Examiners' Report/
Principal Examiner Feedback

January 2012

International GCSE
Mathematics B (4MB0)
Paper 02

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Introduction

This was the first paper for this new specification taken by the winter cohort. It was pleasing to observe that, overall, the standard of presentation and clarity of work was high.

As in the previous summer examination, it would be prudent for centres to encourage their candidates to answer the questions within the examination paper booklet and not, if at all possible, on any extra sheets of paper but if they are continuing a question on a page which does not relate to the question that they are answering, they must indicate that they are continuing the question on another page and indicate the page number and then clearly identify that question on that page.

The question paper did highlight the following problem areas, followed by their corresponding question numbers, which should receive special attention by centres:

- Probability (Q5)
- Finding or realising the need to find a stationary point of a function (Q8(c))
- Parallel vectors (Q9(c))
- 3 dimensional trigonometry (Q10(c))
- algebraic manipulation of a cubic (Q11(e))

Report on individual questions

Question 1

Those candidates who separated the expression into two inequalities usually solved this question quite easily, whilst those who did not, collected half marks at best. A common error was to infer from $6 \leq 3x$ that $x \geq 3$ losing the accuracy mark. The $3x-1 \leq 2x+5$ inequality was usually solved correctly.

Question 2

In part (a), many candidates obtained the decreased value by a two stage process (for example, calculate 25% of £15000 and then subtract it from £15000) rather than the direct one of using the multipliers $\frac{75}{100}$ and $\frac{80}{100}$. There was a noticeable number of candidates who lost the accuracy mark by making a third decrease because they thought that 1st January 2012 was *three* years rather than *two* years after 1st January 2010.

In part (b), many candidates incorrectly thought that $\frac{9000}{15000} \times 100$ was the required percentage decrease, thus losing both marks.

Question 3

Many candidates answered both parts correctly. Of those that did not, usually did not realise or were unaware that a cyclic quadrilateral was involved and so usually lost all of the marks for part (a). Some failed to use the alternate segment theorem to obtain the value of $\angle CDT$ for the final mark. The candidates who successfully answered part (a) usually answered part (b) correctly. As observed in the past with such questions, part (a) required reasons to be given and usually they were albeit in some cases with missing key words such as *cyclic* for cyclic quadrilaterals, or with incorrect descriptions or with no reasons at all.

Question 4

It was disappointing to see that many candidates did not know how to correctly apply the formula for an estimated mean and multiplied their frequencies by the *width* of the time interval rather than by the *midpoint*, thus losing all of the marks. Most of those candidates who realised that they had to use midpoints then normally collected full marks for the part.

It was pleasing to see many fully correct attempts at the histogram required in part (b).

Question 5

This question was one of the discriminators of the examination with many candidates producing completely incorrect answers even to the relatively straight forward part (a). As in the past with the legacy 7361 examination, independent probabilities prove elusive to candidates and it would be advisable for centres to spend more time on this topic. Of those that got past the hurdle of part (a), normally collected at least one mark from part (b) and one from part (c) for supplying one of the correct multiplied pairs of probabilities.

Question 6

Many good answers were seen to parts (a), (b) and (c) with occasionally a candidate losing marks for incorrectly plotted points. The matrix multiplications required in parts (b) and (c) were generally correctly done. A fully correct answer to part (d) proved beyond all except the most able candidates and was thus a discriminating question of the examination.

Question 7

Many correct answers were seen for part (a) but fewer for parts (b) and (c). There were numerous correct attempts at shading the Venn diagram in part (d)(i) which usually resulted in such candidates collecting the three marks available in (d)(ii) and (d)(iii). Of those that answered (d)(i) incorrectly, many were able to and did collect most of the marks available in parts (d)(ii) (via following through on their shaded area in (d)(i)) and (d)(iii). A reasonable number of the candidates who answered part (b) wrongly did manage to collect the two marks available in (c) by following through on their answer to part (b) answer.

Question 8

Many correct answers were seen for parts (a) and (b). Popular incorrect attempts at (b) involved using $2\pi r^2 h$ or $\frac{1}{3}\pi r^2 h$ for the volume of a cylinder and these attempts collected no marks. Part (c) was a relatively straight forward question requiring the differentiation of the given formula for *V* so it was also open to candidates who did not answer parts (a) and/or (b). However, many candidates did not realise that differentiation was required to find the stationary point or failed to differentiate the given expression for *V* correctly. It was pleasing to see several successful applications of product differentiation even though this is not required by the syllabus.

Question 9

Many good attempts were seen at parts (a) and (b). However, part (c) proved elusive to the majority of candidates. Of those who had some idea, incorrectly thought that the line *OB* being parallel to the line *MP* meant that $\overrightarrow{OB} = \overrightarrow{MP}$ and, as a result, many such candidates invariably lost the marks available for (ci). Of these, some did proceed correctly and used the given information that $k = \frac{8}{3}$ and arrived at the correct answer for (c)(ii), namely, $\overrightarrow{MP}$ = 2b. Parts (d) and (e) were available to candidates who did not necessarily answer (c) correctly (but provided they had answered part (b)(ii)) and many candidates took advantage of this and collected most of the marks available there.

Question 10

Many candidates successfully answered part (a) correctly although some failed to correct their answer to the required accuracy, losing the accuracy mark. Part (b) was less successfully answered with many of these attempts using ΔFBC incorrectly to find $\angle FBC$. Part (c) proved to be another of the discriminators of the paper with many candidates not understanding the 3 dimensional nature of the question. Given the problems that candidates had in the previous parts of the question, many failed to collect more than 2 marks for part (d) and these were usually for the area of the triangles *ABF* and *CDE* and for the area of the rectangle *ABCD.* Many incorrectly thought that they had to use their value for *FZ* from part (c) to calculate the area of the trapezia *BCEF* and *ADEF*.

Question 11

Most candidates managed to collect most of the marks for parts (a) and (b), losing marks for making careless errors in producing answers to the required accuracy (part (a)) and/or plotting points incorrectly (part(b)). Many of these did manage to draw correctly the straight line required in part (c). Surprisingly though, a limited number were able to relate the points of intersection of their curve and their straight line to that required in the demands of parts (d) and (e), indeed most had no idea of what to do in (e).

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