principal Examiner Feedback

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Pearson Edexcel International GSCE in Mathematics A (4MA0) paper 4H

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Principal Examiner's Report International GCSE Mathematics A (Paper 4MA0-4H)

Introduction to Paper 4H

The paper performed as expected and was accessible to students at this tier. It included questions that differentiated appropriately and enabled students to demonstrate their ability across the assessment criteria.

Report on Individual Questions

Question 1

Fewer than half of all students correctly answered this question. Those who did either used an ordered list or found the 22.5^{th} or 23^{rd} value. Many students found the mean rather than the median while others just found the middle value from 0, 1, 2, 3, 4, 5, and 6, ignoring the frequencies.

Question 2

Most students scored full marks. Some simply added up the given probabilities and divided by two in part (a), while others assumed the spinner was equally likely to land on green as on blue. In part (b), the most common error was to use their probability from (a), rather than 0.4.

Question 3

The vast majority of students scored full marks. Of those who didn't, many were able to score one mark for completing at least one step. An incorrect method included finding the difference between 715.5 euros and £530.

Question 4

Most students gained full marks in part (a). The relatively small number that answered part (a)(i) incorrectly often gained one mark in (a)(ii) for writing their answer correct to 3 significant figures.

Part (b) proved to be more challenging. Most were able to work out $\frac{4 \times 10^4}{700000}$ but many failed to correctly give their answer in standard form.

Question 5

Part (a) was well answered although a few students either misread one of the scales or started their line at the end of the line for Abri's journey. In part (b), many students gave the distance from Abri's home when Abri and Benito passed each other rather than the distance from the village.

Question 6

Many students were able to find the value of *x* in part (a) although some found the difference between 1 and 11 and then halved their answer. This was also true in part (b), although those who found a correct expression sometimes failed to simplify it correctly.

Question 7

Some students were not familiar with set theory. Those who were familiar usually scored well although union and intersection were often mixed up with each other.

Question 8

The majority of students scored at least one mark in part (a). It was more typical for *C* to be marked south of *A* but with an incorrect bearing rather than with a bearing of 235° from *C* but not south of A. Part (b) proved to be more challenging with many not able to identify the bearing of *B* from *D*. Most who were able identify the angle required using a sketch proceeded to correctly calculate the bearing.

Question 9

Most students correctly applied Pythagoras' Theorem in part (a), with only a small proportion losing marks. In part (b), students generally appreciated the need to use a trigonometric function although it was quite common for them to be applied incorrectly, **typically using the wrong sides for the** chosen function. Some students answered the question using radians in their calculator.

Question 10

Most students scored full marks but those who didn't usually failed to score at all. Those who didn't score any marks usually either used a trial and improvement method or attempted to eliminate the x terms by adding the two equations.

Question 11

Many students reflected triangle **Q** correctly in part (a), although some reflected it in either the line $y = 1$ or a vertical line other than $x = 1$. In part (b), students were more likely to be successful if they drew triangle **S** but even in these cases it was quite common for the description to be only partially correct.

Question 12

Students who attempted to rearrange the equation of the line **L** into the form $y = mx + c$ usually scored full marks in part (a). Occasionally marks were lost for incorrect rearrangements but most marks were lost by those who weren't able to make a start. In part (b), students were more likely to be successful if they had correctly answered (a). Part (c) was more challenging with many students taking (-2, 0) to be the y–intercept. Correct responses usually resulted from initially substituting $x = -2$ and $y = 0$ into $y = 1.5x + c$

Question 13

In part (a), it was apparent that many students were unfamiliar with the Alternate Segment Theorem. Many also struggled with part (b), sometimes making false assumptions about the diagram such as that *OBE* is an equilateral triangle. A large proportion of students did not know how to attempt this question, with students either scoring 2 marks or none. Very few scored one mark; some students might have benefitted by marking angles on the diagram.

Question 14

Most students were able to complete the first branch in part (a) but marks were often lost by those who didn't take into account that **Melina** keeps the first card rather than placing it back into the pack of cards. A small proportion wrote whole numbers on the tree diagram, not fractions. In part (b), most responses scored 0 or 3 marks. Errors included adding their probabilities along a branch rather multiplying.

Question 15

Many students did not understand what was required in either part (a) or (b) and were not able to make a meaningful start. Those who did make a start usually scored full marks in (a) but only 1 mark in (b). Very few appreciated how to find the length of CE; instead they usually left their answer as a column vector.

Question 16

Almost all students scored 0 or 2 marks in part (a) Some students evaluated *gh* using their calculators but did not then attempt to write it as a product of powers of its prime factors. In part (b), some lost 1 mark for writing the power of 3 as 1, rather than 0. Part (c) was answered well by many, although some approximated the value of the two brackets and then multiplied their answers together, scoring 0 marks. Many students didn't have a sufficient understanding of the relevant rules of indices to score in part (d). Those who did make a start then often scored 3 marks but this was mainly achieved by only the top performers.

Question 17

Many students did not know the relationship between displacement and velocity and so didn't link the question with differentiation. These students often found the displacement of the particle at time 5 seconds. Those who did differentiate often struggled to deal with $\frac{9}{t}$ and so invariably scored one mark for 8t.

Question 18

Most students were able to correctly answer part (a). Those who were able to attempt part (b) usually did so by finding the inverse function first. Very few used the more efficient method of solving the equation $6 = \frac{3}{x+4}$. In fact, many just found g(6). Those who were able to attempt part (c) usually did so successfully. Some made arithmetic errors while others evaluated *g*(3) first or multiplied *f* by *g*. In part (d), many students scored 1 mark for a correct rearrangement, but then made an error when expanding brackets and so failed to score any more marks. Those who did manage to reduce the problem to solving the correct quadratic equation then usually scored full marks. A small number dropped marks, though, by not showing sufficient method when solving the quadratic equation.

Question 19

In part (a), most students did not draw a tangent and so failed to score. Those who did draw a tangent often went on to make an error reading the scale on the *x*-axis which resulted in an incorrect answer for the gradient. The scale also caused problems in part (b) resulting in an incorrect line being drawn. Part (c) was only accessible to the most able; those who found *a* correctly invariable also did so with *b*.

Question 20

Students who attempted part (a) by counting squares often scored both marks while those who used frequency density often made numerical errors. Part (b) proved to be more challenging.

Some students recognised that they were looking in the fourth bar, so they opted for the midpoint, 87.25. Others calculated 50 as a fraction or percentage of 160, scoring 0 marks.

Question 21

Part (a) was accessible to many students. Those who were able to form an equation using the Sine Rule sometimes made errors when rearranging to make Sin (*BAK*) the subject. Some used techniques only applicable to right angled triangles. Part (b) was only accessible to the more able students.
Many were not able to identify the correct triangle needed to find the required angle. Students might benefit from sketching the appropriate triangle.

Summary

- Some students would benefit from learning the difference between the mean and median.
- Students should ensure they are aware of basic set notation.
- It was clear that many students lacked a basic understanding of bearings.
- Students aiming for a higher grade should know how to work out the length of a line using column vectors.
- When finding an estimate for the gradient of a curve, it is necessary to draw a tangent.

Grade Boundaries

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

http://qualifications.pearson.com/en/support/support-topics/results-certification/grade-boundaries.html

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