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Examiners' Report/ Principal Examiner Feedback

January 2013

International GCSE Mathematics (4MA0) Paper 2F

Level 1 / Level 2 Certificate in Mathematics (KMA0) Paper 2F

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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 2F

This paper gave candidates the chance to demonstrate positive achievement. Most of the questions had pleasing success rates but, as the demands of the questions increase throughout this paper, it was not unexpected that the later questions were found to be more challenging than the earlier ones. The last two questions in the paper dealt with a geometric construction and inequalities which proved particularly challenging to candidates. Whilst most candidates showed their working, there are still candidates who lose marks by failing to do so.

Report on Individual Questions

Question 1

Q1(a)(i) was answered well. Common errors in part Q1(a)(ii) included 7.10 and 0.07. Q1(b) was well answered.

Question 2

Pictograms were shown to be well understood. It was rare to see an incorrect answer in any of the first four parts of this question. In Q2(e), correct ratio notation was seen most of the time. However, the order was sometimes incorrect with 1:2 rather than 2:1 given as the final answer. A significant number of candidates were able to start with 16:8 but then either made an error when cancelling or failed to simplify fully their answer. Some candidates chose the incorrect information from the table, usually Holland and Spain.

Question 3

Q3(i) was the most accessible part of the three parts of this question, although radius was seen on occasion.

Question 4

Q4(a) was well answered. In Q4(b) the majority of candidates explained that you added five each time to get the next term. Common errors included adding 3 each time or stating that the sequence went up in multiples of 5. The description that each term ended in 3 or 8 was not an acceptable description. A number of candidates gained the mark by showing $5n + 8$. Arithmetic errors were the main reason why candidates failed to score in Q4(c).

Question 5

The success rate in Q5(i) was high. Candidates were less successful in Q5(ii), with 12 being a common incorrect answer. The majority of candidates were able to gain at least one mark in Q5(iii).

Question 6

The most common answer in Q6(a) was the correct name of hexagon, In Q6(b) and Q6(c) candidates were able to identify the two parallel lines more often than they were able to identify the two perpendicular sides. Q6(d) was well answered, although the x and y coordinates were sometimes transposed.

Question 7

In Q7(a), candidates who used a calculator method to find 35% of 80 were generally more successful than those candidates who attempted to use a build up method. When using a build up method to find a percentage of a quantity, it is vital that candidates show all the stages in the method. Q7(b) was seen to be more challenging, with a significant number of candidates unable to answer the question.

Question 8

A common error in Q8(a)(i) was to give the answer of 2 or -2. In Q8(b), a common error was an answer of -4.

Question 9

The majority of candidates were able to give at least one correct answer in Q9(a) and Q9(b). The correct answer of 4 was the most common answer in Q9(c), with the most common incorrect answer being 2.

Question 10

Q10(a)(i) and Q10(a)(ii) were well answered, although some candidates failed to gain any marks for these parts of the question as they gave answers such as 'unlikely' and 'impossible' rather than a numerical answer. Q10(b) was more challenging, with the most common error being an answer of $\frac{3}{20}$ from candidates who failed to read the fraction in Q10(b) correctly. A significant number of candidates used ratio notation, for example, 1:20 and hence failed to gain any marks.

Question 11

In Q11(a) the vast majority of candidates showed no method. Some of those who did demonstrate a correct method of writing the given fractions correctly as decimals sometimes failed to proceed to order the decimals correctly. Candidates have to understand that they need to convert their fractions to an appropriate number of decimal places. It was common to see both $\frac{4}{7}$ and $\frac{5}{9}$ converted to 0.5. In Q11(b), those who knew a correct process to divide fractions showed enough working to gain full marks. It is important that candidates are able to demonstrate fully correct methods for the arithmetic of fractions rather than relying on their calculator.

Question 12

A popular incorrect method was to work out the correct number of cartons that would fit along each corresponding side of the box but then to add rather than multiply the found values. A similar popular incorrect method was to add up the edges of the box and the edges of the carton and then divide the two values. Those candidates who worked out the volume of each object were more successful in going on to obtain full marks.

Question 13

Candidates were able to substitute 1.6 correctly into the formula and demonstrate this by obtaining either 8 from $5c$ or the correct value of A. The most common incorrect value for A was 6 which came from substituting 2 rather than -2 into the formula. In Q13(b), candidates had difficulty in rearranging the formula to work out the value of c. A mark was frequently awarded for the correct substitution of the given values. A significant number of candidates got as far as $5c = 3$ but then gave a final answer of 1.6 rather than 0.6.

Question 14

In Q14(a), those who recognised the need to find a scale factor either using the given number of students and the associated angle or the two given angles generally went on to score full marks. However, the incorrect answer of 110^{o} (from finding the difference between 60 and 90 and adding this to 80) occurred as often as the correct answer of 120^{o}. In Q14(b), there were two possible ways of obtaining the correct fraction; either using the number of students or 360^{o} as the denominator of the fraction. Very occasionally the correct denominator would be given but with the wrong numerator.

Question 15

The most common method used to get the correct answer was to consider the quadrilateral as a whole. A minority of candidates did split the quadrilateral into two triangles and work from there. There was evidence of arithmetic errors causing candidates to lose the final accuracy mark, with the sum of 79 + 35 being evaluated as 144 rather than 114. A significant number of candidates found the sum of the two given angles but then subtracted their answer from 180 (leading to the common incorrect answer of 33^{o}) or from some other incorrect number such as 280 or 340.

Question 16

The majority of responses for Q16(a) were correct. When such an instruction as 'write down all the figures on your calculator display' is included in the demand of a question, it is sufficient to write down the figures given on the initial display. There was less success in rounding the answer to two significant figures, with 5.87 and 5.8 being popular incorrect answers.

Question 17

A significant number of candidates simply doubled the diameter and so gave the answer of 15.2 cm for the circumference, while others halved the diameter and gave the value of the radius as their answer. Those candidates who used the correct formula for the circumference of a circle went on to gain full marks. However, a significant number of candidates incorrectly used either πr^2 or $2\pi d$. Candidates would be well advised to show their working and their initial unrounded answer. On a number of occasions, an answer of 23.8 was given without any supporting working shown. As the guidance given in the question was for an answer correct to three significant figures, an unsupported answer of 23.8 gained no marks.

Question 18

Finding the mean from a frequency table is a process that was found challenging by candidates on the foundation paper. A minority of candidates were able to demonstrate the correct process. Some of those who started off the process correctly went on to divide by 5 (the number of marks) rather than 20 (the number of students). The other common error was simply to divide the sum of the marks by five.

Question 19

This question was found to be challenging for the candidates. The majority of errors in both parts stemmed from the fact that candidates had not taken on board the importance of the universal set and so included odd numbers in their answers. From those candidates who realised that 4 and 8 had to be two of the numbers in the set in Q19(a), common errors were to include another member of set A, include more than one other even number not in A or to include an odd number within the answer. In Q19(b) it was seen that candidates found the terminology hard to understand in what intersection meant and the most common incorrect answer was one that contained three of the numbers 2, 4, 6, 8, and 10.

Question 20

The majority of correct answers given came from an algebraic method. Those correct answers that used, for example, a trial and improvement method scored no marks. The majority of candidates were able to gain at least one method mark by demonstrating some correct algebraic processes. Common incorrect answers were 3.4 and 3 rather than the correct −3.

Question 21

Common errors were either to go on once the correct answer had been found and subtract from 1, to subtract rather than add the given two probabilities or to subtract one of the given probabilities from 1.

Question 22

A common incorrect answer was 39, coming from the addition of the given lengths. Other candidates also focussed on the perimeter rather than the area and attempted to find all missing lengths before adding them together. Some candidates multiplied all the given lengths. Not all candidates recognised the need to split the given shape in order to find the area. Success in finding the areas of the various shapes was mixed. Many of those who were able to find the area of a rectangular part of the whole were then unable to find the area of the triangle or the trapezium correctly.

Question 23

In Q23(a), a common incorrect answer was $12x + 3$ or $2x - 3$, which came from the wrong expansion of the second bracket with a final term of +12 rather than −12. In Q23(b), a significant number of candidates only gave two terms when expanding the brackets. Those who used the correct method of expansion sometimes gave the final term as 9 rather than 14. The correct expansion was sometimes seen followed by incorrect simplification.

Question 24

Common errors included forgetting to take the square root as a final step or squaring and adding the two sides rather than squaring and subtracting.

Question 25

Candidates found this question challenging. Only a small number of candidates were able to gain full marks. Many candidates were unable to make a start to the question, failing to gain a mark for working out that the fraction of females was $\frac{4}{9}$. The most common error was to attempt to add the given two fractions.

Question 26

One method to find the solution was to divide the given value in the ratio 5: 9. However, a very common incorrect answer was £6.80 which came from dividing the given amount in the ratio 5: 9: 6.

Question 27

Candidates who knew how to construct an angle bisector gained full marks but very few correct constructions were seen. Some candidates were able to gain a mark for a correct first arc drawn but a significant number of candidates were not able to gain any marks in this question. In all construction questions, arcs used for the construction should be left and not rubbed out.

Question 28

This was a challenging question for candidates. There was clear evidence of x and y being confused in answers to this question. Similarly, the wrong inequality signs were often seen with ≤ used instead of the correct ≥ and vice versa. Lists of coordinates were seen more often than any inequalities.

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