Examiners' Report
Principal Examiner Feedback

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

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Following on from the November 2020 series, this 4MA1 paper was also sat in unusual circumstances. Only a few days after the UK entered a national lockdown, paper 1 of this series was sat by this cohort. It was pleasing to see them adapt very well to an everchanging situation and to their credit, each question was attempted well, even if not always successfully.

Students of the 4MA1 course are now familiar with new topics to the specification. At foundation level, certain topics still cause issues in general, such as describing transformations, geometric reasoning for angles questions and many of the grade 4 and 5 questions in the final third of the paper. It is pleasing to see workings written down for all questions meaning students give themselves the best possible chance of gaining method marks even if they don't pick up the accuracy mark.

1   Part(a) was answered very well with almost all students able to give a correct answer. Part (b) saw less success with incorrect answers of tenths seen regularly. Parts (c) and (d) saw mostly correct answers although some gave an answer of 5000 for (d). Most students also gave a correct answer of 2370 for (e), with some giving an answer of -2370 which was acceptable for 1 mark.

2   The first of two spinner questions was answered well with almost all able to give 3 different numbers less than or equal to 9. In (a)(ii) less success was seen as some confused multiples with factors and gave incorrect answers such as 1, 2, 5. Part (b) saw a variety of answers, some correct, some incorrect. The most common incorrect answer was a cross at 1.

3   The first stage of this 3 mark question saw students needing to find the weight of the excess baggage in the suitcase. The second stage was to multiply this value by 7.45 and a correct answer of 81.95 gained 3 marks. Some students were unable to find the excess baggage and instead either misread the scale or did not read the scale at all – in either case if a value was multiplied by 7.45 then 1 mark was awarded.

4   Part (a) was answered well as most students were able to correctly convert to a fraction; incorrect answers seen included $\dfrac{57}{1000}$. Part (b) also saw plenty of success although some gave an answer of 20 or 0.2. Part (c) and (d) also saw these students able to manipulate fractions although some did not fully simplify their fraction in (c), leaving their answer as $\dfrac{18}{21}$. Almost all were able to gain 1 mark for an answer of 78 on (e).

5 Part (a) of this sequences question was answered well with most able to pick up 1 mark for a correct shape. For part (b) most students were able to complete the table correctly; the most common incorrect answer seen was 16, 19 when the common difference was incorrectly calculated as 3 instead of 4. It was also pleasing to see most students be able to continue the sequence and successfully find the number of shaded squares for Shape number 8. Part (d) saw more varied success with some unable to give a correct reason as to why 50 was not in the sequence – the most seen incorrect reason being '50 is not in the 4 times table'. Students seemed to focus on the difference of four rather than the fact that the sequence contained only odd numbers and 50 is even.

6 It was pleasing to see the majority of students use a correct conversion of 1 metre = 100 centimetres in this question. The first mark was awarded for a correct conversion, either for 6 metres to centimetres or 17.5 centimetres to metres. From there students gained the next mark for a complete method to divide one length in to the other, an incorrect conversion was accepted here so those who did not gain the first mark could still gain the second. The A mark was for understanding that only 34 bracelets could be made and some failed to recognise this and gave their answer as a decimal or as 35.

7 Part (a) saw lots of success with many able to give a correct simplification. Some could only simplify one term correctly; $13x + 10y$ and $7x − 2y$ were commonly seen incorrect answers. A few students lost a mark as they did not fully simplify and left the answer as $13x + −2y$. For part (b) many also picked up 2 marks for a correct answer of 5.5 or equivalent. Clear algebraic working was not required and there were many who did not write any algebra at all which could still gain full marks if done correctly.

8 Part (a) of this two-way tables question was answered very well with most able to pick up 3 marks for 6 correct entries. As is common with these questions very few workings out were shown; for those who did not gain full marks almost all picked up 1 or 2 for a partially correct table. In part (b) success was more varied with some unable to give a correct fraction; 29/60 or 7/29 were commonly seen incorrect answers.

9 It was pleasing to see a good number of students work through this solution methodically and gain the first 2 marks for an answer of $x = 62$ from correct working. Some students gained a correct answer from incorrect working, usually by labelling angles *DAE* and *ADE* as 59 which led to an answer of 62 for angle *AED* – these solutions gained 0 marks. It was disappointing to see very few students gain credit for reasons given for each stage of their working; this is certainly an area for this cohort to work on. The most common missing word was 'angles' e.g. 'a straight line is 180' does not score a mark. Some think that 'give reasons' means to explain what they did e.g. 'I subtracted 242 from 360'.

10 This 3 mark proportion question saw lots of success for these students. Many were able to make a correct start to find the cost of one chocolate bar. From there a complete method was needed to pick up the second method mark. An answer of 1.85 gained the 3ʳᵈ mark. For those that did not gain full marks, common errors were to divide 5 by 5.75 as a first step and to fail to divide 5.55 by 3.

11 Finding the difference between two times is certainly an area to work on for these students. To gain 2 marks an answer of 11 hours 45 minutes was required. Many were unable to get there but a good number did manage to pick up 1 mark for either 11 hours or 45 minutes.

12 Part (a) saw mixed results with around half of this cohort unable to pick up the mark, the x^2 part of the expansion proving the stumbling block. In part (b) the substitution of $c = -5.6$ caused the most problems with many unable to deal with the double negative. In saying that, a common incorrect answer was also 9.5, where the student had dealt with the substitution of $c = -5.6$ correctly but had added 1.5 and 2.4 instead of multiplying. Part (c) again saw varied success, a good number were able to make a correct first step and then go on to gain 2 marks. Of those that didn't, many found the first step a problem, possibly because they were dealing with 4 letters rather than a mixture of letters and numbers.

13 Part (a) saw students generally gain 0 or 2 marks. A good number dealt with the numbers correctly to give a correct answer of 24. The most common incorrect methods seen were (750 / 180) × 100 and (750 / 100) × 180. It was pleasing to see a good number of students gain 3 marks on part (b). There were two main methods seen; the first to find the total income and then 94% of this value, the second to find 94% of the cost of a ticket and multiply this by 180. Many gained 1 mark for 180 × 32.50 (= 5850). Some students were unable to interpret the information given and make a start on this question and some thought 94% meant to divide by 94.

14 In both parts of this transformations question marks could be deducted if more than one transformation was described. This was seen regularly and students should note that if a single transformation is asked for then only one should be described. In part (a) reflection was often seen but students found it challenging to give the correct line of symmetry or in fact any line of symmetry. In (b) rotation was seen often as was a correct angle and direction but a correct centre was seen less regularly. Many described more than one transformation, with vectors or move/down/up being seen the most often.

15 It was pleasing to see a good number of students extract the correct information from the table and give the correct probabilities in this two part question. In part (a) many were able to give a correct answer of 13/30 – the correct equivalent decimal or percentage were accepted. Part (b) saw less success with some students able to find the number of not red counters but then not following this through as a correct probability. In both parts incorrect notation was seen such as 13:30 or 13 out or 30 or 13 in 30; if this was seen for both (a) and (b) it was only penalised once.

16 This 2 mark fractions question saw many pick up both marks. The common denominators seen most were 24 and 48. Some students were unable to make a correct start and tried to find a common denominator but failed to multiply the numerators accordingly. There were also some students who worked with decimals, gaining 0 marks.

17 This 4 mark ratio and fractions question began with students needing to find 7/10 (= 14,112) or 3/10 (= 6048) of 20,160. Many found 3/10 of 20,160 but then went on to work with this and gained no further marks. Of those that did work with 7/10 of 20,160 it was good to see many of them able to split this value into the ratio correctly. For the 3rd method mark a complete method was required and the correct answer of 6174 gained full marks. Some did manage to reach 14,112 but then divided by 9, 5 and 2 rather than by 16. There were several students who were not able to make a correct start at all on this question; dividing 20,160 by 3 was a common incorrect start. The final subtraction was sometimes done using the wrong two (correct) values such as dollars and rupees.

18 It was pleasing to see a good proportion of these students gain 1 mark for correctly identifying the modal class, some incorrect notation was seen such as wrong inequality signs but as long the intention was clear the mark was awarded. The most common incorrect answer was 23. For part (b) there were a good number of students who were able to make a correct start on this 4 mark mean from a grouped frequency table question. This involved using the mid interval values and the frequencies to find and sum products for 2 method marks. Some were then able to go on to divide by 80 and find a correct answer in range. Common errors were to divide their sum (= 5310) by 5 or by the sum of the mid interval values. There were a good number of students who gained no marks as they were unable to make a correct start at all. Unfortunately, there were some students who misunderstood the definitions of mode and mean and despite showing correct workings for the mean next to the table, they then used these workings for their answer to (a) and gained no credit.

19 This volume and time question caused many problems for this cohort. To gain the first method mark the volume of the water already pumped out or the water left or the whole container needed to be found. A good number were able to do this. From there students needed to work with some sort of rate whether that be looking at time or dividing the volume of water already pumped out into the volume of water left. The 3rd method mark was for a complete method to find the time taken to pump the remaining water out or the total time taken to pump all the water out. The A mark was for an answer of 20 30 although 8 30 (pm) was accepted. It was disappointing to see some students reach 8.5 hours but then give an answer of 19 00 instead of 20 30, missing the initial 1.5 hours. Some students attempted methods where they attempted to split the cross section up into rectangles sized 20cm by 30cm and work with proportion, this usually led to errors and 0 marks. There were very few fully correct solutions. A few of the students who had the correct approach lost marks at the end where they used 1.3 for one and a half hours instead of 1.5.

20 In this 2 part sets question (i) saw more success than (ii). In (ii) the most common error was to omit a value (usually 24) or include extra values. Some students misinterpreted the symbols and gave the correct answer for (i) in (ii) and vice versa.

21 Part (a) on this question saw mixed success. Some students were able to correctly extract $5y^3$ and give two correct terms in the brackets for 2 marks. Of those that didn't, 1 mark could be gained for a correct partial factorisation with a minimum common factor of $5y$ or y^2 and a good number were able to do this. Common incorrect solutions included trying to combine the two terms into one such as $35uy$. In part (b) clear algebraic working was asked for and it was pleasing to see all students follow this instruction. The first method mark was for removing the fraction from the right hand side and this was attempted by most; it was common to see errors made here as some failed to multiply the left hand side by 4 or multiplied incorrectly e.g. resulting in $16 - 3x$. The second mark was for rearranging to get the x terms on one side and numerical on the other and it was pleasing to see a good number able to do this – even if errors had been made in the first stage this mark could still be gained. An answer of 2.75 or equivalent gained 3 marks.

22 Both parts of this standard form question saw plenty of correct and incorrect answers. Many had an idea of how their answer should look in (a) but struggled to deal with what the power of 10 should be. An incorrect power of 7 was often seen, presumably from counting the number of zeros. In (b) common incorrect methods included misinterpreting the power and giving an answer of 25,000. A significant number had the decimal point in the wrong place or often no point at all, e.g. 000025.

23 This two part percentages question saw more success in part (a) than in (b). A good number were able to show a correct method and follow it through to give a correct answer in range. Some used the efficient method of 4000×1.035^3 whereas others did 3 separate percentage increases. Of those that did not gain 3 marks, some gained 1 mark for a correct initial increase of 3.5% but then went no further or used simple interest. There were also a good number who did not know how to start this question or used an incorrect multiplier such as 1.35. In (b) the most common scores seen were 0 and 3. Some were able to use a correct method and arrive at a correct answer of 32,600. Unfortunately, the majority did not and therefore gained 0 marks, with increasing or decreasing 30,481 by 6.5% being the most common incorrect method.

24 This 3 mark perimeter problem caused some issues for this cohort. To make a start the circumference of a full circle or arc length of a semicircle needed to be found. A good number reached this stage but then went no further as the 2nd method mark involved finding the arc length of both semicircles and adding. To gain full marks students needed to remember to add on the two straight edges and many forgot to do this. Common incorrect methods seen were to work with area which gained 0 marks.

25 Part (a) saw students needing to expand a bracket with a product inside. Some were able to deal with the powers on the algebraic terms correctly as well as 2^4 and gain 2 marks. Of those that didn't, common errors were to fail to evaluate 2^4 correctly; 2 and 8 were often seen. In part (b) students needed to factorise a quadratic expression and then use their factorisation to solve an equation. Some were able to produce a correct factorisation and then go on to gain another mark in (ii) for the correct solutions. It was common to see no correct working in (i) and therefore nothing gained in (ii) as this part followed through from the previous factorisation.

26 The final question saw students needing to work with trigonometry to find the perimeter of the given triangle. The first method mark was for a trig ratio for either *AB* or *AD*. A good number were able to do this but then many failed to go any further as the second method mark required methods to find both *AB* and *AD*. Of those that did get this far, some used trigonometry twice but others used trigonometry and then Pythagoras' Theorem. To gain the 3rd mark a complete method was required and the A mark was for an answer in the given range. It was disappointing to see some students find values for *AB* and *AD* but then fail to interpret these correctly; only adding one lot of *AD* was a common error costing 2 marks. There were many students who rounded their values from each stage of their workings, giving a large range of acceptable answers, meaning that almost all correct methods with no errors gained full marks.

Summary

Based on their performance in this paper, students should:

- Learn the angle reasons to be given for each stage of their workings.
- Practise finding the difference between two times.
- Practise expanding single brackets where the term on the outside is algebraic.
- Practise describing transformations questions and note that if a single transformation is asked for, only one of enlargement, reflection, rotation or translation should be described.
- Learn to distinguish between and select the correct method to find length (perimeter), area or volume.
- Write down operators for 'obvious' calculations e.g. 30% of means $30/100 \times$ or $0.3 \times$