



2003

Further Mathematics GA 2: Written examination 1

GENERAL COMMENTS

Most Further Mathematics students were well prepared for Examination 1 in 2003. The number of students who sat for Further Mathematics examination 1 in 2003 was 20 402, a decrease of 238 of the 20 640 students who sat in 2002.

Multiple choice

This table indicates the approximate percentage of students choosing each distractor. The correct answer is the shaded alternative.

Question	A	B	C %	D	E
1	2	1	3	83	11
2	7	8	6	6	73
3	25	7	16	47	5
4	3	11	59	25	2
5	3	14	54	25	4
6	22	53	11	10	4
7	9	62	2	16	11
8	3	89	5	2	1
9	33	16	12	16	23
10	12	9	52	17	10
11	39	25	13	18	5
12	16	9	16	37	22
13	10	15	11	11	53

Modules

Module 1: Number patterns and applications

Question	A	B	C %	D	E
1	3	16	78	2	1
2	2	6	79	11	2
3	5	1	90	1	3
4	4	14	16	65	1
5	3	50	29	9	9
6	76	16	3	3	2
7	40	31	5	5	19
8	7	40	27	9	17
9	12	7	19	19	43

Module 2: Geometry and trigonometry

Question	A	B	C %	D	E
1	3	20	4	3	70
2	7	10	75	6	2
3	4	5	50	24	17
4	10	15	16	53	6
5	47	3	16	3	31
6	3	1	11	75	10
7	2	50	37	6	5
8	6	9	13	64	8
9	2	4	6	23	65

Module 3: Graphs and relations

Question	A	B	C	D	E
1	8	16	72	2	2
2	63	10	15	8	4
3	42	8	42	5	3
4	5	9	11	68	7
5	14	38	28	14	6
6	6	10	11	11	62
7	38	27	9	12	14
8	7	9	42	37	5
9	8	10	11	33	38

Module 4: Business-related mathematics

Question	A	B	C	D	E
1	2	2	88	6	2
2	6	4	64	14	12
3	3	4	24	51	18
4	6	28	45	12	9
5	24	63	3	5	5
6	46	13	15	22	4
7	17	39	10	30	4
8	10	30	22	16	22
9	15	9	22	32	22

Module 5: Networks and decision mathematics

Question	A	B	C	D	E
1	92	3	3	1	1
2	3	3	4	1	89
3	3	59	6	27	5
4	9	2	8	19	62
5	5	14	59	13	9
6	5	11	48	28	8
7	20	10	7	54	9
8	2	28	36	14	20
9	13	60	13	6	8

Areas of strength and weakness

Core

The Core was generally well done with the exception of two questions.

Question 9, required students to make use of both numerical and graphical information to arrive at the correct answer. Firstly, they needed to know that, if $r^2 = 0.8198$ then $r = \pm\sqrt{0.8198}$, and secondly, that additional information was required to determine which sign to use. The scatterplot clearly showed that the relationship represented negative correlation so that $r = -0.91$, correct to two decimal places. Only 33 per cent of students were able to follow this process through. The fact that 23 per cent of students chose $r = 0.91$ suggested that they may have been unaware that the equation $r^2 = 0.8198$ had two solutions.

The very low success rate of 18 per cent in answering Question 11 indicates that students generally were unfamiliar with the use of parallel boxplots as a method for displaying a relationship between a numerical variable and a two or more level categorical variable. This knowledge is an explicitly stated requirement of the study design. The fact that 39 per cent chose the 'histogram' option, a univariate display, also suggests that many students failed to recognise the bivariate nature of the situation.

Number patterns and applications

This module was well done with the exception of Question 7. The most popular incorrect response, option A, suggests that many students failed to recognise that the problem situation, determining the maximum height a growing shrub, required them to sum the infinite geometric sequence and not just add in the value of the next term.

Geometry and trigonometry

This module was also well done, with the exception of Question 7, which involved the scaling up of an area. While 37 per cent correctly used a scaling factor of 25 to give the answer 5500 cm^2 (option C), 50 per cent incorrectly used a linear scaling factor of five to arrive at an answer of 1100 cm^2 (option B). The regularity over the years with which students have failed to recognise that the scaling factor required depends on the dimension of the quantity being scaled suggests that teachers choosing this module should spend more time on this topic.

Graphs and relations

This module was well done, with the exception of Question 9 that The significant proportion of students who chose the incorrect response E, was indicative of an inability to translate correctly the statement ‘Jensen works at least twice as many hours in the restaurant than he does at the nursery’ by writing $2y \geq x$ rather than $y \geq 2x$.

Business and related mathematics

Three questions, 7, 8 and 9, caused particular difficulties in this module. In Question 7 the great number chose option B indicated that they had failed to recognise that interest was compounding quarterly. Question 8 involved the use of the simple interest formula in finding balances in a savings account where interest is paid monthly on the minimum monthly balance. The reasonably even distribution of the incorrect responses across three of the four distractors suggested that most students were unclear as to what constituted a minimum monthly balance when interest payments were made over several months. Question 9 tested a qualitative understanding of a reducing balance loan and found many students wanting.

Networks and decision mathematics

This module was well done with the exception of Question 8. The fact that many chose the option that corresponded to a travelling time of 24 minutes suggested these students likely knew what to do, but were perhaps not careful enough in eliminating other feasible solutions before deciding on their answer.

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