



Examiners' Report
Principal Examiner Feedback

Summer 2024

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In Mathematics (4MA1) Paper 1FR

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4MA1 1FR June 2024 Principal Examiner's Report

The majority of questions were well-attempted by this cohort, although there was more variety towards the back end of the paper. Some topics earlier on in the paper require further attention and it was surprising to see some questions set at grades 1 and 2 answered poorly. Below is a detailed breakdown of the performance by students for each question, with a summary of points for improvement based on the performance for this paper given at the end of the document.

- 1 Part (a) was answered well with most students able to gain 1 mark, usually for an answer of 15, but 19 was also seen, as was students giving both 15 and 19. In (b), the majority gave the correct answer of 48 but a small number gave an answer of 6. For part (c), two thirds of students were able to identify the only prime number in the list as 19; for those that didn't a variety of answers were seen showing a lack of understanding of prime numbers for those students. In part (d), 70% of students gave an answer of 6 but the incorrect answer of 48 was seen regularly, presumably confusing factors with multiples.
- 2 Both parts of this question were answered well. In (a), common incorrect answers included $\frac{3}{10}$ and $\frac{1.3}{100}$; in (b) almost all students gained B1 for an answer of 4, incorrect answers seen included 80 and 3 written in the box.
- 3 Part (a) was answered well 70% of students able to write 267 in the box and gain B1; of those that didn't, the most common incorrect answer seen was 96387, coming from 5073×19 . Part (b) saw mixed results more than half of students unable to give a correct answer of 2744. A wide variety of incorrect answers were given including
 - 2.4... (cube root of 14),
 - 3.7... (square root of 14)
 - 7 ($14 \div 2$)
 - 42 (14×3)
 - 196 (14^2)In part (c) the majority of students scored 2 marks. Some students identified 987 and 139 but did not find the difference, others did a subtraction but one of the numbers was incorrect; $987 - 151$ and $973 - 139$ were the most commonly seen.
- 4 Part (a) was answered well with most able to give a correct answer of 28. In part (b), the majority of students gained 1 mark for a correct representation on the pictogram for Spaniel; for those that did not gain a mark the most common incorrect answer was one full symbol and one half symbol. Part (c) was answered well with many able to gain B1 for an answer of 20; of those that didn't the most common error was to read the Cockapoo total as 33 leading to an incorrect answer of 19.

- 5 Part (a) was answered well with most students able to order the values correctly from smallest to biggest. The most common incorrect answer seen was -3 , -8 , -14 , 12 , 24 . Part (b) saw more mixed results with most students giving the correct answer of 20 (-20 was also accepted for B1) but a variety of incorrect answers were seen, with 4 being the most common, presumably from $12 - 8$. Part (c) was answered well with most students able to give a correct answer of -16 ; some gave an answer of 16 . Part (d) was answered very well with most students gaining 1 mark for an answer of 11 .
- 6 Part (a) saw mixed results with less than half of students able to give a correct answer of 8 , with 4 being the most common incorrect answer seen. For part (b), most students were able to correctly identify the right angle, sometimes using R , sometimes using the right angle symbol and sometimes a combination of the two. For (c) results were more mixed and some students thought the top left vertex was obtuse. Some added an arc outside the shape, hence identifying the reflex angle instead of the obtuse angle. On both (b) and (c) it was not uncommon to see letters not clearly identifying an angle, e.g. in the middle of the shape or on a side. Part (d) saw mixed results with half of students able to give a correct answer in the range of $40 - 44$. It was surprising to see so many students give an answer way out of the acceptable range and so many blank responses, presumably as students did not have the correct equipment for the exam.
- 7 Despite coming early on in the paper, this question caused problems in this cohort. For part (a), half of students were able to correctly work with the information given and reach an answer of 32 ; all of the methods highlighted in the mark scheme were seen. Some students who decided to work with $24 \div 72$ or $96 \div 72$ lost the accuracy mark as they rounded to e.g. 0.3 or 1.3 leading to an inaccurate answer. Part (b) saw less success with $72 \div 24 \times 40$ being the most common method seen for the 40% of students who gained 2 marks.
- 8 This question was generally answered well with three quarters of students able to gain 4 marks for an answer of 3.45 . For those that didn't, failing to properly consider the information in the question was the main mistake e.g. using 1 birthday card and 1 sheet of wrapping paper – there was a Special Case available for those students who managed to do this accurately.
- 9 Part (a) was generally answered well with 90% of students able to give a correct coordinate for A . In part (b) the answers were mixed with some students gaining one mark as one of the coordinates was incorrect. In part (c) students often marked the point on the diagram but were not able to correctly write down the coordinates of D . In both (b) and (c) plenty of correct answers were seen but it was not uncommon to see confusion between x and y coordinates throughout.
- 10 Part (a) was answered very well with 90% of students able to gain 2 marks. It would be advisable for students to show their method as those that had an incorrect answer generally

did not show any method and therefore no marks could be gained. Part (b) was also answered well with the most common incorrect method being to apply the correct operations in the incorrect order e.g. $482 - 32 \div 1.8$, this approach still gained 1 mark.

- 11 65% of students scored 1 mark in part (a); the most common incorrect answer seen was c^5 . Part (b) saw mixed results, 65% students were able to collect like terms and simplify correctly. Common incorrect answers were to have one of the two terms correct and confusion between + and - leading to an answer of $16w + 8y$. A small number 'simplified' the correct answer to e.g. $10wy$, losing 1 mark. For part (c) more correct answers were seen for the 1st term compared with the 5th term. Some students had an incorrect 1st term and then continued the sequence leading to an incorrect 5th term as well. That being said, half of students still managed to gain 2 marks for 3 and 31. Part (d) saw many students able to gain the first M mark for expanding the brackets but then struggled to deal with the rearrangement of x terms on one side and numerical terms on the other. Some students incorrectly expanded, $7x + 5$ and $x + 35$ were most commonly seen, but were then able to gain the second M mark by correctly rearranging from there.
- 12 This 5 mark angles question saw the full range of marks awarded. Many students were able to work with the quadrilateral and/or the isosceles triangle and work out angle BCD and/or angle DCE . Many were then able to go on to reach 138 as the angle for BCE but some were unclear as to what angle they were working out and did not reach 138. Correct angle notation was seldom seen, with students just using single letters or marking angles on the diagram. Some found 138 but then did more work to it, losing the third mark. A few thought that BCE was the angle at B , C and D added up. As for the reasons for each stage of working, this was very mixed and very few managed to give a complete set of reasons for their method to gain B2. It should be noted that as a minimum the underlined words on the mark scheme are needed for each reason to be awarded credit.
- 13 It was rare to see a correct, simplified answer on part (a) although many students did manage to gain 1 mark for $2n$ or $n + 7$. Part (b) was beyond the majority of this cohort as they were unable to interpret what the question was asking them; the most common incorrect answer was $T =$ their answer to (a).
- 14 This question was answered well with most able to give a correct answer. As seems to be common with this style of question, workings out are rarely seen so for those students who did not gain the correct answer, the majority gained 0 marks. It is advisable that students work out and write down parts of the calculation such as the numerator or denominator to guarantee themselves at least one mark.

- 15 It was rare to see a fully correct solution for this question. Many students were able to make a good start, gaining the first mark for either finding the number of boxes that will fit along an edge of the crate or the volume of either the box or the crate. The next step required students to consider that there will be space above the top level of the boxes and most struggled with this concept; many did not realise that the boxes will only be able to be stacked 5 high and divided the volume of the crate by the volume of the box. There were also a large number of incorrect methods, working with surface area and adding the dimensions were the most common seen.
- 16 60% of students were able to reach an answer of 21. Very few set up an equation using e.g. x , most produced calculations instead. Of those that did not get full marks, very few gained any credit as they did not interpret the information in the question correctly. The most common incorrect method seen was to find the sum of the given numbers and divide by 5 or 6. On some occasions the correct answer was seen written on the blank card but an incorrect value such as 11 was on the answer line; students should be aware that the answer line takes precedence and should ensure they always write the correct answer there.
- 17 The full range of marks were seen in this probability question. Less than 20% of students were able to interpret the information correctly, find the value of x and go on to reach the correct answer of 216. Of those that didn't, some managed to reach 0.57 or even find the value of x to gain 1 or 2 marks but went no further; some also stopped at 0.54 (the probability of landing on odd) which also gained 2 out of 4 marks. A small number reached 216 but then gave their answer as $216/400$ which lost the A mark. Many students were unable to make a correct start to the question and a common incorrect method was to find $3/5$ of 400 (as 3 out of the 5 numbers on the spinner are odd).
- 18 This question differentiated well as the full range of marks were awarded. A good number made a correct start working with the ratio to find the number of white and brown loaves. The steps from there proved too difficult for most as they struggled to interpret the information correctly. Some students were able to produce correct calculations but mixed up the white and brown at some stage of the method; if their calculations were carried out accurately then SCB4 could still be gained. A lack of clear steps on the page also confused some students and they used the wrong values from previous correct calculations.
- 19 The full range of marks were awarded on this question. 30% of students produced a fully correct method, with inverting the second fraction and multiplying being the most common, to gain 3 marks. Some students had two correct improper fractions, inverted the second and multiplied but failed to evaluate to e.g. $\frac{28}{63}$ and instead went straight to $\frac{4}{9}$, gaining 2 marks. A good number managed to convert correctly to improper fractions but went wrong after that and gained 1 mark.

- 20 30% of students gained full marks on this question, it was pleasing to see the majority of them use the 'efficient' method e.g. 5200×1.025^4 rather than the year-by-year method. For those that didn't gain full marks, the most common incorrect methods worth credit were to treat the problem as simple interest and as a result there was a SCB1 for finding 10% or 110% of 5200. There was some confusion with the value of the multiplier and 1.25 was seen often.
- 21 Both parts of this question proved challenging for this cohort. In (a) some were able to work with the volume of a cylinder and reach an answer of 6 but the majority did not include the formula at all; dividing 1208 by 8 was a common incorrect method. In (b) those that recalled the formula for density were often able to gain at least one mark for reaching 1510, but many then failed to convert this answer to kg.
- 22 Part (a) was answered well as three quarters were able to give a correct answer; those that didn't usually had an incorrect power such as 4.5 or 11. 30% of students were able to correctly expand both terms in part (b) for 2 marks. Of those that did not gain 2 marks, many gained 1 mark for a partially correct expansion; having $5k^6$ or $20k$ or 20 were common mistakes. Some students achieved the correct answer but went on to do further incorrect working such as 'simplifying' to $25k^7$ and as such only awarded B1. A fully correct solution to part (c) was rarely seen although there was more success on (i) than (ii). A quarter of students were able to correctly factorise whilst others gained 1 mark for an answer in the correct form with the correct values but incorrect signs. In part (d) it was common to see students arrive at a value of 3.8 or equivalent but not have the correct inequality. Two thirds of students were unable to make a correct start and incorrectly rearranged leading to 0 marks.
- 23 This question proved a step too far for most of this cohort. Many were unable to set up and solve an equation using the area of the trapezium but some were able to find the area of the triangle, scoring 1 mark. Even without finding the missing length on the trapezium students could still score method marks for Pythagoras work but this was rarely seen.
- 24 This question was answered poorly with 80% of students gaining 0 marks. Of those that did gain any credit, an answer in the form $y = mx + 1$ was most commonly seen, gaining 2 marks, with incorrect gradients of $\frac{1}{2}$, -2 and 2 often seen.

Summary

Based on their performance in this paper, students should:

- Ensure they have the correct equipment for the exam, including protractor, compass and ruler.
- note that as a minimum the underlined words on the mark scheme are needed for each geometric reason on angles questions to be awarded credit.
- always show steps of their method, in particular questions assessing use of the calculator
- be aware that the answer line takes precedence and should ensure they always write the correct answer there.
- lay out their working clearly for longer, higher mark questions.
- understand when further algebraic simplification is not possible e.g. $5k^5 + 20k^2 \neq 25k^7$

