Examiners' Report
Principal Examiner Feedback

Summer 2022

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

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International GCSE Mathematics
4MA1 Paper 1F

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 using set theory, polygons and working with prime factors.

Overall, working was shown and was easy to follow through. There were some instances where students failed to read the question properly. For example, on Q11, some students did not answer the question but simply worked out 912g. Some students could not recall the conversion that there are 1000g in 1kg.

A significant number of students struggled with solving problems with perimeters, finding HCF and LCM using indices**, applying Pythagoras theorem and working out the number of sides of a polygon.** On the whole, problem solving questions and questions assessing mathematical reasoning were not tackled well, this was particularly apparent in questions 11, 15, 17, 22 and 25.

Question 1

(a) This part was answered well. Misspellings of Gazientep were condoned.

(b) This part was answered well. Some students did not write all of the number in words, for example, 2 thousand, five hundred and thirty four losing the mark. Misspellings were condoned.

(c) This part was answered well.

(d) This part was answered well. An answer of –608 was accepted.

(e) This part was answered well. The answer should have been a whole number not a decimal.

Question 2

All parts were generally answered well.

Question 3

(a) and (b) were answered well by many students. Some students wrote down correct probabilities and credit was given.

(c) Students answered the question by saying the probability adds up to one, it is below one etc. There were many students who did not understand that the value of probability lies between 0 and 1. 1.

A common error was to comment that it could not be 1.4 because there were only 3 types of vegetable.

Question 4

This four-mark geometry question gave a good spread of marks.
(a) There were many interesting ways of spelling pentagon seen but marks were awarded as long as the meaning was clear.
(b) Drawing an arrow was usually accurate but a significant number of students made mistakes with their placement of an arrow with 350 appearing as a common incorrect answer.
(c) Many students answered this part well. Some students gave answers in the 24-hour format or wrote down quarter to two.
(d) This part of the question was answered well. A common correct answer was cm. A minority of students gave an answer of m or metres.

Question 5

(a) This part was answered well. Some students gave both answers of 6 and 8.
(b) and (c) These two parts were answered well. However, a common incorrect answer for part (b) was to write 3 with 27 gaining no marks.
(d) Generally, students gave an answer of 3 or 7 or 11.
(e) This part was answered well. Many students placing the brackets in the correct place.
Generally, students were able to show that they understood the various mathematical terms being tested by this question.

Question 6

(a) Many students answered this question well by giving a correct answer of 132° 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.
(b) Less able students found this question challenging as they did not understand that angles in an equilateral triangle are equal or vertically opposite sides are equal. Students who worked out 60° and then subtracted (60° + 105° + 125°) from 360° to find the correct answer of 70° gained full marks. It was disappointing to see students subtracting (60° + 105° + 125°) from 540° thinking that 540° is the sum of the angles of a quadrilateral.

Question 7

Questions involving change still cause problems for students. Many students worked out the total cost of the carnations by multiplying 6 by 220 and finding 1320. At this stage they correctly subtracted 1320 from 5000 gaining two marks. The more able students subtracted 140 and then divided by 295 giving an answer of 12. Some students did not subtract 140 and then

divided by 295 giving 12.47 thus losing the final two marks. The more able students did not subtract the change and divided by 295 giving an answer of 12.47 and then rounding down to 12 to gain full marks.
Credit was given to a build up method to work out the number of roses.

Question 8

(a) 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 $7g + 2e$ or $9ge$.
(b) This part was well answered. Many students could multiply 3 by 12 and multiply 5 by 4 and obtain 36 and 20 respectively which gained the first mark. A common error was to add 36 and 20 and write for example 56. Students can use a calculator to subtract their numbers.
(c) A large majority could solve the equation, 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 $4p$ as meaning $4 + p$ and worked accordingly to find a value for p that fitted their invented equation, scoring no marks.

Question 9

The majority of students gained at least one mark. Those who used a pair of compasses and drew the appropriate arcs were usually successful. A significant number of students, however, gained only one mark because they failed to show construction arcs and merely drew the required triangle instead of constructing it – some used a vertical line from the centre of the base as a guide.

Question 10

(i) This part was answered well. Students gave correct answers such as $\frac{7}{20}$, 0.35 or 35%. However, some students gave an answer of 7 : 20 which is incorrect notation and no credit was given.
(ii) Almost all students were able to gain the two marks here for giving the correct probability using a correct notation. Understanding the answer was $\frac{8}{20}$ or equivalent but writing in an incorrect probability form such as 8 : 20 was condoned as the students were penalised in part (i).

Question 11

Students were able to make progress with this question and gain at least one mark. This was awarded for converting 0.85 kg into 850 g. Some students did not realise that 1kg = 1000g. Some students gained two marks by working out the amount of flour required, 912g, to make 38 small cakes. Another common approach used was to find the number of cakes that can be made from 0.85kg of flour thus finding 35.4… small cakes. Some students forgot to answer the question by not stating no or equivalent. There were many valid approaches to this question

where credit was given. Students should be aware that it is possible to make a non-integer number of small cakes unless the question states otherwise. Some of the students that used a unitary method of solution and showed a complete process rounded or truncated intermediate values and lost the accuracy mark. The presentation of work on this question was often poor with calculations spread all over the working space.
The more able students wrote down a concise and efficient method to answer the question.

Question 12

(a) 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 of stars (10) rather than the sum of the frequencies (25) which was given in the question. The other error was to divide the sum of the number of stars by 5. A common arithmetic error was to evaluate 0 × 6 as 6 rather than 0.
(b) Most students gained the one mark in this part of the question with some giving their answers as equivalent fractions or percentages.

Question 13

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's disappointing to see a number of students who plot the correct points and don'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, 3) 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 14

(a) This part saw students generally gain 0 or 2 marks. A good number dealt with the numbers correctly to give a correct answer of 25.4. The most common incorrect methods seen were $\frac{39.8}{10.1} \times 100$ or $\frac{10.1}{39.8+10.1} \times 100$.

(b) It was pleasing to see a good number of correct responses and some not fully correct but with working that enabled them to gain method marks. Some students correctly found 21% of 59.9 but forgot or didn't realise the need to add it to 59.9. Students should be reminded to take note of any question using percentages as to whether they are increasing, reducing or just giving the percentage of the amount. Some less able students surprisingly used a non-calculator, break down approach to finding 21%, so 10% = 5.99, 1% = 0.599 etc these mostly proved to be incorrect as students mixed up the decimal points. A few students simply subtracted 21 from 59.9, showing no knowledge of finding a percentage of an amount. Some students worked in millions, for example, using number of cars as 59 900 000, but this was not penalised.

The more able students used the method $\frac{121}{100} \times 59.9$ to find the final answer of 72.

Question 15

Many students gained one mark by finding the length of the square by dividing 48 by 4 and obtaining 12. Many students did not understand that 12 needed to be subtracted from 30 to find the sum of the two length of the isosceles triangle or divided by 2 to find one length of the isosceles triangle. A common error was to divide 30 by 3 to find 10 assuming the triangle was equilateral. Some students found 12 and 18 and then worked out (4 × 12) + (3 × 18) or (4 × 12) + (6 × 9) thus working out an incorrect answer of 102.

Question 16

(a) This part was answered well by students. Most students were able to gain the method mark by recognising that the sequence increased by adding 4 each time and hence writing $4n$, but there was a significant number writing $4n - 1$ or even $n + 4$. Students need to be encouraged to check their rule to see if it works for the next term in the sequence. Some students lost the accuracy mark by writing $n = 4n - 3$

(b) This part was a very challenging question to many students as the majority did not know how to work out the $(2m)^{th}$ term of the sequence.

Question 17

Many students could work out the probability of the spinner landing on 2 or on 4 by calculating 1 – (0.26 + 0.18) then dividing by 2. It was interesting to see students employ different methods to find the final answer. The common approach was to work out 45 ÷ 0.18 to find the total number of spins of 250. Some students who worked out 250 did not know how to work out an estimate for the number of times the spinner will land on 4 and gave up. The more able students multiplied 250 by 0.28 to find the final answer of 70. A common incorrect method was to add 0.26 to 0.18 to find 0.44 and then divide by 2 to find 0.22 which lost the first mark. They went on to find 250 and then lost the final two marks by multiplying 250 with 0.22. A few wrote their answer incorrectly as a probability.

Question 18

For parts (a) and (b), the first mark was gained when the students only had to show both numbers written as prime factors, which could be at the end of factor trees or on 'ladder' diagrams, or 4 factors (in part (a)) or 4 multiples (for part (b)) for each number or use of the table method. Most managed to do this for one mark, and a significant number achieved full marks. Some students used factor trees or 'ladder' diagrams and then tried to draw a Venn diagram which they tried to use and lost the final mark. Generally, this question was not answered well as many students could not gain the second mark as they had no understanding of the meaning of HCF's and LCM's.

Some students confused HCF and LCM. They often did not know what a factor or a multiple is. The majority of students gained one from the factor tree. The most common mistake as an answer for part (a) was 7.

Question 19

This question was poorly attempted by many students. Many students did not realise that the sum of angles around a point add up to 360°. Students when attempting this question could be classified into 3 types,

(i) the students had no idea how to answer the question,

(ii) the student who realised that 360 is divided by 18 to obtain an answer of 20 thus gaining two marks

(iii) the student who showed a clear method and obtaining the final correct answer of 9

Students needed to understand that the exterior angle and then the interior angle was required to answer the question i.e. number of sides = $\frac{360}{\text{interior angle}}$.

Question 20

(a) This part was not answered well. A common error was for adding the second term in the brackets and obtaining – 2 or –10 or 10 rather than multiplying to obtain − 24; some students also had difficulty in simplifying $-6\boldsymbol{n} + 2\boldsymbol{n}$ correctly. Overall, the errors made were usually down to poor arithmetic skills when dealing with negative numbers.

(b) 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 $8x - 12$.

Many students had difficulty in isolating the terms on either side of the equation. Students wrote down $8x - 12 = 3x - 5$ but many could not isolate the x terms and the numbers. Common errors were based on fundamental misunderstandings of algebraic processes, e.g., $8x + 3x = -20 - 12$, $3x - 8x = 12 - 5$, 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) This part was a 'reverse percentage' question, however, this was not how the large majority of the students interpreted it. By far, the most commonly seen, but incorrect, method was to find 4% of the new amount or to increase the new amount by 4 per cent. Where students understood the question, they were nearly always able to show the working required and give the correct answer for all 3 marks.

(b) This part was poorly attempted. Many students simply gave an incorrect answer of 30% by adding 15% with 15%. Many students find compound interest and depreciation questions difficult. Many of the scripts were blank or 30% written on the answer line. Furthermore, students found it difficult as no initial amount was given.

Question 22

This question was not answered well. A minority of students substituted into the given formula correctly, $1.4 = \frac{72}{(\text{area})}$ and rearranged correctly obtaining $\frac{72}{1.4}$ or 51.4. A majority of students rearranged incorrectly, 72 × 1.4, thus losing the final 3 marks of the question. Once 51.4 was found the students multiplied this by 18 to find the correct answer. Some students worked out 51.4 and proceeded to equate this with πr^2 and worked out the radius. The final step was to substitute into the formula for the volume of a cylinder to obtain the correct answer. This method gave the correct answer; however, it was not necessary to use this approach.

Question 23

(a) This part was well answered however some students wrote down incorrect answers such as 8.9^{-5} or 8×10^{-5}

(b) This part was well answered. Some students wrote down 8.3400 or 83.400 as incorrect answers.

Question 24

(a) Many students fail to realise that $a^0 = 1$. Common incorrect answers were 32*t* or 32 or 8*t*.

(b) This part was answered well. Many students giving an answer of 11. Some students wrote their final answer as x^{11} which was condoned.

(c) Students were being tested on the use of the power laws $(ab)^n = a^n b^n$ or alternatively the use of $(2k^2m^4)^3 = 2k^2m^4 \times 2k^2m^4 \times 2k^2m^4$ followed by the application of a simpler rule. Common incorrect answers were to write down $2k^5m^7$ where the power of k and m had been treated incorrectly. It was disappointing to see many students could not recall any of these index rules.

Question 25

This question was poorly attempted. A minority of students obtained full marks. Some students worked out 15 and 8 and did not recognise that Pythagoras theorem was required to work out the distance between the centres of the two circles. Full marks were awarded when the correct answered was obtained using a diagram. Incorrect answers from a diagram, such as 17.3 scored no marks.

There were many blank responses.

Summary

Based on their performance in this paper, students should:

- learn angles around a point add up to 360°
- learn the difference between LCM and HCF
- 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

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