Examiners' Report/
Principal Examiner Feedback

Summer 2014

Pearson Edexcel International GCSE
Mathematics A (4MA0/4H)

Pearson Edexcel Level 1/Level 2
Certificate Mathematics A (KMA0/4H)

Paper 4H

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Principal Examiner's Report

International GCSE Mathematics A

(Paper 4MA0-4H)

Introduction to Paper 4H

The most able students performed well throughout the paper, including the more challenging questions towards the end.

On questions where there is more than one step needed to get to the final solution, students would be well advised to keep full accuracy until the final answer.

Students are advised to take care when copying formulae from the formula sheet. In questions involving angle calculations, students should make it clear unambiguously which angles they are calculating either by using the standard three letter angle notation or writing found angles on the diagram in the correct place. When using a calculator, many students continue to make errors when squaring negative numbers by failing to use brackets.

Report on Individual Questions

Question 1

The correct answer was given by the vast majority of students. Occasionally, 21 rather than 14 was calculated or both 14 and 21 were left on the answer line. In order to gain full marks in questions of this type, the correct value must be selected. A small minority of students found $\frac{2}{3}$ rather than $\frac{2}{5}$ of 35

Question 2

Part (a) was well done. In part (b), 0.15 rather than 0.35 was sometimes used as the probability. Students would be well advised to read questions carefully to avoid this type of error.

Question 3

The vast majority of students scored full marks in part (a); only very occasionally was the wrong formula used.

Question 4

Part (a) was well done although some students either forgot to subtract 40.5 from 270 or else added 40.5 to 270.

Part (b) was less well done with many students working with 1.15 or 0.85. A common error was to get as far as 90 but then adding onto 13.5 to get a final answer of 103.5; this showed a misunderstanding of the question and thus the loss of the accuracy mark. Some thought that 13.50 dollars was the reduced amount and failed to score any marks. Another fairly common error in part (b) was to work out what 85% was (ie £76.50) rather than working out what 100% was.

Question 5

Interior and exterior angles were often confused. Although the correct value of 24° was frequently given as the final answer, so was 156° - the exterior angle. Less able students subtracted 156 from 360 to get what they thought was the 'exterior angle'.

Question 6

The most common method seen was to convert both prices to pounds using the given exchange rates and then subtract. However, a significant number of students either multiplied both given prices by the respective exchange rate or divided both prices by the respective exchange rates; this lead to the loss of one of the first two method marks. Some students did convert the price in euros to dollars, subtracted and then converted the result into pounds, although a number who used this method forgot to complete the final conversion. They also tended to lose the accuracy mark because of premature rounding. Some students used $165 instead of $165.24 and so lost the accuracy mark.

Question 7

At this level students were generally able to construct the bisector correctly. A small minority of students, having drawn arcs crossing *BA* and *BC* then used the points *A* and *C* as the centre for their second pair of arcs.

Question 8

This question was well answered. The inevitable common error occurred when students squared and added the given sides leading to the common incorrect answer of 19.9

A number of students went straight to 17.2 for a final answer and did not show the square root, as this answer was not accurate, they lost the accuracy mark which emphasises the need to show full working. Several students tried to use inefficient trigonometric methods usually without success.

Question 9

It was encouraging to see the majority of students showing a clear algebraic approach in their solution. The most common error was to transfer the 6 incorrectly with 17 – 6 rather than 17 + 6 seen on the RHS of the rearranged equation.

In part (b) the most common error in the expansion was to end up with +10 rather than +16.

Question 10

There were some students who found the sum of the frequencies and then divided by 4, but the majority of students used the correct method. Some did use the end values rather than the mid-interval values and so gained 2 of the available 4 marks. A number of students did multiply the frequencies by the mid-interval values and then stopped. Some started by multiplying all the frequencies by 10 (the class width) and hence lost all of the marks.

Question 11

Whilst many fully correct tables and graphs were seen, when an error occurred it generally came from evaluating x^2+2x-3 with $x=-4$; students commonly got an answer of −27 which suggests a lack of brackets around the negative number when using their calculator. Impressively, some students were able to recover from this error when it came to drawing their graph as they realised that the graph should have a line of symmetry.

Some students failed to gain full marks for part (b) as they had clearly used a ruler to join points on the graph rather than draw a smooth curve or they had not drawn their curves accurately enough - although the points were plotted correctly the curves sometimes missed these points.

Question 12

17.5 was a common incorrect answer, possibly arising from students failing to read the question carefully, as this was the length of *AC* rather than the required *BC*.

Question 13

Students who understood the concept of gradient and knew the general equation of a straight line generally did well in this question. However, obtaining a gradient of 2 rather than 0.5 in part (a) was a common error.

It was disappointing to see an arithmetic error appearing in part (b) from students who had answered part (a) correctly, substituted $(4,-2)$ correctly into $y=0.5x-2$, got as far as $-2=2+c$ and then concluded $c=0$. This happened frequently enough for it to be noticed as a common error. In both parts, several students used well rehearsed methods for obtaining the equation of a line passing through two known points or through a known point with a given gradient. Very few students actually showed any substitution in part (b).

Question 14

Part (a) was generally well answered although some students had 5 rather than 4 zeros after the decimal point.

In part (b) the vast majority of students were able to gain at least one mark for sight of the digits 85. The final answer was frequently given as 850000, 85×10^4 or 85^4.

Question 15

A surprising number of students rearranged one equation and then substituted their expression for either x or y into the second equation; a lot of good algebra was seen in this process. Of those students who opted to start in the more traditional way by multiplying both equations, many either chose the wrong operation to eliminate or else chose the correct operation but made an arithmetic error (these usually came when attempting to deal with the arithmetic of negative numbers). There were few students who wrote down the correct answers without any working but, those that did gained no marks.

Question 16

In part (a), it was common to see 180 – 72 in the working space but not linked to angle *POR*. It must be made clear what angle is being worked out if method marks are to be awarded.

In part (b) many were able to score one method mark for identifying the right angle or using opposite angles in a cyclic quadrilateral sum to 180°. Some students assumed that the quadrilateral was an isosceles trapezium and therefore used an incorrect method to find some of the angles or used the fact that there were alternate angles present. There was also little sign of students indentifying angles using the three letter angle notation.

Question 17

Students who were able to write the correct initial equation $F = \frac{k}{x^2}$ generally went on to score full marks. However, in part (b) a number of students failed to rearrange correctly and a disappointing number of students concluded with an answer of 4 rather than 0.25

Question 18

There were a number of errors made when substituting into the quadratic formula and in several cases by not extending the division line far enough. Those who made the correct substitution generally went on to gain full marks. Virtually all students showed some working - those who showed no working received no marks even for fully correct solutions.

In part (b) the majority of students were able to gain 2 marks. The marks lost were as a result of failing to find both solutions when finding the square root of 81. Having found both roots, some students had trouble using the correct inequality signs. The best attempted solutions showed a sketch graph and they were generally able to score full marks.

Question 19

Part (a) was well done. The common error in part (b) was to forget to include the probability for two wins.

Question 20

One error seen was to misinterpret the recurring decimal as 0.3838... rather than the correct 0.3888... Students who started off the process correctly then sometimes made a subtraction error when dealing with the recurring decimals.

Question 21

It was disappointing to see good work spoiled by the incorrect copying of a formula. For example, $\frac{4}{3}\pi r^2$ and $\frac{3}{4}\pi r^3$ were seen being used for the volume of a sphere. Some students misread the given surface area as 81 rather than 81π but, provided correct working was shown, were able to gain 3 out of the 4 available marks.

Question 22

Students who understood the underlying principles behind histograms were generally able to score full marks. There were occasions when all the bars were translated to the left – students would be well advised to ensure that they look carefully at the frequency table for the widths of the bars.

Question 23

The main problem for students here was in identifying the angle between *AM* and the plane *BCDF*. Those who were able to identify the correct angle generally went on to obtain full marks. For others, angle *AMC* was often found as the required angle, following students working out *AC*.

Students would be well advised to clearly mark the angle they are attempting to find – it was not always easy to determine exactly which angle students were attempting to find. Several students tried to use inefficient methods involving the use of the sine and/or cosine rules and usually ended in making little progress. Students should be encouraged to look for the most straightforward approach to solve problems of this type.

Question 24

Students who were able to apply index laws generally scored a mark for simplifying the left hand side of the equation but then had more difficulty in writing the right hand side as a single power of two. It was sometimes difficult to determine if students had written 2 and a half to the power *n*, or 2 to the power half *n*

Question 25

Those who factorised the quadratic in the denominator and then used $2(x-3)(x-1)$ as a common denominator were generally more successful than students who worked with a common denominator of $2(x-3)(x^2-4x+3)$. Students who knew how to simplify fractions then frequently made an error when expanding the brackets on the second fraction with the negative sign inbetween the fractions being the main cause of this problem. A basic error at this stage of the paper was to not put brackets around the $(2x-6)$ and/ or the $(x+2)$ when multiplying them as the numerator. Students who started with a numerator and denominator and then carried on with no denominator could at best score 1 mark for the factorisation of x^2-4x+3. Some students failed to fully simplify their answer and stopped at $\frac{3x-9}{2(x-3)(x-1)}$ thus failing to gain the final two marks.

Grade Boundaries

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