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Examiners' Report
Principal Examiner Feedback
Summer 2017

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

This exam paper gave a good range of marks for the award of grades.

Though most students showed their working there were still far too many cases when it was often disorganised, showed a lack of clarity and was without a logical progression. Sometimes this caused students to lose marks when it was not possible to follow their train of thought. This was especially evident in Q8, Q14, Q17, Q19 and Q23.

Some students lost marks through writing their numbers indistinctly. There were many cases where it was not possible to distinguish between 5s and 2s, 4s and 9s, 1s and 7s.

Performance in the basic skills of algebraic manipulation has improved though substituting into formulae and dealing with solving equations remains poor.

Almost all students had the necessary geometric equipment.

Report on individual questions

Question 1

This question was well understood with almost all students gaining full marks for parts (a) and (c) with a small minority of students making a mistake in part (b). More students would have gained a method mark if they had shown which frequencies they were adding.

Question 2

In this question students were most successful in parts (a) and (d) with the correct answers of 5 and 16 usually given; however, if 64 or 96 was given in part (d) preceded by the correct answer of 16, full marks were awarded.

Parts (b) and (c) were often poorly answered with $\frac{7}{100}$ often given as the answer to part (b) instead of $\frac{7}{10}$, and 0.3 given as the answer to part (c) instead of 0.03

Question 3

Congruency and similarity were well understood in this question with most students gaining the marks in parts (a) and (b) but in part (c) it was fairly common to see the answer given as 14, the perimeter of the rectangle, rather than 10; its area.

Question 4

The scenario in this question was well understood and students scored a good spread of marks. Most students realised they had to work out 2 lots of £8.40 and 3 lots of half of £8.40 but often made a mistake when they took their total away from £30. Another common mistake was to write the answer of 60p incorrectly as 0.60p or £0.6

Question 5

This question too was well understood though it was quite common to see extra circles included at the ends of the vertical lines in part (a).

Parts (b) and (c) were often successful though occasionally students gave the answer for lines instead of circles in part (d).

Question 6

Though most students understood the question there was a range of incorrect answers. In part (a) students often used 180° and gave the common wrong answer of 80 for which they gained the method mark provided they showed their working.

In part (b) the type of angle was often given as obtuse rather than acute though there was an interesting selection of spellings which gained the mark as long as the meaning was clear.

In part (c) it was common to see students copying the given triangle in (b) or drawing an equilateral triangle with sides equal to the 7 cm length of PQ .

Question 7

Another well understood question with students understanding what processes they had to carry out. However, quite a few thought there were 100 metres in a kilometre and so their method was spoiled as were those solutions where the units were omitted. There were also a significant number of students who thought that Katya ran 1 km a day for 3 days and not 3 km each day for 3 days.

Question 8

Questions on time are often misunderstood on Foundation tier papers and this proved to be no exception on this paper. Though there were many correct responses of 4 35 pm those that omitted the pm lost the communication mark. The students that used the counting back method were more successful in finding the correct start of cooking time than those who tried to subtract 1 hour 55 minutes from 6 30 pm as they often made the mistake of thinking there are 100 minutes in an hour as did those students who wrote 115 minutes as 1 hour 15 minutes which also gained no credit. Another common mistake, in this very common scenario, was to and use 40 minutes for each $\frac{1}{2}$ kg ie adding 15 minutes to each 25 minutes of cooking time and this too was penalised.

Question 9

Almost all the students were able to give the correct answer to part (a) in this conversion graph question and then understood that they had to extend the use of the graph to either change 100 gallons into litres or 450 litres into gallons. Most of the students were able to do this successfully though some were unable to select whether the tank was full or not. A small number of students used comparative values that were not in the scheme eg 1 gallon = 4 litres or 12 gallons = 54 litres and used build up methods to work towards 90 gallons or 400 litres but often made arithmetic errors which caused them to lose the accuracy mark.

Question 10

Parts (a) and (b) in this question on bar charts was almost always answered correctly and students understood what to do in part (c) though some reading from the graphs led to some inaccurate answers although one mark could be earned if only one reading or the total was incorrect.

Question 11

This question on negative numbers was well understood and parts (a) and (c) were usually correct; however, students made errors when they had to find the difference between a positive and negative number in part (b) and when they had to total the five temperatures before dividing by 5 in part (d).

A total of 17, where students ignored the negative signs, was often seen in part (d) as was an answer of 0 following a total of 5 divided by 5 shown.

Question 12

In this question on triangles many students only drew one of the lines of symmetry in part (a), usually the vertical one and thus gained one mark.

Part (b) was not very well understood as students often marked the diagonals with a length of 4 or forgot to halve the partially correct method of 8×4 or 32. The most successful attempts were from those students that found the area of the whole square and divided by 4. As usual there were a significant number of students that gave the perimeter as their answer instead of the area asked for.

Question 13

This question on substituting into a formula was poorly answered with many students getting an incorrect answer 7 in part (a) from $15 - 8$ rather than $8 - 15$ or from an incorrect substitution to get $42 - 35$. Students would have been more successful if they had shown the complete substitution rather than working in two separate parts.

In part (b) it was common to see an answer of 6 from $30 - 6 = 4x$ rather than the correct answer of 9 from $30 + 6 = 4x$. There were still a significant number of students who did not know how to rearrange and solve $30 = 4x - 6$ and used trial and improvement instead to find $x = 9$. These students were not penalised if they obtained the correct answer.

Question 14

This question on pay was not really that well understood as many students thought that the overtime was the ordinary rate plus the $1\frac{1}{2}$ times ie £25 an hour. If they followed that through to an answer of £575 then they could be awarded 2 marks. Many students only found the overtime pay and scored 2 marks whilst others just found the pay for the ordinary hours to gain 1 mark. A significant proportion of students worked out the pay for 7 days though only five days were listed explicitly in the question. However, a good proportion of students were able to work the question through correctly to the correct answer of £485

Question 15

Questions on pie charts are often not well understood and this was certainly the case here. In part (a) few students gave the correct answer of $\frac{1}{6}$ though it was more common to see a fraction equivalent to $\frac{1}{6}$. A significant minority gave the answer of $\frac{3}{5}$ as they cancelled down $\frac{60}{100}$ obviously thinking that there are 100° in a full turn.

Many students gained one mark in part (b) for realising that either each person was represented by 2° or for finding the 150° angle for the women's sector but then failing to realise that they needed to divide it by the 2° that represented each person. A number mixed up the number of boys and girls with degrees when trying to calculate the angle for 'women'.

Part (c) was very poorly answered with the vast majority of students giving an answer relating to angle size not realising that there was insufficient information given about the actual number of people shopping this week or that a pie chart with no figures only gives the proportion of each type of person.

Question 16

Many students were able to score marks in the first two parts of this question on algebraic manipulation though some lost marks for writing $7x$ as 7^x or $6y$ as 6^y .

In part (c) some students made a reasonable attempt and showed $8e + - 2e^2$ which was not quite enough to gain full marks and some others spoiled their correct answer by going on and writing the answer as $6e$ or even $6e^2$ whilst others were confused by $4e^2$ which they thought was equal to $4 \times e \times 2$

Question 17

This question was surprisingly well answered with many students scoring 3 marks for writing the value of x as 45° . However, very few students were able to go on and gain the mark for correctly giving all three reasons ie angles in a triangle add to 180° , base angles of an isosceles triangle are equal and angles on a straight line add to 180° . Some students gained one mark for finding the base angles of the isosceles triangle as 55° . It was quite common to see angle ABC given as 70° , as students realised that the triangle was isosceles but made the wrong angles equal and sometimes all 3 angles were marked as 70° . Occasionally students took the dashes on the triangle to mean that the sides were parallel and they then tried to make the problem about corresponding angles.

Question 18

This frequently tested concept was not very well answered as the introduction of the missing height in the question seemed to confuse students. Some students worked out the volume of the block as 40 cm^3 and then went on to multiply this by 24 to give the volume of the box as 960 cm^3 but then failed to correctly divide this by 80, the cross sectional area of the box. The most successful students were those that realised that 4 blocks fitted along the 8 cm width of the box and to fit in 24 blocks there were 6 layers each and therefore, as they were 2 cm tall, the height of the box was 12 cm. Having established 6 layers of blocks, a common mistake was to give an answer of 6 and not multiplying by 2 to give 12 cm. Those students that showed the incorrect method of 24 divided by 2 equals 12 scored no marks. Some students thought this was a similar shapes problem and tried to find the scale factor of the 2 solids. This may have been why many students incorrectly thought that x should be 8 as they believed that the box had a square face.

Question 19

The concept of finding a percentage profit and adding onto the cost price was lost on many of the students. Most students were able to score one mark for finding either 15% or 30% of £400 and then make a start on working out the total profit or the total income from selling 40 computers at £520 or 10 computers at £460. However it was rare to find fully correct solutions to this question as place value was a common misconception; from the initial workings (30% of 400 = 12 instead of 120) to the middle method marks ($40 \times 400 \times 1.3 = 2080$ and not 20 800). Many pupils who began the question started with 400×50 but did not go any further. Another common error was students who correctly worked out the profit as £5400 but then said "No".

Question 20

Many students failed to gain marks in this question for a wide variety of reasons. Some could not plot the points at the correct height, many failed to plot the points in the centre of the class interval or joined the first and last points on the graph whilst a surprising number just plotted points and failed to join them up. The plots for the frequencies of 15 and 25 were often inaccurate and at 14 or 16 and 24 or 26 respectively.

In part (b) the modal score was zero as most students gave the frequency of the modal class interval rather than the class interval itself.

Question 21

It was rare to see a fully correct solution to the given equation. Almost all the students could expand the bracket but then could not deal with moving the variables to one side of the equation and the constant terms to the other; the negative answer also added to the confusion.

Question 22

This question too was poorly attempted by the majority of the students who did not realise that the 3 element in the ratio 3 : 2 : 5 related to the 60 grams of nuts and it was very common to see the 60 grams divided by the total of the 3 numbers in the ratio ie 10. This approach scored no marks though many students did gain some marks in part (a) often for finding the 40 grams for raisins.

In part (b) it was very rare to see a correct solution as students could not deal with finding the cost of one gram of nuts by dividing £8 by 500 grams with many trying to divide 500 by 8 but some students did score one mark for showing a method to work out there were 90 grams of nuts in the 300 grams of the breakfast cereal. The most common incorrect method, which scored no marks, was to divide 800 by 500 and then multiply by 3, the ratio of nuts not the number of nuts to give an answer of £4.80

Question 23

Students often find working with two dimensional representations of three dimensional shapes very difficult and in this question they struggled to decide which lengths they needed to multiply to find the area of the surfaces. The most common mistake was to multiply the 40 cm altitude by 50 or 80 and if they used 60 cm they then frequently forgot to divide by 2 to find the cross sectional area. Other common errors were 50×60 and 40×80 probably as they were adjacent on the diagram. It was very rare to see a completely correct solution to this question. However, some managed to gain the first mark for finding at least two different areas, usually the rectangular faces.

Question 24

The most successful students were those that worked with equivalent fractions to obtain the total of 15 people and therefore gain the first method mark. Interestingly many students stopped at that point and could not then go on and state that 4 of the 15 were adults and even less gave the correct probability of $\frac{4}{15}$. Some students did gain 2 marks for writing a fraction with a numerator of 4 and a denominator with a number greater than 4

Summary

Based on their performance in this paper, students should:

- Always lay out their working in a logical progression so that their method can be followed easily particularly in higher mark yielding questions
- Write their figures clearly and distinctly being careful to distinguish between 3s and 5s, 4s and 9s and also between 1s and 7s
- Remember that in a frequency polygon the mid points are joined but not the first point to the last point
- Give reasons next to the working in questions where reasons are asked for
- Practice substituting into formulae and dealing with solving equations
- Always include units with their answers

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