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Examiners' Report/ Principal Examiner Feedback

Summer 2015

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

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General Comments

There was no general indication that the examination paper was too long, with most candidates 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 candidates. It should be emphasized that candidates should be encouraged to include their working in their answer to show how they obtained their answers since if an incorrect answer was given without any working shown, all of the associated marks would be lost. This is particularly important if the question requests the candidates to show all of their working or their construction lines. Centers should emphasize to candidates 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 candidates showed that they have a good understanding of the basic techniques of arithmetic, algebra, geometry and trigonometry and were able to apply them competently. Centers should emphasize to candidates 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

- Angle of elevation (3)
- Manipulation of inequalities in negative number ranges (7)
- Highest common factor (8)
- Magnitudes of numbers (11)
- Standard form (15)
- Manipulation of surds (17)
- Geometric constructions (24 and 25)
- Differentiation (27a)
- Algebraic manipulation of non-numeric forms of ratios (28)

Question 1

In was pleasing to see that most candidates answered this question correctly. Unfortunately, there was a small number of candidates who had no idea and thus made no attempt at answer the question.

Question 2

The majority of candidates successfully equated the coefficients of vectors **a** and **b** and consequently managed to collect full marks.

Question 3

The common error made by some candidates was to think that $\angle BAC$ was the angle of elevation (M0 A0) and so an incorrect answer of 78.7^{o} was popular. Others thought that the required angle was $\angle ADB$ (M0 A0). Many candidates, though, collected both marks.

Question 4

It was pleasing to observe that most candidates are aware of sequences and know how to find individual terms from the n^{th} term and so many correct answers were seen. A common error made by a few was to think that +1 was the first term or that the first term was given by $n = 0$.

Question 5

This question was usually answered correctly although some thought that the *inverse* of the matrix was required, losing both marks.

Question 6

A small number thought that somehow $\begin{pmatrix} 5 & -3 \end{pmatrix}\begin{pmatrix} -7 \\ -6 \end{pmatrix}$ was involved which they thought was equal to $\begin{pmatrix} -35 \\ -30 \end{pmatrix}$ or that $\begin{pmatrix} 5 \\ -3 \end{pmatrix}\begin{pmatrix} -7 \\ -6 \end{pmatrix} = \begin{pmatrix} -35 \\ 18 \end{pmatrix}$, obviously scoring no marks. Others ignored the demand for the *coordinates* of *B* and gave $\begin{pmatrix} -2 \\ -9 \end{pmatrix}$ incurring a penalty of 1 mark. Fortunately, many correct answers were seen.

Question 7

Most candidates correctly arrived at $n \le -\frac{23}{9}$ or $9n \le -23$, gaining M1 but then a sizeable number thought that $n = -2$ or -2.56 was the answer(A0), demonstrating a misunderstanding with what “the greatest integer” in a negative number range meant. Others left $n \ge -3$ as their answer (A0), again, avoiding the issue of an integer answer.

Question 8

Many correct uses of the long division method were seen along with the more common methods. Most candidates collected both marks. However, it was clear from a number of final answers that the meaning of the “highest common factor” was an enigma to some of these candidates, many of these thinking that the least common factor was required..

Question 9

Those who realized that $81 = 3^4$ usually collected the three marks of the question, although a number of candidates’ answers suffered from transcription errors (eg, using “1” in place of “11”) resulting in the loss of the final mark. Some thought that $81 = 9^2$ was the way forward and this led to $2 = 3x - 11$ resulting in the loss of all three marks.

Question 10

This question was well attempted in the main although some candidates attempted to calculate $\frac{\Delta x}{\Delta y}$ (M0 M0 A0) or whose attempts suffered from sign errors.

Question 11

Many candidates knew what to do but a sizeable number of these were let down by their final answer which they left as 6.67 million, losing the final mark. Also, surprisingly, many candidates lost the final accuracy mark because of their confusion or because of transcribing errors concerned with the number of zeroes in a million.

Question 12

It was pleasing to see many correct algebraic manipulations which usually lead to the correct answer. A common error seen was to incorrectly rearrange the given equation into $yx^2 = a - b$, losing all three marks.

Question 13

Common incorrect entries in the Venn diagram were 12, 10 and 19 (B0 B0) usually leading to 30 for (b) (B1 ft). Others, restarted in (b) and obtained the correct answer of 20, thus gaining the B mark for that part. There were many fully correct answers.

Question 14

Most candidates answered this question correctly. Of those that did not, usually answered (a) correctly but in (b) had $600\times\frac{0.24}{0.76}(=189)$ as their incorrect attempt (M0 A0).

Question 15

There were many fully correct attempts at this question. Some of the others failed to carefully read the question and gave $\frac{1}{81}$ or $(243)^{4/5}$ as their incorrect answer to (a). Some of these candidates recovered sufficiently to collect both of the marks available in part (b). Unfortunately, there were a significant number of candidates who were unfamiliar with standard form. Popular incorrect answers for (b) were 1.23×10^{2} and 123 or $12.3\times10^{\cdots}$

Question 16

Parts (a) and (b) were normally answered correctly. Some answers to part (c) contained extra spurious elements.

Question 17

This question was one of the discriminators of the paper and from this, it is clear that centers still have work to do with the teaching of surds to their students. Many students were capable of rearranging two of the given surds into more convenient forms and so gained the first method mark but many of these were unable to correctly remove the surd denominator which was necessary if the required answer was to be attained. A common and incomplete answer was $3\sqrt{6}-\sqrt{2}$ which lost the final mark.

Question 18
Many correct answers were seen. A small number of candidates thoughts that the area of *triangle ABC* was required, usually gaining no marks.

Question 19
The majority of students collected full marks for this question. Others lost marks because of poor algebra (usually sign slips) inevitably resulting in at least the loss of the two accuracy marks.

Question 20
Many thought that 3×50 was the required area (M0 A0). In (b), a number of candidates failed to divide their answer to (a) by 3, losing the B1 ft mark. Reading the graph to find the time spent travelling faster than the average speed proved problematic to a number of candidates resulting in the avoidable loss of the mark for (c). Centers are advised to recommend to their candidates to spend more effort on familarising themselves with distance-time graph reading.

Question 21
The main source of confusion was the value of $\left(-2\right)^0$ with -2, -1 and 0 being common misunderstandings. This affected parts (a) and (b). Part (a) was, in the main, well answered as was part (b) although many candidates incurred the loss of marks in (b) because of their problems with $\left(-2\right)^0$, whilst others needlessly lost the final accuracy mark by leaving 6.1 as their answer (ie forgetting to divide by 4).

Question 22
Most candidates collected the B1 mark for (a) but lost two marks in (b) because they thought that the probability was given just by the probability of a white and a black ball plus the probability of a green and a green ball. There was a majority of fully correct answers.

Question 23
Many candidates worked out 4**A** – 3**B** but then stopped and did not proceed to equate the 11 and 22 elements of both sides of the resulting equation losing all four marks. Of those who did equate these elements to obtain equations, often made sign errors, particularly in finding *y*.

Question 24
Nearly all of the candidates managed to draw *AB* correctly and gain the B mark for (a). Many then managed to locate *M* due east of *A*, gaining a B mark, however, a sizable number thought that in fact *M* was south east (or south west) of *A* resulting in the loss of the marks for (b) and then the mark for (c).

Question 25
The arc was usually correctly drawn in (a) but some candidates only drew it in *part* of the parallelogram, losing the B mark. Many candidates collected both marks for (b) but some failed to draw the construction arcs, as required by the question thus losing both of (b)'s marks. If parts (a) and (b) were correct or produced a diagram of the correct form, the marks for part (c) and (d) were usually collected.

Question 26
Most candidates gained the mark for the radius in part (a) but then many of these followed this with poor algebra. Some correctly arrived at $r = \frac{12}{2\pi}$ but then equated this to 6π, usually resulting in the loss of the accuracy mark. Many did not know how to proceed in part (b) whilst others tried somehow, usually incorrectly and without foundation, to reproduce the required expression for *P*. There were, though, many correct answers to this part.

Question 27
The differentiation requirement in part (a) proved to be a discriminator with many gaining at most 1 mark for having obtained one correct term. Here, even the differentiation of $\frac{x}{2}$ proved problematic for some. In part (b), many equated their answer to (a) to $\frac{3}{x} - 2$, gaining M1, but then followed this with poor algebra thus losing the second M for removing the denominators. Many candidates nonetheless gained the method mark for attempting to solve their trinomial quadratic. It was pleasing to seen a reasonable number of fully correct answers to this question.

Question 28
Many candidates attempted part (a) successfully although a number of these needlessly lost the accuracy mark for not giving their answer to 3 significant figures. There were many correct attempts at part (b). Some candidates were unsure of their method and obtained the first two method marks for a relevant angle and for finding either *BD* or *CD* and then usually stopped their attempt. A small number of candidates erroneously thought that ΔBCD was isosceles losing at least the last two marks of (b).

Question 29
This was another discriminator of the paper. Many candidates had no idea of how to proceed and were probably confused by being presented with symbolic rather than numeric ratios. Of those that had some idea, usually gained the first mark for translating at least one of the given ratios into an algebraic form and then possibly a second mark for using it in $L = A + B$ but then usually stopped mainly because they only were using one of the two algebraic ratios. The more abler candidates usually managed to get over this hurdle and carried on to obtain the correct expression for μ. It is very pleasing to report that some of these latter candidates produced very elegant and direct derivations of the required expression for μ. A handful of students used the idea of proportion/ratio tables and usually these candidates arrived at the solution as the need for algebraic manipulation was significantly decreased.

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