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Examiners' Report/ Principal Examiner Feedback

Summer 2013

International GCSE Mathematics B (4MB0) Paper 02

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General comments

It was pleasing to observe a high standard of responses. The question paper highlighted that in general students found the following topics (followed by their corresponding question numbers) to be more challenging:

- Mean mark for a distribution of marks (2a)
- Describing transformations in the plane (5e)
- Use of ratios with vectors, finding ratio of sides (7)
- Interpreting Venn diagrams (8a, d and e)
- Bearings (9)
- Mensuration and algebra (10)
- Completing tree diagrams (11c), magnitude of fractions (11e)

Question 1

It was pleasing to see many fully correct answers to this question. Of those who did not answer this question correctly, the usual mistake was to take $\frac{AE}{EC} = \frac{DE}{EB}$ leading to $18 \times EC = 15 \times 24$, gaining no marks. A number of students who calculated *EC* (28.8 cm) correctly (M1 A1) did not add EC to 15 cm to obtain the diameter (A0) as required by the question.

Question 2

A significant number of fully correct attempts for this question were seen.

In part (a), the most common error seen was the use of a denominator of 5 with either the numerator or the denominator of the correct equation as their numerator and then putting this equal to 3.5. Some just had the correct expression for the mean stated, and did not proceed to give an equation as required (B0).

Those who correctly answered part (a) usually scored the marks for part (b) and (c). Negative answers obtained from an incorrect equation for (a) were seen for (b) leading to B0 (follow through) for part (c).

Question 3

In general this question was very well answered. Part (a) was usually correctly answered but some students used 15 instead of 17 for the slanted height and thus scored (M0 A0). A few tried in part (b) to substitute a numerical value for π and so lost accuracy.

Question 4

Those students who recognised the notation of the question had very little difficulty writing their equations and then solving them. Such students then usually demonstrated a clear knowledge of how to solve simultaneous equations.

In (c), a few wrote $3 \times -1^2 - 6$, (missed brackets), but usually the brackets were then implied by a correct solution of 3 - 6 = -3, gaining M1 A1, however a number thought that $3 \times (-1)^2 - 6$ lead to -3 -6 = -9 (M1 A0).

Question 5

With the exception of part (e), students seemed well able to handle this question. There were a few errors in labelling of students' triangles, for example, some students just wrote ABC or A'B'C' in the middle of their triangle rather than labelling each point of the triangle. In part (e), many students thought that there were two transformations involved, usually a rotation and enlargement. Responses that were not a **single** transformation gained no marks. In other cases, an otherwise fully correct solution lost 1 mark for the scale factor given as 2 rather than -2.

Question 6

A significant number of students scored full marks for this question. However, in part (b), 144.28 or 144.3 were common final answers, and so the final mark (A1) was lost for the required accuracy. A few made a premature approximation of £655, leading to a correct follow through answer of £145, gaining the final accuracy mark.

Question 7

It was pleasing to see a reasonable number of fully correct answers to this vector question. However, it was clear that many students did not understand how to use the ratios given in the question. As a consequence, in part (b) many of these students thought that $\overrightarrow{OC} = \frac{2}{5}\overrightarrow{OA}$ giving $\overrightarrow{OC} = \frac{6}{5}\mathbf{a}$ and $\overrightarrow{OD} = \frac{1}{4}\overrightarrow{OB}$ leading to $\overrightarrow{OD} = \frac{9}{2}\mathbf{b}$ were the most common errors. This caused such students to have problems with the rest of the question. Also, because X was given to be the midpoint of *CD* in the question, many in part (c) thought that $\overrightarrow{OX} = \frac{1}{2}\overrightarrow{OD}$ (M0 A0). The less able students found it difficult to equate their coefficients of vectors **a** and **b** in part (f), usually losing all of the marks. Otherwise correct solutions often lost the final mark in (g) because evidence of vector division was seen.

Question 8

Most of this question was usually well attempted, however, the less able students were confused with part (a) with the result that their answers to the rest of the question became problematic, usually losing the accuracy marks. In part (b), 25, 18 and 17 were often seen where the 25 - *x*, 18 - *x* and 17- *x* should have been placed in the Venn diagram and sometimes the area where 25 – *x* should have been was just left blank. The 21, 22, and 37 were usually correctly placed. In part (d)(i), 91 was often seen as an incorrect answer because such students forgot to include $\mathrm{n}\left(S \cap E \cap M'\right) = 17 - x$. Part (e) was rarely correct, 17/120 was a common incorrect answer here scoring just one of the available marks.

Question 9

It was evident that a number of students found bearings difficult as many students were unable to do parts (a) and (b)(ii) with "95.2" and "65.2" being seen as examples of incorrect answers. The other two parts of (b) were most often answered correctly - indicating a sound knowledge of the cosine and sine rules as they were usually able to answer parts (c) and (d) as well. Some students missed the 'travels around triangle *ABC* **four** times' while others forgot to change minutes to seconds.

Question 10

Part (a) of this question was well answered although many students did not simplify their answer as required by the question. Part (b) on the other hand was more difficult with many students unable to get the correct result even after numerous attempts. Their main error was including the top of the shape in their calculations (ie as if the tank had a lid) whereas it was an open tank with no top. Parts (c) and (d) were well attempted with many students collecting full marks and most students then carried on and earned both marks on part (e) by correctly reading off from their graph. Those who tried to solve an equation to answer this part did not do as well. In part (f), those who did not use calculus usually had a clear understanding of what they were expected to do and so earned full marks. However, a number of students did use calculus.

Question 11

The majority of students seemed to find this question straight forward. Although some did not know how to draw the whole tree diagram - most knew how to fill in what they were given and then usually went on to collect most of the marks for part (d). Of those who could completely draw the diagram, most knew how to use it to answer part (e). However, although they got the correct two fractions, many such students did not write the fractions with a common denominator in order to show the probability of *A* winning was greater, thus losing the final mark.

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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