Examiners' Report
Principal Examiner Feedback

Summer 2019

Pearson Edexcel International GCSE

In Mathematics B (4MB1)

Paper 01

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Paper 01

Introduction to Paper 01

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:
• Lines of symmetry and rotational symmetry
• Questions that involve the demand to show all working
• Probability
• Squaring a matrix
• Unstructured question on finding the shaded area
•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

Students found this question difficult, struggling in particular with part (a).

In part (a) the most common error was not maintaining the size of the number giving 87 as their answer rather than 8700. Another common incorrect answer was 8600.

Attempts at part (b) were slightly better. The most common errors were 0.04 and 3.70×10^{-3}

Question 2

Generally this question was well answered. The most common error was trying to find the HCF rather than the LCM and making numerical errors, particularly when using the table method.

Question 3

Many students had little idea what was required in this question and just left it blank while others shaded in more than 1 square.

Question 4

This question was well answered although a minority of students did not show their full working and jumped from $\frac{9}{4} \div \frac{23}{6}$ to the answer with no intermediary step such as cancelling or $\frac{54}{92}$

Question 5

Students who knew how to differentiate were able to gain at least 1 mark for this question. They were able to gain the mark for differentiating $2x^4$ but were unable to write $\frac{3}{x^2}$ in a form that they could differentiate i.e. $3x^{-2}$

Question 6

The vast majority of students found the gradient correctly with only a few working out the $\frac{\text{difference in } x}{\text{difference in } y}$ in error. The few students who chose to work out the gradient by doing a sketch often forgot that the gradient was negative.

Question 7

The vast majority of students correctly expanded out the brackets although some continued to try and simplify further resulting in the final mark being lost. The most common continuation was, equating the quadratic to zero and solving it demonstrating a misunderstanding of the question.

Question 8

This question was well answered. The majority of students were able to find both the terms although some did not find the sum. Others attempted to find the sum of the first 10 terms.

Question 9

Students who used the idea that $n = \frac{360}{\text{exterior angle}}$ were usually successful in finding the correct number of sides. Those who attempted to use the sum of the interior angles often used 9° as the interior angle forgetting to subtract it from 180 ° resulting in the incorrect formula 180(n – 2) = 9n

Question 10

This question was intended to be a relatively straightforward percentage question and those who understood that the sale price was required usually gained full marks. The most common errors were to use £7.60 as the sales price and work out the original price or to simply work out 15% of £7.60

Question 11

This was a standard indices question and was answered well by most students. The most common error was to multiply 4 by 3 giving an answer of 12 rather than 64 in part (b). The other mistake was to add the indices rather than to multiply.

Question 12

Part (a) was difficult for many with few students knowing how to find the range of f. Only a minority expressed the range incorrectly as $x \geq -2$

Part (b) was well answered with many students showing clear accurate working resulting in both marks being awarded.

Question 13

Both parts of the question were also mostly correct.

Question 14

For some students this was a challenging question on which they were unable to make a start. Of those students who were able to factorise both the numerator and

denominator many did not recognise that they could cancel (x – 3). The students who recognised the denominator as the difference of two squares usually got $(2x+6)(2x-6)$ and did not take out the common factor. When factorising students should be advised to look for a common factor first as this will often lead to a simpler factorising of quadratics.

Question 15

This question was poorly answered. The few students who knew what they needed to do to prove two triangles were congruent were usually able to gain a mark for stating $BQ = QC$ because Q is the midpoint of BC. The most common error was to assume that the parallelogram $APQR$ was in fact a rhombus with all sides equal usually resulting in the incorrect statement that $PQ = RQ$. The few students who realised that $APQR$ was not a rhombus were usually able to gain the method marks with only a few losing the A mark by not stating which of SSS, ASA, AAS, ASA they had used.

Question 16

There was a mixed response to this question with many students simply not knowing how to start.
The students who attempted part (a) usually gained the correct answer.
The most common error in part (b) was to use $3x + 0.2 = 1$ rather than the total of the probabilities equalling 1. Students who showed clear working were still able to gain the second method mark if the substitution of their value of x into the probability of 6 was seen.

Question 17

This question was well answered with the majority of students $\frac{1}{2}ab\sin c$ in part (a) and using $\cos x = \frac{4}{12}$ in part (b)

Question 18

Students had varying degrees of success with this question. The most common method was to try and write down the sum of the probabilities of all the possible combinations. This is a lengthy method which would work well but more often than not one of the possible combinations was missed out. The students who attempted the quicker way of doing 1 minus the sum of the probabilities of the marbles being the same colour often

mistakenly believed that green and purple were the same colour or did not read the question carefully enough and assumed that they were.

Question 19

Many students seemed to be unprepared for this question. The most common error was not realising that they needed to find the bounds for *L* and *g* and simply substituted in 1.32 and 9.8. A minority then found the upper bound of the answer.
The second most common error was to use an upper bound for both *L* and *g* rather than use the upper bound for *L* and the lower bound for *g.*
Students should be advised to write down both the upper and lower bounds for all variables and select the appropriate ones so maximise their marks.

Question 20

On the whole once students recalled frequency density they were mostly able to answer the question. Quite a lot of students were able to deduce that the value for 25-30 was 7 based on the bar with equal width next to it. Beyond this, a small number of students lost marks for inaccurate heights or extending the final bar to the end of the graph.

Question 21

This question required clear working. Minor numerical errors were allowed for the method marks but poor presentation and notation meant many students lost marks through misreading their own writing. There are many different approaches but the methods generally all involved the same steps. The most common error was to not multiply **all** the terms by 3 or (3*w* – *y*) to remove the fraction.

Question 22

The majority of students made good attempts at this question although some fell short because they missed some of the faces out. The most common mistakes were confusing surface area with volume and using 2.3×1.2 twice rather than finding the length of FB.

Question 23

A number of students seemed to have difficulty in completing this Venn diagram. Manipulation of number to complete the diagram was seen to be generally poor, with only a small number being successful. The main misconception was failing to spot that 8 should be placed in the History only region, often putting 27 there. Several students also failed to remember to include the number of students who didn't study any of the subjects, 11, in the Universal set. Many also left $H\cap G\cap L$ blank, not recognising that it should be 0.

Question 24

This proved to be challenging vector question requiring strong algebraic skills. The vectors $\overrightarrow{YZ}$ and $\overrightarrow{ZX}$ were frequently incorrectly calculated. Of those students who were successful in finding $\overrightarrow{YZ}$ and $\overrightarrow{ZX}$ only a minority went on to find the required ratio successfully. Good, clear presentation helped in this question.

Question 25

This question was generally well answered with a large proportion of students making a good effort at the explanation. However, more attention needs to be paid to minimum wording for these explanations - it appears that some are under the impression that some code words such as simply writing "cyclic quadrilateral" is enough whereas they need to refer to opposite angles and 180°.

Part (a) was answered better than part (b). In Part (a) there was some confusion over three letter angle notation and some students did not understand which angle was being asked for. In part (b) a few students confused BCDO with a cyclic quadrilateral. Generally, those who identified angle BOD being twice BCD on the circumference went on to a successful conclusion. Once again, a logical step-by-step approach and good presentation helped here.

Question 26

In general this was well attempted although careless errors caused loss of marks especially with negative values.

The main misunderstanding was to do with what $\mathbf{A}^2$ actually means. A lot of students interpreted $\mathbf{A}^2$ as "square individual elements" although they demonstrated through their work on **AB** that they were capable of multiplying matrices. Some students were unaware of how to correctly find the determinant and several attempts to set a whole matrix equal to $3k+28$ rather than the determinant was seen.

Question 27

This question was poorly answered with only the most able students able to make any progress.

The work was often very poorly organised and it was not clear what area or perimeter the students were working out making it difficult to decide whether they were using an appropriate method. The formula for the large semi-circle was usually correct but a correct method to find the shaded area was rarely seen. Parts of the perimeter were often found correctly but '*x*' was often missed. There were a number of answers which included both *x* and *r*.

Question 28

This question was usually very well done or not attempted at all. When differentiating the differential was correctly stated in many cases although it was not uncommon for the '4' to be retained. In part (a) after a successful differentiation, students were generally able to substitute 2 for *t* equate to 9 and solve the resulting equation to find *k*. In part (b) the main error was failing to use the derivative for *v*, instead attempting to solve $-3t^3 + 6t^2 + 21t + 4$. Of those who gained the correct equation and solved correctly most realise that *t* could not be negative. Students who were successful at part (b) generally went on and completed part(c) successfully although some then lost the mark by not giving their answer to the nearest whole numbers as requested in the question.

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