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Examiners' Report/ Principal Examiner Feedback

January 2015

Pearson Edexcel International GCSE
in Mathematics (4MA0)
Paper 3HR

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Grade Boundaries

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This paper was very accessible for the majority of students with the most able gaining very high marks. Students presented their work clearly and appropriately with well-structured responses in the majority of cases. The questions on algebra were usually answered very well, as were those involving trigonometry. Mistakes on the early part of the paper appeared to be made because the question was not read carefully enough. Students often failed to gain full marks on the transformation question even though its target grade was far lower than some of the questions where candidates mostly gained full marks. Some students also struggled with the term 'bearing' and got mixed up with inverse and direct proportion. Good use was made of calculators, many candidates keeping full accuracy until the final answer.

Question 1
Most students were able to gain full marks on this question but there were a few who misread the question and gave the number of girls or gave the number of boys and girls.

Question 2
This was generally very well answered although most students either gained zero for full marks as they do not tend to write any intermediate stages of their working in a calculator question. Most candidates could round the answer to the calculation to three significant figures in part b) but a few forgot the zeros and gave 157 instead of 15700.

Question 3
This was very well answered, the typical mistakes seen were to calculate $0 \times 5 = 5$ or to progress from what was required to find the mean number of goals scored by the football teams.

Question 4
Most students were able to gain full marks on this question. It was pleasing to see clear algebraic working shown for the equation in the vast majority of cases.

Question 5
The majority of students were able to draw the graph of this linear equation very well, in many cases with very little working. A few made one error in plotting but were still able to gain 3 of the marks for a correct line through at least 3 of the integer value points.

Question 6
It was interesting that some students plotted the coordinates of A and B on the grid for question 5 and found the mid-point of the line in this way – they could have used the grid on question 7 but this was seen more infrequently. Some used an incorrect method, subtracting the coordinates from one another, possibly getting this mixed up with finding the length or gradient of the line AB.

Question 7
Students often struggled to recall the name for this transformation and problems arose from the description, the translation vector sometimes being written the wrong way round and some students thinking it was 5 to the right and 7 up or finding the vector from B to A rather than A to B. Some also wrote the vector as a coordinate for which they gained no credit.

Question 8
This question was generally done very well with full marks gained by the majority of students, often with very little, but very efficient working. If candidates went wrong it was generally in part (b) where they did not fully follow through their working, giving 104 or 1.04 as their answer rather than 4%.

Question 9
Most candidates gained full marks by showing this subtraction of fractions very well. A few different but effective methods were seen, most common though was to make the mixed numbers into improper fractions and then to put them over a common denominator of 6. Any candidates who tried a decimal approach struggled with the recurring decimals and failed to achieve marks.

Question 10
This question was well answered, the mistakes being to fail to give the total surface area as outlined in bold in the question or do find the circumference instead of the area for the circular ends of the cylinder. The lower bound was correct in almost every case, but a few candidates got the upper bound incorrect by giving 30.4 instead of 30.5 or 30.49 recurring

Question 11
The students were generally able to gain 3 out of the 4 marks on this question for finding either angle A or angle B correctly but they often failed to convert this to the bearing of A from B. Some students saw a right angled triangle and used Pythagoras to find the length of the line AB and gave this as their answer, presumably thinking it was a bearing.

Question 12
Although the correct answer was seen from over half the students, some methods were used to find the Lower Quartile and Upper Quartile which are more usually used for interpolating from a grouped frequency table. We did give these students credit, but they did a lot of work outside that required for this question. For a small sample of data like this, the lower quartile is found as the median of all the values to the left of the median, and the upper quartile is the median of the values to the right of the median. Or, more formally, the Lower Quartile is at position ¼(n + 1), and the Upper Quartile is at position ¾(n + 1). Students varied in their knowledge of what 'more spread out' meant for part (b), often stating vague or incorrect reasons.

Question 13
The majority of students gained full marks for this question.

Question 14
This question was answered very well by a good number of students with clear working shown. Those who failed to gain full marks generally gained at least 3 marks for $n = 9$. Those who didn't do well often used incorrect but almost correct formulae for angles in a polygon, such as $180 \times (n + 2)$ and a good few wrote that $(n – 2) \times 180= 140$

Question 15
Many students gained full marks for this question but some failed to raise 2 to the power 4 or left the answer as 24 and sometimes the power of x was left unsimplified. One out of two marks was awarded for two of the three terms in a product with three terms and this was frequently awarded.

Question 16
This question was very well answered with the majority of students gaining full marks. It was pleasing to see nearly all students plotting the cumulative frequency curve at the ends of intervals and only a few 'bar charts' Most students understood what was required for the median but some students misread the horizontal scale and assumed it was the same scale as the vertical.

Question 17
For part (a) many students were able to show convincingly that the volume was equal to the given formula. Others tried to work with the formula and unfortunately generally gained no marks. Some could gain a formula for the lengths of the edges but were unable to see where this fitted into the volume formula. For part (b) the majority of students gained at least one mark here, and generally two. Finding the maximum value was correct for about half of the students, but others struggled and often differentiated again or showed working that did not make any significant progress towards the correct answer .

Question 18
A large amount of correct answers were seen for this question. Those who gave the incorrect answer often used the formula wrongly and squared the radius instead of cubing it and others forgot to divide the formula for a sphere by two in order to find the volume of a hemisphere. A few candidates used the diameter instead of the radius in an otherwise correct formula.

Question 19
Many students clearly know the intersecting chord theorem but a few showed that they think you add the values instead of multiplying.

Question 20
This question was very well done by the majority of students. Those who gained no marks generally showed the method for R being directly proportional to the square of c. A few missed the final marks as they gave a formula for c in terms of R and should be directed to read the question more carefully. In almost every case, the candidates who gained full marks on part (a) also gained full marks in part (b).

Question 21
Most students had few problems with parts (a), (b) and (c) although in (c) some candidates were tried to find hg(x) rather than the gh(x) that was required. For part (d) there were a good number of correct answers but some students struggled. A first step was often given but then they were unable to progress and a few students thought that the inverse was just the original function but inverted, confusing the term “inverse” with “reciprocal”.

Question 22
The majority of students gained some marks, if not all, on this question. In both parts, it was wrongly assumed by some that the cards were replaced; method marks could be gained for this but it should be noted that when two things are taken then it should be assumed that one is taken and then the next, without the first being replaced. In part (b) some students failed to remember that 5 could be obtained by taking 1 then 4 or 4 then 1, etc.

Question 23
The majority of students made a good attempt at answering this question, with a pleasing number gaining full marks. There were many methods used and the mark scheme had a lot of updates to accommodate interesting, correct methods. A few candidates wrongly assumed that the triangle was right-angled, using Pythagoras theorem or trigonometry incorrectly. There were also some candidates that realised they would need to use the formula Area = ½absinC but used ½ × 13.8 × 8.5 × sin 47 so that the angle was not being between the two given sides.

Question 24
These type of questions come up frequently in International GCSE papers and students generally know what is required. The students sitting this paper were no exception, most of them showing clear algebraic working and gaining a set of correct answers. Those who didn’t gain full marks generally gained 1 mark for showing a correct substitution but were unable to expand the bracket correctly, or 3 marks for getting to the correct three part quadratic but being unable to solve it by either factorisation or use of the formula. It is noticeable that a few students gain the correct answers for x (− 1.6 and 4) by using their calculators but as they cannot factorise they go back and give us $5x^2 - 12x - 32 = (x + 1.6)(x - 4)$ which cannot gain the method mark and therefore loses the final accuracy marks.

Summary
Based on their performance on this paper, students are offered the following advice. They should:

- be coached in ensuring they read the questions carefully, giving the answer that is required and noting that words in bold type are there to prompt them
- have more practice on work on transformations
- show all algebraic working carefully and if they cannot factorise a quadratic expression then they should use the formula
- ensure they know the difference between inverse and direct proportion
- ensure they know how to work out a bearing

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