Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

January 2022

Pearson Edexcel International GCSE

In Mathematics B (4MB1)

Paper 01R

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Introduction

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 for a future examination.

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

- Showing clear working particularly when it is requested in the question
- Working with surds
- Fractions, ratios, and percentages
- Length and area scale factors
- Upper and Lower bounds and their applications to all four operations
- Indices
- Conversion of metric units, e.g., millilitres to litres and vice versa

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. In addition, candidates 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 candidates 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

Almost all candidates knew the correct method for dividing fractions and it was only the lack of showing all relevant working that meant that some candidates did not score both marks.

Question 2

Several candidates who did obtain $n = 21$ correctly failed to give any reasoning that as this value was an integer, 222 was therefore a term in the sequence. The most common incorrect method was to substitute 222 for n.

Question 3

While most candidates correctly re-wrote 3 litres as 3000 ml there were a number of incorrect conversions between millilitres and litres seen. Even for some who did have the correct conversion many failed to give their answer as a fraction in its simplest form.

Question 4

Almost all candidates correctly calculated the number of people at the meeting based on the given proportion of the pie chart.

Question 5

Candidates are reminded that on questions involving bearings it is a good idea to draw a diagram showing the given angles and to read the question very carefully; many candidates incorrect calculated the bearing of *P* from *Q*.

Question 6

This question on similar triangles was answered extremely well with the majority scoring full marks. The most common error was from those candidates who used the length of *BD* rather than *AB* in their equation (or working) to find *BC*.

Question 7

This question, on finding the value of *n* based on the LCM of two numbers, differentiated well with many incorrectly believing that *B* was equal to 3 375 000. Those candidates that realised that $5^n = \frac{3375000}{2^3 \times 3^3}$ were mostly successful in obtaining the correct answer of $n = 6$.

Question 8

The vast majority of candidates scored at least one of the two marks available for differentiating one of the two terms of *y* correctly. When mistakes occurred, it was almost always in the second term due to either the negative operator or negative power.

Question 9

Over the last few series examiners have seen an improvement in regards to questions containing intersecting chords and it was pleasing to note that most candidates were successful in solving this question. The most common error was adding rather than multiplying the required lengths together.

Question 10

This question on the determinant of a 2 by 2 matrix was answered extremely well and examiners were impressed with the candidates' ability to solve the resulting linear equation once the determinant was equated to 0.5. Alas not all scripts were error free and when errors did occur it was usually sign errors in either the setting up of the determinant or in the solving of the linear equation.

Question 11

The most common error in this question on angles/sides in a regular polygon was to assume that the given angle of 150 degrees was the internal angle of the polygon. Even those candidates who correctly realised that they had to first work out the base angles of the isosceles triangle, far too many 'wasted' time working out the interior angle when all that was required was to realise that the exterior angle was 15 degrees (from (180 – 150) / 2) and then calculate 360 / 15 which gives the correct value of *n* as 24.

Question 12

Almost all candidates applied the correct method for finding the lowest mark required in the fifth exam with the most common error being to leave the answer as 88/100 (which does not explicit the answer the question) rather than as either 88 or 88%.

Question 13

This question was answered extremely well with most candidates scoring all three marks for solving the equation containing algebraic fractions. On this occasion, sign errors and errors in expanding brackets were rare.

Question 14

While most candidates could correctly find angle *BAD* (using angles on a straight line) many did not realise that this angle was equal to the required angle *ACB* (from the alternate segment theorem). Of those that did find the correct angle many did not give any reasons for any of the stages of their working.

Question 15

As always in this type of question (rationalise the denominator of a surd) a number of candidates showed no working but simply stated the correct answer directly from their calculators and so scored no marks. Those that correctly multiplied numerator and denominator by $\sqrt{5}+2$ were usually successful (although in this type of question candidates are reminded to show all relevant working which includes the expanding of brackets and simplifying of any relevant surds).

Question 16

This question on bounds was not answered very well with many candidates not realising that the lower bound for *P* would be found by using the lower bounds for *a* and *c* but the upper bound for *b* (with many just using lower bounds for all three). Even those candidates who did realise which bounds were required many could not give the correct bounds for each of *a*, *b*, and/or *c*.

Question 17

This question on completing the square was answered particularly well with most candidates getting the correct value for at least one of *a*, *b*, or *c* (most usually *a* or *b*).

Question 18

Surprisingly on this question regarding the volume and surface area of a cylinder it was the quoting of an incorrect formula for the volume of the cylinder (usually as that of a cone) that accounted for the loss of the most marks. Those candidates who did quote the correct formula usually went on to score at least the first two marks for finding the correct value for the radius.

Question 19

This question was done well with many candidates correctly finding the required angle. The most common incorrect method was to assume that angle *ADC* was right-angled and then use Pythagoras to work out the length of *AC*.

Question 20

The most common incorrect method seen in this question was to re-write $y=5+\frac{3x+4}{7-x}$ as $y\ \ 7-x\ \ =5+3x+4$ or as $y=5\ \ 7-x\ \ +3x+4$. Those that correctly removed the bracket usually went on to make *x* the subject.

Question 21

Very few candidates scored any marks in this question as many incorrectly used the length scale factor $\frac{16}{9}$ rather than area scale factor $\left(\frac{16}{9}\right)^2$ in their attempt to calculate the area of triangle *EDC*. Another common error was to incorrectly read the area of triangle *ABC* as 31.5. Those that set up a correct equation, e.g., $\left(\frac{16}{12}\right)^2=\frac{31.5+x}{x}$ where *x* was the required angle, usually went on to score all four marks.

Question 22

A very well-answered question with most candidates stating the correct modal class in (a) and calculating an estimate of the mean (using the correct mid-points) in (b).

Question 23

Responses to this question on fractions, ratios and percentages were mixed; some candidates left it blank while others scored full marks. The most successful were those that initially considered the proportion of students from village *A* who did not travel by bus to Crown Academy.

Question 24

Many candidates failed to make any real progress on this question with most showing a misunderstanding of the laws governing powers and indices. The most successful candidates were those that realised that

$$\frac{12^{3x}\times 3^{4x^2-3x}\times 3}{24^{2x}}=\frac{2^2\times 3\ ^{3x}\times 3^{4x^2-3x}\times 3}{2^3\times 3\ ^{2x}}=\frac{2^{6x}\times 3^{3x}\times 3^{4x^2-3x}\times 3}{2^{6x}\times 3^{2x}}=3^{4x^2-3x+x+1}$$

and then stated that $4x^2-2x+1=3$. Those that formed the correct three term quadratic equation in *x* usually went on to find both roots of this equation.

Question 25

Parts (a), (b) and (c) were answered extremely well on the topic of sets with only the subset of *C* in (d) causing difficulties. Many of the most able in (d) only gave the proper subsets (therefore forgetting to state the null set and *C* as subsets of *C*) and scored only two marks in this final part.

Question 26

All parts of this question were answered extremely well. There were the usual sign errors in (b), and some candidates failed to read part (d) carefully and instead solved the given expression by equating it to zero.

Question 27

Surprisingly, the most common error in this question was to assume that the quadrilateral was cyclic and therefore angle *ABC* was 48 + 59. The most common correct approach seen by examiners was to calculate *AC* using the sine rule and then angle *ABC* by the cosine rule followed by applying $\frac{1}{2}ab\sin C$ twice to find the required area of the quadrilateral.

Question 28

Most candidates realised the need to differentiate the given curve in this question, and examiners noted that this was done extremely well. However, from there many candidates incorrectly set the derivative equal to zero rather than substituting into the derivative the value of 1 and then putting this value (which if correct was – 3) equal to the earlier derived gradient function. Those that did handle the first few stages of this problem correctly usually went on to correctly find the gradient of *PQ*.

Question 29

The final question was answered extremely well with many correctly in (a) using the factor theorem to show that $k = 23$. Examiners were pleased to report that very few attempts by long division were seen. In (b) most candidates correctly used the given factor to fully factorise the cubic and then go on to write down its roots. The most common error was in not reading the question carefully and stopping after the cubic had been written in terms of its three linear factors.

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