Examiners' Report
Principal Examiner Feedback

January 2018

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

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<u>3HR Jan 2018 Examiners Report</u>

The majority of students were well prepared for this paper and were able to tackle all questions on the paper.

Whilst much correct and well presented working was seen, students should be reminded that, when a question demands that clear algebraic working be shown, failing to heed this and just give an answer will result in no marks being awarded.

Report on individual questions

Question 1

Most students made a positive start and gained full marks in all parts of this question. In part (a) many students factorised their answer, which was not required but was not penalised. In part (c) some students made the error of adding the powers instead of multiplying.

Question 2

Students generally performed well on this question, with the majority gaining full marks. Those students who had no understanding of parallel line rules or angles in a parallelogram were unable to make any progress into this question and so scored no marks. A common error was to believe that angle BAE = 56

Question 3

Most students were able to understand the different currency conversions and gain full marks for this question. The most common error was to work with euros, but then fail to convert their difference into US dollars, therefore gaining just two marks. Incorrect reverse operations were frequent eg 210 × 9.72

Question 4

This familiar question proved to be a successful one for students as the majority gained full marks. Part (a) was answered very well with most students able to correctly draw a line between the given x-values. Part (b) proved to be a problem for a small number of students, with some substituting 50 in for x instead of y.

Question 5

This area and perimeter question was answered with varying degrees of success. Most students could work with the area of a trapezium formula but some then failed to square root to find the length of the square. Of those that did, some then gave an answer of 18, instead of going on to find the perimeter of the square. A significant number of students still managed to gain full marks on this question.

Question 6

This circle question was answered very well with most students gaining full marks. The most common errors were incorrect use of circumference formula (using 80 as the radius) or failure to correctly calculate Sachin's distance by using one diameter plus half of a circumference.

Question 7

Students answered this question well with a large number gaining full marks. Some students failed to find the percentage profit, instead finding the final percentage in relation to the initial expenditure (165%), this answer gained three marks. Some students were unable to work with percentages but many of these still managed to gain two marks for finding an income gained from some of the lemons. A common error was to divide the actual profit by 660 instead of 400.

Question 8

This scale ratio question saw most students gain at least one mark. Most students gained either one mark or three marks, as those who were able to make the first step either went on to reach the correct answer or could not complete their method. Those who only gained one mark, did not use both the cm to m and m to km conversions (or equivalent).

Question 9

This fraction question saw most students trying to work with 320. Many students were able to gain full marks; of those that didn't most gained two marks for an answer of 230, but then failed to go on to express their answer as a fraction.

Question 10

For part (a) the majority of students were able to gain one mark by giving a correct list of values. For part (b) many students were able to give the 4 correct values. Those that didn't usually gained no marks as they were unsure how to go about answering the question.

Question 11

Pythagoras' Theorem is clearly a strength for the students entered for this paper as many were able to gain full marks on this question. A small number of students attempted to use trigonometry and this usually resulted in no marks. $\sqrt{[(10^2 + (5\sqrt{3})^2]}$ was often wrongly calculated as being $\sqrt{115}$ due to the omission of brackets around the surd.

Question 12

This familiar question was answered well with many students gaining full marks on both parts. In part (b) some students were unable to gain any marks as they failed to show a complete method – some gave their length for *EB* as 9 cm and failed to subtract from 13.5 cm, possibly as a result of not reading the question carefully enough.

Question 13

This was the first question on the paper in which students struggled to gain full marks. Very few were able to reach a correct and fully simplified formula. However, many students did manage to gain one mark for a correct expression for the total distance. A conversion of v km/h to $1000v$ / 3600 m/s proved to be a major problem and was usually omitted.

Question 14

Approximately half the students were able to work with compound interest and were able to gain two marks for finding the amount in the account before the 40% deduction. Unfortunately many students then deducted 40% from the total amount instead of the interest, misunderstanding the intentions of the question.

Question 15

This standard question resulted in many students gaining full marks. Of those that didn't, most gained no marks as they struggled to make a start on the question. Students should be encouraged to check that their solutions work for both equations to ensure accuracy. If no relevant algebra was seen no marks were awarded even if correct values appeared on the answer line.

Question 16

Part (a) was answered well with the majority of students able to give an answer in the specified range. In part (b) many students gained two marks as they were able to use the graph to find a value within the given range. Some students used 140 instead of 120 as their total frequency, gaining no marks. In part (c) most students were able to gain one mark by finding 15% of 120 (= 18); most then failed to gain further marks as they read at this value on the vertical axis from the graph instead of 120 – 18 (= 102); additionally, in this case, the scale proved too awkward for some.

Question 17

In the first of this two part question many students were able to gain at least one mark by writing both fractions with a common denominator. This often led to the candidate gaining two marks. However, some did not show the expansion of $(x + 1)^2$ which led to the second mark not being gained. For part (b) students needed to recognise the equivalence of the two numerators, $(x^2 + 2x)$ and 1. A small number of students did gain four marks, with the quadratic formula being the most common method used to solve the resulting quadratic equation.

Question 18

In part (a) students fared well with many gaining two marks for a correct answer. Part (b) saw mixed results as many students failed to take into account all the different possible outcomes for a total of 4.

Question 19

This circle theorems question saw around half of students gain full marks for a correct answer. Some students gained two marks for finding the angles *TOB* and *OTP* but could not go any further. Students should be encouraged to use correct three-letter notation or label their angles on the diagram in future questions similar to this especially when adjacent obtuse and reflex angles are involved.

Question 20

There were a pleasing number of students who were able to gain two marks on this question for calculating an estimate for the number of snails with a length more than 55 millimetres (425). Unfortunately, most of these students could not gain the third mark as they had not interpreted what the question was asking for and gave 425 as their answer, instead of the proportion of snails with a length of more than 55mm.

Question 21

Part (a) in this algebra question appeared to be too challenging for most students. In (ai) some were able to gain one mark for substituting for z in the formula given for y, however very few were able to go on to gain two marks. The power “w” was frequently omitted or processed wrongly. Part (aii) saw very few students able to work with the powers to find k. Part (b) also saw a mixed degree of success as some students did gain full marks for a correct answer, however most gained no marks or just one mark as they struggled to work with and simplify the powers and use the rules of indices.

Question 22

There were a pleasing number of students who managed to gain full marks on this demanding volume question. For those that didn’t, many found the volume of the sphere rather than the hemisphere or failed to include brackets when evaluating the radius or height to a given power.

Question 23

For part (a), students generally scored no marks or full marks. Those who scored no marks, usually took x to equal $\frac{25}{9}$ which led to an incorrect method. In part (b) there were a pleasing number of students who were able to work with the composite function fg(x) and then complete the solution by manipulating their expressions to finish at f(x). Part (c) saw very little success with most students unable to spot that h(x) was equal to $f^{-1}(x)$. The few that did generally went on to score two marks.

Summary

Based on their performance in this paper, students should:

- ensure that they read the question carefully and check that their final answer does answer the set question
- include all necessary brackets in algebra. For example, write $(3r)^2$ instead of $3r^2$ and write $(2x + 1)(x + 1)$ instead of $2x + 1(x + 1)$.
- ensure that angles and workings are labelled correctly using three-letter angle notation, or label values for angles on the diagram
- avoid premature rounding as this can lead to inaccurate answers.