Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

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International GCSE Mathematics
4MA1 2HR Principal Examiner's Report

This was an unusual examination series, and we had a very varied group of responses with some of an excellent standard but others leaving out vast swathes of the questions on the examination paper.

On the whole, working was shown, but it is still the case that many students would do well to show us all the stages in their work, especially when a calculator is used.

Problem solving questions often cause students problems and the best advice for them is to try to do what you can even if you cannot finish the question as valuable method marks can often be gained.

A few excellent solutions to this paper are an indication that some may have been entered at the wrong level and that the higher level may have been more appropriate.

Question 1
Part (a) was answered well, with the vast majority of candidates showing discs in the correct order to produce the smallest number 12 348. Part (b) was not answered well, with many candidates choosing to end their number with 8 or 4, which whilst producing an even number, did not meet the demand of the **largest** even number. For (c) and (d), many candidates only gave a single number for their answer, and also erroneously identifying 1 as prime.

Question 2
This question was a good source of marks for most candidates, with fully correct answers to all parts except (b). A large number of candidates failed to simplify their ratio, or used values from different days to the Monday and Tuesday required. Drawings on the picogram for (c) were generally clear, with candidates often using the 'half' picture from Tuesday and Wednesday as a guide. Writing 6 out of 14 as a fraction caused no trouble for most, although some failed to simplify it correctly. Where a suitable scale was used in (e) most candidates could draw three correct bars and gain both marks. The issue for a significant minority was finding a scale of evenly spaced values starting with zero on the frequency axis.

Question 3
Unfortunately, some candidates failed to heed the instruction of writing a suitable **metric** unit for each part of this question, hence gaining no marks. The first two parts were otherwise answered well, although part (iii) was not answered well, as candidates often did not give a unit of area, or said mm^2, which gained no marks. A large number of candidates were confused by part (b) and commonly gave imperial units, or values that were wildly out of the expected range (1.8 m to 2.2 m).

Question 4
The names of 3D shapes was not familiar subject knowledge for a significant number of candidates. Although a fair few did get all three correct, blank responses were commonplace, as were 2D shapes 'circle', 'triangle' for the first two especially. In (b), most candidates successfully counted 8 faces in shape **C** but many struggled with

counting vertices. A common error was to give 18 (which is the number of edges), suggesting that they did not know what a vertex was.

Only about half of the candidates were able to work out how many bricks were in the large prism, and then use this to work out a correct volume. Many candidates only counted the number of bricks they could see, rather than counting those on the face, and then doubling to get the total.

Question 5
Working out a range of temperatures in (a) requires a subtraction, which unfortunately many candidates did not recognise, thus giving answers such as -6 to 4 which was worthy of no credit. Part (b) was answered well, although some candidates did calculate the mean rather than the median. It was encouraging to see a good number of candidates write out the temperatures in order before selecting the median. The final two parts of this question were answered well, although candidates should be encouraged to show their working out by means of a calculation before stating their answer, as this would have given the opportunity of method marks to be given to some of those with incorrect answers.

Question 6
The correct response of A 320 grams, B 240 grams and C 640 grams, accompanied by clear working gained three method marks and an accuracy mark. Of those who gained part marks it was usually the first method mark for showing how to calculate the weight for Cake A. Some lost marks because they did not use ratio to find the weight of Cake B and Cake C, instead choosing to divide the remaining 880 by 2.

Question 7
The majority of candidates were able to identify the correct time of 18:12, and gave **D** as their answer to (a). Many candidates did correctly work out that the difference in time between **A** and **E** was 4 hours 52 minutes, with some gaining just one mark for a partially correct answer of 4 hours or 52 minutes. In part (c) a major stumbling block was finding the difference between time E and time B in minutes. Another was realising how to use the given rule even when 85 minutes had been found. Correct use of inverse operations to find the weight of the chicken as 1.75 kg gained all marks. Slightly more success was had in part (d) with a majority of candidates obtaining a correct formula, although some omitted the 'T =' and hence scored just one mark.

Question 8
The correct answer of £20.69 was found by some of the candidates but many floundered because they used the conversion factors incorrectly. Multiplying when they should have divided and vice versa. Two main approaches were used: either converting the cost both in Berlin and Dubai into pounds and subtracting, or converting the cost in Dubai into euros, subtracting and then converting to pounds. A large number of candidates were able to gain one method mark for showing how to convert one value correctly.

Question 9
Candidates generally found this question difficult and many did not seem familiar with the topic of bearings. Even those who did use a protractor correctly in part (a) struggled with part (b) which required a calculation of 45° + 180° to obtain 225°.

Question 10

In part (a), a good number of candidates found the correct response of 250 g using the calculation (60/24) × 100 and were awarded two marks. Some rounded their calculation after part processing to obtain a non-exact value and therefore could not be awarded the accuracy mark. Part (b) was less well answered, the main issue being the fact that once it was determined that 30 buns require 125g of butter the next step is to find a percentage. All that was required was to realise that 125 g represented a 25% increase on the baseline value of 100g. Supporting work showed that some thought that the base line weight was 125g and gained no marks for an answer of 20%.

Question 11

For part (a), a complete substitution using brackets was required, which is most appropriate when substituting a negative value in**to** an expression. A large number of candidates obtained two marks for a correct answer of 28 but many had errors in their processing of $5 \times (-2)^2$, usually due to omitted brackets. The factorisation in part (b) required finding the common factor of 2p and placing it outside a bracket containing (4*p*-1). Unfortunately, many candidates only partially factorised the expression, although some had no idea what to do and gave answers that demonstrated no understanding of factorisation. Part (c) was answered well, with many candidates managing to obtain a fully correct expression, and many others getting one of the terms $12t^2$ or $-8t$ correct. Candidates continuing to incorrectly simplify answers to $96t^3$ were penalised for this incorrect use of algebra. Part (d) caused some difficulty to about half of the candidates, failing to expand the quadratic at all. Commonly just the x^2 and -8 terms were seen, thus not gaining any marks.

Question 12

This question was poorly answered, compared to the other questions in this part of the paper. Although some candidates were able to find the area of the semi-circle and subtract from 72 to obtain a correct answer, a worryingly large proportion thought that the area of the circle was $6 \times \pi^2$. Some chose to work with the perimeter of shapes and as such could not gain any credit.

Question 13

The question states “show clear algebraic working” which means that either multiplication by 5 to get $10x - 15 = 20$ or division by 5 to get $2x - 3 = 4$ were ideal starting points. Many could proceed from these starting points to get an answer of $x = 3.5$ for three marks. The usual error of incomplete multiplication of the bracket occurred to get $10x - 3$ was a problem for some, whereas others had been poorly prepared and were unable to make a meaningful start on this question. Finding the answer of 3.5 by the method of trial and improvement gained no marks as an algebraic approach was a required feature of the question.

Question 14

Although candidates generally gave the correct answers of 24 and 30 to the first part of this question, there was less success on part (ii). A large number of candidates were not familiar with the expression *A*’ and simply restated the values of *A* again. In part (b), writing a correct expression for C was only seen in a very small minority of responses, showing a lack of understanding of set notation from most candidates.

Question 15
Candidates frequently scored one mark for either 81 or for k^8, but only the most able were able to score both marks for a fully simplified expression of $81k^8$. In part (b), the responses to this question highlighted the need for candidates to work on the laws of indices, particularly in relation to negative indices. An answer that included $7m^4$ gained one mark in a fairly high number of cases, but the other mark for n^6 was rarely awarded.

Question 16
There were mixed fortunes on these responses. In part (a) many could rotate the shape through 180 degrees but did not always use the centre of rotation about the point (−3, 2), thus gaining just one mark. Two marks were awarded for the correct rotation in the correct location, which was seen much less frequently. Part (b) was generally answered with better accuracy, although some candidates mixed up the horizontal and vertical translations.

Part (c) required the description of "enlargement, scale factor 2 from centre (−3, 3)" or equivalent, and as such only a small minority of responses gained full marks. The individual parts could each gain one mark providing nothing in the answer contradicted the statement. Candidates stating "enlargement then translation" gained no marks for that part. The centre of (−3, 3) can easily be found by drawing lines through the corresponding vertices of the shapes, although this method was rarely seen.

Question 17
Very few students correctly realised that the Wednesday price of £1.26 was in fact 105% of the price on Monday. Hence 1.26 ÷ 1.05 =1.2 and 1.2 × 30 = £36 gave the cost of 30 litres of petrol on the Monday. Many candidates were able to gain just one mark for a partially correct calculation that typically included multiplying 1.26 by 30, even if a percentage multiplier of 0.95 was used.

Question 18
Most candidates struggled with this question, not even identifying the straight lines of $x = 3$ and $y = 1$ which would have gained one mark following the special case. Fully correct solutions identifying all the correct inequalities to define the region were rare, even though the equation of one of the lines was given. It was apparent that many candidates were not familiar with this topic at all. Frequently responses were seen simply listing co-ordinate points of intersection and hence gained no credit.

Question 19
Part (a) was an excellent source of marks, with a very high proportion of candidates correctly identifying the Pacific ocean. Part (b) was answered less well, although use of the calculator was very helpful to many candidate, an answer of 93930 only gained one mark. Slightly less than half of all candidates were able to follow the instruction "Give your answer in standard form" in order to obtain a correct answer oof 9.393×10^4.

Question 20
The most straightforward way to solve the equation was to factorise, obtaining $(x - 1)(x - 20) = 0$ and hence finding the two solutions $x = 1$ and $x = 20$ for three marks. Other methods such as using the formula or completing the square when applied correctly lead to the same answers and gain the same marks. Unfortunately, a significant number of candidates attempting to use the quadratic formula were careless using brackets around

their $(-21)^2$ and with insufficient next steps show did not gain any marks due to not following the instruction “show your working clearly”.

Question 21

A fairly large number of candidates gained one mark for recognising that this was a frequency distribution and hence found the product of the mid-point of the class interval with the frequency coupled with an intention to add these products. Candidates were expected to show a complete algebraic method to obtain the answer of 10, with no marks awarded for an answer of 10 with no justification, as the question states “Show your working clearly”.

Summary

Based on their performance in this paper, students should:

- Be familiar with metric units, including those for length and area, and use these to estimate the size of familiar objects.
- Learn the mathematical names of 2D and 3D shapes
- Practice using written formulae, both forwards and backwards.
- Develop understanding of bearings, and use of protractors.
- Focus learning on sets and set notation.
- Develop understanding of transformations, both applying and identifying transformations.
- Take heed of the instruction “show each stage of your working clearly”.

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