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Principal Examiner Feedback

Summer 2015

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

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Summer 2015
Publications Code UG042054

GCSE Mathematics 1MA0
Principal Examiner Feedback – Foundation Paper 1

Introduction

This paper seemed accessible to all students with the majority of questions attempted by all students. What was particularly noticeable was that a greater proportion of students made inroads into the longer high-tariff functional questions. Whilst there remained too many trial and improvement approaches, many attempts demonstrated strategies that might have led to successful conclusion if it was not for poor arithmetic skills, though these strategies were not always clear from working.

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 working out was set out in such a disorganised way that examiners found it impossible to identify a chosen route of solution by the candidate, in order to award method marks.

Equally diagrams and graphs need to be drawn accurately. Students need to show greater care in taking readings from graphs.

Students are required to have mathematical equipment; a compass, protractor and ruler were needed to answer some of the questions on this paper.

But the greatest failing, all too obvious on a non-calculator paper, was an inability to process common calculations accurately. These include long multiplication, finding fractions or percentages of quantities, and simple proportion.

Report on individual questions

Question 1

In part (a) both a half square and two quarter squares were accepted for 2, and though drawings were free-hand, they had to resemble the correct proportions to get the mark. Having been given correctly sized symbols which only needed to be copied, it was surprising to find such lack of care in drawing the answers. In part (b) there were many correct answers, but those who might have failed in their arithmetic needed to show some evidence of adding numbers from the four days in order to gain a method mark.

Question 2

Part (a) was well answered apart from those who gave a fraction rather than a percentage. Equally, in parts (b) and (c) most students gained full marks, though in (c) some just shaded 5 squares rather than 1/5. In part (d) the majority of students were able to gain at least 1mark by stating 2/8 as one of their fractions, 4/12 was the most common incorrect fraction given.

Question 3

Scaling is not always understood. The failing of some in part (a) was to interpret the scale as 0.1, 1 or even 2. Some appeared to estimate rather than base their answer on a scaling of 0.2 Some students used the diagram sensibly to count up in 500s, frequently showing 3500 as part of that process, though incorrectly writing this as 3050 did not help. Many gave the correct answer, but some gave answers which were off the scale given, indicating they were failing to evaluate their given answer in the context of the question. This also included those who put a decimal point in their answer.

Question 4

Nearly all gained the mark in part (a). In part (b) a significant minority gave Ficus incorrectly as their answer. Part (c) was usually correct, but 19190 and 19000 were common errors.

Question 5

The parallel lines were generally well done and indicated by arrows as suggested in the question. Some spoilt it by putting the same symbol on two sets of different pairs of lines. Marking the right angle was less well done with many acute angles indicated, and some giving an ambiguous answer by putting the R outside the diagram. Many correctly measured the x angle but it was clear that not all students had a protractor to do so, with estimates usually in the 40s.

Question 6

Most gained the mark in part (b). Weaker students were unable to gain the mark in part (b) with some resorting to trial and improvement, usually unsuccessfully. The omission of the "+" sign for 8 meant the mark could not be given.

Question 7

Many correct answers in part (a) with times given in a variety of acceptable formats. Students who listed the times in part (b) usually went on to gain the final answer, but some started with 0932 instead of 0920. Many giving incorrect answers of 4, 5 or 7 could not be credited any marks without evidence of working. Part (c) was not well answered.

Question 8

Although most gave the answer of "likely", there were many who gave "certain", perhaps interpreting the question as "six or less". Both probability scales were used effectively by the majority. Part (c) was also well answered with only a few just giving options such as H/T and 1,2,3,4,5,6.

Question 9

In part (a) many students were able to gain 2 marks as there was evidence that they had understood the question and had used a correct method for both schemes but disappointing errors in simple subtraction often lost them the accuracy mark. Others were credited with 1 mark where correct working was shown, when the number of extra kg used was a value other than 7, usually 6 or 12. Further errors were seen in part (b) with 25−16 calculated incorrectly. 18 was a common answer, having failed to add on the original 5kg. Some multiplied 18 by 5 to get 90 instead of adding 5, whilst some started from £19 rather than 16.

Question 10

Scaling was an issue for some students throughout this question, indicated by incorrect answers of 28 or 29 in part (a). Various strategies were used in part (b), with many arriving at 220 pounds to enable them to give a correct conclusion. A common misconception was that pounds was equivalent to £s. Candidate who chose very small amounts to convert lost the accuracy in their answer. Attempts to extend the graph were unsuccessful since this also led to inaccuracy.

Question 11

The first three parts of this question were answered well, the only error being those who reversed the coordinate values, though it was not uncommon to see this error only in the first two parts. In part (d) many offered y=3 as the line, or a diagonal line through the point (3,0).

Question 12

Some chose to ignore negative signs completely, whilst others could not subtract 17 from 30. The missing numbers in the last two rows were frequently wrong or missing. Some simply added all the columns to get their answer. Generally, a question that was not well understood.

Question 13

Part (a) was answered well by nearly all, but in part (b) the most common incorrect answer was obtained from 10÷5 (=2).

Question 14

This functional question was well answered by many, though a failing of some was to multiply all three dimensions by 3. Some did not consider the weight of the 3 boxes in arriving at their conclusion. Weaker students gained some marks when they showed correct units conversion, though this was the first question on the paper where there were some non-attempts. Students would benefit from greater experience of this type of problem, where more than one type of conversion is required.

Question 15

There were many incorrect responses to part (a) with 2, 4 and 12 being common answers given. In part (b) the most popular answer was 30 which gained no credit. 10 was also frequently seen from adding the number of cars column. Those that understood the process showed multiplication of fx, but a high proportion of students either multiplied incorrectly one value ($0\times2=2$ being common) and/or added the total incorrectly.

Question 16

In part (a) some were too casual in their drawing of lines of symmetry, but most gained at least 1 mark. Weaker students frequently gave just one line of symmetry. The quality of the answer to part (b) was sometimes determined by the amount of equipment a candidate had. For example, there was evidence of some students attempting this with just a ruler. Most gained 1mark for showing production of a triangle but without showing construction arcs. In part (c) many students did not understand what they needed to do as the most common method shown was 24×6 with, most often, the answer 144. Some showed "8" on each edge of the triangle and then proceeded to get the correct answer, the only common incorrect method at this stage being to find the total length of all the lines drawn (84). In contrast, part (d) was extremely well done; the only common error was leaving gaps between some of the hexagons drawn.

Question 17

Students who showed the substitution of the values into the expression nearly always scored 1 mark. This often led to a calculation of $8+ -15$, but a significant number of students were unable to process this correctly, giving -23 as their final answer. Substitution to give $2\times4+3-5$ was also commonly seen, along with $24+35$. Part (b) assessed understanding of order of operations. Too many incorrectly performed the calculation $(4\times3)2$ though some showed $4\times3\times3$ but still gave the wrong answer.

Question 18

It was not uncommon to find the angle given correctly, but a poor level of communication of the reasons for their process of solution. The most successful method was to find the 3rd angle in triangle ECB and then subtract from 180. Those using the total of the angles in a quadrilateral frequently made arithmetic errors. A few assumed triangle ECB was isosceles. Centres are advised to encourage students to write their found angles on the diagram, a secure way of showing which angle is which; the alternative is to identify which angle is which in working but this was very rarely seen.

Question 19

This question was not well answered with many gaining no marks. In part (a) a few students correctly divided 135 by 45 to get the answer 3, but then failed to multiply by 2 and gave the number of roach as 3 (an overall total of 10). Many unsuccessfully added combinations of 22.5, 45, 135 and 180. A successful approach involved marking off the circle in 45° steps, writing 2 for each.
In part (b) too many made direct reference to the different sector sizes on the diagram, only showing a misconception that the bigger angle size indicated bigger frequency, that is without realising that the question referred to the actual number of fish.

Question 20

Most students realised that 1/10 of 60 was 6, but then appeared to struggle to find 3/5 of 60, usually giving this as 12, though sometimes spoilt by poor arithmetic skills. Most attempts at adding the fractions were unsuccessful. But overall the majority scored full marks on this question.

Question 21

A significant minority of students failed to attempt this question. Many who started knew the initial cuboid was $2 \times 10 \times 15$ but sometimes incorrectly calculated. Some wanted to work with areas, or even added up the lengths of all the sides. A variety of methods were seen in working out $300 \div 25$, usually addition methods. Trial and improvement methods using $5 \times 5 \times ?$ were usually unsuccessful.

Question 22

There were many correct responses to this question. Common errors included the absence of any reference to a time frame, or a questions asking for the time spent at the track rather than how often. The response boxes regularly failed to include a zero, were not exhaustive, or were overlapping. Centres need to be aware that tally charts or data collection sheets will get no marks.

Question 23

Parts (a) and (b) were usually answered well by those who understood what was meant by "factorise", though in part (b) a common error was to include the y in the bracket such as y(y−2y). In part (c) many students showed some understanding by writing p^7/p^2 but were then unable to process this to arrive at the correct final answer. But the most common incorrect answer was p^{12}/p^2 leading to p^6. Some weaker students had been trained to write out the expansion of the ps and then cancel, which usually worked. In some cases the final mark was lost because students failed to show care in writing their final answer as p5 rather than p^5.

Question 24

Better organised students clearly set their work out in two columns underneath the boxes, or divided their work up with equal clarity. There were some good examples of long multiplication methods, with usually no more than one error shown. Those listing 25 lots of 2.39 usually failed to perform the addition correctly. The percentage calculation was usually done correctly, again using a variety of methods, which attracted an independent mark, but the working needed to be clear. Unfortunately some students assumed that VAT needed to be taken away rather than added. The conclusions were usually stated correctly, but where students included additional incorrect information this was penalised, for example the difference between the two worked out incorrectly.

Question 25

Relationships were usually correctly stated; some students lost the mark by stating "negative" without reference to correlation. In part (b) there were many correct answers but again there were issues with scaling where students read off incorrect values. Students should be advised to always draw a line of best fit since this could attract a method mark even if the answer given is incorrect.

Question 26

Most students understood what they needed to do to get to the answer, but again poor arithmetic let them down. There were many attempts to work out multiples of 15 and 40, clearly shown. There were some cases where students got as far as 120 but then incorrectly worked out the number of boxes / packets.

Question 27

There were many who failed to attempt this question. A common route seen was the calculation of the perimeter rather than the area. Of those students who sub-divided the shape the majority attempted to find the total area by adding triangles and rectangles rather than a trapezium. Finding 25% was almost always done by finding 10%, 20%, 5% rather than by its association with ¼. On many occasions 25% was calculated but then not deducted, or taken incorrectly from the cost of the tiles. There were often problems with appropriate rounding.

Summary

Based on their performance on this paper, students should:

- be advised not to reply on trial and improvement approaches for the solution of problems. They are rarely successful.
- be advised to show all relevant and necessary working out, ensuring that it is legible
- draw diagrams and graphs accurately and take care when taking readings from graphs
- bring mathematical equipment to the examination; a compass, protractor and ruler were needed to answer some of the questions on this paper
- practice arithmetic skills such as long multiplication, finding fractions or percentages of quantities, and simple proportion.

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