Examiners' Report
Principal Examiner Feedback

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

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4MA1 1FR Jan 2019 Principal Examiners Report

Students who were well prepared for this paper were able to make a good attempt at most of the questions. For those questions requiring working to be shown, most students provided it which is encouraging as it has been common in the past, in particular in terms of algebraic working, for it to be absent.

It was encouraging to see some good attempts at topics new to this specification. Of these new questions, students were particularly successful in the question assessing the addition of mixed numbers but less successful in finding vector used for a translation.

Problem solving is an area in which this cohort needs to improve; the ones presented on this paper provided mixed results. Questions involving time continue to be a problem as do converting between metric units of measure.

1   Part (a) was answered well with almost all giving the correct answer of Manchester. Part (b) saw less success with common incorrect answers of 77 and 78 being seen. Most students were able to gain 1 mark on part (c) with the correct answer of 105.

2   The second question saw some familiar work with fractions, decimals and percentages. It was surprising to see so many students fail to gain 1 mark with part (a); it was commonly seen that $\frac{1}{6}$ and $\frac{1}{2}$ were placed in the incorrect positions. The remainder of the question was answered well with students able to convert a fraction to a decimal and percentage in parts (b) and (c) respectively, and almost all being able find the difference between 1 and $\frac{5}{8}$.

3   Part (a) was answered well with almost all students able to measure the length of the line and give an answer in the range in cm; 3.4 and 3.5 were the most commonly seen answers. In the second part of the question students were required to find a point Q by measuring both a length and an angle. Many were able to gain two marks for a point within the allowed tolerance; those that didn't usually gained one mark for a point 2cm from O.

4   Although some students were able to interpret the linear scale correctly, many did not and a large range of incorrect answers were seen for part (a). Fortunes improved in part (b) with many students able to gain two marks for correctly reading 8.4 and 3.8 from the bar chart and finding

the difference. If the correct answer wasn't seen, students were able to pick up one mark for a method to find the difference with one value correct; this was rarely seen as often if one value was incorrect, so was the other due to the vertical scale being interpreted incorrectly. Part (c) was answered well with almost all students picking up one mark for a correct bar drawn.

5   This question saw the familiar list of integers where students had to recognise multiples, factors and primes. Part (a) was answered well with most students being able to give the correct answer for a multiple of both 6 and 9. It was rare to see a fully correct answer for part (b) but some students were able to pick up one mark for a correct factor of 90. It is clear that these students need to learn the definitions of 'sum' or 'prime' or both as many were not able to give two numbers from the list with a sum that was prime.

6   Part (a) was answered well with almost all students able to give the correct answer; (2, 6) was occasionally seen. Plotting coordinates is also a strength of this cohort with almost all able to plot the point D correctly; those that didn't usually plotted (−1, 4) instead. In part (c) around half of the answers were correct; common incorrect answers were 'equilateral' and 'right angle'. There was little evidence of a method seen in the working space for part (d) which indicates that most students used the diagram to find the midpoint of AC. Some students were able to do this successfully and pick up two marks, others managed to gain one mark for one correct coordinate or an answer of (4.5, 3). There were also a large number of incorrect answers seen.

7   This 4 mark question was the first problem of the paper and provided the full range of marks available. It was pleasing to see a good number of students able to provide a fully correct method and answer for 4 marks. Some students got as far as 200 – 171.2 but made an arithmetic error to arrive at 29.8 as their answer; this was disappointing on a calculator paper. Those candidates who gained one or two marks were able to work with the initial percentage calculation but failed to consider the change aspect of the question or find the total of two adult tickets and two child tickets.

8   Part (a) was answered well with almost all students picking up two marks, those that didn't usually picked up one mark for either $4x$ or $3y$. Part (b) saw a pleasing number of correct answers with almost all students able to reach a correct answer of 4.5 or equivalent. Of those that didn't it was usually arithmetic errors which prevented them from picking up full marks.

9   Part (a) of this pattern sequence question caused problems for this cohort with many incorrectly adding a black and white counter to the right end of the initial pattern. Some were able to correctly interpret the sequence and add a black counter onto either end. Parts (b) and (c) provided more success with many students able to give the correct answers. Part (d) saw mixed results; some students attempted to continue the sequence which tended to be unsuccessful as errors were made. There were a small number of students who did gain two marks with some of them using the nth term.

10   This question saw 6 marks available on probability. Part (a) was answered very well with almost all students able to give a correct fraction; some converted to a decimal or percentage correctly too, although this was not necessary to gain the mark. Part (b) was also answered successfully with many gaining two marks; those that didn't usually gained one mark for a complete method to find the number of beads that are either red or yellow, with an arithmetic error being the reason why they did not gain the A mark. Part (c) discriminated between the students well with the whole range of marks being seen. A good number of students were able to pick up 3 marks for an answer of $\frac{2}{26}$ or $\frac{1}{13}$. Some only gained two marks for getting as far as a complete method to find the number of blue counters but no further. Some picked up the one mark for a correct start to their method e.g. finding the number of pink counters. There were a small number of students who did not gain any marks as they were unclear how to begin the process.

11   The number of marks gained on this three part question was varied. Part (a) saw many students gaining 2 marks for a correct reflection; of those that didn't could've picked up 1 mark for a shape of the correct orientation or in the line $y = 5$. Usually those students who didn't pick up any marks on this part scored 0 for the whole question. Part (b) saw a good number of students pick up 1 mark for a correct reflection of their shape from (a). Part (c) rarely saw both marks being picked up for a correct description. It was common to see the double reflection described again and an incorrect vector such as $\begin{pmatrix} 6 \\ 0 \end{pmatrix}$ given. There were a small number of students who correctly described a different transformation other than translation following through from their incorrect answers to (a) and (b) which gained marks accordingly.

12   This time problem caused problems for these students and it was rare to see a fully correct answer. One of the main issues seen was students

working with 100 seconds in a minute; this generally led to 0 marks. There were a good number of students who picked up the first M mark for a method to find the total time of the three songs given in the question, but they were then not able to go on to achieve the correct answer, with 5 minutes 21 seconds being a common incorrect answer.

13   In this 3-part question on linear graphs, parts (a) and (b) were answered well with almost all students picking up 4 marks in total. Part (c) saw less success with a fully correct answer rarely seen. Some students did manage to pick up 1 mark and this was usually for a point plotted to the left of x = 2, but plotted on the line rather than above it. The most common incorrect answer seen was to plot P at the point (2, -1).

14   This question was answered well showing that this cohort can confidently use their calculators. Almost all students gave the correct answer for both parts, with 44 occasionally seen for part (b), presumably coming from an incorrect method of 11×4.

15   This problem solving question was a bridge too far for the majority of these students as a fully correct answer was rarely seen. It was common for the first M mark to be gained, usually for 45 × 80. Unfortunately most students did not know where to go next, and use of the correct conversion between litres and cm^3 is clearly something this cohort needs to work on.

16   This familiar 'show that' fractions question produced the full range of marks available. It was pleasing to see some students gain the full 3 marks, with the most popular method being to convert to improper fractions as a first step and then find a common denominator of 12 before adding. A large proportion of the cohort managed to find two correct improper fractions but then went straight to $\dfrac{53}{12}$, which gained just the 1 mark in total. A good number of students were unable to make a correct start and pick up any marks; converting the fractions to decimals was an incorrect method seen regularly.

17   Many students were unable to make a correct start on this fractions and ratio question. It was common to see students try to work with decimals instead of the fractions or to find $\dfrac{3}{5}$ and $\dfrac{4}{5}$ of 60. Of those that did make a correct start many got as far as 27 or 12 or 39 but then failed to go on and find the fraction of children who play a musical instrument; this gained 2 marks. There were still a good proportion of the cohort who gained the full 4 marks for an answer of either $\dfrac{39}{60}$ or $\dfrac{13}{20}$.

18   This 4 mark Pythagoras question usually saw students pick up either 0 or all 4 marks. Those that were able to get off to a correct start by using Pythagoras to find the length of *QS* were the able to use the theorem again to find the length of *PQ* and a correct answer of 11. The majority of the rest of the cohort did not pick up any marks; common incorrect methods were to add 14^2 and 10^2 instead of subtracting and to try to use trigonometry. There were a small number of students who arrived at an answer of 7, coming from a failure to correctly input $\left(4\sqrt{6}\right)^2$ into the calculator; these students could still gain 3 marks if they showed their method.

19   The first mark in this question was for working with the range to find the value of *a*; this was done well by the majority of the students on this paper. Following the first mark it was all or nothing; students either went on to score 3 marks or just the 1. For those who did not gain the correct answer the most common incorrect method was to confuse the median with the mean, which meant students set up an equation adding the four values then dividing by 4 to equal 30.

20   It was pleasing to see the majority of students pick up at least 1 mark on this speed, distance, time question. This was usually for the initial step of dividing 30.5 by 8, presumably the speed, distance, time formula being familiar to this cohort. Many were unable to progress from here but for those that did, several went on to gain the correct answer of 228.75. There were also some students who picked up 2 marks; this was usually for a correct method but premature rounding in their method led to an inaccurate final answer.

21   Forming linear equations from geometric situations is clearly something this cohort should concentrate on improving. Many students were not aware of how to begin this question; the most common incorrect methods were to add the three expressions for angles and sum to 180 or to multiply, expand and simplify the two expressions in *x*. For those that did manage to set up the equation many were able to go on to find the value of *x* and then substitute in to find the value of *y*. There were a small number of correct answers seen with a numerical method shown but no algebraic working. It is important that students read the question properly and where algebraic working is asked for it needs to be provided if credit is to be gained.

22   It was pleasing to see around half of this cohort pick up all 3 marks in this scale models question. Many students were able to find a correct scale factor and go on to use this in the correct way to obtain an answer in the acceptable range. Of those that did not gain any marks on the question, the most common incorrect method seen was to work with

the given heights and find differences rather than dividing to find the scale factor. There were a small number of students who achieved 2 marks for a correct method but losing accuracy by rounding prematurely.

23   This linear simultaneous equations question caused problems for these students and it was rare to see a fully correct solution. Many had an idea of what needed to be done but usually let themselves down once they had multiplied one or both equations by failing to choose the correct operation (add or subtract). There were some students who made arithmetic errors and therefore only gained 2 marks; it should be noted that clear methods were needed to award these marks and it was pleasing to see most students make an effort to provide this.

24   Part (a) for this question saw mixed results. It is clear that some of the students who sat this paper do not know the difference between standard form and an ordinary number, with many giving an answer of 480 000 000 000. Some students were able to interpret the question correctly and give a correct answer for 1 mark. Part (b) saw mixed results with many students trying to go down the route of using a prime factor tree which rarely led to the correct answer. There were a good number of students however who picked up B1 for at least 2 correct steps in repeated prime factorisation or B2 for an answer in the form $2^m \times 3 \times 5^n$. Part (c) was answered poorly, probably because it was rare to see a correct answer in (b); not a single student picked up the 1 mark available.

25   This question working with the areas of semicircles saw a good number of students pick up 1 mark, usually for $\pi \times 6^2$. It was rare to see students pick up more than 1 mark, but there were some who provided a fully correct method and gave their answer as a decimal rather than in terms of π. As we have seen in the past, there were a significant number of students who used the wrong formula and worked with circumference rather than area.

26   This reverse mean problem required students to first find the total number of coins for the boys. Some students managed to do this to pick up the first mark but were then unable to go on and find total number of coins for all the children. Of those that did, some then divided by 2 or simply gave an answer of 84. There were a small number of students who did go on to pick up all 3 marks with an answer of 4.2. The most common incorrect method was to add boys mean and the girls mean and divide by 2.

Summary

Based on their performance in this paper, students should:

- Learn definitions of basic numerical terms such as 'sum' and 'prime'

- Practise reflecting shapes and describing transformations

- Work on conversions between units of time and remember there are 60 seconds in a minute, not 100

- Work on the conversion of units of capacity in particular litres to cm^3

- Practise forming linear equations from geometric situations and scenarios

- Ensure calculators are always used to check calculations to avoid arithmetic errors