Examiners' Report
Principal Examiner Feedback

Summer 2025

Pearson Edexcel International GCSE
In Mathematics A Modular (4WM1F) Paper 01
Unit 1F Foundation Tier

Edexcel and BTEC Qualifications

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Summer 2025
Publications Code 4WM1F_01_2506_ER

International GCSE Mathematics
4WM 1F June 2025
Principal Examiner's Report

Candidates who were well prepared for this paper were generally able to make a good attempt at all questions. It was encouraging to see many candidates clearly showing their working. However, some topics, such as applying everyday mathematics and calculating percentages, proved challenging for certain candidates.
In most cases, working was shown and was easy to follow. There were, however, instances where candidates had not read the question carefully. For example, in Question 15, some misinterpreted the requirements and gave final answers that were not expressed as probabilities.
A notable area of weakness was problem-solving in geometry. More broadly, questions assessing mathematical reasoning and multi-step problem-solving were not handled well, with this being particularly evident in Questions 7, 18, 21, 22, 24, and 28.

Comments on individual questions

Question 1

Parts (a) and (b) were answered well answered by most candidates

However, both parts of (c) were not answered as successfully as expected. A noticeable number of candidates appeared to misinterpret the instructions. The question specifically required the use of all four numbered discs to form, respectively, the smallest possible four-digit number and the largest four-digit even number. Despite this, many responses included only a single digit, suggesting that some candidates focused solely on identifying the smallest or largest individual number rather than constructing a full four-digit number using all available digits.

This highlights the importance of reading and interpreting the question carefully. Candidates are encouraged to take a moment to ensure they fully understand what is being asked before beginning their response.

Question 2

In part (i), the majority of candidates correctly selected the appropriate word to describe the outcome of randomly selecting a blue button. In part (ii), however, many candidates incorrectly chose "likely" instead of the more accurate term "evens," which better reflects the probability of the outcome. In part (iii), most candidates again selected an appropriate word to describe the outcome of randomly selecting a pink button, showing a generally sound understanding of basic probability language.

Question 3

Success varied across this question, which assessed a broad range of topics from the specification. In part (a), many candidates answered well, giving the correct response of 42°. Part (b) was less well answered, though it was encouraging that almost all candidates attempted this multiple-choice style question.

Part (c) was attempted by almost all candidates, with misspellings of "octagon" accepted. Despite this, only around two-thirds of candidates gave the correct answer.

Parts (d) and (e) were generally answered successfully, though results were somewhat polarised, with candidates typically scoring either full marks or none. Performance depended on their breadth of understanding of unit conversions, with part (d) proving the more successful than part (e).

Question 4

Responses to this question varied widely, ranging from all parts correct to all parts incorrect. However, the majority of candidates gained at least some marks in parts (a) and (c) for correctly giving and plotting coordinates. In part (b), many candidates correctly calculated the midpoint, demonstrating sound understanding of the method required. Where marks were lost, this was most often due to interchanging the x and y coordinates.

Question 5

All parts of this question, which assessed basic understanding of decimals, fractions, percentages, and the conversions between them, were successfully answered by the vast majority of candidates. In part (a), the most common error—though made by only a small number—was giving 0.6 as 6% instead of 60%.

Part (c) proved to be the least successful. Marks were often lost due to miscounting the number of squares in the diagram or giving the fraction for the unshaded portion instead of the shaded. In some cases, candidates arrived at the correct fraction but forgot to simplify it, resulting in the loss of a mark.

Question 6

Part (a) was well answered where the majority of the candidates gave an answer of 6. The most common incorrect answer given was 20.

Part (b) was well answered where the majority of the candidates gave an answer of 48. The most common incorrect answer given was 12.

Question 7

This question provided good differentiation. Most candidates were able to gain the first mark by correctly finding either the discount on one calculator, the reduced price of one calculator, or the cost of two calculators. Many of those who scored only one mark did not apply any discount, instead subtracting £50 from the cost of two calculators, which led to the incorrect answer of £3.60; no further credit could be awarded in such cases.

A common error involved finding the total discount of £13.40 and subtracting this from £50, giving £36.60. This was marked as a special case: as the candidate had considered the discount and the change due, it was awarded 2 marks. Candidates who successfully calculated the cost of two discounted calculators (£40.20) typically went on to achieve full marks.

For multi-stage questions of this kind, candidates are advised to set out their calculations clearly on separate lines, rather than as a continuous string of working, to reduce errors and improve clarity.

Question 8

A large proportion of candidates gained full marks for drawing the graph of $y = 2x - 1$, having first correctly completed the table of values in part (a). A few lost one mark for failing to join the points. The most common error in part (a) was for the y values for $x = -2$ and $x = -1$ to be calculated incorrectly. This often resulted in a line that was not fully correct but if at least 5 points from their table were accurately plotted candidates could gain one mark. Candidates should be encouraged to check for consistency by noting whether any plotted point lies out of line with the rest. If so, they should return to part (a) to re-check their calculations.

Question 9

(a) Many candidates seemed unaware of the properties of a kite. A common incorrect assumption was that angle *ADC* was 90°. Some candidates unnecessarily split the kite into two isosceles triangles, over complicating the route to the answer and often making a numerical mistake along the way. Others assumed incorrectly that angle *BCD* was the same as angle *DAB*. There were also several illogical guesses at the size of the angle seen too.

If the method for finding the fourth angle in this type of quadrilateral was unknown, then no marks could be awarded. The marks awarded in both parts (a) and (b) were polarised. Either scoring zero or two marks, and rarely being awarded one.

(b) This part scored marginally better than part (a). A common mistake was for candidates to assume the total of the interior angles for the isosceles triangle was 360°, not 180°. Many candidates started correctly by subtracting 118° from 180°, but then neglected to share the result between the two remaining equal angles. Others seemed to know that an isosceles triangle has two equal angles, but incorrectly assumed that 118° was the repeated angle. This resulted in the common incorrect answer of 124°. As in part (a), several candidates offered illogical guesses at the size of the angle.

Question 10

(a) Many candidates wrote the correct answer of 68%. There were many who forgot to multiply by 100, leaving their answer as 0.68. A common incorrect answer was 4.25, given when candidates incorrectly found 25% of 17.

(b) Ordering 5 fractions produced many correct responses; where working was shown this was usually the conversion of the 4 given fractions into decimals, with the rare occurrence of attempts to convert to fractions with a common denominator.

In part (c), most students were able to put brackets in the correct place. Several responses were left blank. A common incorrect answer was to wrap $\frac{3}{8} \div \frac{1}{2}$ in brackets.

Question 11

Listing possible combinations was a very accessible question, with around 80% of students gaining both the marks. A mark was sometimes lost for including repeated or incorrect combinations alongside at least 4 correct ones.

Question 12

This question was generally well answered, with most candidates achieving the full 2 marks. For those who did not, the outcome often depended on whether any working was shown. An incorrect final answer with no method received 0 marks. However, where candidates recorded some steps, M1 could still be awarded if at least one of the values from the mark scheme appeared in their working.

Question 13

Many candidates were able to convert the fractions to a suitable common denominator, although some simply added the numerators and denominators, indicating they had not recalled the correct method.

A number of candidates converted the fractions to decimals before adding them, which did not gain any marks. Some candidates were unsure how to layout their working, and gave an incoherent list of sums which were relevant to the original fractions but the results were not put back into fraction form and they came to no other conclusion so no marks could be awarded.

Question 14

(a) Many candidates gave the correct answer of 17. A common mistake made by candidates was to list 9 and 8, neglecting to add these subtotals together.

(b) The majority of candidates were awarded at least 1 mark on this item. Those that scored just 1 mark often gave an incorrect answer of $\frac{6}{23}$. Candidates scoring zero marks often gave 6 as their answer, rather than writing their answer as a probability.

Question 15

(a) This was a very accessible question, with the majority of candidates scoring 2 marks.

(b) Parts (i) and (ii) were often either both answered correctly or both answered incorrectly. Candidates who scored zero on both parts frequently failed to express their answers as probabilities. Part (i) was answered slightly more successfully than part (ii), with errors in the latter often arising from miscounting the number of 5s or 7s in the table.

Question 16

(a) Less than half of the students could correctly take out a single common factor, many candidates seemed not to understand what was required. The most common incorrect answer was 21*eg* from attempting to add the terms together. Factorising a simple expression with a common factor of 3 was successfully achieved by only 40% of candidates.

(b) This part of the question proved challenging for many candidates. The responses suggest that some candidates at this level would benefit from further development of their algebraic skills.

Many candidates could not multiply $x(x+5)$ as they tended to write down $2x$ or 5. Many candidates appeared to attempt an expansion of the product of two brackets method, or attempt to collect like terms within the brackets before expanding.

Candidates who understood the technique needed usually gained at least one mark for finding the correct expansion of one bracket. For these candidates, errors in collecting like terms with the correct sign were the main source of errors.

Question 17

This question was answered well by the majority of candidates, with most securing both marks. Those who scored only one mark often converted the 8 hours into minutes unnecessarily, resulting in an equivalent answer but in the wrong unit of speed. Those who scored zero marks often applied the formula incorrectly, multiplying the distance by time to give an answer of 44 480.

Question 18

This question provided good differentiation. Most candidates gained the first mark for using a correct method to find one relevant area, usually the rectangle. The more common approach was to calculate the total area first and then divide by four, rather than determining the number of tins required for each individual part of the stage.

A frequent incorrect total area was 66, often the result of calculating the triangle's area as 6×3 instead of using the correct formula. Quite a few candidates reached the correct figure of 14.25 tins needed but lost the final mark by failing to round up to the nearest whole tin, as required. Only a quarter of the cohort scored full marks on this item.

Question 19

The second show that question involving fractions, and the first common item with the higher tiered paper. This question proved tricky for many candidates. Less than 15% scored full marks. Over half the candidates scored at least the first mark for writing both fractions in improper form. We often saw the correct improper fractions then being multiplied together but the candidates jumped straight to $\frac{66}{7}$ without showing any cancellation or intermediate step. Some candidates tried to find the common denominator, but failed to follow this with a correct multiplication. It was essential that students showed all steps, rather than what the calculator gave, in order to be awarded full marks.

There is confusion about when common denominators are needed and about when the second fraction needs to be inverted, which was seen, wrongly, in the context of this multiplication question. Several blank responses were seen and some candidates attempted to covert the fractions into decimal form which rendered no marks. There were a high proportion of students who missed the final mark because they forgot to simplify the final mixed number as requested, leaving their answer as $9\frac{9}{21}$.

Question 20

In parts (a) and (b) candidates unfamiliar with the terminology of lower and upper bounds tended to state numeric values with no connected logic to the question. On the foundation paper this question proved to be challenging. Common wrong answers were 17.3 in part (a) and 150 and 145.5 in part (b). Part (a) on lower bounds was answered more successfully than part (b) on upper bounds, with approximately 25% scoring the mark in part (a) and only 8% scoring the mark in part (b).

In part (c) Few did not round at all but rounded their answer at the end. If candidates only scored 1 mark, it was usually from not rounding the 815 or the 0.399 correctly. There were very few fully correct responses, around 16% scoring full marks, but most candidates clearly did not understand 1sf rounding. 0.399 was often rounded to 0 and then ignored when doing the division. 815 was often rounded to 8. Some did not attempt to round any part to 1sf and simply type the calculation into their calculator to get the un-estimated value.

Question 21

This question proved to be challenging for the foundation candidates as expected at this stage of the paper. Approximately 50% of candidates scored no marks. Despite this, the question still provided good differentiation. The first mark was usually secured by either calculating how often the spinner would land on a particular colour or by writing down a proper probability equation—recognising that the probabilities must add to one. Many scoring 1 mark neglected to consider the expected number of any outcome so often could not be awarded any further marks. Some found the probability of blue rather than expected number of blues. For those candidates finding the expected number of reds, instead of blue, 3 marks were awarded but in general if a candidate had made it this far through the solution they went on to score full marks. Approximately 25% of the candidates scored full marks.

Question 22

This question proved challenging. Many candidates confused the area with perimeter in this item, and there were many blank responses. A good number of candidates gained either one mark for the correct area of the triangle, or three marks for a fully correct answer. The most common error was seen when candidates attempted to calculate the area of the semicircle, either using the diameter instead of the radius, using the wrong formula or not dividing the area by 2.

Question 23

Answers to parts (a) and (b) were good. Most candidates knew they had to add the exponents in (a) and subtract the exponents in (b).

Part (c) provided evidence that candidates struggle most with the 3rd law rather than the others. When mistakes were made it was typically with the 5^3, writing 5, 15 or 625 instead of the correct 125. Or candidates would forget to raise a^4. There was confusion over the application of the index rules, with some candidates combining the addition and multiplication rule. Some common incorrect responses were $5ar^{18}$ and $5ar^{24}$.

Question 24

This question proved appropriately challenging for this stage of the paper, but it also differentiated well. Many candidates were able to access the first mark for writing down $65 = \frac{702}{area}$ and then obtaining 10.8 or wrote down $65 = \frac{702}{6x}$. Candidates who wrote down $65 = \frac{702}{area}$ lost the first mark unless they recovered by writing down $702 \div 65$ or equivalent. Many candidates could not rearrange the formula correctly.

A common error was to write $65 \div 702$ at this stage of the problem. Many candidates who found 10.8 went on to gain full marks. A good proportion of candidates correctly went on to divide 10.8 by 6 to achieve the correct answer of 1.8. There were many candidates who wrote 10.8 on the answer line, forgetting to take the area of the rectangle into account for the final two marks.

Question 25

(a) This question proved to be suitably challenging for foundation candidates, that being said approximately 25% scored full marks on this item. When attempted, errors often arose during the rearrangement process, where candidates confused addition and subtraction when attempting to isolate the *x* terms.

A significant number of candidates failed to recognise the importance of consistently applying multiplication or division across both terms in the expressions. This led to structural errors, such as moving one term inside a bracket to the other side of the equation incorrectly, or subtracting only the constant term in the numerator without accounting for the missing factor of 6 (or 1/6).

Some candidates were able to recover marks through follow-through credit, awarded for correctly rearranging their resulting four-term equations to group *x* terms on one side and constant terms on the other. Many candidates wrote no response to this question, but a pleasing majority did make attempt at solving.

(b) Factorising the quadratic proved to be suitably challenging again for the foundation candidates. Many attempts seen involved an attempt at trying to isolate the *x*'s. Many seemed not to understand the necessity of two brackets. Just over 10% scored full marks on part (i) and many went on to score follow through in part (ii), with 17% being awarded in this part.

Question 26

(a) This part of the question proved challenging for many candidates, with only 10% achieving full marks. Those who scored only one mark often failed to consider the complement of the required set or did not list all four of the expected elements. Misunderstanding the notation or overlooking part of the set definition contributed to these incomplete responses.

(b) This part was answered better. Around 30% of candidates correctly identified that the number 30 belonged to the given set, thereby concluding that the set could not be empty.

(c) This part was not awarded to almost all candidates, with less than 10% scoring 1 or 2 marks.

Question 27

(a) This part was answered well by many. Over 50% gave the correct answer. Some candidates wrote their final answer as 7^0 which was condoned.

(b) For this stage of the paper, many candidates achieved at least one mark in this part of the question. The most successful responses came from those who first clearly wrote down the full expression involving powers of 8 for example those who first wrote $\frac{8^7}{8^{12}}$. Not many students used the method of writing the linear equation − 4 + 11 − 12 = n to obtain their answer, instead sight of the expression − 4 + 11 − 12 was more commonly seen.

A frequent incorrect method involved calculating − 4 + 11 followed by 12 − 7 to give the incorrect answer of 5 was seen. This suggests a misunderstanding of the order and rules of index operations.

Marks were typically either full marks (2) or no marks. Method marks alone were rarely awarded, as many candidates worked only with the indices numerically, without referencing the powers of 8 explicitly. There were many blank responses to this item, but it was pleasing to see many more attempting this item.

Question 28

This proved to be a suitably challenging question for foundation candidates. There were many blank responses, but of those that attempted – many were awarded with a least one mark, for some initial trigonometry work. There were few candidates that managed to earn full marks on this item, but those seen wrote neat and succinct answers. A recurring mistake involved incorrect use of Pythagoras' Theorem—particularly omitting brackets around the surd $6\sqrt{3}$. It was clear that many candidates needed to annotate their diagrams more carefully and think critically about which lengths they were finding at each stage. Several managed to find some correct intermediate values but failed to use them appropriately in the final stages of their solution.

Based on their performance in this paper, students should:

- learn angles in a quadrilateral add up to 360°
- learn to solve algebraic equations involving fractions
- learn when and how to trigonometry and Pythagoras' theorem in multi-step problems
- show clear working when answering problem solving questions
- read the question carefully and review their answer to ensure that their answer fulfils the question
- On fraction questions know when to use common denominators and when to invert the second fraction
- become more competent with the use of negative integers in calculations

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