34	Algebra - interpretation of formula
61-70%	7	Algebra - solving a linear equation
	9	Algebraic indices
	14	Arithmetic - percentage changes, including VAT
	18	Probability
	26	Arithmetic - percentage increase
	28	Vectors
51 – 60%	10	Coordinate geometry
	22	Algebra - solution of equations and inequalities
	25	Trigonometry
	30	Trigonometry
	35	Algebra - rearrangement of a formula
	36	Algebra - Velocity/time graph
41 – 50%	11	Arithmetic - conversion of units
	13	Statistics - interpretation of diagram
	21	Statistics - discrete data
	24	Algebra - solution of quadratic that does not factorise
	27	Cumulative frequency
	31	Algebra - interpretation of cubic function and its graph
33	Algebra- interpretation of units of solid	
31 – 40%	17	Algebra- roots of quadratic equations
	32	Probability
	37	Trigonometry - sine and cosine formulae
	38	Algebra - simplification of algebraic fractions
	39	Trigonometry
	40	Algebra
21 – 30%	16	Vectors

**Answers.**

1	D	21	C
2	C	22	D
3	C	23	C
4	C	24	C
5	D	25	D
6	D	26	A
7	B	27	A
8	A	28	B
9	B	29	C
10	A	30	B
11	B	31	D
12	C	32	B
13	D	33	C
14	B	34	B
15	D	35	C
16	B	36	C
17	A	37	C
18	B	38	A
19	C	39	D
20	B	40	D



**FSMQ Intermediate Foundations of Advanced Mathematics(FAM)**  
**January 2005 Assessment Session**

**Unit Threshold Marks**

<b>Unit</b>	<b>Maximum Mark</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>U</b>
<b>6989</b>	40	32	28	24	20	16	0

The cumulative percentage of candidates awarded each grade was as follows:

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>U</b>	<b>Total Number of Candidates</b>
<b>6989</b>	15.4	32.1	55.9	77.7	93.1	100.0	780





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