



**General Certificate of Secondary Education
January 2012**

Methods in Mathematics (Pilot) 93651H

(Specification 9365)

**Unit M1: Methods in Mathematics
(Algebra and Probability) - Higher**

Report on the Examination

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Unit 1: Higher Tier

General

This was the third series of the specification, and it was heartening to see an improvement in the ability of students to score marks across the whole range of questions. Questions on number and manipulative algebra were generally well answered, but some students struggled with questions on probability and non-manipulative algebra, particularly when problem-solving techniques were also required.

Topics that were done well included:

- solving basic equations
- multiplying out algebraic expressions
- sharing in a ratio
- probability from Venn diagrams

Topics which students found challenging included:

- using a probability tree
- proportionality
- gradients of straight lines
- probability of independent events
- sketching graphs
- surd manipulation

Question 1

Most students answered part (a) correctly, although 20 was seen at times and some occasionally gave a negative number as their answer. The algebraic manipulation required in part (b) proved to be more challenging, with many students adding or subtracting incorrectly, although well over half scored full marks.

Question 2

Many different approaches were made to this problem-solving question, and the majority of students scored at least one mark. However, only two-fifths were fully correct solutions.

Question 3

Fully correct proofs were rare in this question, with many students unable to write the instructions in algebraic form. The lack of use of brackets was particularly noticeable. Many students ignored algebra altogether and simply gave one numerical example.

Question 4

Many students could not evaluate y when x is -1 , often giving -8 as the answer through taking $(-1)^2$ to be -1 . Point plotting was generally good, but the standard of curve drawing was fairly poor.

Students should be encouraged to draw a curve as a single curved line through the points. Just over half of the students answered part (c) correctly from their curve, while the others clearly did not understand what was required.

Question 5

Most students were clearly familiar with the method needed to solve simultaneous equations, but many made arithmetic errors or made mistakes in subtracting or adding to eliminate one variable.

Students should be encouraged to check their answer by substituting the values into each equation.

Question 6

Less than half of the students scored both marks in part (a). The non-unitary coefficient of x in the second bracket proved problematic, as did the simplification of one positive and one negative term in x . Again, fewer than half of the students knew the difference of two squares in part (b).

Question 7

While most students could label the tree diagram correctly, far fewer could use it to find the answer in part (b). Many added along the branches instead of multiplying, and those who did multiply often included $\frac{1}{4}$ in their calculation.

Question 8

This question was not well answered, with many students clearly unsure how to get started. For a topic with a standard method, proportionality always seems to pose problems for students.

Question 9

The majority of students scored no marks on this question, with nearly one-quarter making no response. Several understood that the coefficient of x is the gradient, but used 11 and -1 , ignoring the coefficients of y .

Question 10

Many students started by stating that $p + 2p = 0.045$ instead of using $p \times 2p$. This did not automatically preclude them from the final two marks, but these marks were rarely achieved. Some students, however, showed excellent mathematical knowledge and technique, working clearly and correctly through the question.

Question 11

In part (a) it was disappointing to see that many students at this tier simply added the numerators and added the denominators. Most of the others gained both marks, but several added $15/40$ and $16/40$ as $31/80$.

Part (b) was not as well done, even though the method is simpler. Many students tried to equate the denominators and several inverted one or both of the fractions.

Question 12

The majority of students could do part (a), but nearly half went wrong on part (b). Many of these clearly did not understand the meaning of 'factorise', as they attempted to simplify or even multiply the terms in the expression.

Question 13

Three-quarters of the students gave the correct answer to part (a), with 6.6 a common wrong answer. Less than a half were correct on part (b), where the use of estimation would probably have proved useful. Part (c) was well done, although some students left answers which clearly did not add up to 600.

Question 14

Problem-solving incorporating algebra is not usually well done, but nearly 80% scored full marks on this question. Very few students did not work out that $x = 4$, with mistakes creeping in when solving $12 + 5y = 2$.

Question 15

Very few students adopted an algebraic strategy to solve this problem, and a systematic approach of trying possible combinations of numbers soon paid dividends for many students. The main error seemed to be a neglect of the condition that at the end, the bag had an equal number of red and blue marbles.

Question 16

Again, few students used an algebraic method and generally made trials of various integers which led to a solution. This strategy proved relatively successful in this question, but students should be encouraged to adopt an algebraic approach.

Question 17

The majority of students added correctly in part (a), although a few ignored the 13 students that were in neither club. Most then gave the correct probabilities in part (b), but part (c) proved trickier. Most students realised that there were now 32 students, but many took little notice of the new probabilities.

Question 18

Just over half of the students could convert 93 000 000 into standard form, and only one-fifth were fully correct in part (b); although many achieved one mark for some correct working. Over half correctly identified 3 as a possible answer in part (c), with 4 a very common wrong answer.

Question 19

Approximately one-fifth of the students could sketch the curves in parts (a), (b) and (d), which was encouraging, but this dropped to about one-twelfth with part (c).

Question 20

Very few students were fully successful on this question, with most having little idea where to start. Even those students who appeared to know the correct method soon went awry when trying to rationalise the denominator.

Question 21

Over half of the students adopted a sensible approach to this question, listing the trains that Krystle would see. Unfortunately, many neglected the trains which had left Lonnen before her train left Newton.

Mark Range and Award of Grades

Grade boundaries are available on the [Results statistics](#) page of the AQA Website.

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