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Principal Examiner Feedback

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Pearson Edexcel GCSE
In Mathematics A (1MA0)
Foundation (Non-Calculator) Paper 1F

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GCSE Mathematics 1MA0
Principal Examiner Feedback – Foundation Paper 1

Introduction

Most students attempted all the questions on the paper.

Most students were able to contain their answers in the spaces provided.

It was pleasing to see so many students showing the intermediate stages in their calculations, but poor arithmetic was an issue for many.

Students often had difficulty in multiplying numbers involving multiples of 10, particularly when deciding how many zeros are needed after the number.

Long division appears to be a forgotten skill for many students. A common approach is to guess a number close to the required answer and then to fudge the difference.

Students should be reminded that, unless they are asked specifically to measure the lengths of lines or the sizes of angle in diagrams, they should not expect the diagrams to be accurately drawn.

Report on individual questions

Question 1

This question was generally done well. Most students were able to use the key correctly to interpret and complete the pictogram. A common but rare error in part (a) was Ben. In part (d) the sizing of circles was not always consistent. Often the half circle was drawn smaller than the full circles. A common but rare error in part (d) was to draw two and a quarter circles rather than two and a half circles.

Question 2

This question was generally done well. In part (a) most students were able to calculate the number of passengers needed to fill the bus. Here, as elsewhere, simple errors in calculations often lead to incorrect answers. A common error in part (a) was 36, often obtained from the following incorrect calculation 25 – 13 = 12, 12 + 20 = 22, 58 – 22 = 36. In part (b) most students opted to add and find the difference of numbers by working across the page. Common errors here were often due to adding one, sometimes both, groups of five numbers incorrectly. Those students opting to work with the differences of numbers for each day were considerably less successful than those working with the differences of numbers for each week. A common error was due to errors in signs, or to writing a negative difference as zero.

Question 3

This question was generally done well. In part (a) most students were able to write 7378 to the nearest hundred. A common but rare error was 400. In part (b) most students were able to write 6402 in words. Some students wrote all the number in word except for the “two”, which was given as “2”. Part (c) was done less well. A significant number of students were unable to write down the answer without drawing a multiplication grid and attempting a calculation. Part (d) was done well. A common approach was to halve 28 and then halve again. Part (e) was done less well. A common incorrect answer was $\underline{9 + 12} = 21$, $21 \div 7 = 3$. Some students, having applied the order of operations correctly, were then unable to add the numbers correctly. A common error was 12, often obtained from $9 + 4 = \underline{12}$.

Question 4

This question was generally done quite well. In part (a) most students knew that they had to subtract 124 from 180 and could write down a suitable geometric reason for the calculation using all the key words. A common incorrect answer in part (a)(i) was 66. A common incorrect answer in part (a)(ii) was to omit the word “angles” in the reason, typically “a line adds up to 180”. Part (b) was generally done well. Most students were able to identify the shape correctly and write “square” or “rectangle”. Common incorrect answers here were “quadrilateral” (usually) and “rhombus” (rarely). Part (c) was generally done well. Most students were able to draw a suitable kite on the grid. Students should be advised to use a ruler to draw straight lines and to use the intersection of the grid lines for the locations of the vertices of diagrams.

Question 5

Parts (a)(i) and (ii) were generally done well. Most students were able to write down the correct words to describe the likelihoods of the given events. Part (a)(iii) was not done well. Few students were able to identify “evens” as the required likelihood. A very common incorrect answer here was “likely”. Part (b) was not done well. Many students were unable to complete the spinner to satisfy both the required criteria. Common incorrect answers here include the use of incorrect numbers of Ls and Ms, e.g. JJKKMMML and JKMMMMLL, and the omission of letters, e.g. JKMLL (only).

Question 6

Part (a) was not done well. Few students could find the total weight of the potatoes in the small sack, but many were able to obtain a mark for calculating a first step in the answer, usually 37 – 13 = 24. Algebraic approaches to this question were extremely rare. Part (b) was done quite well. Most students opted to do their calculations in pounds. Many students were not able to do the required calculations correctly or give an appropriate unit with their answer. A common calculation error for 30 × 2.2 was 60.60. A significant number of students attempted this calculation by long addition, often by adding 2.2. ten times and multiplying the answer by three, often incorrectly. A common error in the long addition approach was …, 8.8 + 2.2 = 10.10, … Students should be advised to write the units with their answers.

Question 7

Part (a) was done quite well. Many students were able to identify and name shape E. A common incorrect answer here was “parallelogram”. Part (b) was done well. Most students were able to write down the letter of the shape with exactly two lines of symmetry. Part (c) was not done well. A significant number of students were unable to write down the order of rotational symmetry of shape B. A very common incorrect answer here was 1. Part (d) was done quite well. Many students were able to identify a pair of parallel lines. Some students identified two or more pairs of parallel lines but incorrectly used the same notation to define each pair. Part (e) was done quite well. By far the most common incorrect answer here was “acute”.

Question 8

Part (a) was done quite well. Although many students knew what they had to do, a significant number of these were not able to do the required calculations correctly. Common errors in calculating 8 × 60 were 540 and 420. Many students, having calculated 4.80 correctly, were then unable to subtract this from 10. A common error here was 6.20. Part (b) was generally done well. Many students were able to identify the costs of posting the magazines from the table, but a significant number of these were unable to do the calculations correctly, the error often occurring in the calculation of 5 × 1.13. Most students were able to identify the person having the cheaper way of posting the magazines by writing a suitable concluding sentence involving several words.

Question 9

This question was done well. Most students were able to write down all the possible combinations of the counters. Common but relatively rare incorrect answers included combinations of counters taken from a single box or bag, e.g. black, red.

Question 10

Part (a) was generally done well. Most students were able to simplify the expression. A common incorrect answer here was t^3. Part (b) was generally done very well. Most students were able to simplify the expression by removing the multiplication signs. A small number of students wrote their simplified expression as $ef5$. Part (c) was done quite well. Most students were able to obtain at least one of the two algebraic terms $4x$ and $6y$. Common incorrect answers here were $4x - 6y$ and $3x^2 + 6y$.

Question 11

Part (a) was done well. Most students were able to find the perimeter of the given shape. By far the most common error here was 5 (the area of the shape), but 9 and 11 were also seen. Part (c) was done well. Most students were able to reflect the shape in the mirror line. A common but relatively rare incorrect answer was to locate the reflected shape next to the mirror line.

Question 12

Part (a) was generally done well. Most students were able to use the rule correctly to calculate the total hire charge. Here, as elsewhere, incorrect answers were often due to errors in arithmetic. A common incorrect answer was 86, resulting from the incorrect calculation $4 \times 90 = \underline{36}$, $36 + 50 = 86$. Part (b) was not done as well as part (a). A significant number of students attempted this question via a trial and improvement approach, often with mixed success. A common incorrect answer using this approach was $8 \times 90 = \underline{810}$, $810 + 50 = 860$ (answer 8 weeks). Those students attempting to use inverse operations often made errors in the division stage of their calculation, e.g. $810 \div 90 = \underline{90}$.

Question 13

Part (a) was done quite well. Many students simply wrote the answer (5) on the answer line. Few students started their answer by writing a suitable equation for one or both of the sides of the rectangle. A significant number of students wrote down an expression for the perimeter of the rectangle and were then unable to make any further progress with the solution. Part (b) was done quite well. A significant number of students attempted this question by trial and improvement. A common correct answer using this approach was $30 + 60 + 90 = 180$ (so $y = 30$). A common incorrect answer was $180 \div 3 = 60$, $180 \div 2 = 90$, $180 - 60 - 90 = 30$. Many of those students attempting an algebraic approach were not able to formulate a suitable initial equation using all of the angles. A common incorrect answer here was 36, usually obtained via $2y + 3y = 35$, $180 \div 5 = 36$ (so $y = 36$).

Question 14

Parts (a) and (b) were generally done well. Most students were able to interpret the graph and change between the units. Part (c) was not done so well. A significant number of students were not able to interpret the scales correctly (particularly the miles scale) to achieve the required accuracy in their final answer. A common error here was to read the graph at 25 (km) as 14.8 (miles). A surprising number of students changed 250 km to miles, changed 100 miles to km and then incorrectly found the difference in these numbers.

Question 15

This question was not done well. Few students could work out the number of paving stones needed for the whole path. Some students, having calculated the number of paving stones needed for the 4m widths and 6m lengths (total 40), did not then add on the 4 extra paving stones needed for the corners. A significant number of students thought that each width of 4m needs 4 paving stones, and that each length of 6m needs 6 paving stones, and drew this in the diagram Students should be advised that lengths in diagrams may not be accurately drawn. A very common error in calculating the area of a paving stone was $0.5 \times 0.5 = \underline{2.5}$.

Question 16

Part (a) was generally done well. Many students commented on the need for sum of the angles in the quadrilateral to total 360 degrees. A significant number of students then went on to calculate the size of the angle x (100) or to take the size of the angle x to be 90 and show that the angle sum for the diagram (350) was incorrect for a quadrilateral. A common error was to state that the size of angle x is greater than 90 “as shown in the diagram”. Part (b) was done quite well. Many students were able to draw a suitable tessellation of the given shape. Students should be advised to draw at least two rows of shapes for their tessellations.

Question 17

This question was done quite well. Many students were able to write down all the various stages of their calculations even if they were then not able to calculate them correctly. By far the most common error was to calculate $828 \div 12$ incorrectly. Students employing methods of decomposition, e.g. 5% + 10%, should be advised to show the details of their working. For example, the answer 10% = 72, 5% = $\underline{34}$, so 15% = 106 is awarded no marks, whilst the answer 10% = 72, 5% = $72 \div 2 = \underline{34}$, so 15% = 106 is awarded 1 mark.

Question 18

This question was not done well. In part (a) few students could find the nth term of the arithmetic sequence, though 6 often featured in many attempts. Common incorrect answers here included $n + 6$, $6n - 1$, $6n$ and $5n + 6$. Part (b) was not done well. Few students could explain why 121 was not a term in the sequence. Relatively few students used their answer to part (a) to answer part (b), and often with mixed success. The most successful attempts were often due to extending the sequence to 119 and 125 and commenting that neither of these terms is equal to 121. Common incorrect answers included "yes, it's in the sequence because it is an odd number", "no, it's not in the sequence because it (121) is not in the 6 times table".

Question 19

The presentation of work in this question was often poor and calculations appeared all over the answer space. Although few students were able to achieve full marks on this question many were able to gain at least one mark. This was usually awarded for doubling quantities in the recipe in a first stage of a build-up method, e.g. 240g butter, 120g caster sugar, 360g flour, or for attempting to divide 120 (or 60 or 180) by 8, or for subtracting the quantities in the recipe from the available quantities. A common incorrect answer here was 16. Few students attempting a unitary method of solution were able to do all the stages of calculations correctly, errors generally occurring at the division stage.

Question 20

This question was not done well. Few students could use the properties of parallel lines to deduce the size of angle *FBC*, and the properties of isosceles triangles to deduce the size of the angle *BFC*. Common errors here included (i) incorrectly assuming the size of the angle *CFG* to be the same as angle *BFE* (70), presumably because it looks the same as angle *BFE* in the diagram, (ii) incorrectly deducing that the size of angle *FCB* (x) to be the same as angle *FBC*, again presumably because it looks like that in the diagram, (iii) assuming that triangle *FBC* is an equilateral triangle. Students should be advised that the sizes if angles in diagrams may not be accurately drawn. Few of the students that were able to obtain the correct value for x (40) were able to write down all the reasons for their calculations or all the reasons correctly.

Question 21

This question was done quite well. In part (a) many students were able to write down two things wrong with the question, usually referring to the absence of a suitable time frame and the poorly defined (vague) nature of the response boxes. A common incorrect answer here was "no other box". Part (b) was done quite well. Most students were able to write down a suitable question with an appropriate time frame. Common errors in presenting the answer boxes were (i) no zero option, (ii) overlapping intervals and (iii) use of inequalities (rare). Some students incorrectly interpreted how often to mean "how many hours…".

Question 22

This question was not done well. Those students opting to present the information in a two-way table had considerably more success than those who did not. Students presenting their answers in a two-way table should be advised to show the details of their calculations. Those students not opting to present the information in a two-way table were often very untidy in the presentation, with calculations appearing all over the working space. Although many students were not able to score full marks on this question many were able to score at least one mark for a correct first stage in their calculations, usually for 54 (total number of bottles on Sunday), and sometimes for 48 (total number of half pint bottles).

Question 23

This question was attempted by many students but relatively few were able to gain full marks. Most students appreciated that they had to calculate the volume of the cuboid (rather than the surface area), but relatively few were able to do this correctly. Here, as elsewhere, students often had difficulty in multiplying numbers involving multiples of 10, particularly when deciding how many zeros are needed after the number. A very common incorrect answer here was to calculate $30 \times 40 \times 50$ as $\underline{6000}$, deduce that 2 bottles of oil are needed (usually by 3000 + 3000 = 6000), work out the total cost for the oils as £7 (usually by £3.50 + £3.50 = £7), and concluding that Sally has enough money for the bottles of oil.

Summary

Based on their performance on this paper, students should be advised:

- to use a ruler to draw straight lines
- to use the intersection of grid lines for the locations of vertices in their diagrams
- that lengths of lines and the sizes of angles in diagrams may not be accurately drawn
- to write the units with their answers
- to draw at least two rows of shapes for tessellations
- to show the details of their calculations, particular when employing build-up, decomposition and two-way table methods.
- to write down all the reasons for their answers or calculations when requested

Grade Boundaries

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