Examiners' Report/
Principal Examiner Feedback

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Pearson Edexcel International GCSE
Mathematics B (4MB0)

Paper 01R

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Introduction to Paper 01R

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

In particular, to enhance performance, centres should focus their student's attention on the following topics:

- Reasons in geometric problems
- Probability equations (without replacement)
- Defining regions by inequalities
- Using the length of vectors which are perpendicular to each other
- Variation
- Ratios of areas of similar figures to find a volume
- Correctly using volume formulae of standard three dimensional shapes
- Using mid-class values to aid in finding an estimate of the mean of a grouped frequency distribution

In general, students 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. In addition, students should also be advised to read the demands of the question very carefully before attempting to answer.

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

Report on Individual Questions

Question 1

The vast majority of students knew how to find a common multiple from the numbers given. Only half of this majority, however, knew how to find the **Lowest Common Multiple** (LCM) and 15120 proved to be a popular, but erroneous answer. Only a handful of students confused Lowest Common Multiple with Highest Common Factor (HCF) and an answer of 12 was therefore only infrequently seen.

Question 2

Just over half of all students scored full marks on this question. The majority of errors seemed to be in giving the answer to part (a) as either 0.061 or 0.062

Question 3

Students would have found it helpful to draw diagrams here to help to understand what was required. Many students seemed to be confused between the given diameters and the requirement to find the sum, or differences, between radii. As a consequence, answers of 14 cm and 38 cm proved to be popular, but erroneous answers. Only one-fifth of all responses scored full marks for this question.

Question 4

The vast majority of students were able to find at least one factor (usually 2 or *x*), from the given expression. Recognising the difference of two squares proved problematic for many resulting in just over half of all students scoring full marks.

Question 5

Finding the number of lines of symmetry or the order of rotational symmetry from a given diagram continues to be a challenge to many, and only about half of all students were successful here.

Question 6

Half of all students correctly identified that they needed to evaluate $\frac{13.60}{85}\times 100$ to successfully arrive at the required solution. Of those who didn't, incorrect expressions of the form 13.60×1.15 or 13.60×0.85 were frequently seen earning no marks at all.

Question 7

Many students correctly handled the fractional indices in this question and much correct working was seen with seven-tenths of all responses achieving full marks. Of those who failed to score here, many evaluated $a^{\frac{1}{2}}\times a^{\frac{1}{2}}$ as $a^{\frac{1}{4}}$.

Question 8

Despite a seemingly innocuous column vector question, much incorrect working was seen in this question. Indeed, many students did not seem to know that they simply needed to add the three vectors given for part (a) and either left the question blank or simply manipulated the first and last of the vectors, ignoring the second vector. In part (b) the negation of the student's answer to part (a) earned a follow through mark but a common error seen was inverting the values from their part (a) and $\begin{pmatrix}-234\\112\end{pmatrix}$ proved to be a popular, but incorrect answer. Less than a third of students scored full marks on this question.

Question 9

Despite the odd arithmetical slip, the vast majority of students scored well on this question with three-quarters of responses scoring full marks.

Question 10

The odd sign slip made by some students in expanding the numerator meant that such responses only achieved the first mark. Of those that did evaluate the numerator correctly, a significant number failed to see any further simplification from the expression $\frac{4xy-12x^2}{y-3x}$ and consequently the final mark was lost.

Question 11

The vast majority of students seemed to have been well drilled in the technique of writing an answer in standard form, and this question was very well answered with over three-quarters of responses scoring full marks.

Question 12

Again, a well answered question with nearly eight-tenths of students scoring full marks. A very small number of students ignored the requirements of the question and gave their answer as a range rather than a list. This earned, at best, one mark only.

Question 13

Almost all students scored at least one mark on this question, this was invariably for part (a). Part (b), however, proved to be more problematic for over half of all students as many did not seem to recognise that they needed an equation in *y* which involved combining two probability fractions (without replacement) and equating to the given fraction. As a consequence, there were many blank responses for this part of the question.

Question 14

Despite six-tenths of students getting this question fully correct, most of those who were unsuccessful treated the numbers on the Venn diagram as *elements* of each subset, rather than the *number of elements* in each subset. Consequently, answers of 4, 3 and 2 proved to be popular, but erroneous, answers.

Question 15

Whilst there were a significant number of students who wrote down statements with the inequality sign the wrong way round, the most common error here was writing down one inequality as $y \geq 0$. Just under half of all students scored full marks on this question.

Question 16

Nearly six-tenths of students scored full marks on this question. However, a significant number of students, whilst able to divide the prize winnings in the given ratio, were unable to provide the correct values when given the distribution by the winner to the other two prize winners.

Question 17

An large majority of students scored full marks on this question on surds, showing that centres had drilled their students well on this topic.

Question 18

The vast majority of students scored well on part (a) of this question and many correct answers of $4\mathbf{a}-2\mathbf{b}$ were seen. Part (b), however, proved to be more of a challenge as many students failed to connect the property that the two vectors were perpendicular to each other and therefore, given their lengths, Pythagoras was required. Many incorrect methods of the form $4\times6-2\times5$ or $4\times6+2\times5$ were seen which meant that the marks for this part of the question were lost.

Question 19

This was a question that generally earned either full marks or no marks for students. The majority of students who scored no marks simply gave the wrong equation, often using $y = kx^3$. This type of question occurs frequently on papers and centres should focus their students' attention on the correct processes. Just under two-thirds of responses scored full marks on this question.

Question 20

Students taking this paper have invariably been good at algebraic manipulation, and the responses to this question confirmed this with nearly two-thirds of responses scoring full marks on this change of subject question.

Question 21

Students were evenly split with their ability to answer this question on similar solids. About half knew what was required and scored full marks whilst the remainder scored no marks at all. Methods such as $\frac{9}{16} = \frac{13.5}{x}$

or $13.5\times\left(\frac{16}{9}\right)^{3}$ were incorrect methods and earned no marks. Centres would be well advised to drill their students in the basic process of similar solids for future examinations.

Question 22

A third of students either did not know how to begin this question or misquoted formulae for the area of a hemisphere and/or the area of a cone. Successfully quoting one of the required formulae did enable a significant number of students to achieve the first method mark but equating two correct formulae proved to be more challenging. Once a solution of $2r$ had been found from two correct equations, the final hurdle preventing students getting full marks was the failure to add the radius of the hemisphere (r) to the height of the cone ($2r$) to arrive at the required answer of $3r$. About one-sixth of responses achieved full marks for this question.

Question 23

About one-third of students did not seem to realise that they needed to equate the coefficients of the respective components from the terms of the two sides of the equation, and consequently earned no marks at all for this question. Once this had been realised by the remaining students, the vast majority went on to score full marks.

Question 24

Students taking this paper are usually well-drilled in the processes of algebraic manipulation and the responses to this question showed that this was the case here. Nearly two thirds of responses scored full marks on this question. Indeed, except for those few students who left the question blank or did not know how to remove denominators, the remaining students who did not score full marks invariably made an arithmetical slip in obtaining the trinomial quadratic.

Question 25

Rather than using mid-class values for the calculation of the estimate of the mean, a significant number of students used the *class width* when determining $\sum fx$ and consequently lost the first three marks. Fortunately, the marks for the completion of the histogram in part (b) was independent of part (a) and some students were able to recover some marks here. Overall, this question was not done as well as expected, with only four-tenths of responses achieving full marks.

Question 26

This question proved to be quite challenging for the almost half of all students. Many either did not begin, made incorrect assumptions about the diagram or left (or misquoted) valid reasons. Not realising that the lengths of the two tangents from outside the circle are equal in length was the main initial error – often with $\angle DAT = 80^{\circ}$ seen. Presumably, as triangle *DAT* **looked** like an isosceles triangle, with *DA* = *DT*, then this justified to the student that this was the case. Clearly the notation *Diagram NOT accurately drawn* was ignored. Centres need to focus their students' attention on correct geometrical properties rather than assumptions from a drawn diagram. Significantly, less than one-tenth of responses scored full marks on this question.

Question 27

The vast majority of students were able to use ratios correctly and find the size of the smallest angle in part (a). Parts (b) and (c) proved to be more challenging; correct formulae were often quoted but with incorrect values substituted and so marks were lost. As a consequence, only about four-tenths of responses scored full marks on this question.

Question 28

The vast majority of students were able to make a good attempt at differentiating the cubic function. However, about two-tenths of candidates either left a blank response or made an elementary mistake with their differentiation and scored no more than one mark on the question. Of the remaining students, most realised that they had to equate their trinomial quadratic to -1 but many of these stopped after they had found $x = 1$ thus losing the last mark. This question was a good discriminator, and one-quarter of responses achieved full marks on this question.

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