Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

November 2023

Pearson Edexcel GCSE (9 – 1)
In Mathematics (1MA1)
Higher (Calculator) Paper 2H

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GCSE (9–1) Mathematics 1MA1
Principal Examiner Feedback – Higher Paper 2

Introduction

As is often the case in a November series there was a small cohort of students on this higher paper, and they typically struggled to access many of the harder questions. Most candidates had a reasonable amount of success in the first half of the paper, and many familiar styles of questions helped throughout. The performance of many students suggests that, unlike in summer, most candidates were aiming for the lower grades.

As was evident in summer, there was little or no evidence of students being under equipped, and use of calculators was good throughout.

Students are clearly making an effort to show their working all through the paper, and this allowed them to maximise the marks gained.

REPORT ON INDIVIDUAL QUESTIONS

Question 1

A very familiar 3-part algebra question to start the paper, was accessed by all, and with significant success. Part (a) was an expand and simplify, with almost all gaining at least one of the two marks on offer, normally for a correct expansion of one of the brackets and with a large number gaining both for the simplification. In part (b) students were required to factorise an expression. Again, many gained at least one mark for a partial factorisation, but it was more common to award both marks. The third part of the question was a relatively simple rearrangement which was answered well. The first mark was awarded for a correct first step of rearrangement, normally seen in the form of subtracting 11 from both sides. A significant number gained both marks. It is worth noting that a small proportion, lost the second mark as they failed to give their answer in the form "$g =$".

Question 2

This question required students to calculate a percentage profit. All students were able to make an attempt with almost all gaining some credit. The first mark was for finding the amount spent and earned, and then the second was for calculating the profit. Unfortunately, many students then did not know how to progress further. Many chose to divide the profit by the amount earned rather than the amount spent, and as such gained no further credit.

Question 3

A familiar compound interest question, and it was really pleasing to see so many students gaining both marks. Compared to the similar question in summer, it was notable that there were far fewer students working with simple interest. Those who did use simple interest were able to gain some credit for adding the percentage on. The mark scheme was generous as it allowed students who did not use correct money notation to gain full marks. This will not always be the case so students should ensure that when a question is dealing with money, the expectation is to give answers correct to two decimal places.

Question 4

This question was a straightforward solving of an equation with the unknown on both sides. A good proportion of students gained marks. Many were able to gain at least one for carrying out one of the two processes correctly, normally dealing with the constant term. The fact that the variable was a negative, caused many students problems, with a significant number trying to subtract x rather than adding it. This is an area that students would benefit from extra practice.

Question 5

This ratio problem proved a real challenge to many. A good number of students were able to gain the first mark for realising that they had to work from part to whole and either found the original total or the values for Chris and Errol at the start. For many that was as far as they were able to get as they didn't then work correctly with the new ratio and the total amount. Those that did, typically gained at least 3 marks for getting both values for Errol. Unfortunately, quite a few students lost the final mark because rather than subtracting these two values, they subtracted the value for Chris from the value for Errol.

Question 6

Very few students were able to access this question. Despite it being only grade 5 this is a topic area students seem to really struggle with. There was credit given for a suitable diagram, but very few were able to provide one, showing very limited understanding of bearings in general. In most cases, they drew the two points the wrong way round, or were unable to correctly mark on the reverse bearing.

Question 7

Most were able to gain some credit on this volume and flow problem. This was either for correctly working out the volume of the cylinder, or for correctly using the rate of flow. Unfortunately, very few were able to put all the steps together. Many didn't work with the conversion at all which could have been used with either the rate of flow or the volume, and this meant in most cases the maximum they could score was 2 marks out of the 4.

Question 8

It was surprising to see how few students were able to gain marks on this question with it being such a familiar question on this specification. It is clear that many students need a greater understanding of rounding, and truncation, and the limits of accuracy.

Question 9

This now familiar topic was answered, overall, very well. A majority were able to gain at least one mark for a correct expansion of a pair of brackets. Many were then able to continue and gain all the marks. Some however, when expanding the final bracket, failed to gain enough terms, and the method mark requires a complete method to find all terms, so those who only had 5 or 7 lost this mark.

Question 10

The probability tree question is a familiar one and most were able to gain at least one mark in part (a) for at least two correct probabilities, with many completing the tree correctly. In part (b) however there was less success. A number gained a single mark for one correct product. The issue it seems was that many didn't really understand the meaning of 'at least' and worked out the probability of only passing one test. This resulted in many gaining no further credit as their method was incomplete.

Question 11

This question required students to match graphs to their type of proportionality. It seems that a good number are not familiar with reciprocal graphs, or the graph of $\sqrt{x}$, and as such were able to gain 1 mark at most.

Question 12

This problem was unfamiliar to most and there was very little success. A small number were able to find one or both midpoints of the given coordinates, but for almost all, that was all they could do. There was little evidence of students knowing to use Pythagoras to find the distance between two points, and so it was rare to see the award of more than a single mark.

Question 13

This is a very familiar style of question, but the decimal in question proved a challenge. The big point of note from candidates is to use the correct notation for recurring decimals. This could be in the form of repeating all the recurring digits at least twice or the correct dots above the recurring digits. Those who failed to use such notation scored at most 2 marks. Many when writing the decimal out often lost the '2' as a recurring digit and used repeating 3 and 7. In this case they often scored zero.

Question 14

This question required students to work with two difference types of ratios, either individually or by combining the two ratios. Many students were able to gain some marks on this which was really encouraging to see. Two marks were gained often for setting up a correct relationship and substituting to find one of the constants. Candidates then failed in most cases to gain any more marks. The next mark was for either combining the two equations, or for correctly substituting into the equation linking x and w. Unfortunately, the majority attempted the first method, and did so incorrectly, and so gained no further credit. Those who took the simpler path and substituted first, normally had more success.

Question 15

This question, whilst relatively standard, especially parts (a) and (b), was answered very poorly by the majority of candidates. The first two parts required students to fill in a frequency table from a histogram, and then to complete the graph. Part (c) asked for an estimate of the median. In fact, students were more likely to score a mark in part (c), normally for finding at least 2 areas, but it was very rare to see any further correct working.

Question 16

This problem required students to use the Sine rule followed by the area of a triangle using $\frac{1}{2}ab\sin C$. In comparison to many other questions at similarly high grade, this was attempted by many, and there was some good evidence of success. Those who recognised the Sine rule normally went on to score the first 2 marks for using it correctly, which was really encouraging. However, many then either didn't use the correct formula, or used it incorrectly when finding the area of the triangle. Often 64 was used as the angle or candidates worked with 90 degrees rather than recognising the alternate angle. It seems that many didn't use the available formula sheet, and this is something that can be prepared for in Summer when the formula sheet will be available again.

Question 17

Another familiar style question, but performance suggests it is not one that many students had spent much time preparing for. Part (a) saw some awarded 1 mark, but very few were able to gain 2 marks as they didn't complete their explanation, normally missing out a statement about a change of signs. The rearrangement in part (b) only carried one mark, but again it seems many have little experience of this when factorisation is required, and poor incorrect algebra was commonplace. Part (c) only required substitution and evaluation, and it was not surprising to see that more students were able to gain marks in this part compared to the others. Many scoring 1, 2 or 3 marks. Those who gained 2 normally carried out extra iterations and therefore should be encouraged to read the question carefully to ensure they complete the correct number.

Question 18

The level of vector algebra was low and in was common to see blank responses for this question, with a majority having no idea how to start the proof. We did see a small number of candidates gaining some marks, normally one or two, typically for a correct expression for $\overrightarrow{EH}$ or $\overrightarrow{BC}$, but very few were able to complete the proof.

Question 19

This was one of the better answered questions at this level, with a good number able to gain 2 marks in part (a). This was normally done by two steps of substitution, rather than forming the composite function. However, some that attempted the two steps of substitution, completed the first step correctly, but then instead of substituting their found value into g(x), they re-substituted −3, and unfortunately gained no credit.
In part (b) it was pleasing to see so many understand the concept of an inverse function, and many were able to rearrange to find this.

Question 20

This hard algebra question required students to deal with 3 different aspects. There was division by a fraction, factorisation of a harder quadratic, and then the addition of fractions with different denominators. A reasonable number of students were able to gain one or two marks, normally for the first two steps. However, many struggled with the factorising, and

often lost a factor of 2. This appears to come from their method for solving quadratics, they can divide through by a common factor, and they attempted to do the same here. Those who made a mistake in the factorisation step, then were not able to gain further credit as any fractions they had, would not be correct.

Question 21

This question proved too hard for most candidates, which is to be expected for a question at this level. The conditional aspect of the probabilities was normally missed, and very few were able to gain the first mark for finding the number of gold medals. Failure to gain this first mark meant no marks were awarded at all.
A small number were awarded 1 mark for a correct expression for the number of golds. Those who went one step further and formed the correct equation typically completed the problem and gained all 4 marks,

Summary

Based on the performance on this paper, students should:

- Remember correct money notation when working with problems involving currency.
- Practise further with solving equations that involve negative coefficients.
- Spend more time working with bearings and be encouraged to form diagrams to support.
- Ensure they read questions carefully so, like in the iteration questions, they complete the question as it is asked.
- Ensure they are familiar with the formula sheet as it will be available in Summer.

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