Examiners' Report
Principal Examiner Feedback

Summer 2025

Pearson Edexcel International GCSE
In Mathematics A Modular (4WM2H) Paper 01
Unit 2H Higher Tier

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Summer 2025
Publications Code 4WM2H_01_2506_ER
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PE report on 4WM 2H Summer 2025

Overall, most students were successfully able to access the majority of questions, which was encouraging. It was also gratifying to see students attempting questions on topics that had frequently been left unattempted in previous series of the linear course, such as vectors and quadratic inverse functions.

In general, students presented their working clearly. However, they should ensure they complete each question thoroughly by re-reading the requirements after finishing their solution. For example, in question 7, a significant number of students divided £240 into the ratio 3:4:5 but did not proceed further, earning only 1 mark out of 4. Others completed the question for 3 marks but did not simplify their ratios, understanding the importance of expressing ratios in their simplest integer form.

It was evident that many students had memorised specific formulae to solve certain types of questions, such as percentage change, compound interest, completing the square when the coefficient of x^2 greater than 1, direct or inverse proportion, and the nth term of an arithmetic series. While many students applied these formulae successfully, a notable proportion either failed to recall or correctly apply the formula or struggled to interpret their answers within the context of the question. For example, in question 3, an answer of -30% needed to be interpreted as 30% percentage loss. An interesting approach to calculating the total surface area of a prism in question 2 involved using the net of the solid. This method entailed determining the perimeter of the trapezium, multiplying that by 9, and then adding the areas of the two trapezium faces. While this technique proved effective for some students, others lost all marks due to errors in their working.

Question 1

A significant proportion of students achieved full marks by correctly placing 4, 6, and 9 on the appropriate cards. Most other students scored 2 marks, typically for correctly placing 4 and incorrectly placing 6 on another card, earning the second mark for the correct mode. These students appeared unsure about how to handle the information regarding the median. Some students had the correct numbers but placed them on the wrong cards, which was awarded 2 marks. A small number of students seemed unsure about how to approach the question but managed to earn 1 mark by correctly interpreting the range and placing a 4 on the first card.

Question 2

Most students performed well on this question, either achieving full marks or losing only one mark due to an error in identifying the correct area. Common mistakes involved calculating the area of the trapezium, with many students treating the shape as a compound figure—either as a rectangle (8×3) combined with a triangle (4×3)—or as a large 12×3 rectangle. Additionally, some students incorrectly calculated the top face area as 8×8 instead of 8×9.

When a face was omitted, it was usually the top or the base. Many students who scored 2 marks could have potentially earned 3 marks by aligning the number of area calculations with the number of faces of the shape. A significant number of students found the question challenging, receiving zero marks, often because they could not correctly determine the area of two different faces or for calculating the volume of the prism.

Question 3
This question was well attempted by higher-level students, with a large proportion achieving full marks. Many students used the formula (initial – final) / final × 100 and obtained an answer of -30. Since the question concerned percentage loss, those with -30 needed to interpret it as a 30% loss to earn full marks. Many students did this correctly, but some did not, resulting in the loss of the final accuracy mark. A small minority calculated the percentage decrease by dividing the decrease by the final value instead of the initial, but they were still able to earn 1 mark if they did this.

Question 4
This question was well done with the majority of students gaining marks for constructing a perpendicular bisector, however, a surprising number of students (approximately 20%) did not know what to do, or did not understand the question, scoring 0 marks. It was common for students to earn one mark by drawing a single pair of intersecting arcs, with the perpendicular bisector represented as a 'half line' on only one side of the line.

Question 5a
This question was generally well-answered, with most students achieving full marks. However, there was a notable polarisation in responses, with some students scoring full marks and others scoring zero. The most frequent incorrect answer involved the term-to-term rule instead of the position-to-term rule, with '$n+4$' being a common error. Many used the formula and gave an answer of $11 + (n - 1)4$.

Question 5b
It was unexpected that nearly half of the responses were incorrect. Students either did not identify a prime number or presented a prime number that was not part of the sequence. The most frequently correct answer was 19, with some students writing this in the working space while noting that it was the third term, which was acceptable. Some students calculated multiple values from the *n*th term formula, with some results being prime and others not. This was regarded as 'choice' unless students clearly indicated which specific answer they were selecting. Many students misunderstood the distinction between the term and the term number. As a result, some lost marks because they wrote only the term number without including the actual term.

Question 6a and 6b
It was encouraging to observe this question being answered so effectively, with a significant majority of students achieving full marks. A range of approaches were employed (all those given in the mark scheme), with the use of a scale factor being the most common. For part (b), the mark scheme permitted a correct method based on either the student's scale factor or the answer from part (a). Some students mistakenly provided the answer for part (a) in part (b) and vice versa, which was awarded 2 method marks.

Question 7
Overall, students typically earned at least one mark on this question, often by knowing how to find one share or by correctly identifying the initial amounts Pau, Sam, or Tia had. While some students became a bit confused about how the amounts changed, most managed to secure at least 3 marks. Those students who did not achieve the final accuracy mark was usually due to providing an incorrect amount (gaining 2 marks) or, more commonly, not simplifying the ratio properly—such as giving ratios as 4: 3.5: 4.5 or 80:70:90 for 3 marks.

Question 8
A range of marks was awarded for this question, with most students achieving full marks. However, a notable proportion received zero marks, either because they did not know how to approach the problem or because they started again using an incorrect method. A common mistake was to attempt to form an equation for the mean using the frequency values. Some students initially used the correct method of employing midpoints to find the products near the table but then abandoned this approach in favour of the incorrect method mentioned earlier, resulting in a score of zero. Other students used one or more of the product values, or their $5x$ product, to continue their calculations, retaining their earlier method marks even if their subsequent processing was incorrect. A significant number of students scored the two available marks but did not divide by $(x + 11)$ to form an equation, so no additional marks could be awarded. Students who were unsure how to deal with the algebra in the question still managed to earn 2 marks by correctly adding together four products.

Question 9
Most students responded well to this compound interest question, demonstrating an understanding of how to use the multiplier raised to the power of 3 to arrive at the correct solution and achieve full marks. Some students applied the formula $(1 + 7/100)^3 \times 4000$. Those who did not receive full marks typically earned 1 mark for correctly calculating the initial increase by 7%, or for one of the many special cases given in the mark scheme.

Question 10
A very well-answered question, with most students achieving full marks. Their correct solutions stemmed from accurate working. Some students lost marks mainly due to simple arithmetic errors in aligning either the x-term or the y-term; however, it was encouraging to see clear working, and such students often secured the two method marks available. Some students successfully used a substitution method, which involved precise rearrangement and algebraic manipulation; however, those who relied on this approach tended to be less successful in earning full marks. There were also instances where students presented correct answers without showing their working; these responses scored no marks, as working was necessary to credit the accuracy mark - A fully correct answer was dependent on the first method mark.

Question 11a
A significant number of students achieved at least 1 mark on this question. They demonstrated understanding of how to manipulate equations to isolate the t terms. However, handling the inequality proved challenging for those who chose to subtract $2t$ from both sides. This approach often resulted in dividing by a negative number, and many students failed to reverse the inequality sign accordingly. These students were awarded 1 mark.

Question 11b
Although most students performed well on this question, marks were lost primarily due to using the incorrect inequality ($<$ or $\leq$ instead of $>$ or $\geq$) for the first two B1 marks, or failing to determine the correct equation and/or inequality for the diagonal line, with $y < x + 9$ often seen. Students who described the unshaded region correctly were awarded 2 marks. Some students correctly wrote the equations of the three lines, but this only earned them one mark because their equations do not describe the shaded region. Approximately one-quarter of students did not earn any marks on this question.

Question 12a
This question was generally well answered with the vast majority of students writing the number correctly as a decimal.

Question 12b
This question necessitated a solid understanding of the rules governing indices and the structure of standard form. Surprisingly, a significant number of students scored zero marks because they were unaware that dividing powers of 10 involves subtracting their exponents. Additionally, the numbers involved were very large, making it impossible to simply input them directly into a calculator. Those who lost one mark generally either failed to write their answer

in standard form—leaving it as 0.5×10^6—or incorrectly expressed it in standard form as 5×10^7 instead of the correct 5×10^5.

Question 13

ai) Many students recognised that angle *EAB* is equal to angle *ADB*, but a comparable number did not make this connection. A common mistake was to assume that *BD* and *EAF* were parallel, which resulted in the conclusion that *EAB* equals *ABD*, both measuring 42 degrees (alternate angles). Part (ii) was dependent on part (i) and required the use of specific terminology - "Alternate Segment (theorem)," or a description incorporating these words. Correct spelling was not mandatory, provided the meaning was clear.

b) Several correct methods were observed in determining angle *CDB*, ultimately resulting in the correct answer of 22°. Where 22° was not explicitly provided as the answer for *CDB*, students were awarded a method mark if their working showed that either *ACD* = 42°, *BAC* = 22°, or *CBD* = 60°, clearly seen in the diagram or in their working. A common mistake observed was assuming that angle *EAB* was equal to angle *FAD.*

Question 14

It was encouraging to see students performing well on this cumulative frequency question. The majority earned marks for constructing the table in part (a) and went on to secure one or two marks for plotting and drawing their cumulative frequency graphs in part (b). Some students misplotted one point or did not use midpoints correctly. At this stage, no marks are awarded for a histogram unless it is accompanied by a cumulative frequency graph.

For part (c), answers within the specified range would earn 1 mark, even if a histogram or no graph was provided. Otherwise, follow-through for a cumulative graph or an incorrect ascending graph could be awarded for the median based on their graph.

In part (d), answers of 5, 6, or 7 for those people who took more than 45 minutes secured two marks. For any other answer, follow-through was available for an ascending graph for both the method mark and the accuracy mark.

Question 15

Most students found this question challenging, with over half scoring 0 marks. They appeared unsure how to handle the absence of a specific quantity to increase by 12% and then decrease by 15%. Many mistakenly assumed that the overall change would be a 3% decrease. Those who succeeded often used multipliers to approach the problem. Another effective strategy was to introduce an arbitrary quantity, increase it by 12%, then decrease the result by 15%, and calculate the overall effect.

Question 16
Most students achieved full marks on this question. However, a notable number struggled with calculating the quartiles. Some used $n/4$ (rounded) to determine the position of the lower quartile, which resulted in the correct answer for that part. Conversely, they used $3/4\,n$ for the upper quartile, which led to an incorrect result and thus an incorrect overall answer. As a result, responses to this question were split sharply between full marks and zero marks.

Question 17a
Overall, students found this question challenging, with fewer than half achieving full marks. Although credit was awarded for partially simplifying the indices, a significantly larger number of students received zero marks.

Question 17b
Most students received 1 mark out of 2 for this question, mistaking it for a question about standard form. Some were able to combine the exponents of 10, while others managed to prime factorise 10^{290}. Many students struggled with the full prime factorisation of the number. Some students combined the values and presented their answer in standard form, which, if correct, earned 1 mark. However, these students appeared to either ignore or be unable to prime factorise properly. Other students knew they needed to prime factorise but made errors in their working. A much larger proportion of students scored zero marks than those who achieved full marks.

Question 18
This standard proportionality question was handled very well overall, with the majority of students achieving full marks. The average score was above 2. Many secured 2 marks by showing that $k = 800$, but then went on to express y in terms of W or simply not give any expression at all. However, some students missed out on marks by using incorrect relationships, such as $W = ky^2$ or $W = 1/y$. A formula-based approach was common among many students, which occasionally resulted in them applying the wrong relationship.

Question 19
It is encouraging to observe that students are improving in solving this type of question, with many achieving full marks for making t the subject of the formula. Students who did not attain full marks generally understood that they first needed to multiply and expand the denominator, and most executed this step correctly. Some students encountered errors when rearranging the formula

to isolate t^2; although, those who succeeded in this step often did not proceed further, as they overlooked the need to factorise. A considerable number of students did not answer the question correctly and lost the accuracy mark because they failed to include "t =" after square-rooting their expression for t^2. Mistakes in algebraic manipulation were common and often limited students' success on this question. In particular, many students miscopied their own work from one step to the next, leading to an incorrect answer.

Question 20
Students found this proof question challenging, with over half failing to earn any marks. A notable number achieved full marks, most defining their even numbers as $2n$, $2n+2$, $2n+4$ oe. Some students used the alternative approach of defining terms as n, $n+2$, $n+4$, and those employing this method generally scored 2 marks, as they did not explain the final step of the proof: "as it is true for all consecutive odd and even numbers, then it is true for all even numbers," oe. Errors in expansion and manipulation prevented some students from attaining higher scores.

Question 21a
This question was aimed at higher-grade students, and it was understandably challenging for many. The most common mistake was interpreting $gg(x)=6$ as $gg(6)$, which earned no marks. Nevertheless, it was encouraging to see some students earning a mark by correctly interpreting and representing $gg(x)$ algebraically. Among those who scored 1 mark, few progressed further correctly, often making errors when simplifying the numerator and/or denominator. There were also some exemplary responses that achieved full marks, even though some students chose not to attempt this question.

Question 21b
This discriminating question at the top end question proved to be challenging for most students, and the distribution of marks aligned with expectations. It was encouraging to see a considerable number of students achieving full marks, with due consideration of the domain specified in the question. Many students who did not obtain full marks were still able to earn partial credit. A notable portion of students used a formula for completing the square; while most applied it successfully, some struggled with recalling or accurately using the formula. Additionally, a significant number of students chose not to attempt the question at all. Among those who used the quadratic formula, a common mistake was incorrectly substituting 'c' as $(7 + y)$ instead of $-(7 + y)$.

Question 22
This high-graded question was well attempted. It was encouraging to see that most students recognised the need to differentiate and set the resulting expression equal to zero to find the critical values. In some cases, explicitly

stating that the expression should be equated to zero was not always made, but it could be inferred through methods such as factorisation, completing the square, or applying the quadratic formula. Most students applied these techniques successfully. Among those who gained marks, the most common score was 3 out of 4 for identifying the critical values. For a ‘positive gradient,’ the quadratic would be represented as an inequality, and many students attempted to solve this inequality. Some did so incorrectly, or their answers were presented as a combined inequality rather than separate inequalities for the discontinuous solution. Additionally, some students rejected the negative critical value.

Question 23

Most students attempted this ‘show that’ question and managed to earn at least 1 mark by providing a correct algebraic expression for the volume of the cuboid. However, fewer students successfully derived an expression for the surface area, often omitting one of the faces. To achieve full marks, students needed to simplify their expressions accurately, many lost marks due to algebraic simplification errors despite arriving at the given answer. Overall, this was a challenging question for a significant number of students, with some unable to score any marks.

Question 24

It was encouraging to observe that the majority of students were able to access marks for this question. Many effectively applied the formula for the sum of an arithmetic series and the *n*th term formula. However, since the *n*th term formula was not included on the formula sheet, a common mistake was students either recalling it incorrectly or mistakenly believing they needed to use the formula for the sum of the first 21 terms. Those who successfully set up the two equations generally managed to find the values of ‘*a*’ and ‘*d*’ and used these to calculate the 5th term. Again, marks were lost for errors in algebraic manipulation. Overall, about one-third of students achieved full marks, which is very pleasing.

Question 25

Most students scored at least 1 mark for this question by finding the scale factor or volume factor; however, many were uncertain about how to proceed afterward. Those who continued and applied the expression for subtraction generally achieved full marks—a significant proportion of students. A variety of approaches were observed, and while the mark scheme is not exhaustive, it covered the vast majority of methods used. Although students could directly calculate the volume of A, most chose to first determine the volume of B and then used that result to find the volume of A.

Question 26

Students who were familiar with working with vectors generally scored 1 mark in part (a). Although some students made a sign error for the **c** component, resulting in the incorrect expression $-3\boldsymbol{a} + 9\boldsymbol{c}$ instead of $-3\boldsymbol{a} + 3\boldsymbol{c}$, follow-through marks were available in part (b) for those who made this mistake. Approximately half of the students scored 1 mark in part (a) who then proceeded to part (b).

Most of these students earned 1 mark for correctly introducing a parameter. Many students were able to score some part marks despite algebraic errors; which inhibited them from making further progress. A small proportion of students achieved full marks.

Part (b) proved to be very challenging for many students, and a significant number did not attempt the question at all.

Question 27a
Most students attempted this question, and as anticipated, their success varied. Many provided correct answers, but the most frequent mistake involved altering the wrong coordinate or applying the opposite change to the x-coordinate.

Question 27b
Most students either left this question blank or received no marks. However, a significant number achieved full marks, while only a small fraction earned a single mark for a partial transformation.

Based on their performance on this paper, students should

- Study and practice the rules of indices to improve understanding and application.
- Address common errors in algebraic manipulation through additional practice.
- Practice questions with inequalities, particularly in understanding that dividing both sides of an inequality by a negative number reverses the inequality sign. Additionally, it is important to consider when to combine solutions of quadratic inequalities into a single solution set and when it is appropriate to keep solutions separate.
- Cover the topic of vectors thoroughly.
- Emphasise the importance of showing all steps in “show that” questions.
- Annotate diagrams wherever possible to aid in calculations and understanding.

GunnyP 25/06/25

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