Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

Summer 2023

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

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Principal Examiner's 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. Students were less successful in conversions, finding the mean from a frequency table, fractions and percentages.

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 Q13, where some students did not answer the question but simply worked out 57.*5* for the area or 2500, for the area of 1 tile.

A striking weakness in students was solving problems with pictograms, ratio ,similarity and enlargements. On the whole, problem solving questions and questions assessing mathematical reasoning were not tackled well, this was particularly apparent in questions 6, 9, 10, 13 and 25

Comments on individual questions

Question 1

All parts of the question were answered well. In part (a), some students gave an answer of 11 362 which was an acceptable answer. In part (c), some students wrote down 8900 as a common incorrect answer. In part (d), a common incorrect answer given was hundredths.

Question 2

All parts of the question were answered well. In part (c), some students wrote down three even numbers or 3 odd numbers not clearly understanding the question.

Question 3

All parts of the question were answered well. In part (a), misspellings were condoned. Those who didn't know the mathematical name for a 5 sided shape sometimes thought it was a hexagon. In part (c), a common error by some students was to label the reflex angle at *C* as *T* or label the lines as *T*.

Question 4

All parts of the question were answered well. In part (c), the most common misconception being that 0.459 is greater than 0.49.

Question 5

(a) The overwhelming majority of students were able to explain the need to add 4 to the previous number to give 18. Some students used various explanations that gained the mark. Descriptions such as 'I calculated the difference between the numbers' were not sufficient.

(b) It was pleasing to see so many correct responses for the explanation needed. Arguably the most efficient answer was to recognise that the sequence contained only even numbers (or numbers ending in digits 0,2,4,6,8 as many students put it) and that 217 is odd.

Question 6

Students generally answered this question well. Many students multiplied 9.25 by 1000 and then divided by 750 and then left their answer as 12.3…. or 12 or 13. Some students did not round up and multiply 13 by 58 to find the cost of the flour. If the students worked out 12 × 750 to give 9000 this gained two marks. Some students did not know the conversion from kilograms to grams as they were multiplying by 100. Most knew to divide by 750, so a common answer was 2 from 925/750. Repeated addition was used often with 750*g* to reach 9000*g*. The alternative method of dividing 750 by 1000 and then using this answer to divide into 9.25 was rarely seen. Students are encouraged to read the question carefully as they need to round up the number of bags of flour rather than round down in this question.

Question 7

(a) Only a small number of candidates were unable to multiply two algebraic terms.

(b) Collecting like terms was well done, although the directed number aspect is still an issue for some. The most commonly seen error was simplifying to $5d + 8e$ or $5d + 2e$.

(c) A large majority could solve the equation, with an algebraic method seen regularly. There were many who did not write any algebra at all, but this could still gain full marks if the answer was correct. A few misinterpreted $4x$ as meaning $4 + x$ and worked accordingly to find a value for x that fitted their invented equation, scoring no marks.

Question 8

(a) This was a challenging question for many students. A common incorrect answer was 95

(b) Generally, this was answered well. A minority of students divided 79 057 by 3 or square rooted 79 057

(c) A majority of students could find the correct answer by writing down 16 × 125. However, some students were writing down 16 + 25 thus gaining one mark. A common incorrect answer given by students was 20^5

Question 9

Many students could interpret the key and wrote down 16 + 12 + 22 + 18. Some students misinterpreted the number of cars sold by Belinda as 10. Finding a total of 68 gained the first 2 marks. Some students wrote down 68 without any working. Students should be persuaded to show working on such a question.The more able students worked out the number of extra cars that needed to be sold in March as 9 thus gaining the third mark. There were a number of students who did not work out the value of 69 to gain the final mark. Students should read the question carefully.

Question 10

Many students worked out the required angle was 117°, however, many students could not give the correct reasons, at each stage, to gain the final two marks. Many managed to use the fact that vertically opposite angles are equal and then stated (sometimes on the diagram) that angle *BCD* is 108°. Also, use the fact that angles in a quadrilateral sum to 360° and then found angle *BAD* which was 63° thus gaining the second mark. Not all students who correctly calculated angle *BAD* were able to complete this question correctly, deciding to go off in all sorts of related incorrect calculations. Some of the weaker students knew that angles on a straight line totalled 180° but chose to use angle *CDA* with angle *BAD* to find the value of *x*.

Students are encouraged to write down the mathematical reasons for each stage of working as stated in the question, rather than give a commentary on their calculations.

Question 11

(a) Many students showed they were confused with the term range and often got it mixed up with the total, or the mean or the median. Even if they knew the terminology, they were confused with the numbers they should use to find the range of cousins and many used the range of the frequencies, $11 - 1 = 10$

(b) Most students gained the one mark in this part of the question with some giving a correct answer of 3. A common incorrect answer was to write 11; the frequency of the mode, which is not accepted

(c) The majority of students gave the correct answer to this question. Of those that didn't, the most common error was for students to find the products correctly but then divide by the sum of the number in the cousins column (15) rather than the sum of the frequencies (30) which was given in the question. The other error was to divide the sum of the number of cousins by 6. A common arithmetic error was to evaluate 0×3 as 3 rather than 0.

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 who plotted the correct points and didn't put a line through them. 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 negative gradient going through (0, 4) 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

This proved a quite a challenging question for many students. The first obstacle for the students was finding the area of the compound shape. The students should realise that the shape should be split into two rectangles in order to work out the total area of the shape. The students who worked out 57.5 were awarded the first two marks. At this stage the students needed to work out the area of a tile: the most common calculation was 50×50 to obtain 2500. Students then tried to divide 57.5 by 2500 or 5750 by 2500. The 5750 originated from multiplying 57.5 by

100 to convert from m^2 to cm^2 which is an incorrect conversion. Students should decide to be working in centimetres or metres not both unless they know the conversions from m^2 to cm^2 or vice versa. Once they could not work out the number of tiles required then they lost the final two marks.

The other approach for finding the number of tiles needed to cover each side of the compound shape was rarely seen.

Question 14

It was pleasing that many students did manage to write a formula for F in terms of r and h but unfortunately the most common formula seen was $F = r + h$ which scored only one mark. Students who used both $2r$ and $7h$ usually gave a fully correct formula although some gave the answer as $2r + 7h$ or as $2r + 7h = 9F$ and scored only two marks. Some students thought they had to work out a numerical answer.

Students should not include the units when writing expressions or formulae, for example, F kg = $2r$ kg + $7h$ kg.

Question 15

Many students were able to convert to a suitable common denominator, although some simply added the numerator and denominator, having failed to recall the appropriate strategy.

Some students converted the fractions to decimals and then proceeded to add them which gained no marks.

Question 16

This was a difficult question for many students. A minority of students could work out 1700 ÷ 2 to find 850 and then failed to realise that one part is 850. At this stage many students did not know how to answer the question.

Common errors were 1700 ÷ 7 or 2150 ÷ 2 or 2150 ÷ 7 and a variety of other irrelevant and somewhat confused attempts made regular appearances.

Question 17

Many students were able to make inroads into this question. Most students used a factor tree or a table and there were very few arithmetic errors. Those students who did not gain full marks tended to give an answer that wasn't in index form as requested. These gained two marks if they had found all the correct prime factors. Those students who made arithmetic errors could gain one mark if they had at least two correct stages in prime factorisation. Students are reminded that for this type of question working must be shown, as many modern calculators have a FACT facility that produces answers directly.

Question 18

(a) This part was generally answered well by the students. It was encouraging to see candidates could interpret set A and it included the element “5”.

(b)This was generally answered well by the students. Many students clearly wrote down the 7 elements as required. It was encouraging to see students could interpret the concept of the union of 2 sets.

(c) A minority gained the one available mark, but a significant number failed to read the information about the universal set and therefore thought 9 did belong to the set *C*. Some students stated that 9 was outside of the Venn diagram, as it was outside the sets *A, B, C*, implying a lack of understanding of Venn diagrams.

Question 19

A minority of students produced completely correct solutions to both parts of this question on proportionality.

In part (a), scale factors were the most popular approach, usually $GH = 4 \div 1.6$, by the students who understood similarity.

In part (b), scale factors were still widely used but proportionality statements such as $\frac{BC}{9.6} = \frac{5.7}{6}$ also appeared. Scale factors were sometimes used incorrectly, multiplying instead of dividing.

Question 20

As expected, this question was answered poorly with many blank responses. A minority of the students were using Pythagoras to calculate the diameter of the larger circle. A few went on to gain full marks. Of those who lost marks, many used the area of the semicircle, rather than the perimeter of the arc, or included *AC*, *CB* and *AB* in the perimeter, some neglected to divide the circumference by 2 or mistakenly used the value of 8.48… as the radius of the larger circle, rather than its diameter.

Similarly, some students used 6 as the radius of the smaller semicircles and neglected to divide the circumference by 2.

Question 21

Sometimes students used the wrong probability to estimate the number of games that Evie will lose. Students are advised to read questions carefully. Those who gave their final answer as $\frac{78}{300}$, rather than 78, only gained 1 of the 2 available marks.
It was encouraging to see that many students showed their reasoning clearly.

Question 22

Parts (a) and (b) were answered well, with very few mistakes.

(c) Students were being tested on the use of the power laws $(ab)^n = a^n b^n$ or alternatively the use of $(3x^6y^8)^2 = 3x^6y^8 \times 3x^6y^8$ followed by the application of a simpler rule. Common incorrect

answers were to write down $3x^8y^{10}$ where the power of x and y had been treated incorrectly. It was disappointing to see many students could not recall any of these index rules.

Question 23

Part (a) was answered well. In part (b), many incorrect solutions were seen, and the main incorrect answer was to write incorrect signs in the brackets e.g. $(y + 5)(y – 4)$ or $(y + 5)(y + 4)$ or $(y – 5)(y – 4)$; one mark was withheld for this. Some students tried to use the quadratic formula. Students should ensure they have the correct factors by multiplying back as a useful check for this type of question. Other incorrect answers such as $y(y – 9) + 20$ were also seen. A number of students factorised correctly, but then went on to solve the expression as though it were an equation equal to zero. Even though they weren't penalised for doing this, it does show that students should read the question carefully and reflect on whether or not it is an expression that needs factorising or an equation which needs solving.

Question 24

(a) This part was answered well, though occasionally 5600 was seen.

(b) A minority of students were successful in this part of the question which involved a multi-stage calculation. A minority of students scored only 1 mark out of the 2 marks available because they could work out the value of the numerical expression as an ordinary number but either did not attempt to put it in standard form or could not write it correctly in standard form.

Question 25

As expected, this was a challenging question for the Foundation students. Some students stated the correct answer, 477 030, but then subtracted 700 000 from it and gave the depreciation value, 222 970 as their answer; in this case they were penalised, and 2 marks only were awarded. Simple interest was generally used, instead of depreciation; students who made this error generally scored 1 mark out of 3, usually for the depreciation value of the first year. In this examination series many students were writing $700\,000\times(1-12\%)$; we did not award marks for this unless it gave a correct solution. $700\,000\times(1-0.12)^3$ was worth 2 method marks. Students are encouraged to write down the correct notation so that marks can be awarded for their correct method.

Question 26

This question was generally answered poorly. If incorrect, most students reduced the shape successfully but did not draw it in the correct position, this was awarded 1 mark for having the shape in the correct size and orientation.

Summary

Based on their performance in this paper, students should:

- learn angles in a quadrilateral add up to 360°

- learn the difference between acute, obtuse and reflex angles
- learn to carry out calculations involving conversions such that 1 kg = 1000 g
- learn how to work out the area of a compound shape
- 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.

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