Examiners' Report
Principal Examiner Feedback

Summer 2018

Pearson Edexcel International GCSE
In Mathematics B (4MB1) Paper 02

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Introduction to Paper 02

On the whole, several of the students sitting this examination seemed unprepared and lacking knowledge in many subject areas that were being examined. This was across all areas but particularly noticeable with matrices and Sets & Venn diagrams. Some students were well prepared, but they were in small numbers.
Problem areas that should receive special attention by Centres are as follows:

- Set working out logically so it is able to be followed by examiners
- Read questions carefully
- Read answers from calculators carefully
- Not use premature rounding as it may lose final accuracy marks
- Know how to square a matrix (Q3)
- Formulae relating to a pyramid and the meaning of 'height'(Q2)
- Set notation & Venn diagrams (Q4)
- Understand and learn function notation (Q5)
- Be more familiar with vectors (Q9)
- Learn replacement and non-replacement methods for probability (Q11)

Report on individual questions

Question 1

While most students could answer part (a) there were several students who were unable to find the correct total amount of money paid for all the tickets sold for the concert. Small mistakes such as reading numbers incorrectly from their calculator or forgetting to multiply the number of tickets by the cost of each ticket were common. Those who showed correct working but an incorrect total were awarded method marks, but a common error on the student's part was to omit their working which is never a good idea. Part (c) asking for the number of tickets sold in the Balcony for the concert in 2018 was met with a mixed response; some students moving from part (b) to this with ease but also with many blank responses for this part.

Question 2

It was alarming to see the large number of students who thought the height of the pyramid was either 11 cm or the slant height from the middle of *AB* to *E* or *BC* to *E*. Those that showed a correct calculation for the mid-point of *AB* to *E* or the midpoint of *BC* to *O* were able to gain a method mark, but then without a correct calculation for the height gained no more marks. Clearly students need to learn what is meant by the height of a pyramid and how to find it in a situation such as the one in this question. A few more successful students ignored the request to give their answer in the form $p\sqrt{q}$ and instead gave 177.48... which was awarded all but the final mark.

Question 3

Very few students were able to show a completely correct solution to this question on matrices.
It was surprising that the majority of students did not know how to square a matrix where the most commonly seen method was to square each of the 4 items in the 2 × 2 matrix. This gained no marks for the matrix, but the student could pick up a mark if we saw their calculation for $\mathbf{A}^2 - \mathbf{B} = \lambda \mathbf{I}$
The values of a and λ had to be correct and from correct working in order to gain the accuracy marks.

Question 4

Some of the students sitting this paper had a very poor grasp of set notation and often picked up no marks at all. The symbol for number of items was not known by many, with a list of items in the set rather than a numerical value frequently given. In part (e) the symbol from the box appeared to be chosen randomly in many cases. For part (f) where the students were told that the item chosen at random was in set X; several students ignored this part and gave a fraction with the denominator of 14 which was the total number in the universal set.

Question 5

This question was a lot more successful for many students than those previously met in this paper.
(a) There were a good number of correct responses, but many where students made $x = 0$ in the equation and gave the incorrect answer of 3. Many had little idea what to do.
(b) Most students thought that the range was $f(x) < 0$ and some stated it was positive integers. Please note that the answer did need to be in correct notation and should not include 3
(c) Many students thought they needed to work out a long winded equation here, not realising that the answer was easily found by equating the denominator to zero. Sometimes quadratic equations were seen and a lot of work which gained the student no marks.
(d) This was the most successful part of the question, even though it was not the one with the lowest targeted grade. Many students were able to gain the correct quadratic equation and solve it. Unfortunately many students did not reject the positive root. In fact few rejected any root and if they were to reject one it was usually the negative one as this is commonly the case in questions when the values relate to lengths of shapes.
(e) There were a good number of correct responses for the inverse of the function g, but many got confused in their rearranging of the equation. A few students showed good working but left the inverse in terms of y, which lost the final accuracy mark. Some students thought they should just give the original equation g with every term multiplied by -1

Question 6

Some students were able to get full marks on this question but many did not realise the significance of the mode of the six numbers being 12 and the numbers being in ascending order of size and so were unable to gain the key equation of $x + y = 12$
Many students, were, however able to gain the correct equation relating to the mean and so gained at least 2 marks.
There were a small number of students who used trial and improvement to gain the correct values of x and y which gained full marks, but was risky as no method marks were available for such an approach.
Many students were able to find the median, but we also frequently saw the range being given instead.

Question 7

We saw some very good responses for this question, but also a large number who did not have the necessary skills to gain a large number of marks across the question.
(a) This mark for plotting the points and joining them to give triangle A was sometimes the only mark gained by a student for this question. It was unfortunate that a few students could not even plot all the points correctly; students must be taught to check this first stage very carefully as it is the key to the other parts, and while follow through marks are available, an incorrect initial triangle can lead to problems such as a shape not fitting on the grid.
(b) While many students could reflect the shape it was a shame that some reflected it in the y axis rather than the line $x = -2$
(c) Most students were able to give the correctly translated shape with follow through marks for those that had an incorrect shape *B*. It was common for students to move the shape in the wrong direction for the given translation.
(d) We saw a good number of correctly transformed shapes found by using the given transformation matrix. Some however, did not seem to use the matrix at all and just moved their shape *C* somewhere else, appearing to be randomly chosen.
(e) We saw the correct inverse matrix quite frequently, but a good number who did not know what was needed.
(f) Very few students were able to correctly describe the single transformation represented by the inverse of the matrix **M**. For those that were able to give a description, it was often missing the scale factor or with the incorrect scale factor.

Question 8

(a) In many cases this question was very poorly done and students just tried to do some work on the given equation.
(b) This part was met with more success than part (a) with students often showing the correct substitution of 1.5. Many students knew they had to do something with the values of 2p – 3 but were unsure and sometimes tried using the whole of the factor instead of *p*; this got very complicated.
(c) We did see the correct factorisation on a number of occasions, but several students did not know what was required.
(d) Again, few understood the significance of $p > 3/2$ and were unable to answer this part of the question successfully. Some understood the need to substitute a value into the equation of the curve and often used 1.5

Question 9

Part (a) was often the only part of this question that was done correctly by large numbers, and even then we saw some incorrect answers for this part.
(b) We saw some correct answers for this and some that followed through incorrect vectors from (a) and were awarded the marks. The number of students gaining the marks here, however, was very limited.
(c) Of the small number that attempted this part, very few students were able to correctly find the values of mu and lambda as they were trying to work with whole vectors rather than the coefficients of **a** and **b**.
(d) We saw very few attempts at this part of the question and those that did often had incorrect numbers, but there was a small number that knew exactly what to do.

Question 10

All but a very small handful of students did not even attempt part (c) and so limited themselves to only the marks for completing the table and drawing the graph.
(a) The table was often completed correctly, although a number lost a mark for ignoring the rounding instruction. A very small number thought the graph must be symmetrical as they saw two entries for y of −2 and completed accordingly, gaining no marks. Students must calculate the values using the given equation and not assume they know what the values will be.
(b) Most students were able to plot the points correctly although a number of (6, 7.33) were plotted as (6.5, 7.33). Poor curves and straight lines joining the coordinates were frequently seen, although we were fairly generous especially on the left and right hand side of the graph where there was a long stretch between points.
(c) Virtually no student even attempted to do anything for this part. We did see a few students using substitution, but the idea of trying to find the equation of the necessary straight line, seemed beyond the majority. Those few students that found the correct line, were generally able to score full marks for this part.

Question 11

Students were better prepared for this question than for any other on the paper.
(a) The majority of students were able to correctly complete the tree diagram, with only a few forgetting to decrease either the denominator or denominator or both by 1 for this non-replacement situation.
(b) We saw a good number of students gaining full marks for this part, and those that did not, often gained a method mark for one correct product.
(c) This part of the question was quite challenging, but several students were able to give the correct probabilities for even A and event B and give the correct conclusion.
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