Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

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

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Students who were well prepared for this paper were able to make a good attempt at all questions. It was encouraging to see some worthy attempts at topics new to this specification. Students were less successful in using trigonometry, bearings and solving linear equations.

On the whole, working was shown and easy to follow through. There were some instances where students failed to read the question properly. For example, in question 18 students regularly found 16/25 of 120 or did not work out the ratios correctly or mixed the boys and girls up.

A striking weakness in students was the question on bearings, trigonometry and transformations. On the whole, problem solving questions and questions assessing mathematical reasoning were not tackled well in particular question 12 and 18.

Question 1

(a) This part was answered well. It was encouraging to see that the majority of students wrote down Tanzania.

(b) This part was answered well. A common error by some students was to write 800 000

(c) This part was answered well. An answer of −2410 was accepted.

(d) This part was answered well. A common answer was to write 'ten thousand hundred and twenty'.

Question 2

(a) Majority of the students drew the bar to the correct height of 13. A common error by some students was to draw the bar to 12. All students are encouraged to use a sharp pencil and a ruler.

(b) This part was answered well. It was encouraging to see that the majority of students wrote down Brazil.

(c) Many students answered this question well. The first mark allowed incorrect notation such as 29 out of 113 or 29:113. Some students wrote down answers such as $\frac{29}{k}$ with $k > 29$ **or** $\frac{n}{113}$ with $n < 113$ which were given the first mark. However, answers such as $\frac{29\text{million}}{113\text{million}}$ or $\frac{29000000}{113000000}$ were given full marks.

Question 3

(a)(i) This was answered well. A common incorrect answer was m, metres or miles

(ii) This was answered well. A common incorrect answer was kg or kilometres.

(iii) This was answered well. A common incorrect answer was cm^2, square centimetres or a unit of length.

(b) Students generally answered this question well. Many students multiplied by 1 by 1000 and then divided by 30 and then left their answer as 33.3… or 34. Some students lost the final mark for not rounding down. Some students did not know the conversion from litres to millilitres as they were multiplying by 100. Most knew to divide by 30, so a common answer was 3 from 100/30. Repeated addition was used often with 30ml to reach 100ml. The alternative method of dividing 1 by 1000 and then using this answer to divide into 1 was rarely seen.

Question 4

(a) Most students were able to continue the pattern correctly. A small number of students lost the mark because they included an extra square on the bottom of the diagram or had not drawn enough squares horizontally.

(b) The majority of questions were answered correctly for this part.

(c) Majority of the students answered this part well. Many students continued the sequence by adding 2 although occasional arithmetic errors were made. Very few students attempted to use the *n*th term or simply working out 31×2. Some students incorrectly gave 72 as their solution thinking that the pattern number and the number of squares were proportional eg some multiplied the fifth term by 6 to reach the 30^{th} term.

(d) This part was a challenge to a large number of students. Many students simply wrote down no and 2 needs to be added. Many wrote that the *n*th term was $n + 2$. Some who attempted to explain a counter example were unable to do so convincingly. Even though they could not see the correct formula, often a link was made to $2n$ meaning a sequence going up in 2's. A number of students who said yes, explained it by the series consisting of even numbers.

Question 5

This question was done well. Most students were able to write down all the possible combinations from the CEW and OMW. A common mistake by some students was to write down the correct combinations and then continue writing out combinations in different orders, e.g. (C, O) and (O, C)

Question 6

(a) This was answered well. Some students wrote $\frac{0.25}{1}$

(b) Many students could write $\frac{34}{10}$ as a mixed number but it was not uncommon to see 3.4, $\frac{17}{4}$ or $3\frac{4}{10}$, which gained 1 mark and there were even some non-responses.

(c) It was clear in this part of the question that some students lacked the experience of past papers in dealing with fraction manipulations without the use of a calculator. Many resorted to a decimal treatment and this work always gains no credit. The most successful attempts involved inverting the second fraction and changing division to multiplication. Then either cancelling had to be shown to have taken place, or the numerators and denominators had to be multiplied out to obtain for example $\frac{48}{60}$. For some students the traditional methods for division of fractions clearly remain a mystery. All kinds of muddled manipulation of numbers appeared as did frequent blank answer spaces. Some attempts to use $\frac{16}{4}$ and $\frac{15}{3}$ were seen. $\frac{16}{4} \div \frac{15}{3}$ is mathematically correct but an unsuitable method of division if there are no common factors. Students who tried to use this method were not successful because they were unable to show sufficient convincing working. Very few were successful with the "common denominator then divide the numerators" approach.

Question 7

(a) This was answered well. Many students giving the correct angle and the correct reason. Some students gave calculations instead of reasons, which scored no marks.

(b) It was very pleasing to see a good number of fully correct responses here, with the size of angle *y* calculated and reason(s) given for the answers. In-between these were a significant number of responses with the correct values found but no reasons given. The student could approach this question in two different ways, firstly by considering quadrilateral *ABDE* or secondly by considering quadrilateral *ACDE* and the straight line *DB*. Many students could work out 137° but did not give complete reasons. For example, if the student approached the question by considering quadrilateral *ACDE* and the straight line *DB* they only gave one reason when two were required for the final mark.

Question 8

(a) Collecting like terms in was not well done, the directed number aspect is still an issue for some. The most commonly seen error was simplifying $-2k - k$ giving $-k$ or $+ k$. Many students simplified 6m + 5m to 11m correctly where they gained 1 mark.

(b) This part was well answered. Many students could multiply 2 by 5 and multiply 3 by 8 and obtain 10 and 24 respectively with an addition sign between which gained the first mark. Some students just wrote 10 and 24 thus not gaining the first mark. A common

error was to add 10 and 24 and write for example 44. Students can use a calculator to add their numbers up.
(c) It was encouraging to see a number of students were able to achieve full marks, with a good number of the rest able to gain one mark for correct substitution. A common error was to rearrange the equation incorrectly by writing down 60 – 16 = 2a. Students who rearranged correctly went on to gain full marks but some forgot to divide −44 by 2. Numerical methods were rarely seen. Some substituted 16 as the value of '*a*' instead of *P*.

Question 9

The majority of students gained one mark by working out the number of large ice creams or the number of small ice creams by dividing 240 by 3 and/or multiplying this answer by 2 to obtain 80 or 160. Some students tried to convert the 1/3 into a decimal such as 0.3 or 0.33. Students wrote down that 1/3 = 0.3 or 0.33 and then multiplied 0.3 or 0.33 with 240 could gain the first mark. Students who just did 240 × 0.3 did not gain any marks. Many students could gain the second mark but a minority of students multiplied 160 with 3.8 trying to find the cost of the large ice creams. Many students lost the final 2 marks as they did not use a complete method to work out the cost of a small ice cream. Again, there was a significant amount of often convoluted working that made little sense mathematically; amongst this were attempts to divide 640 by 3. There was evidence that some students did not read through the question carefully enough.

Question 10

(a) Most students wrote down the correct answer. Some students just gained 1 mark by writing 16 : 40 or 8 : 20 or 4 : 10 ie: partially simplified. Some students wrote answers in the form of a fraction such as 2/5 which did not gain any marks.
(b) This part was well answered. Students are encouraged not to write probability in ratio notation.

Question 11

(a) Many students obtained the correct method by working out 16/40 of 360 or dividing 360 by 40 and then multiplying by 16. Some students tried to use a two stage approach by expressing 16/40 as 40%, however, they never completed the second stage and gained no marks.
(b) Many students realised that each person was represented by 4° but then failed to realise that they needed to divide 56 by the 4° that represented each person. Some students tried to use a two stage approach by expressing 48/192 as 25%, however, they never completed the second stage and gained no marks.

Question 12

This question was a challenge to the majority of students. Those who read the question carefully and understood what was required tended to gain full marks. Many students gained 1 mark for working out the minimum number of marks needed out of the two papers or working out the marks obtained in paper1. To gain the second mark the students had to find two values which could be used to find the final answer such as 96 and 44 or 48 and 44 or 48 and 4. Most candidates managed to achieve M2 for using BC, but many lost marks by just stating 4 and not adding 4 to their 48. Showing that 65% (of 80 was required) gained 2 marks. The majority of students did not gain the final two marks. two marks. Many students are not showing the method in the % calculations so gaining no method marks, e.g. 55% of 60 would score no marks but $\frac{55}{100}\times 60$ would score 1 mark.

Question 13

A large number of students didn't understand bearings.
(a) Majority of students did not know which angle to measure. Many found the acute angle at *P* which was 50° or the obtuse angle 130
(b) Many students failed to measure the line from *S* to *P* correctly and many students did not use a ruler to measure the line. Some students who measured the line correctly failed to multiply this length by 20 or even divide by 24. The second method was rarely used by the majority of students. The final mark was often lost by otherwise successful students by not giving the answer to the nearest hour (7.08, rather than 7). It was not unusual to see division by 60 in an attempt to change units of time.

Question 14

(a) Some students were able to find the coordinates of the midpoint of AB, but there were several spurious attempts, showing little understanding of what was required. Some students simply subtracted the *x* values or the *y* values and then divide by 2 while others simply added the coordinates, showing no intention of dividing by 2. Sketches often failed to show a method to find the midpoint. If students picked up only one mark, it was generally for the *x* coordinate being correctly given as 9; the *y* coordinate of −1.5 seemed harder to find or the coordinates written in reverse. The formula for gradient was sometimes seen.
(b) Many students wrote down the incorrect answer of 2 or 3.
(c) Many students answered this question poorly. A minority of students substituted *x* into $y = 2 - 3x$ and obtained –298 and then wrote down no or equivalent. A minority of students substituted *y* into the equation and obtained 103.3 (if this is to gain a mark it should be 101.3) or compared the *y*-intercept values. Some students lost the mark by not evaluating their expression such as $-302 \neq 2 - 3(100)$ and stating no.

Question 15

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 answered poorly as many students could not gain the second mark as they had no understanding of the meaning of HCF’s and LCM’s.
Some candidates confused HCF and LCM. They often do 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 16

This question proved straightforward for the majority of candidates. A few found only the area of the one rectangle such as 12 × 9 or 12 × 6. Many students did not approach the question using an algebraic method. A common approach was 129 – 108 and then divide by 3. Some students left their answers as 3 × 7 = 21 thus losing the final A mark. Some who had 21 then divided by 6

Question 17

(a) This part was answered well. Only a minority of students wrote down 16. It was encouraging to see the majority write down $3 < w \leq 4$. Correct notation was not required to identify the modal class.

(b) Many students answered this question well. The majority of the students showed clear working However, a common error by some students was to use the lower limits or the upper limits to work out $\sum fx$ so gained 2 out of the 4 marks available. This method is incorrect and the students need to understand that they must use the mid points. Other common errors were to write $\frac{144}{\text{their freq}}$ (students should note that the value of the sum of the frequencies was given in the question) or writing $\frac{144}{5}$. A common error was to multiply the frequencies by the class width (10). Another frequently seen error was to divide 40 by 5. It seems that although the weight had to be between 2 & 7 kg, answers of 8 and 28.8 were common.

(c) The correct answer was common, but a significant number of students included the class interval $4 < w \leq 5$ so obtaining $\frac{9+2+1}{40}$ which resulted in an incorrect answer.

Question 18

Whilst many correct answers were seen, some students were unable to successfully navigate their way through this problem.

It was not uncommon, for example, to see students who correctly shared 120 in the given ratio but then found $\frac{16}{25}$ of 45 rather than $\frac{16}{25}$ of 75. Those who did get as far as calculating $\frac{16}{25}$ of 75 then did not know how to divide the 45. Some students did not understand the statement ‘Twice as many girls go sailing as go climbing’ as they divided 45 by 2. Some students found 30 or 15 but went on to add 30 with 48 or 15 with 48 or 15 with 27 not realising they had to add 30 with 27 to obtain the correct answer.

Question 19

This question was answered poorly. If incorrect, most students enlarged the shape successfully but did not draw it in the correct position, this was awarded 1 mark for having the shape in the correct orientation. Many students had problem with understanding that ‘Enlargement’ doesn’t necessarily mean the resulting figure will be larger. Many did manage to achieve B1 for, at least showing the correct size & orientation. Even when they drew the guidelines correctly from the vertices, they were unable to complete this correctly.

Question 20

(a) This part was answered well as majority of the students gave the correct answer. Only a minority wrote down 78 000. Although 000.78 was sometimes seen.
(b) This part was frequently incorrect and those who often gained 1 mark was for 22 500 000 or for an equivalent such as 22.5×10^6, or for writing 2.25×10^n where n could be any value but not 7. Some candidates may benefit from being reminded how to use the standard form button on their calculators.

Question 21

(a) This part was not answered well. A common error was for adding the second term in the brackets and obtaining − 3 rather than multiplying to obtain − 40; some 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) This was generally poorly answered. Some students gained 1 mark for partial factorisation rather than factorising the expression fully, $y(5 + 20y)$ was frequently seen.
(c) This was answered poorly as most students had no idea that anything to the power zero is one.
(d) This part was very demanding in that it required clear algebraic working and involved expanding the bracket on the LHS and a fraction on the RHS. Students sitting this tier were often unable to make the correct start to solving the equation by multiplying both sides by 2 or expanding the bracket. Some of those that made a good start and did multiply correctly by 2 and expanded the bracket correctly. A common error in expanding the bracket on the LHS was to write 6x – 5. Even when some students passed this hurdle they had difficulties in isolating the *x*'s on one side and numbers on the other side due to poor algebraic rearranging.

A correct answer **without** clear algebraic working was awarded no marks as the questions told the students this was needed.

Question 22

At this tier either students score full marks or no marks at all. Some of the students worked with cos 63. Others used sin 27 using the trigonometric ratio successfully. A few students gave a two stage solution generally using tan to find the other shorter side and then Pythagoras's Theorem. Provided that accuracy was maintained throughout, this lead to the correct answer and full marks. The most common error seen was to start correctly with $\cos 63 = \frac{24.3}{PQ}$ but then make an error in rearranging this to get 24.3 × cos 63. It was disappointing to see many students use 63 × cos (24.3) suggesting a total misconception of angles and sides. It was also interesting to see students using 24 instead of 24.3. Students should not round the numbers given in the question.

Summary

Based on their performance in this paper, students should:

- learn and be able to recall metric conversions such as 1 litre = 1000 millilitres
- know the difference between metric and imperial units
- learn how to use fractions and percentages
- use a ruler when measuring lines and a protractor when measuring angles
- know how to measure reflex angles
- know how to initially write SOHCAHTOA equations prior to rearrangement.
- differentiate between factors and multiples and HCF and LCM
- 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
- ensure their working is well-presented in a structured format and that any unnecessary working is crossed out.

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