Examiners' Report
Principal Examiner Feedback

January 2019

Pearson Edexcel International GCSE
Mathematics A (4MA1) Paper 2H

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Students were, in general well prepared for this paper and often made a good attempt at all questions. Some missed the point with questions such as Q18 and rather than using upper and lower bounds, just used the given values.
In addition some students seem to ignore statements, such as 'Give reasons for each stage in your working' and give no reasons whatsoever.

On the whole, working was shown and enabled students to benefit from method marks, even when an arithmetic error had occurred. The minority of students still need to be reminded that they need to do this. Premature rounding caused students to lose accuracy marks in some questions, e.g. Q22

A minority of students seemed to be unfamiliar with the formulae that were on the examination paper and sometimes copied them incorrectly.

Question 1

This question was done well with many correct answers, often without showing any working.
A number did not know the conversion factor for m to km, multiplying by 10 or 1000, others multiplied by 200 rather than dividing. Very few who gained both method marks then went on to get the answer wrong.

Question 2

Many students got the right answer here gaining full marks for unsimplified answers such as
$7 + 4(n - 1)$. A number got the 3 and 4 the wrong way round giving $3n + 4$ as their answer, this gained no marks. Candidates who gave an answer of $4n + k$ where k could be any value including 0 (excluding 3), gained one mark as did those who expressed their answer in the form $n = 4n + 3$, although this was seen infrequently.

Question 3

There were some good algebraic responses to this question with the majority of candidates gaining at least 2 marks for 12 or 78. Many then arrived at the correct answer by trial and improvement. Common mistakes were to divide 90 by 3, failing to realise that the total number of counters went up, or to divide 78 by 3 rather than 2.

Question 4

This was generally done well with a number of students losing the final mark because they didn't label the sets *A* and *B*. A number forgot to write 8 and 10 in the universal set or thought that 1 and 3 had to be repeated in set *A* only. Occasionally there were 3 overlapping sets drawn and the maximum mark possible for this was 1 if 8 and 10 were shown in the universal set.

Question 5

A large number of candidates did not know how to start this question with many finding the area of the whole rectangle and dividing by 12 or making the assumption that the width was half or a third of the length.

Very few used an algebraic approach to the question most relying on visualising the number of small rectangles on the width and length, arriving at the correct values of 28 and 11. Of those who did find the width and length of the small rectangles many made no further progress.

Question 6a

For the first mark candidates only had to show one number written as prime factors, which could be at the end of factor trees or on 'ladder' diagrams, or 2 factors for each number or use of the table method. Most managed to do this for one mark, and a significant number achieved full marks.

Question 6b

A large number of candidates still do not know the difference between LCM and HCF often giving an answer of 1. A few multiplied the factors out and then started again with their own factor trees or just multiplied all the factors together. A common mistake was to leave the 3 off their final answer which gained 1 mark, so long as the other factors were all correct. Full marks could be obtained for the product of the factors or the value 646800.

Question 7a

The majority of students used the formula $P \times \left(1 + \frac{rate}{100}\right)$, often cubing it to get to the correct answer. Those that did it in three stages sometimes lost marks due to errors in their calculations. A few lost the final answer mark due to rounding errors and not displaying a more accurate answer before rounding to an answer outside of the range.

It was pleasing to see very few students attempting to use simple interest, which usually gained them one mark.

A common error was to use a multiplier of 1.23 rather than 1.023

Question 7b

The majority of students did not know how to tackle this question which involved two reverse percentages, one an increase and one a decrease.

The most common error was multiplying rather dividing as the first step. Multipliers of 1.08 and 0.85 were often seen and those who realised the correct multipliers were 0.92 and 1.15 multiplied rather than divided.

Some candidates did divide for the second stage of working but this gained no credit if the first stage used multiplication.

A few candidates found the difference between the percentages as 7%, then calculated 7% of the given value.

Question 8a

There were many completely correct responses, the most common incorrect response was to multiply 0.65 × 3.5 indicating lack of knowledge of the density formula.

Very few students showed a first step of $0.65 = \frac{0.35}{V}$ but went straight to a calculation. Those that did show this stage often went on to a correct answer although a few used $\frac{0.65}{3.5}$, gaining just the first mark.

Question 8b

Again as in question 1 the candidates showed a lack of knowledge on converting km to m, with conversion factors of 10, 100 and 10000 seen. Many realised they had to multiply 60 × 60 to convert hour to seconds but then multiplied the number of km instead of dividing. A few just divided by one 60.

Question 9

Many correct answers were seen here although a few gained no marks for this as they used trial and improvement methods rather than an algebraic approach.

The majority of students used the method of elimination of one variable to answer this question, with a few multiplying both equations by a constant to reach a common co-efficient for one variable.

The most common error was then to forget that $5y - -2y = 7y$ giving an answer of $3y$. They were however able to pick up the second method mark if they showed the correct substitution of their value into one of the equations.

Question 10

The majority of students gained at least two marks here for either realising the y intercept was 1 or the gradient 1.5 and substituting correctly into $y = mx + c$, many finding both m and c correctly for full marks.

Question 11

The students were more successful at comparing the median results rather than the interquartile (IQR) results, often showing a lack of understanding of IQR.

Most gained at least one mark for a comparison of either the median or IQR, although it should be recognised that just quoting figures is not a comparison.

Many did not understand how to put their comparisons in context thus losing the second mark, even if they gave a comparison of both medians and IQR as one of them had to be in context.

Question 12b

This was a standard indices question and answered well by most candidates. The most common error was to multiply 3 by 3 giving an answer of 9 rather than 27, the other mistake was to add the indices rather than to multiply.

Question 12c

The majority of candidates gave an answer of $2(e^2 - 9)$ failing to realise that $(e^2 - 9)$ would factorise as the difference of two squares, thus gaining the one mark.

A few candidates gave an answer of $(e - 3)(e + 3)$ which gained no marks as the loss of the factor of 2 indicated division by 2 rather than factorisation.

Question 12d

Most candidates recognised the need to square both sides and then multiply by $5r$, a number then went on to subtract r, thus gaining 3 marks. However very few recognised the need to remove r as a factor before dividing to arrive at the final answer.

Very few students wrote the answer without $r =$ and those that did usually had $r =$ seen in the working so did not lose the mark.

Question 13

Very few candidates used an algebraic approach to produce the equation $\frac{264 + 8x}{39 + x} = 7$

and if they did, many did not know how to continue to solve this equation.

Most candidates started correctly by multiplying number of mice by frequency but didn't show any intention to add thus gaining no credit. If they did show intention of adding, many did not know what to do with the 8x.
Many candidates attempted trial and improvement for this question often arriving at the correct answer.
There is a good number of students who do not understand the correct way to find the mean from a frequency table. They started off the process correctly multiplying each number of mice by its frequency and then finding the sum but then divided by 35 (the number of mice) rather than 39 + x

Question 14
A standard probability question which was generally well done.
In part a most candidates gained a mark for showing 0.65 on first branch, a number were then confused by a question which effectively was with replacement and wanted to use different probabilities on the second branch, a few candidates wrote the products here gaining no credit.
In part (b) a large number of candidates did not recognise that 3 branches needed to be added, often only considering one or two branches which gained 1 mark.

Question 15
Far too many candidates are still answering part (a) in part (b) and vice versa.

15(a)
Most candidates appeared to have knowledge of the trapezium formula and were able to apply it successful, although there were a number who neglected to put brackets round (2x − 3). If these were not recovered at a later stage in working no marks were awarded.
Many candidates instead of multiplying both sides by 2 multiplied the first bracket by a half even before expanding the brackets, making it more difficult and causing unnecessary errors.

15(b)
Some candidates had no idea how to solve a quadratic equation, although they did know how to use their calculator to so giving the correct answer on the answer line – this gained no marks.
It was rare to see factorisation but those who did were usually successful. Most used the quadratic formula successfully showing the correct substitution, although often with a sign error. There was a clear use of the calculator after this as this incorrect substitution was often recovered in the final answer,

Some students recognised the need to reject the negative answer and were awarded full marks. Some gave both solutions and lost one mark as the negative answer was impossible for the given measurements.

Question 16

Very few correct answers were seen here, the few candidates who did cube root 960/405 then did not realise they had to square the answer. A few got the correct factor but then divided when they should have multiplied.

Question 17a

Most students were able to correctly work out the value of f(5).

Question 17b

Most students attempting this question on functions were able to correctly tell us the value of x to be excluded from the domain of g, but it was less well done than part (a).

Question 17c

Many candidates were able to gain the first mark by successful substitution of −1.5 into g(x) but did not work this value out correctly, often due to the negatives, reaching −½ instead of ¼. Most successful responses evaluated g(x) clearly to start with before substituting into f(x), candidates who tried to do both at the same time were generally less successful.

Question 18

Very few candidates gained full marks here, often using 15 instead of 25. Most gained one mark for one correct bound and often two marks for two correct bounds.

A large proportion of candidates simply used the stated values in the calculation rather than using any rounding principles, thus scoring no marks

Question 19

Those that knew to work with areas of the bars were usually successful on this question. The ones that didn't, often just did one multiplication with an answer of 10 and nothing further.

Those who understood the concept of frequency density were able to answer this question efficiently, with almost all achieving a correct answer.

The common mistake was to find the number of people rather than the proportion, losing the final accuracy mark.

The unequal split in the 0-5 group caused problems as many did not read the scale correctly.

Question 20

There were many correct ways of tackling this question, although many candidates did not fully understand the concept of proof. There were a lot of blank pages.

A number of candidates made a successful start with an appropriate correct circle theorem gaining 2 marks, but got no further.

Of those who did provide a correct proof, many lost the final answer mark because they didn't give full reasons, the most common missing reason when appropriate was 'angles in a triangle add to 180'

Question 21

Many candidates successfully identified the gradient of *L*, however the gradient of *M* was often given as the reciprocal but not negative. For those who did correctly find the gradient of *M* the next algebraic step caused difficulties for many.

Some tried to substitute into $y = mx + c$ but mostly struggled with the gradient being a fraction.

Question 22

It was pleasing to see a number of candidates achieving the correct answer, although a number lost the final two marks by not multiplying 36.86 by two or lost the final answer mark because of loss of accuracy through premature rounding when finding the half angle.

A significant number successfully wrote the correct formula for area of base of cone and total surface area of cone, of those who didn't they seemed to have forgetten the formulae were given at the front of the paper. They then gained one mark by writing the correct ration of 3 : 8 below.

Those candidates who realised $\pi r^2 = 3$ and $\pi rl = 5$ generally faired better than those who retained the full formula throughout.

A few candidates got the ratio the wrong way round.

Question 23

Some students had no idea of direction and use the correct values in the vectors but no idea which were negative or positive. Finding *AB* and *BA* was often done correctly, but those that found *BA* mostly failed to gain any further marks due to working out *DC* incorrectly.

Many students arrived at the correct vector for *BC* but did not know how to find the magnitude, of those whose who did, a few did not understand that they had to leave their answer as a surd and gave their answer as a decimal.

Summary

Based on their performance on this paper, students should:

- Be able to recall metric conversions, e.g. 1 km = 1000 m and be able to use various formulae, e.g. formulae linked to cones and spheres.

- Take note of when a question involves using upper and lower bounds and know which to use to get the required solution.

- Read questions carefully and check that they have answered what was asked

- Show careful working and avoid premature rounding.

- Take note of when a question involves using upper and lower bounds and know which to use to get the required solution.

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