



General Certificate of Secondary Education

Mathematics (Modular) 4307 *Specification B*

Module 3 Higher Tier 43053H

Report on the Examination *2008 examination - March series*

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General

The paper provided a good challenge containing some standard applications as well as questions set in context. Candidates were able to complete the paper within the time allowed. When questions were not attempted this was due to lack of knowledge rather than to having insufficient time. Most candidates showed their working but in some cases the work was difficult to follow or was ambiguous.

The algebra questions were not well attempted overall. Factorising, using graphs and algebraic proportion are weak areas for many candidates. However, plotting points and explaining why a single bracket expansion was incorrect were quite well attempted. Written methods for fractions continued to be a weak area and the order of operations and indices were not understood by many.

Topics that were well done included:

- distance, time, speed problem
- inverse proportion in context
- comparing a percentage and a fraction
- rounding to one significant figure for estimating
- ratio problem in context
- identifying the smallest number when written in standard form
- plotting points on graph paper.

Topics which candidates found difficult included:

- finding reciprocals
- algebraic factorisation
- laws of indices
- bounds
- solving quadratic equations graphically
- surds.

Question 1

This opening question was well answered with only a few candidates dividing the numbers instead of multiplying them.

Question 2

This question was also well answered. The majority multiplied 9 by 20 and then divided by 15. A few candidates tried seemingly random calculations with the three numbers.

Question 3

This was another well answered question with success being gained by working out Adam's mark as a percentage or by finding 65% of 40. Only a few candidates did a correct calculation and then chose the wrong person, although some failed to make a decision.

Question 4

Part (a) was quite well answered although a disappointing number of candidates could not key in calculations involving several operations correctly. In part (b) there were many who rounded to three decimal places and overall this standard process was not carried out well.

Question 5

Many candidates did not know the meaning of reciprocal which meant that part (a) was poorly answered. Some wrote 1 over 1.25 but failed to work this out which is a straightforward task using a calculator. Part (b) was answered quite well but part (c) proved more challenging. Part (d) resulted in a disappointingly small number of candidates gaining both marks. Many obtained 0.013 but were unable to convert it correctly to standard form. Some carelessly gave the power of 10 as 2 instead of -2 , others had a power of -3 or 28. Those candidates who converted out of standard form were then not able to process the calculation correctly.

Question 6

Part (a) was the most successfully answered algebra question on the paper. Many candidates gave the correct expansion while others gave an acceptable explanation in words. A significant number thought that the identity symbol was Kim's error. Part (b) was badly answered. Very few candidates attempted factorisation at all and most candidates cancelled within the given expression.

Question 7

In part (a) a reasonable proportion of candidates were familiar with the multiplier needed for decreasing by 3% with the decimal used far more frequently than the fractional equivalent. Part (b) resulted in a mixed response. Some candidates did not round their answer to the nearest hundred and others used simple interest. It was disappointing that so few candidates multiplied by a power of 0.97. Many who worked a year at a time, finding 3% and then subtracting, made arithmetical or rounding errors.

Question 8

Knowledge of the laws of indices was very poor. Many tried to evaluate the expression and quickly ran into difficulties. Those who worked using index form frequently obtained a numerator of 5^{11} .

Question 9

Part (a) was a standard question and proved straightforward for those candidates familiar with the idea of direct proportion, although a significant number did not account for the square or used inverse proportion. Many candidates presented their answers poorly and their work was ambiguous. Many candidates did not understand this topic. Part (b) was very poorly answered even by those who had answered part (a) successfully.

Question 10

Many candidates had an incorrect upper bound of 72 500. The idea of rounding to the nearest 500 proved challenging to many candidates. A reasonable number knew that they had to subtract a lower bound from an upper bound in order to obtain the maximum number of males, but fully correct solutions were rare.

Question 11

The majority of candidates knew to round the numbers to one significant figure and did so correctly. However, most were unable to use the order of operations correctly.

Question 12

Part (a) was answered quite well. Part (b) was more demanding but also answered reasonably well. The majority of errors involved the position of the decimal point. Only a few did not try to use the given calculation. However in part (c) there were more who attempted a long multiplication. A significant number tried to work out $142.5 + 3.75$ and most of these were processed correctly.

Question 13

There were many fully correct answers in part (a) but a significant proportion had no idea how to subtract the fractions. A common wrong method was to subtract the numerators and to also subtract the denominators. Part (b) was poorly attempted with the most successful method being to convert the fraction to 0.6 before dividing by 4. In part (c) many did not know $56^0 = 1$ but those who did, found this question straightforward. Many thought that $56^0 = 0$. Neither part of (d) was answered well. In part (i) many divided 27 by 3 and then by 3 again. Many candidates did not realise that part (ii) was linked to part (i).

Question 14

This question was well answered. The most common error was to divide the Year 10 pupils in the ratio 4 : 5. A few candidates worked out the number of boys in the assembly. Some careless arithmetic errors were made with $84 \div 4 = 22$ being common.

Question 15

Part (a)(i) was answered better than part (a)(ii). Part (b) was the most successfully answered.

Question 16

A large majority of candidates did well in part (a). Using the graph in part (b) was not well understood and this part was often not attempted. A significant number were able to draw the straight line in part (c)(i). Part (c)(ii) proved too difficult for most of the candidates and was often not attempted. Poor presentation and arithmetic made some answers ambiguous as it was not clear whether functions were being added or subtracted.

Question 17

This was a challenging question and marks were gained in various ways, most commonly by rationalising the denominator. The absence of brackets when substituting $2\sqrt{3}$ into the formula was a common error. Many substituted a value for π even though the answer was asked for in terms of π .