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Principal Examiner Feedback

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In Mathematics A (1MA0)
Foundation (Calculator) Paper 2F

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GCSE Mathematics 1MA0
Principal Examiner Feedback – Foundation Paper 2

Introduction

Performance was polarised mainly at the upper end with those who were clearly aiming to pass at grade C. There was some evidence of a concerted effort to gain marks on certain questions, whilst there were some topics where performance was very weak. These included algebraic manipulation, proportional calculations and compound measure.

Performance on unstructured questions was better near the front of the paper, but much weaker in the later parts of the paper. However, there were too many attempts that resembled trial and improvement approaches.

The inclusion of working out to support answers remains an issue for many; but not only does working out need to be shown, it needs to be shown legibly, demonstrating the processes of calculation that are used. There were too many instances in this paper where simple arithmetic errors were made, even when calculators were available. There was also evidence that some students did not have basic equipment such as a ruler or protractor.

Report on Individual Questions.

Question 1

Most students gained full marks for this question. The only notable errors occurred in part (b) where 7100 was sometimes given, or for 27 in part (c).

Question 2

Nearly all students gained full marks.

Question 3

Most students gave the correct response for 2 marks. A common incorrect answer was 313 from 143 + 109 then subtracting this from 565.

Question 4

Most students gained full marks. Those who did not remember the meaning of the phrase "order of rotation" usually gave a random guess for part (c).

Question 5

There were many correct answers here. Predictably incorrect answers included −12 in part (a) and 4 for part (b).

Question 6

In part (a) there were many correct answers. Adding the marks rather than the frequencies appeared to be a common error, though there were also those who omitted one of the frequencies, or perhaps read one off incorrectly.
In part (b) many wrote down the correct answer, though there were some who clearly did not know the meaning of the term "mode".
Part (c) was not well answered. Many calculated 6−1 (giving an answer of 5), or even 10−1 rather than 10−2.

Question 7

Students used a variety of methods to solve this problem, including repeated addition or subtraction, and trial & improvement. Often the division leading to a decimal value was interpreted as the cost, rather than the amount of items that could be purchased. There was confusion about the correct units for those who got as far as 0.76, with too many writing 0.76p rather than just 76p.

Question 8

Most could evaluate the missing angle successfully, and to a slightly lesser extent the 36. Very little evidence of method was seen on scripts thus making the awarding of any available method marks difficult. Those who correctly identified that each student was equivalent to 2.5° tended to score full marks. Premature rounding in some work led to an inaccurate final answer. Rarely was the total of 144 students identified to then get 42 for the last entry.

Question 9

A well answered question in which nearly all students gave the correct answers.

Question 10

It was pleasing to see a good number of fully correct answers to this question and to note that students made a clear statement of which garden centre was cheaper. Where full marks were not gained, they usually picked up 2 marks for calculating the cost of two bags for Greens Garden shop (showing £9.98) and for identifying that t7 bags would be required from Suttons. Common errors included calculations of 7×2.25 or
$6 \times 3.25 + 2.25$

Question 11

It was disappointing that few students gained full marks in part (a). Usually this was due to the absence of the units (cm), or incorrectly stating them as cm^2. However, there were also some who gave an incorrect numerical value for the perimeter, sometimes due to confusion with area.

In part (b) many students showed evidence of $\frac{7}{56}$ but frequently simplified to $\frac{1}{7}$, $\frac{7}{49}$ or $\frac{7}{8}$. Some responses showed incorrect calculations such as $8 \times 7 = 54$

The mark was usually gained in part (c) where most understood line symmetry, though some answers were spoilt when only 2 squares were shaded, or a shape with 2 lines of symmetry was created. But in part (d) the converse was the case, with few picking up the mark, though interesting to note it was the weaker students who usually gained this mark. Many confused this with line symmetry. It was not uncommon to find the same answer presented in both (c) and (d).

Question 12

In part (a) a significant number of students were of the belief that there are 100 g in 1 kg, thereby losing the marks. It is interesting to note that some of these corrected themselves in part (b), but failed to recover their incorrect attempt at part (a). Overall most found part (b) too difficult, and there were many whose working showed either a failure to understand the question, or an inability to deal with quantities (mixing up packets) and units. Common incorrect answers were 140 and 1400 arising out of 28% of 5000. The best and most reliable method was the one where 2000 packets = 28 so 4000 packets = 56 and 5000 = 56 + 0.5(28) = 56 + 4 = 70.

Question 13

In the first two parts it was frequently the case that students confused multiples for factors, and vice versa. In part (c) poor choice frequently led to incorrect answers of 4 or 39.

Question 14

This was a well answered question. In part (a) a few incorrectly stated 91 from $(8 + 5) \times 7$ and these students usually made a similar error in operations in part (b). A few just did $29 \div 13$, or showed a lack of understanding that the fixed charge was paid only once.

Question 15

Part (a) was usually answered correctly, though there were a few who read off the wrong axes, or used the scale incorrectly.
There were also many correct answers in part (b), full marks usually being gained when worked from 50 euros = £42 and multiplied by 3. Where students did see the need for using the graph and a calculation, they used a small value on the graph so any small error was magnified by the large multiplier used. Incorrect approaches included reading off from 105 euros or finding the difference between £ and euros in (a) and then subtracting this from 150.

Question 16

In part (a) students confused the terminology; many stating the number of edges or faces rather than vertices.
Part (b) was usually well done. A significant minority drew a net for a square-based pyramid or drew the outer two rectangles as trapezia.
Only a few students answered part (c) using compasses; errors were therefore made in drawing the two sides up from the base, which was usually of the correct length.

Question 17

Most students gained full marks in this question. Some students rounded answers to 0.06 or gained just 1 mark for 16.625; a few calculated 2.5^3 as 7.5

Question 18

The most successful approach was finding the two volumes and then dividing. Those that first found the number of boxes on each dimension (showing 12, 12, 10 on the diagram or in working) frequently spoilt their method by adding these to give the most common incorrect answer of 34.
A significant minority worked with areas of sides, or thought either that they only needed 2 edges to calculate volumes, or needed to divide their volumes by 2.

Question 19

Most gave answers of 9.6, 9 or 10; the latter two gained full credit as long as they also showed the 9.6 from which these came. Some confused the mean with another average, or even range. Some answers of 48 were given without the division by 5.
Part (b) was not well answered, with confused working frequently leading to 28.8, 20, 12 and 0.05 There were many using a trial and improvement approach, finding, 20%, 10%, and sometimes even 5% to get the answer.

Question 20

Many scored full marks for their table, with the value for $x = -1$ proving the most challenging. The biggest loss of marks in part (b) was for those students who correctly plotted the points, but then failed to join them to give the line. Some who drew a correct line by ignoring some incorrect points then failed to go back to the table to correct them.

Question 21

Part (a) was usually well answered; the main error was in finding the difference between 1730 and 1810.
In contrast, part (b) was not well answered. Some understood it was speed as evidenced by the drawing of an SDT triangle but sometimes this was incorrectly produced. Many thought the required calculation was $30 \div 20$

and could gain no further credit as a result. $20 \div 30$ was a better approach, but rounding this to just 0.6 inevitably led to inaccurate calculations, usually leading to 36 minutes and 18.10 Many successful students who calculated the 40 correctly then failed to get the final (QWC) mark since they did not explain fully how they knew David could get home on time.

Question 22

This question differentiated well across the full ability range. Common errors included tally charts, those who only gave a question, those who confused how many times sport is played with how long sport is played for, failure to include a zero and overlapping boxes.

Question 23

In part (a) there were many correct solutions. A common error was in writing the correct answer in the table, but then replacing this with an incorrect answer on the answer line, commonly $\frac{1}{5}$ or 0.7. In part (b) there was less ambiguity, the only common error was by showing $60 \div 0.1$ or $60 \div 5$.

Question 24

There were many different approaches to this question. Those who divided quantity by price were left with two figures they found difficult to interpret, and many in this situation gave the incorrect conclusion that the smallest was the best value. By far the greatest success was achieved by those who divided price by quantity, usually then giving the correct conclusion. Of the many other methods use of 5, 9 as multiples was quite common, and usually well understood by those who presented it. A significant minority simple subtracted amounts and prices and tried to draw a conclusion.

Question 25

Many students gained full marks for this question. In most cases part (b) was answered correctly. In part (a) the most common error was for students to leave their answer as n^{10}/n^{6}. The most common incorrect approach was to multiply the indices.

Question 26

There were many who failed to read this question properly, as evidenced by the sizeable number who started with finding 40% of 165, or finding $165 \div 2$. Many proceeded to state that 44 were taken from the bag but only the more able could link 44 to 66 and 55 and then go on to write this as a ratio. Of those who got to $66:55$, many then either failed to simplify, or wrote their ratio the wrong way around.

Question 27

Correct answers were frequently derived from numerical, trial & improvement approaches. These gained full marks when the correct answer was obtained, but rarely could be awarded any part marks for a partial method. Those students who formed an equation were either unable to collect terms, or isolate terms, sometimes writing down two equations that were unconnected. Failure to include the 90° often led to $10x + 10 = 360$. Some gained a single mark for identifying correctly an angle of 135°.

Question 28

For most the only mark gained was for correctly working out the area of the circle. But finding the area of the square was too difficult for nearly all students. Those using Pythagoras's Theorem were seen to round prematurely.

Summary

Based on their performance on this paper, students should:

- present working legibly and in an organised way on the page, sufficient that the order of the process of solution is clear
- check arithmetic needs to be checked, even if carried out on a calculator
- include working out to support all answers
- practise skills such as algebraic manipulation, proportional calculations and compound measure
- they read the fine detail of the question to avoid giving answers that do not answer the question
- bring the full range of equipment needs to the examination: in this case including a ruler, a compass and a protractor

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx

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