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Examiners' Report/ Principal Examiner Feedback

January 2014

Pearson Edexcel International GCSE Mathematics B (4MB0/02R) Paper 02R

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General Points

In general, this paper was well answered by the overwhelming majority of candidates. Some parts of questions did prove to be quite challenging to a few candidates and centres would be well advised to focus some time on these areas when preparing candidates for a future examination.

In particular, to enhance performance, centres should focus their candidate's attention on the following topics, ensuring that they read examination questions very carefully.

- Reasons in geometric problems
- Conditional probability
- Vectors
- Set notation
- Enlargements with negative scale factors
- Drawing tangents to graphs

In general, candidates 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.

Candidates should also be reminded that if they are continuing a question on a page which does not relate to the question that they are answering, they must say...*'continuing on page xxx'.*

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 candidates use methods which are beyond the scope of the syllabus and, where used correctly, the corresponding marks are given.

Details of Marking Scheme and Examples of, and Report on, Candidates' Responses

Question 1

A well attempted question with the vast majority of candidates (over 75%) correctly using $\pi(R^2 - r^2)$ for the cross-sectional area then multiplying by 4 to arrive at the required answer to score full marks.

Question 2

Nearly all candidates showed they were confident in the use of ratios and the majority gave correct responses to parts (a) and (b). Part (c) however proved quite problematic for a significant number of candidates as there were a number of miss-interpretations of the requirement, '*one quarter of the people who could have voted did not vote'* and there were a number of incorrect attempts to multiply 24744 by $\frac{5}{4}$ or $\frac{3}{4}$ rather than the required fraction of $\frac{4}{3}$.

Question 3

Nearly two-thirds of candidates scored full marks in this question. This proportion would have been even higher if not for elementary arithmetical mistakes. Disturbingly over 10% of candidates either made no attempt at all at this question or made far too many errors to score no marks at all.

Question 4

Although the angle in part (c) proved to be more problematic than the other two parts, many candidates scored well on finding the required angles. Where they didn't do so well was in giving adequate reasons. Many reasons were either wrong, lacked enough wording or simply missing to warrant a mark. So, in part (a), whilst *angle at the centre* was seen on some scripts, *angle at the circumference is twice the angle at the centre* was erroneously seen on other scripts. Indeed, it was rare to see a reason involving isosceles triangles in part (b). In part (c), candidates did seem to fair a little better with their reasoning if they had acquired correct reasons for the previous two parts of the question.

Question 5

Candidates seemed well drilled in tackling percentages and pie charts as this was a very well answered question with over 70% of candidates scoring full marks.

Question 6

Much correct working was seen in parts (a) and (b) as many candidates seemed to have been well drilled in using the sine and cosine rules. For those candidates who realised that to do the last part they needed to determine the value of $\angle DBC$, the majority arrived at the required answer. For those candidates, however, who attempted to find the length of DC by first finding $\angle BCD$, then dropping a perpendicular from B to DC, many took up a considerable amount of valuable time and generated costly errors in their working.

Question 7

Whilst 20% of candidates got no further than the first two parts to this question, two-thirds were able to tackle all parts very well. Clearly, some candidates were unable to tackle the set notation parts to this question. It was encouraging to see a large number of candidates getting the conditional probability part of the question correct.

Question 8

Whilst the first four parts of this question were tackled well with a large number of candidates drawing the correct triangles and identifying the line of reflection, a significant number of candidates were unable to progress with the remainder of the question. This was undoubtedly due to not understanding what an enlargement scale factor of -1 actually means. Many attempts were made to

use the correct centre of enlargement but a variety of incorrect triangles were seen on many scripts for part (e). As a consequence, few scripts showed the required answer of reflection in the line $y = x + 3$ for the final part of the question.

Question 9

Rather surprisingly, nearly a quarter of candidates did not get beyond the tree diagram and of these candidates, there were a significant number of errors on the diagram as a consequence of misunderstanding the problem. Of those who were able to show a completed and correct tree diagram, many were able to tackle part (b) although some candidates lost the final mark because they failed to draw the required conclusion. Part (c) proved to be quite a discriminator with many candidates simply seeing this as $\frac{4}{9} \times \frac{3}{6}$ rather than a conditional probability with a restricted sample space. About 10% of candidates did obtain the required answer of $\frac{1}{3}$ for this part of the question.

Question 10

Candidates' answers varied significantly on this vector question. Indeed, a significant minority got little further than part (a). The required answer of $\frac{3}{2}\mathbf{b} + \frac{1}{2}\mathbf{a}$ for part (iv) proved to be elusive to many and an incorrect answer here meant that only one mark was available in part (b). Candidates, however, were able to recover in part (c) as the two expressions for $\overrightarrow{ON}$ were given. The majority of candidates seemed to be well drilled in the process of equating vector coefficients and many correct (over 50%) values of μ and λ were seen. Although part (d) was a discriminator, it was pleasing to see that about a quarter of candidates were able to arrive at the required answer of 108.

Question 11

The final question on the paper produced a varied response from candidates. Indeed, the completion of the table for the cubic and the plotting of the resultant points proved a challenge to nearly a third of candidates as they were unable to achieve the full six marks for these two parts of the question. Correct answers to part (c) of -26 were frequently seen but often achieved no marks at all because calculus was used rather than the required method of drawing a tangent. Many candidates recovered in part (d) by drawing the correct line of $y = -15$ and reading off their intersection correctly. For those candidates who attempted the final two parts of this question their answers were quite varied. Most were able to draw the correct straight line from the given equation but fewer than expected were able to give the required range statements.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
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