Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

Summer 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 Q11, some students did not interpret the question correctly; they did not multiply 250 by 5 to find the total amount of butter before dividing by 120.

A striking weakness in students was solving problems with set theory, reverse percentages, applying Pythagoras theorem and working out problems involving ratios and percentages. On the whole, problem solving questions and questions assessing mathematical reasoning were not tackled well, this was particularly apparent in questions 6b, 7, 11, 14b, 15 and 17

Comments on individual questions

Question 1

This question was answered well by almost all students.

Some students found part (d) difficult by writing down tenths instead of tens.

Question 2

This question was answered well by almost all students.

On part (c), some students gave an incorrect answer of 60

Question 3

(a) and (b) were answered well by many students.

(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. A common incorrect response was to write down that probability adds up to more than 1 or they added the 3 values shown instead of commenting on 1.2

Question 4

This question was answered well by almost all students.

(a) There were many interesting ways of spelling octagon seen but marks were awarded as long as the meaning was clear.

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(b) A common incorrect answer was 220

(d) There were many interesting ways of spelling metres seen but marks were awarded as long as the meaning was clear.

Question 5

Part (a) was answered well by almost all students.

A common answer for (a)(iv) was to confuse 9 as a prime number.

Part (b) had a mixed response. Some students did not know how to apply the correct order of operations to the question thus giving an incorrect answer of 220

Question 6

(a)(i) Many students answered this question well by giving a correct answer of 125°

(a)(ii) Although students understood that angles round a point add up to 360° they used angles in a circle add up to 360° rather than the correct reason using the words underlined in the mark scheme ie. ~~for~~ angles around a point add up to 360° or angles around a point add up to 360°

(b) Weaker students found this question challenging as they did not understand that base angles in an isosceles triangle are equal or angles on a straight line add up to 180°. Students who worked out 126° and then subtracted (126° + 98° + 90°) from 360° to find the correct answer of 46° gained full marks. It was disappointing to see students subtracting (126° + 98° + 90°) from 540° thinking that 540° is the sum of the angles of a quadrilateral.

Question 7

Questions in context still cause problems for many students. The first mark was obtained for multiplying 35 with 14 to find 490. Many students worked out the overtime pay by subtracting 490 from 679 to find 189, gaining the second mark. Some students forgot to divide their overtime pay by 21 to find the number of hours.

Some students tried to divide 679 by 14 or 21.

It was encouraging to see students write out a clear method.

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 $4x + 3y$ to ~~or~~ $7xy$.

(b) This part was well answered. Many students could multiply 4 by 13 and multiply 6 by 7 and obtain 52 and 42 respectively which gained the first mark. A common error was to add 52 and 42 and write for example 94. 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 $5p$ as meaning $5 + p$ and worked accordingly to find a value for p that fitted their invented equation, scoring no marks. A noticeable common error was to write $5p = 28 + 11$ rather than $5p = 28 – 11$ 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 $\frac{10}{29}$, 0.34 or 34%. However, some students gave an answer of 10 : 29 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 $\frac{12}{29}$ or equivalent but writing in an incorrect probability form such as 12 : 29 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 1.4 kg into 1400 g. Some students did not realise that 1 kg = 1000 g.

Some students gained the second mark by working out 750 ÷ 60 or 1400 ÷ 200. Some students did not work out the total amount of butter that David had by forgetting to multiply 250 by 5 but simply dividing 250 by 120 thus losing the final 2 marks.

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 biscuits 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 school lunches (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 school lunches by 6. A common arithmetic error was to evaluate 0 × 2 as 2 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 positive 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) A good number dealt with the numbers correctly to give a correct answer of 17.6. The most common incorrect methods seen were $\frac{86}{100} \times 490$ or $\frac{490}{86} \times 100$. Some students tried to use a build up method of percentages of 490 and then found it difficult to arrive at an accurate answer.

(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 12% of 375 but forgot or didn't realise the need to subtract it from 375. 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 weaker students surprisingly used a non-calculator, break down approach to finding 12%, so 10% = 37.5, 1% = 3.75 etc these mostly proved to be incorrect as students mixed up the decimal points. A few students simply subtracted 12 from 375, showing no knowledge of finding a percentage of an amount.

The more able students used the method $\frac{88}{100} \times 375$ to find the final answer of 330

Question 15

Many students gained one mark by finding the length of the square by subtracting 15 and 17 from 40 and obtaining 8. Some students used Pythagoras theorem to find the length of the square. Some did not apply Pythagoras correctly, adding instead of subtracting. Students went on to find the area of the square but had difficulty in finding the area of the triangle.

The more able students used the formula for the area of a trapezium to find the area of the required shape.

Question 16

(a) Most students were able to gain M1 by recognising that the sequence increased by adding 3 each time and hence writing $3n$ as part of their answer. Some students wrote $\pm 2n + 3$ or even $n - 2$. Other students did understand that the correct expression was $3n - 2$ but wrote their answer with a variable n on both sides of an equation as in $n = 3n - 2$, losing the accuracy mark in the process.

(b) A minority of students answered this part of the question well by writing down 77 as the correct answer. A number of students didn't read that part (b) referred to a different sequence or made errors trying to write out all the terms rather than use the *n*th term.

Question 17

Many students made a correct start on this probability problem by adding the probabilities of walking and travelling by bicycle. If they went on, which only a small number did, to subtract this from 1 to find the probability for travelling by bus and car, they gained the first method mark. For the next mark, this value then needed to be divided by 3, as the probability of travelling by car was twice that of travelling by bus. However, a majority divided by 2 and were unable to progress correctly beyond this. Others did not divide at all and their working either stopped or became increasingly muddled. Those who did divide by 3 and correctly allocated the two probabilities, were generally able to work to produce the correct answer. Some students multiplied 0.18 by 450 giving 81 as an answer and were credited with 3 marks. A few wrote their answer incorrectly as a fraction, $\frac{162}{450}$, and lost the final accuracy mark.

Question 18

Most students who found the HCF, 36, used either a factor tree or repeated division but a minority either used lists of factors or showed no working at all. Venn diagrams were occasionally used, usually successfully. 12 and 24 were common wrong answers. Some students could not extract the HCF, even after finding all the factors. An answer of $2^2 \times 3^2$ was accepted for full marks.

Some students used their calculators to find the answer of 36. The use of a calculator is not acceptable as the question clearly states, 'Show your working clearly'.

Question 19

This question was a 'reverse percentage' question but this was not how the large majority of the students interpreted it. By far the most commonly seen, but incorrect, method was to find 15% of 943 or to increase or decrease 943 by 15%. Where students understood the question, they were nearly always able to show the working required and give the correct answer for all 3 marks.

Question 20

This question was poorly attempted as is expected for the latter part of the paper. There were at least 4 methods to solve this problem. The two common methods were to find the interior angle or the exterior angle of the pentagon. A minority of students worked out the interior angle of the polygon by dividing 540° by 5 or worked out the exterior angle by dividing 360° by 5 giving answers of 108° and 72° respectively. At this stage some students labelled the diagram incorrectly thus losing a mark. Many students could not work out the value of 84°. The more able students used the idea that angles around a point add up to 360° to find the final answer of 156°.

Question 21

(a) Generally, this part was answered well, however, a common error was −3 or +3 rather than −40 in their final answer. Other students also had difficulty in simplifying $-8m + 5m$ 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 $9n - 12 = 5n + 6$

Many students had difficulty in isolating the terms on either side of the equation. Students wrote down $9n - 12 = 5n + 6$ but many could not isolate the n terms and the numbers. Common errors were based on fundamental misunderstandings of algebraic processes, e.g., $9n + 5n = -12 + 6$, 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 22

This question was generally poorly attempted. Many students do not understand Set theory as this can be clearly seen by many blank responses.

In part (b), there were many muddled, ambiguous and wrong statements and numerous blanks whilst some did not recognise the empty set symbol.

(c) It was seen that some students found the terminology hard to understand for set *D*. Credit was given for three correct values with no more than one incorrect **or** for four correct values with no more than one incorrect.

Question 23

This question was not answered well as expected. A minority of students substituted into the formula correctly, 1575 = (area) × 21 or $1575 = \pi \times r^2 \times 21$ and a small number of students rearranged correctly for the area obtaining 75 or for correctly rearranging for r or r^2. Once 75 was found the more able students used the given formula correctly to find the correct answer. Some students, having worked out 4.88…, proceeded to use πr^2 to find the area of the circle unnecessarily. Common incorrect substitution into the pressure formula were seen with students calculating the curved surface area instead of the area of the circle or using volume.

Question 24

(a) Many students wrote down the correct answer of 35 000 000 as this question is a good source of marks for Foundation level students.

(b) Most students added 6 780 000 to 8.2×10^5 giving an answer of 7 600 000 thus gaining the first mark. Generally, students found it difficult to give an answer in standard form. A common error was to subtract 6 780 000 from 8.2×10^5

Question 25

(a) Many students found this difficult. Only the more able students wrote down the answer as 1. Common incorrect responses were 0 or 1 > 0

(b) There were mixed responses to this part of the question. A common incorrect response was 12

(c) Many students gained 1 mark for two parts correct (usually $a^{12}c^6$) but either didn’t deal with the number at all or multiplying 5 by 3.

Question 26

As expected, only the most able students could answer this question. A minority of students could use Pythagoras theorem to work out the length of *CM*. Of those who lost marks, some added 9^2 to 6^2 which scored zero marks. The lack of knowledge of Pythagoras theorem hindered many students to answer the question.

Some students tried to work out the area of the triangle. Some students attempted to work out angle *CAM* and proceeded to work out *CM* using trigonometry.

Some students didn’t round their correct use of Pythagoras but were usually awarded 3 marks for the special case.

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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