Pearson Edexcel

# Examiners' Report
# Principal Examiner Feedback

## November 2024

## Pearson Edexcel International GCSE
## In Mathematics A (4MA1) Paper 1F

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# IGCSE Mathematics 4MA1 1F Principal Examiners Report

Students who were well prepared for this paper were able to make a good attempt at all questions. It was encouraging to see many students clearly showing their working. Using everyday mathematics and finding percentages were some topics that some students found challenging.

On the whole, working was shown and was easy to follow through. There were some instances where students failed to read the question properly. For example, in Q15, some students did not interpret the question correctly; they did not find 56 or 560 to find the total cost of the plants.

A striking weakness in students was solving problems with number work, reverse percentages, applying Pythagoras theorem and working out problems involving fractions and percentages. On the whole, problem solving questions and questions assessing mathematical reasoning were not tackled well, this was particularly apparent in questions 6, 10, 13, 15, 22 and 27

## Comments on individual questions

### Question 1

At the start of the paper students were presented with a very familiar style of question which involved reading information from a table and they were almost all able to achieve full marks. This question was answered well by almost all students.

Some students found part (b) difficult by writing down hundredths instead of hundreds

### Question 2

This question was answered well by almost all students.

On part (b) students are encouraged to use a ruler to draw a straight line.

On part (c), some students gave an incorrect answer of 1 or 2

**Question 3**

(a) The correct answer was almost always seen although, very occasionally, the answer was given as 4 when students failed to use the information provided in the key.

(b) This part was easily accessible to almost all students, who were able to give the correct answer of 9. For those who did not, most were able to gain a mark for correctly reading one of the two values, either 19 or 10, from the pictogram.

(c) This part required students to draw $3\frac{1}{4}$ squares, which the clear majority were able to do.

**Question 4**

(a) and (b) Most students were able to interpret the table correctly and give an answer of 70 and 15 respectively.

(c) Most students wrote down a correct answer of 7000 and –40 was an acceptable answer. Some students wrote down 12 000 but this was a common incorrect answer as they could not interpret 10° warmer.

**Question 5**

(a) and (b) were answered well.

(c) The majority of the students gave an answer of –24, however, a few gave an incorrect answer of –14

(d) The majority of the students gave an answer of 48

(e) The majority of the students gave an answer of $a^4$, however, a few gave an incorrect answer of $4a$

(f) This part was well answered. Many students could multiply 9 by 8 and multiply 4 by 12 and obtain 72 and 48 respectively which gained the first mark. A common error was to add 72 and 48 and write for example 120. Students can use a calculator to subtract their numbers.

**Question 6**

There were a variety of different ways this question could be answered. Generally, many students could find the correct answer of 156.24 and these students showed a clear method to obtain their answer.

Common errors were to write down 2358 ÷ 0.28 thus losing the first mark. Many students could work out 42 × 12 to give 504 gaining at least 1 mark.

Students are encouraged to read the question carefully and then try to formalise a strategy to answer the question.

**Question 7**

Many students answered the first part of the question well by giving a correct answer of 42° with a correct reason using the words underlined in the mark scheme ie. for angles on a straight line add up to 180° or angles on a straight line add up to 180°.

Less able students found working out angle *x* a problem as they did not understand that angles in a quadrilateral add up to 360°. Students who worked out 42° and then subtracted (42° + 107° + 125°) from 360° to find the correct answer of 86° gained full marks. It was disappointing to see students subtracting (42° + 107° + 125°) from 540° thinking that 540° is the sum of the angles of a quadrilateral.

A common error made by some students was to conclude that angle *x* was equal to 42°. This showed a lack of understanding of angles on a straight line add up to 180°.

**Question 8**

(a) This part was answered well. Students gave correct answers such as $\frac{27}{80}$, 0.34 or 34%. However, some students gave an answer of 27 : 80 which is incorrect notation, and no credit was given.

(b) Most students were able to gain the two marks here for giving the correct probability using a correct notation. Understanding the answer was $\frac{43}{80}$ or equivalent but writing in an incorrect probability form such as 43 : 80 was condoned as the students were penalised in part (a). Some students gave an answer of 43 which only gained 1 mark.

**Question 9**

Generally, this question was answered well. It was encouraging to see many students write down their methods clearly, for example, 41.25 ÷ 15 to find 2.75 and then multiply by 52 to find the total cost of the pencil cases.

A common error was to write down 52 divided by 41.25 thus losing all the marks.

Some students worked out 52 ÷ 15 and then wrote down 3.47 and then multiplied by 41.25 to find 143.14 therefore losing the final A mark due to inaccuracy.

**Question 10**

Generally, this was answered well by many students, particularly the ones who used a ruler to measure the line in centimetres.

The length of 6cm from the castle to the tower was frequently identified and many multiplied by 18 and not multiplying by the given scale first or vice versa. At this point only one method mark was awarded. Some students did not know how to take the next step.

**Question 11**

A large majority could rearrange the formula correctly, with an algebraic method seen regularly. Clear algebraic working was not required and there were many who did not write any algebra at all, this could still gain full marks if done correctly. A few misinterpreted $8d$ as meaning $8 + d$ and worked accordingly to find a value for $d$ that fitted their invented equation, scoring no marks. A noticeable common error was to write $8d = c + 5$ rather than $8d = c – 5$ scoring no marks.

**Question 12**

There was a mix of blank responses and fully correct responses for this question. For those who attempted the question, a fully correct graph was often seen. Although it was disappointing to see a number of students plot the correct points and then fail to join them with a line. A few students made errors such as wrongly plotting one of the points, but these were generally able to gain 2 marks for a correct line through at least three of the correct points. A small minority gained just one mark for a line drawn with a positive gradient going through (0, –1) or for a line in the wrong place, but with the correct gradient. Some students did not extend their lines through the full range of values specified, losing one mark as a result.

**Question 13**

Most students found this multistage problem involving area, proportion and cost challenging, with a wide range of approaches and very few fully correct responses seen.

Students tended to be more successful for the first method mark where many found 7 and 12 from $3.6 \div 0.3$ and $2.1 \div 0.3$ but most of these students then found the sum of these two numbers writing 19 as their final answer instead of $7 \times 12 = 84$

Some students worked out the area of the rectangular wall by working out 7.56 and then worked out the area of the tile as 0.9 rather than 0.09. Students should use a calculator to work out $0.3 \times 0.3$ to find 0.09

The third method mark was to divide the number of tiles by 6 to find the number of boxes of tiles and then multiply by the cost of each box. Some students worked out the number of tiles and then multiplied by the cost of each box thus losing the final two marks.

Students who were the most successful often showed working in a systematic way. It is important for students to use a clear method to help them work through this multistep question.

**Question 14**

(a) This part of this question required students to find the sum of the possible pairs of numbers that two spinners could land on and enter them into a table, which had been started for them. While most were successful, it was concerning that for this relatively straightforward task, seemingly random numbers were entered, or the table left blank.

(b) This part asked for the probability that the score is 9 or less to be worked out from the values in the table and many students gained at least one mark for either having 11 as the numerator or 12 as the denominator. It is pleasing that almost all students now give probabilities in one of the acceptable forms, a fraction, decimal or percentage, although ratios and words were still seen.

**Question 15**

This question was a good source of marks for many students. Most students could find 35% of 140 to find 49 plants and 1/4 of 140 to find 35 plants scoring 1 mark. For some reason students at this stage added 35% with 25% to find 60% of 140 which was incorrect as they did not subtract this value (84) from 140 to find the number of plants. Most students went on to find 49 × 6 or 35 × 8 gaining the second method mark.

Students were tripped up for finding the value of 56 – many methods led to an incorrect answer so losing the third method mark.

It was quite surprising that some students could not find the total cost by adding 294, 280 and 560 by giving an incorrect answer thus losing the final mark.

An answer of 24 from adding 6 + 8 + 10 even after working out 49 and 35 resulted in no marks, as the 49 nor 35 were not used to find their final answer.

Clear methods were shown by the majority of the students.

**Question 16**

Many students found this question difficult as they did not realise that 31.4 to 1 significant figure is 30 or 48.7 to 1 significant figure is 50. A common error was to multiply 31 with 49 thus losing all the marks to this question.

**Question 17**

A minority of students could draw the reflection of shape P in a given line, $x = 1$. Some students were able to pick up 1 mark for a correct reflection in a line parallel to the given line or for the reflection of shape P in the line $y = 1$. It was perhaps surprising that most students were unable

to gain any marks for drawing a reflection worthy of at least some credit, with a noticeable number not drawing anything.

**Question 18**

(a) Writing down the modal class was correctly answered by the vast majority of students, with the most common error being to give the frequency linked to the modal class.

(b) There were a good number of students who were able to make a correct start on this 4-mark, finding the mean from a grouped frequency table question. This involved using the mid interval values and the frequencies to find and sum products for 2 method marks. Some were then able to go on to divide by 60 and find a correct answer. Common errors were to divide their sum (= 1170) by 5 or by the sum of the mid interval values. A few students used end points rather than midpoints and could gain M2 if they divided by 60. A few tried to multiply each frequency by 5, the width of the class interval. There were a good number of students who gained no marks as they were unable to make a correct start at all.

**Question 19**

Students who knew how to construct an angle bisector gained full marks but very few correct constructions were seen. Some students were able to gain a mark for a correct first arc drawn but a significant number of students were not able to gain any marks in this question. In all construction questions, arcs used for the construction should be left and not rubbed out.

**Question 20**

(a) A significant number of students did not acknowledge the instruction in this part to give the answer in index form and therefore failed to score any marks. A common incorrect answer given was $p^8$

(b) This part of the question was poorly done by the majority of students. Many students at this level have poor algebraic skills.

Many students could not multiply $2n(4n + 3)$ as they tended to write down $6n^2$ or $8n$ or they could not expand $n(n – 4)$ as they tended to write down $2n$ or $n$ or $–4$.

Students who understand the technique needed to expand and simplify two brackets usually gained at least one for finding 3 correct terms out of 4. For these students, errors in associating the correct sign with the correct term or failing to simplify $8n^2 + n^2$ or $6n - 4n$ correctly were the main source of errors.

(c) A few students were able to score full marks on this question, though many were able to score at least one mark for expanding the brackets to obtain $2x + 5 = 12 - 3x$. Many students had difficulty in isolating the terms on either side of the equation. Students wrote down $2x + 5 = 12 - 3x$ but many could not isolate the $x$ terms and the numbers.

Common errors were based on fundamental misunderstandings of algebraic processes, e.g., $2x - 3x = 12 + 5$, incorrectly moving terms from one side of the equation to the other side, usually by not changing the sign of the term.

As the question clearly states, 'Show clear algebraic working', some of those students who attempted to find the solution by trial and improvement gained no marks.

**Question 21**

(a) and (c) were answered poorly as students could not interpret set $B$ and set $A'$ correctly.

(b) This part of the question was answered well by most students. It was encouraging to see students could interpret the set $A \cap B$ correctly.

**Question 22**

Many students could easily gain the first 2 marks of this question by substituting into the formula for the volume of a cylinder and finding 277 088. Some students converted the 70 cm and 18 cm into 0.7 m and 0.18 cm respectively.

Some students did not realise that $1\text{m}^3 = 1000$ litres. Some students divided the volume by 100 or 10 000 and consequently found the incorrect answer.

**Question 23**

Most students struggled to access this question. Very few students realised the relationship between prime factors and the HCF. Many confused the two skills and some stated the multiple

as the factor and vice versa, confused by the terms "lowest" and "highest". At this level the numbers chosen for this problem also hindered candidates further. Not many students tried to find factor pairs.

Less careful students often made the answer $2 \times 5 \times 7$ from selecting the primes that were common to A and B.

**Question 24**

Many students could easily work out 16% of 475 to find 76 for shop A. Many students performed very well for shop B as they recognised the reverse percentage and applied a sound method correctly. Most chose to divide the sale price by 0.85 or $\frac{85}{100}$ in a single step method, rather than equate 408 to 85% and then find 1% and 100% in stages. A small minority of students attempted to solve through trial and improvement with limited success. Some students gained 1 mark for finding 0.85 but then multiplied by 408. The most common error was to increase the sale price by 15% or find 15% of 408 and reduce it by this value, showing a lack of understanding that the 15% was calculated from the original price. Some students misinterpreted the question and used 1.15 as their 'multiplier' rather than 0.85. It should be noted that (1 – 15%) did not received a mark for 0.85 or 85% until further correct progress had been made, such as (1– 0.15).

Some students worked out the correct values of 76 and 72 and then did not answer the question that shop A gave more money off their normal price.

**Question 25**

(a) Many incorrect answers were seen and the main incorrect answer was to write the signs the wrong way round in the brackets e.g. $(x – 8)(x + 3)$ or $(x – 8)(x – 3)$ or $(x + 8)(x + 3)$; one mark was awarded for this. Many students found this part difficult and then could not answer the second part of this question. Some candidates tried to factorise again or tried to use the quadratic formula. Candidates should ensure they have the correct factors by multiplying back as a useful check for this type of question. Students failed to recognise that the word **hence** meant that they must use their previous answer to solve the equation.

(b) This 3 mark inequalities question saw mixed results. Some students struggled to deal with the negative coefficient for the *y*-term; it was common to see answers of *y* with 3.75 and the incorrect inequality sign or with an equals sign or just 3.75 on the answer line. It was also common to see students rearrange incorrectly and end up with 10*y* and 5. Only a minority of students did manage to rearrange correctly to gain a correct answer for 3 marks.

**Question 26**

(a) Many students wrote down the correct answer of 0.000 084 as this question is a good source of marks for Foundation level students.

(b) This part of the question was challenging to some students as they could not use a calculator to work out the final answer. Many students obtained full marks. Some students left their final answer as $52 \times 10^{145}$ thus gaining 1 mark. Some common incorrect answers were $5.2^{146}$ or $5.2 \times 10^{-146}$.

**Question 27**

The intention of this question was to apply Pythagoras theorem and then use similar triangles to find the value of *x*. This question as expected was answered poorly as only a minority of students using Pythagoras theorem and similar triangles to work out the length of *x*. Of those who lost marks, some added $51^2$ to $24^2$ which scored zero marks for the first two method marks. However, if the students had clearly identified *DE* then they could gain the third and fourth method marks to work out the value of *x*.

Some students used trigonometry to find the value of *x* which was an acceptable method by working out angle *DFE* and proceeded to work out *x* using trigonometry.

**Summary**

Based on their performance in this paper, students should:

- learn angles in a quadrilateral add up to 360°
- learn to solve algebraic equations

- learn when and how to apply Pythagoras theorem

- show clear working when answering problem solving questions

- read the question carefully and review their answer to ensure that the question set is the one that has been answered

- make sure that their working is to a sufficient degree of accuracy that does not affect the required accuracy of the answer.

- become more competent with the use of negative integers in calculations

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