Examiner's Report

Principal Examiner Feedback

Summer 2018

Pearson Edexcel International GCSE

In Mathematics A (4MA0) Paper 3H

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Introduction

This paper was 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 paper included questions that differentiated appropriately and enabled students to demonstrate their ability across the assessment criteria. However, students often failed to gain full marks in question 5 even though it was expected to be more accessible than some of the subsequent questions.

Question 1

Both parts were generally answered well. In part (a), some students showed no working, sometimes resulting in lost marks due to early rounding. Those who did show working usually gained the method mark for 13.7. Some students lost marks because they divided by 42.6 rather than (42.6 – 28.9). In part (b), incorrect answers included 23, 231 and 231.19.

Question 2

The vast majority of students scored full marks in this question. A small number multiplied by 8 and divided by 12 instead of the other way round.

Question 3

In part (a), most students successfully converted 2 hour 15 minutes into either a decimal or fractional number of hours and then went on to get the correct answer. Those who didn't obtain a correct answer often scored one mark for changing 2 hour 15 minutes into minutes or dividing 40 by 2.15. Most students also scored full marks in part (b). Many used 1.024 as the multiplying factor while others initially found 2.4% of $28 500 before added it on to find the correct answer. A few students used an incorrect multiplier, most commonly 1.24, while others divided 28500 by 0.024. Part (c) proved to be more challenging with most student scoring either zero or full marks. Many either divided by 702 by 1.03 or multiplied it by 0.97.

Question 4

In part (a), most students recognised the transformation as a reflection although often struggled to find the equation of the line of reflection as $x = 6$. Some described this line as $y = 6$ while others simply quoted a coordinate. In part (b), many were able to rotate A correctly although it was common for the rotated shape to be in the correct orientation but the wrong position.

Question 5

A significant minority of students failed to score in both parts. A common error in part (a) was $\frac{1}{5}$, although this could be followed through in (b). Some students scored two marks for $\frac{x}{8x}$, although this was frequently left without being simplified. Others simply added the probabilities but were unable to make further progress. In part (b), some students didn't use their value for x but instead multiplied 200 by $3x$. Others divided 200 by 3.

Question 6

Part (a) was answered correctly by the overwhelming majority of students. Part (b) was also answered well with almost all students expanding the brackets correctly. Some were not able to correctly isolate the x terms while others made a sign error when dividing -25 by 2. The vast majority of students were able to multiply the brackets in part (c) to obtain the correct four terms. Mistakes were occasionally made with the signs of terms, most commonly obtaining $5y$ rather than $-5y$ as the middle term. Part (d) proved to be more problematic. Common incorrect answers included $4e^9f^6$ (one mark) and $64e^6f^5$ (zero marks).

Question 7

The vast majority of students scored full marks although those who didn't usually failed to score at all. This is because the most common error was to add the squares of the sides rather than subtract.

Question 8

Although most students scored full marks in part (a), many were unsure how to deal with both inequality signs. Some added 3 to 9 to give $x + 4 < 12$ while others didn't subtract 4 from -3, obtaining $-3 < x < 5$. Part (b) proved to be more accessible although some students failed to use circles at -2 and 5 while others got the circles the wrong way round.

Question 9

Parts (a) and (b) were both answered well, although a relatively small number of students gave answers of 82×10^6 in (a) and 290000 in (b). Part (c) was more challenging although most still managed to score full marks. The most common errors were to either divide the mass of Mercury by the mass of Jupiter or to subtract the two masses.

Question 10

Most students were able to correctly identify the modal class in part (a), although some attempted to find the mean. Part (b) was accessible to the majority of students. Those who didn't score full marks sometimes found the mean instead of the total weight of the 60 apples for two marks. Others used end points rather than the midpoints (one mark) or added the frequencies or midpoints (zero marks). Part (c) was answered correctly by most students but (d) and (e) were more problematic. In part (d), some students struggled to read the scale correctly which often lead to the loss of one mark. Others used the midpoint rather than the endpoint. Many students were unable to find the interquartile range in part (e). Some simply subtract 15 from 45 while others found an estimate of the median.

Question 11

Most students scored full marks but those who didn't often failed to gain any marks. This was usually because the incorrect operation to eliminate a variable was chosen or a trial and improvement method was used. A relatively small number of students chose the more challenging substitution method although those who did often scored full marks.

Question 12

Although the first method mark was relatively straightforward to score, proceeding to a correct answer was more challenging. The biggest hurdle to overcome was evaluating both y, the interior angle of the pentagon, and the sum of the interior angles of the hexagon. Those who managed this invariably continued to score full marks. Some students mistakenly assumed the hexagon to be regular.

Question 13

Most students seemed to appreciate the need to substitute the appropriate values into the quadratic formula. Those who didn't scored no marks. Some students lost marks for incorrectly evaluating $36 - 4 \times 4 \times -1$ as 20 while other lost the accuracy mark for failing to round the positive solution to at least 3 significant figures, 0.15 being a common answer.

Question 14

Many students were able to obtain the correct value of 131° for angle GFE. Those who didn't correctly find angle GFE often applied a circle theorem incorrectly, for example, halving angle GOE to get the final answer of 49°. Those who correctly found angle GFE were then often less successful at giving the reasons for their working, sometimes not offering any or not stating them correctly.

Question 15

In part (a), those students who used a correct common denominator usually continued to score full marks. Some, however, lost the final mark for incorrectly cancelling their correct answer. This question was inaccessible to a significant minority, who either did not appreciate the need for a common denominator or didn't know how to find one. Students didn't always know how to start part (b). Those who were aware of the need to factorise often struggled with the difference of two squares in the numerator. Others also made errors with the signs when factorising the denominator.

Question 16

Most students either scored zero or full marks. Some incorrectly used the formula for the area of a triangle using the lengths of the two sides and the angle given ($0.5 \times 12.7 \times 18.5 \times \sin 78$). Those who were able to apply the Sine rule correctly often went on to score full marks.

Question 17

This question was only accessible to students aiming for a high grade. Many were not able to make a start, but instead used their calculator to obtain the answer. Unfortunately this scored zero marks because the question asked for clear working to be shown. Those who were able to make an attempt usually showed an intention to multiply by $\frac{\sqrt{2}}{\sqrt{2}}$. Most students who made this step then produced a fully correct solution although some did struggle with simplifying $\sqrt{20}$.

Question 18

Many students were not aware of the need to differentiate and often divided $3 + \frac{1}{t}$ by t in part (a). Some gained a mark for writing $\frac{1}{t}$ as t^{-1} but went no further while others attempted to differentiate but did so incorrectly. Those who did manage to answer (a) correctly usually either substituted $t = 6$ into their expression for v in part (b) or differentiated again to often score full marks.

Question 19

Most students either scored zero or one mark. Those who gained the first mark usually did so for finding the volume of the cone. The biggest hurdle was to use the 9 litres of water in the container in a calculation to find to volume of water in the cylinder. Some did find the height of the surface of the water in the cylinder but failed to take the final step to find the height in the container.

Question 20

Many students were not able to make a genuine start. Those who could, however, often scored one or two marks for a partially correct method. Some found the probability that the total is 9 for one combination only (for example 2, 2, 5) and/or the probability that the total is 15 while others found the probability that the total is 9 for all combinations (2, 2, 5 and 2, 5, 2 and 5, 2, 2). Only a relatively small number of students used a 'with replacement' approach.

Question 21

Most students were able to correctly answer part (a). Those who knew a correct method for finding an inverse function usually scored full marks in part (b) but many weren't able to attempt the question. Part (c) was more demanding although a significant minority were able to score either one or two marks for finding $\mathrm{gf}(x)$ and/or $\mathrm{ff}(x)$ or for a correct equation. Solving the equation proved problematic for many, although those who understood the need to simplify it and form a three-term quadratic with all terms on the same side usually went on to score full marks.

Summary

- Students would benefit from learning how to calculate the sum of interior angles of polygons.
- Many students didn't seem to know a correct method for finding an estimate for the interquartile range.
- Students should be made aware that premature rounding can lead to the loss of accuracy marks.
- Students would benefit from learning the basic angles rules involving circles.
- Students were often not aware of the link between displacement, velocity and acceleration.