Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

January 2021

Pearson Edexcel International GCSE

In Mathematics B (4MB1)

Paper 01R

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International GCSE Mathematics – 4MB1

Principal Examiner Feedback – 4MB1 01R

Introduction

In general, this paper was well answered by the overwhelming majority of students. Some parts of questions did prove to be quite challenging to a few students and centres would be well advised to focus some time on these areas when preparing for a future examination.

In particular, to enhance performance, centres should focus their student's attention on the following topics:

- Showing clear working particularly when it is requested in the question
- Equations of lines and shading inequalities on grids
- Probability
- Knowing correct formulae and adapting it, eg halving the volume of a sphere for the volume of a hemisphere
- Upper and Lower bounds and their applications to all four operations
- Inverse proportion
- Conversion of metric units, eg millilitres to litres and vice versa

In general, students should be encouraged to identify the number of marks available for each part of a question and allocate a proportionate amount of time to each part of the question. In addition, students should also be advised to read the demands of the question very carefully before attempting to answer. It should be pointed out that the methods identified within this report and on the mark scheme may not be the only legitimate methods for correctly solving the questions. Alternative methods, whilst not explicitly identified, earn the equivalent marks. Some students use methods which are beyond the scope of the syllabus and, where used correctly, the corresponding marks are given.

Report on Individual Questions

Question 1

Well over 80% of students were able to give the correct first 3 terms in the sequence, with several who did not gain full marks, gaining 1 mark for 2 correct terms.

Question 2

Most students knew how to find a common factor from the numbers given and most of these correctly gave the Highest Common Factor as 6. Only a handful of students confused Highest Common Factor with Lowest Common Multiple (LCM). It must be noted that students were asked to 'show your working clearly' and those who gave a correct answer with no working or insufficient working did not gain the marks for this question.

Question 3

It was surprising that only about 50% of students gained full marks on this question involving changing millilitres and litres to the same unit. Many students showed they thought there were 100 millilitres in a litre or had no idea how to write one value as a fraction of another.

Question 4

It was disappointing to find only about one-quarter of students gaining full marks for this question with only 65% getting 1 mark. The problem in nearly every case was giving the answer as an improper fraction when they were asked to 'give your answer as a mixed number…'. Clearly this is a term that students were unfamiliar with. It must be noted that all stages in fraction questions such as this are required, and marks will only be awarded if there are no jumps between stages.

Question 5

There was a pleasing response to this question asking students to write the answer to the given calculation to (a) 3 significant figures and (b) 6 decimal places. It must be noted that students found the decimal places a lot easier than the significant figures.

Question 6

About 70% of students were able to correctly answer this question, with few who did not gain full marks gaining any method marks either, so it seems to be an area some students show little understanding about.

Question 7

Finding the gradient of the line through the two given points was extremely well done by students with the majority gaining full marks for this question. Those who did not gain full marks often showed calculations for distance between points, so were getting methods confused.

Question 8

This question needed students to work backwards from knowing the area to finding the angle of the sector. It was quite challenging for some who did not know how to start, and a few who started with a correct equation but were unable to rearrange it to gain the correct result. However, around 60% of students gained full marks which was pleasing.

Question 9

Nearly all students sitting this paper were able to correctly factorise the expression for part (a) but found part (b) slightly more challenging – but still well done. Those who did not gain full marks for part (b) were often able to gain a method mark for a partially factorised expression.

Question 10

This question solving a fractional equation was done extremely well with over 90% of students gaining the full 3 marks. Algebra was clearly a strength of the cohort.

Question 11

This question was well answered with many students knowing the implications of the ratio of the volumes for the heights of the containers. Those who did not gain full marks tended to gain no marks showing no correct understanding of the relationship between volume and height.

Question 12

This question needed students to solve the inequality and in addition give the greatest possible value of *x*, given that it was an integer.

The modal mark for this question was 2 out of 3 for solving the inequality correctly. A fair number were then able to give the greatest possible for *x*, but the number who could not was quite disappointing. Some gave the answer to the inequality, rather than the greatest possible value of *x*, and perhaps had failed to read the question correctly.

Question 13

If students knew what the determinant of a matrix was, they were often able to pick up full marks for this question, but a fair number clearly did not and either made no start or a start that showed a complete misunderstanding of the question. We did see a good number of almost correct answers but not quite correct because they did not recognise that if $\sqrt{a} = 5$ then $a = 25$

Question 14

This question was generally well answered but a few struggled to differentiate the, harder to differentiate, 2nd term – these students were still able to benefit from method marks.

Question 15

We sometimes find giving reasons is poorly done, but most students understood the need for this on a 'prove' question. The modal mark was 2 out of 3 where students failed to gain the 3rd mark because they missed off one reason or they failed to give ASA (angle, side, angle) or AAS (angle, angle, side).

Question 16

Very few conceptual errors were seen in this question on matrix subtraction and addition of matrices with scalars. When errors did occur, it was nearly always because of incorrect arithmetic when calculating the elements in either of the two required matrices, or when applying the scalars.

Question 17

Students sitting this paper continued to show their strength in algebra with most showing a completely correct solution to this algebraic fraction expression. A few students did multiply out all the brackets and then showed a division, which was a very long-winded method and a method where errors were more easily able to be made – it should be stressed to students that factorisation and cancelling out common factors is often the best way forward for such questions.

Question 18

The modal mark for part (a) was 3 where students were able to correctly draw the 3 lines, given their equations. However, for part (b) the modal mark was zero with only 30% of students able to correctly identify the region shown by the inequalities. Clearly this is an area that needs further work.

Question 19

This question, involving knowledge of angles within circles as well as trigonometry was very well answered, some using trigonometry within a right-angled triangle and some using the cosine rule within triangle AOB. Those not gaining full marks were often able to pick up a method mark or two for showing one or more angles correctly within the diagram; showing angles in the diagram should be encouraged.

Question 20

For this question on surds, students were requested to show clear working and so it was therefore not acceptable to simply state the correct answer. These questions are designed to test the students' proficiency in carrying out routine calculations without the use of a calculator and so clear working must be shown from the initial form of the question to the final answer. About one-third of students were able to show all working and correctly show the values of a and b as requested. However, a good number were only able to gain 1 mark for the squaring of the denominator initially and then they proceeded to show a correct answer but with no stages of working – clearly having used their calculator.

Question 21

45% of students scored a mark of zero for this question, which was one of the most poorly done on the examination paper. Students struggled to recognise x^3 let alone $y = \frac{k}{x^3}$ so they failed to even make a start on this inverse proportion question. Many showed little understanding by giving a proportional equation with y and x equal to a and $4a^2$. Students should be encouraged to revise more carefully question involving proportion, and in particular inverse proportion.

Question 22

Students who knew how to use the correct formulae tended to do quite well on this question, although an equal number gained 3 marks out of 4 as gained full marks. This was generally because they gave an answer of 16.5 rather than realising they needed to find the height of the solid which was 16.5 + 4 = 20.5

Common mistakes were to use the formula for the volume of a sphere rather than the volume of a hemisphere, although 2 marks could still be gained with this mistake.

Question 23

This was along with Question 21 was another poorly done question which showed most students had little idea of upper and lower bounds and if they had some knowledge were unable to use them accurately when division and subtraction were involved. It was pleasing to see a good number of students able to pick up the mark available for correctly substituting figures into the formula for the area of the trapezium – we allowed the given values or incorrect bounds for this mark.

Question 24

Many students gained no marks for this question with only about 30% gaining full marks. The main problem was that students did not understand the modulus of a vector, so were unable to make a start to the question.

Question 25

There were very few correct answers for this question, but a lot of students were able to gain special case marks for use of the three marbles after the original one marble had been moved or for using 4 marbles but forgetting that the two marbles taken from bag *B* meant that one was not replaced because it was placed on a table. This was a grade 9 problem solving question so it was pleasing that so many students were able to score at least a mark or two.

Question 26

Another particularly challenging grade 9 problem solving question, but many made an exceptionally good start and picked up some marks and of these, there were a good number who gained full marks. Some students lost marks for omission of brackets when doing Pythagoras which was a shame and a point noteworthy of remembering for future cohorts.

Question 27

Two-thirds of students were correctly able to give the class interval containing the median of the times. Others got the mode mixed up with the median or gave the frequency rather than the class interval for their answer. Part (b), finding an estimate for the mean was quite well done with most students knowing the correct method to use, so even with an error they were able to pick up the method marks. Part (c), completing the histogram was very poorly done with over half of the students showing no knowledge of frequency density at all and gaining no marks.

Question 28

It must be noted that this question was one in which we asked students to 'show your working clearly' and so a correct answer with no working or insufficient working gained no marks. However, for this question we did see a good response with many correct answers in part (a). Part (b) had a modal mark of zero, maybe because some students did not seem to understand what was entailed and often showed little working. However, it could also have been that they ran out of time for the last question on the paper.

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