Examiners' Report
Principal Examiner Feedback

Summer 2023

Pearson Edexcel International GCSE

In Mathematics B (4MB1)

Paper 02

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Introduction to Paper 02

Students were generally prepared for this paper and there were some excellent responses.
To enhance performance in future series, centres should focus their student's attention on the following topics:

- Understanding set notation
- Lines of symmetry and rotational symmetry.
- Questions that involve the demand to show all working.
- Following the instruction in graph questions when asked to find by drawing a suitable straight line.
- 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

This was, on the whole, well attempted by students.
In part (a) a significant number of students just wrote the answer in the table, risking the loss of both marks for a minor slip. A minority of students went on to find the number of yellow bricks but this was not required for any part of the question.

In part (b) the tree diagram was usually completed accurately. The most common error was made when completing the second branches where students treated it as a conditional probability problem and assumed the first brick had been taken from the box.
The main error in part (c) was to find the probability that at least one of the bricks is green showing a misunderstanding of what "exactly one of the bricks is green" meant.

Question 2

Part (a) was generally well answered. The most common errors were to divide by the 'new' value rather than the original or just calculate the profit.
In part (b) the majority of students knew what was required and went on to gain full marks
The most common error was to use 1.25 rather than 1.30 which was allowed for the method mark,
In parts (c) and (d) the majority of students gained full marks. Loss of marks was usually in part (d) where they forget to reduce their total by 84

The final part of the question was a problem for some, and many students chose to make no attempt. Those who did were often able to gain the first 2 marks. The majority of students attempted to work out the profit. Often students would not divide by their number of giant pumpkins at the end, so 79.5% was a common incorrect answer.

Question 3

This question was generally well done, with many students scoring full marks. It seemed that either students knew the method well or not at all, and where 0 marks were awarded, a significant minority calculated the sum of class widths divided by the number of classes. Very few students divided by 5 rather than 91.

Question 4

Part (a) was generally answered well with the majority of students using the given formula. Those who attempted to use an alternative method often gave the external angle as the numbers of sides ie 8
In part (b), those who sketched the whole shape generally did well but very few took this approach. The most common errors included sketching a triangle with 2 sides of 5.2 and an angle of 172 and finding the area of this triangle. Many ignored or missed the need for an upper bound and a few did the upper bound of everything. Working with bounds where only some of the values are approximated seemed unfamiliar to those students. There were a range of methods used, with the most successful being the sine rule, followed by using $\frac{1}{2}bh$ or finding S and using $\frac{1}{2}S^2 \sin 8$
Some students, even when they had stated upper bound correctly, did not then use the upper bound in their calculations causing them to lose out on the final accuracy mark.

Question 5

Very few students scored both marks in part (a), many left it blank, some tried to solve algebraically. Others drew the line $y = 3$ and forgot to actually answer the question. The table in part (b) was generally completed correctly, although there were several students who struggled to round accurately. The plotting of points was mostly accurate in part (c) with few straight lines joining the points being seen. In most cases part (d) was answered well. One common error in (d)(i) was to give only the x values as solutions, rather than give the coordinates. Another common error was giving either (0.8, 2.4) or (-1.2, 2.4) instead of (-0.8, 2.4). The majority of students, even where they had not found the correct coordinates in (d)(i), Knew how to find the equation of the line from 2 points and went on to get two out of three marks for their method.

Question 6

The majority of students gained the mark in part (a)
Part (b) both (i) and (ii) were well answered, but part (iii) proved more challenging with a common incorrect response of 28 often seen.
In part (c) most students achieved at least 1 mark for a correct numerator or denominator.

Question 7

In part(a) the majority of students knew what was required and gain the mark.
Part (b) was attempted by the vast majority of students. Most knew what was required although there were a significant number of algebraic and / or numerical errors seen.
In part (c) The majority of students who understood what fg(x) meant went on to gain the first 2 method marks. A large number of students went on to get an incorrect cubic equation, often from a sign error in the expansion of the linear part.

Question 8

Most students gained the first method mark for identifying angle $\angle ABC$ as 90 degrees, most commonly through annotation on the diagram. Many also gained the 2nd method mark for recognising the need to use Pythagoras but less common was equating this to $\left(\frac{5}{4}x\right)^2$
A small number chose to use the Cosine rule with mixed success. Where students managed to solve for x, the majority achieved 6 marks, leaving the final answer as $\frac{8}{7} \leqslant x \leqslant 8$ without considering the need for AB to positive.

Question 9

The factor theorem was well done by the majority of students. Most could also obtain and solve the required simultaneous equations. The most common errors were to forget to equate to 0 or to make a sign error in one of the equations.
In part (b) students seemed able to divide through polynomials, and then to use the formula to solve. Some students chose to ignore the instruction "Without using a calculator and showing all your working " and just gave an answer usually in decimal form.

Question 10

Most students identified, in part (a) that the transformation was a rotation with many also identifying the angle of rotation as 90 degrees clockwise however gaining all three marks was much less common. Parts (b) and (c) were generally well answered with triangles C and D plotted accurately. Those enlarging and reflecting by drawing were generally more successful than those who used matrices to work out the transformed points.
In part (d), those who scored full marks used the first method rather than the alternative, however this was not a common choice. A much more common approach was the alternative method and where it was used, almost always scored 2 marks (the 4th and 5th method marks) but very rarely any more than this. The resulting complicated 2 by 3 matrix in terms of k posed a problem in how to use the determinant of 2 and they could not progress further.

Question 11

Part (a) was consistently answered well with most differentiating all terms correctly. Part (b) was more mixed – students generally achieved both marks or solving v = 0 achieving no marks. This perhaps suggests that a number either didn't read the question carefully enough or didn't have a clear understanding of 'stops accelerating' as opposed to 'stops'. Many students achieved at least 3 marks on part (c), however there were a few common errors: the

first being to find d = 12 but to give this as the answer for k, the second being to set up the equation for k incorrectly as $20+d=k$, arriving at the answer 32 and the other to attempt to solve v = 20

Question 12

It was pleasing to see so many students attempting part(a). Students seemed to be well drilled on working with basic vectors with the main error usually being a sign error early on.

In part (b) many students could use a parameter to set up an equation for the initial vector. The second equation was more difficult to set up, but those that did often achieved full marks. Equating the coefficients of b was a requirement to solve the problem, but some students only equated the coefficients of a which led to no further successful working. There were some correct guesses, but without any correct working including a parameter it was not awarded the marks as the question requested working to be shown.

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