Examiners' Report/
Principal Examiner Feedback

January 2013

International GCSE Mathematics
(4MA0)Paper 3H

Level 1/Level 2 Certificate in
Mathematics (KMA0)Paper 3H

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General Introduction

January 2013 saw a significant increase in numbers, in comparison to any other previous winter session, both at foundation and higher level. At foundation level, numbers rose from a figure of around 400 to nearly 3500. At higher level, numbers rose from around 2000 to nearly 4500. Much of this expansion was fuelled by increasing numbers entering the Edexcel Certificate.

Introduction to Paper 3H

The demands of this paper were appropriate, and comprised of a familiar pattern of topics. Some weaker candidates found the paper challenging contributing to some early questions receiving a much lower success rate.

Report on Individual Questions

Question 1

Both parts were well answered on what was a familiar topic. Occasionally wrong decimals were selected from the table to multiply by 40 and this gained no credit. A number of candidates wrote the correct answer in the table and had a completely different value on the answer line.

Question 2

Candidates found this question accessible whilst some weaker candidates tended to confuse perimeter with area expressions. These mistakes were penalised in Q2(ii).A surprising number of candidates reached $4 = 8x$ before stating $x = 2$

Question 3

In Q3(a) the correct answer was achieved by the majority though a significant number mis-read the question and calculated 45% of 625. Another common mistake was to divide 625 by 45. The method mark was gained by a fully correct percentage calculation (i.e. 45/625 x 100).
In Q3(b) most gained the correct answer by finding 8% of 45 (3.60) and adding this to 45 rather than the method of multiplying 45 by the scale factor of 1.08.
In Q3(c) although dividing by the final figure of 640 rather than the initial figure of 625 was seen occasionally, this mistake was not widespread and only cost candidates their accuracy mark.
A minority successfully changed 1 hour 20 minutes to 1 1/3 hours and went on to divide by the correct denominator. Many others gained partial marks by dividing 1.33 (or better) or 1.3 or 1.2 or 80, the latter producing a speed in kilometres per minute. Candidates should always examine their answer to check if the size is reasonable. Answers of 0.225 km/h and 1440 km/h both fail this test in the context of a cyclist.

Question 4

Q4(b) was answered more successfully than Q4 (a). Greater attention to detail was required in enlarging the shape. Two marks (out of 3) were gained by a correct enlargement of scale factor 3 but translated from its true position. In Q4(b) a majority of candidates picked up at least 1 mark for a successful rotation of 90° clockwise or anti-clockwise.

Question 5

An algebraic method had to be started leading to a correct equation with one unknown to gain the method mark. The awarding of the accuracy marks were dependent on gaining the method marks. Correct answers by trial and error were rare but gained no credit.

Question 6

Correct notation was not required in Q6(a) to identify the modal group. A common wrong answer was 18. $10 < d \leq 15$ was also identified presumably confusing the idea of mode with median. In Q6(b) subsequent correct working to produce a mean average distance was overlooked and hence full marks could be gained from $1040 \div 60 = 17.3$ or better. Some candidates lost marks by either picking the end points of each interval or counting in a consistent distance within each interval other than the mid-point.

Question 7

This question was challenging for many candidates. To gain full marks a correct 'double' inequality was needed with correct inequality notation. Many candidates incorrectly thought integers from –2 to + 5 were required, and this gained no credit. A large number of candidates having achieved 1 or 2 marks in Q7(i) lost marks by not indicating the correct shading of end points around (their) –4 and +3.

Question 8

The positioning of the given angle of 38° in the triangle challenged some candidates, resulting in calculating the length of *AB* rather than *BC*. Those who opted to use trigonometry instead of Pythagoras, were usually successful, either using cos 38° or sin 52°. In Q8(b) the lower bound responses were usually more successful than the upper bound. Common incorrect answers for the latter were 38.4.

Question 9

In Q9(a) "Mars" was the main choice as the smallest planet. The mark could also be gained by stating the correct numerical value for the diameter. In Q9(b) a number of candidates converted the standard form numbers into ordinary numbers before subtracting. This ran the risk of miscounting the number of zeros. Leaving the final answer as 70000 was common and this lost the accuracy mark. In Q9(c) a stated division of two numbers was required, hopefully leading to 400, to gain the method mark.

Question 10

Some weaker candidates here usually gained either no marks or just 2 marks for the numeric answer required in Q10(a). Because of the inconsistencies between answers in Q10(a) and Q10(b) in carrying forward the gradient value, incorrect answers in Q10(c) were required to follow through from Q10(a) only. The notation required for a linear equation challenged many, and even the more able candidates lost marks by giving expressions such as '1.5'x – 1 in Q10(b) and '1.5'x + 3 in Q10(c) omitting the 'y =' in each case.

Question 11

Candidates that recognised the key to working out the horizontal distance was to involve the use of Pythagoras usually incorporated 0.4 into a right angled triangle and performed the calculation correctly. A significant number used Pythagoras on two of the three values from 2.1, 6 and 1.7.

Question 12

A first mark was gained by either multiplying out the brackets correctly or dividing both sides by 2πr. Isolating h then proved more challenging for some.

Question 13

Some weaker candidates did not recognise that to start the question one had to perform calculations on the interval $2 < t \leq 10$, and as a consequence usually scored zero. Most candidates who correctly arrived at a frequency of 40 students in the interval $15 < t \leq 20$ went on to secure all 4 marks. The favoured method was listing the frequency density on the vertical axis.

Question 14

The first two probability values on the "First arrow" branches were a good source of marks. If these were correct, then in a majority of cases the values were carried forward to the "Second arrow" branches. Q14(b) challenged most. Many were unable to extract 3 correct branches and add them together for a final answer. Even allowing for follow through working, it was rare to award more than 1 mark.

Question 15

This was a challenging question. Some candidates omitted to notice the bold type on the question and proceeded to take the numbers in the sets as the elements of the set. Therefore it was common in Q15(i) to see 7, 6, 3, 2 as an answer.

Question 16

For those correctly opting to use the cosine rule many received only 1 mark or less. Some tried to manipulate the formula to make the cosine the subject before substituting in the values 7, 9 and 13. These values often ended up in the wrong place as a result. Many others achieved 1 mark by a correct substitution but then reduced their working to 49 = 16 cos x, (16 from $9^2 + 13^2 - 2 \times 9 \times 13$) so 70.9 then followed (from $\cos^{-1}$ 16/49).

Question 17

Candidates who recognised the numerator was the difference of two squares could usually factorise the denominator correctly. For others this was a challenging question on which they were unable to make a start.

Question 18

This question challenged candidates on the fundamentals of calculus. Q18(c) saw many trying to put $8x^2 + 2/x$ equal to zero and attempting to solve it. Candidates who put the correct derivative equal to zero had problems manipulating the algebra down to $x^3 = (1/8)$

Question 19

Candidates who successfully attempted Q19(a) were then usually successful in Q19(b). A significant number did not notice the demands of Q19(a) and proceeded to solve the given quadratic in the space allocated for Q19(a).

Question 20

In Q20(b) candidates able to manipulate vectors usually picked up 1 mark for identifying *PN* or *NR* using lower case letters. Some concentrated solely on the task of *MN* and/or *NQ* to try to prove *MNQ* was a straight line.Gaining the accuracy mark was a challenge to most candidates. In essence it had to be demonstrated that *PN* or *NR* was a multiple of *PR* or to demonstrate that *PN* + *NR* = *PR.*

Question 21

This question was essentially marked as a 2 stage problem. The first stage was to use Pythagoras to find *PR* or *PM*. The second stage was to involve the latter in trigonometry to find the required angle. A minority of candidates incorrectly calculated *PT* and then used sine or cosine rather than tangent to find the required angle. Some candidates lost the accuracy mark by premature rounding of *PR* and/or *PM*.

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