Examiners' Report/ Principal Examiner Feedback

Summer 2016

Pearson Edexcel International GCSE Mathematics B Paper 1 (4MB0/01)

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Principal Examiner's Report

International GCSE Mathematics B

Paper 1 (4MB0/01)

Introduction

There was no general indication that the examination paper was too long, with most students making attempts at most of the questions. Overall, the standard of presentation and clarity of work was high, however, legibility of the answers was an issue with a small minority of students. It should be emphasized that students should be encouraged to include their working in their answers to show how they obtained their answers since if an incorrect answer was given without any working shown, all of the associated marks would probably be lost. This is particularly important if the question requests the students to show all of their working or their construction lines. Centres should emphasize to students who do need to use extra sheets of paper to answer questions, to clearly indicate this in the answer area of the relevant question in the examination booklet.

It was pleasing to observe that many students showed that they have a good understanding of the basic techniques of arithmetic, algebra, geometry and trigonometry and were able to apply them competently. Centres should emphasize to students that they should give their answers to the required degree of accuracy as marks are needlessly lost by not doing so. The question paper did however highlight the following problem areas, followed by their corresponding question numbers, which should receive special attention

- Bearings (5)
- Algebraic manipulation of signs (6 & 14)
- Simplifying an algebraic answer (9)
- Ratios (13)
- Comparing coefficients of vectors (15)
- Valid integer values required by inequalities (16)
- Manipulation of square roots in algebraic expressions (17)
- Manipulation of indices (21)
- Comparing coefficients of unknowns in algebraic expressions (24)
- Obtaining 3D objects from 2D ones (25)
- Intersecting Chords Theorem (27)

Question 1

It was pleasing to see many correct answers. The main source of error was inaccurate sign manipulation in the expression for the gradient. A few students tried to calculate the inverse of the gradient or confused their coordinates.

Question 2

Many correct answers were seen. A number of students thought that $2(9x^2 - y^2)$ was the required answer whilst others forgot to extract a factor of 2 from $(6x \pm 2y)(3x \mp y)$, losing the A mark.

Question 3

Many correct answers were seen but there were a number of students who divided by 2.09 instead of by 1.91 or had $\frac{2.09}{1.91}$ as their method, losing both marks.

Question 4

Most students collected both of the marks available here. A few were confused by the process of cancelling powers of *a* and *b*, usually losing one mark (A0), so the common errors seen were the addition of powers rather than subtraction and incorrect division of the integers.

Question 5

This question presented no difficulty to the students who were versed in bearings. However, there were many who really did not know what the bearing of Surat from Nashik was, usually drawing an incorrect diagram, with the result that incorrect answers of 38^{o} and 218^{o} were often seen.

Question 6

Most students gained the first mark for writing ff(x) as $3-2(3-2x)$ but then made a sign error in expanding the bracket term thus usually collecting one mark (M1 A0). Others squared the function, losing both marks. A few students lost the accuracy mark because they thought that $3-2(3-2x)=1\times(3-2x)$.

Question 7

This popular question present little difficulty to most students. Many others lost one mark for omitting one of the three elements of $(A\cup B)'$. A few used Venn diagrams usually gaining these students at least one mark.

Question 8

Both marks were collected by the majority of students. The remainder lost both marks because they did not know the expression for the area of a trapezium.

Question 9

Many correct answers were seen but there was a significant number of students who failed to read the last sentence of the question and left their answer unsimplified, $\left(\frac{x}{2x^2}\right)$, losing the A mark.

Question 10

Many correct answers were seen. A number of students did not read the question carefully enough and thought that p (not p^2) was equal to $3x-1$, losing both marks.

Question 11

Many students understood that an integer answer was required and collected the mark for part (a). Others had problems with the division of the powers of 10.

Part (b) presented no problems to the abler students, with the less able showing little understanding of standard form giving answers of the form $0.318\ldots \times 10^{n}$.

Question 12

A popular question marred by the sign error incurred when expanding $-4(1-3x)$, however, providing there were no further errors, such students could collect 2 of the 3 marks available.

Question 13

Many students collected full marks for this question whilst a number of others failed to simplify their ratio, losing the final mark. Despite the fact that questions of this type have been set in the past, there were many students who did not understand what to do, with the result that most of these students failed to collect any marks for this question with some of these students thinking that the answer was 5 : 7

Question 14

A significant number of students had no problem with this question, understanding the geometry required for the method. Of the others, many failed to make a correct angular geometrical statement or were let down by poor algebra with the latter usually losing the 2nd method mark and thus the final mark.

Question 15

This was a discriminator of the paper, with many students not realizing that the way forward was to compare the coefficients of vectors **a** and **b**, so losing all three marks.

Question 16

Unfortunately, there were a number of instances of poor algebra seen in the answers. Many students thought that $\frac{1}{2}(2x+1)=x+1$, losing all of the marks as no algebraic errors were allowed. Of those that passed these algebraic hurdles, many were confused by $x < 2.75$ and thought the largest integer satisfying this was 3 (A0).

Question 17

Many students, including some of the abler ones, thought that squaring the given expression would lead to $x^2+9=x^2+y^2$, losing all of the marks. Others were confused by the squaring of the left hand side. Those who got through this hurdle usually collected all of the 4 marks available.

Question 18

Most students collected full marks for this popular question. However, in part (a), there were a number of students who did not know what the median was or how to obtain it. Part (b) was more popular demonstrating that students appeared to be more at home with the concept of mean than with that of median.

Question 19

Many students had no idea about part (b) but did manage to collect both marks for part (a). A few mixed up the coordinates for *B* and *C* in part (b).

Question 20

Many correct answers were seen for this question. However, a common mistake was to forget about the power of *x*, so a student would write $256=\frac{k}{x^3}$ and then $256=\frac{k}{0.5}$, losing all of the marks. Another mistake was to use *direct* variation instead of the required *inverse* variation.

Question 21
There were many correct answers for part (a). Common incorrect ones were 1, 2, 4, 8 and 2, 4, 6, 8, which were treated as special cases, gaining only 1 of the 2 marks available.

Part (b) was problematic and proved to be an enigma to many except the abler students.

Question 22
Curiously, in part (a), some students did not realise that the derivative of *s* was required or that it obtained by dividing *s* by *t*. Most of the students who correctly answered (a), answered (b) correctly as well, although some gave $-\frac{1}{5}$ *and* 2 (A0) as their answer not realizing or noticing that the question gave that $t \geq 0$. A number of students differentiated their answer to part (a) in part (b). The majority of students collected full marks.

Question 23
There were many guesses of 180° for part (a) but also, fortunately, many correct answers of 90° were seen. In part (b), most students had no idea of what the required matrix was, indeed some thought that it was a column vector and not a matrix. Few students drew the intermediate quadrilateral on their diagram with the result that they were unable to give the required translation or gain any of the two follow through marks available.

Question 24
Part (a) was another discriminator of the paper with few students noticing that they had to equate the coefficients of the x or x^2 terms or, alternatively, to divide $(x-4)$ into $6x^3 - 19x^2 - 26x + 24$ (M0 A0), or took note of the statement that the given equation was true for all x. Many algebraic errors were seen in students' working.

Part (b) had many correct responses even though some of these students had failed to answer part (a).

Question 25
Part (a) was usually correctly answered, however, many students then insisted that parts (b) and (c) were to be done using 2D trigonometry, ignoring the fact that they were dealing with a cone, thus losing all of the marks for (b) and (c), for example, by using the cosine rule in (b) getting an answer of 12.1. Some of these students did, however, manage to collect the method mark from part (c) by using their answer to (b) in a Pythagoras Theorem statement for the height on the cone. 60° was a popular, albeit incorrect, guess at the base angle of the resulting cone.

Question 26
A common error in the Venn Diagram for (a) was to give an incorrect numerical probability in the 2nd branch, such as $\frac{3}{4}$ or $\frac{4}{5}$, instead if $1 - p$. Fortunately, many of these students did give the other two branches correctly and went on to collect full marks for parts (b) and (c). Overall, this question was well answered.

Question 27
Most students collected both marks for (a) although some did not realise that Pythagoras' Theorem was needed (scoring M0 A0). Part (b) was the domain of the abler students with the less able demonstrating that they did not understand how to correctly apply the Intersecting Chord Theorem, resulting in the loss of the first method mark and thus the following 2 marks. Part (c) was generally well answered even though the student might have scored nothing on (a) and (b) as all of the information necessary to calculate *EB* was given in the question. Interestingly, many of these students had showed that they had little idea of how to apply the Intersecting Chord Theorem in (b) but then

did so correctly in (c). A number of students found *EB* correctly in (c) and then revisited (b) and used their *EB* to incorrectly show that *AE* = 8 cm (M0 A0 A0).

Question 28

There were a number of a students who did not attempt this question probably because the question was not broken done into parts which would have elucidated the method of solution of the question. However, the majority of students gained fully or nearly full marks for this question. Unfortunately a few students displayed their misunderstanding of the use of the basic trigonometrical ratios.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx

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