Principal Examiner Feedback

Summer 2015

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

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GCSE Mathematics 1MA0
Principal Examiner Feedback – Foundation Paper 2

Introduction

It was pleasing that many students showed sufficient working out to gain method marks when the final answer was incorrect. Working was often well set out. In too many cases, though, absence of working meant that no method marks could be awarded.

Answers to QWC (Quality of Written Communication) questions generally showed enough working to allow the award of communication marks.

Students should take care when writing their answers. It was often difficult for examiners to read students' numbers, with 4 looking like 9, 1 looking like 7, 3 looking like 5, etc.

Although this was a calculator paper, students did not always use efficient methods for calculations and reverted to perhaps more familiar non-calculator methods for calculations such as finding percentages. Some students seem to think that "show your working" implies use of non-calculator methods.

Some students used incorrect notation, eg ratios, when writing probabilities. Probability answers must be given as fractions, decimals or percentages. Too many students gave a description of a probability, eg 'likely', when a numerical probability was required.

The percentage questions were not as well answered as might have been expected.

Report on individual questions

Question 1

Part (a) was nearly always correct.

Part (b) was also answered well. A few students squared 1.69 instead of finding the square root.

In part (c) some answers of 6.4 were seen.

Question 2

Many students correctly identified the shape as a hexagon in part (a). Pentagon and octagon were common incorrect answers. Part (b) was answered very well.

Question 3

This question was answered very well with many students using 17 × 4 + 3 to work out the number of chairs needed. Those who forgot to include 3 chairs for the people organising the quiz and gave 68 as the final answer were awarded one mark. Some students worked out 17 × 4 but then followed this with an incorrect step. A few students simply added 17, 4 and 3 to give an answer of 24 or multiplied all three numbers, resulting in an answer of 204.

Question 4

Overall, this question was well attempted with most students choosing to present the data using a bar chart, with the pets labelled along the horizontal axis. The bars were usually drawn at the correct heights although a few students omitted the snake. If the final mark was lost it was usually for not labelling the vertical axis, or, less often, for one of the bars being plotted incorrectly or for a non-linear scale. A sizeable minority used a tally chart while a few students drew a pictogram or a pie chart.

Question 5

In part (a), many students simplified the expression correctly. The most common incorrect answers were 7e (from treating all terms as positive) and 6e. A few students gave only partially simplified expressions, e.g. 6e – e and 2e + 3e.

Part (b) was also answered well. Some students removed only one of the multiplication signs, giving an answer of 7g×h or 7×gh, and thus did not gain the mark.

In part (c), many students were able to simplify the expression correctly. It was common to see 1a rather than a but this was condoned. When one mark was awarded it was often for collecting the terms in a correctly, eg a – 6d. An inability to deal with '–2a' was the undoing of many students. Common incorrect answers which were awarded no marks included 5a – 6d and 5a + 4d. Some students wrote 6ad with no working shown and gained no marks.

Question 6

The majority of students were able to work out how many students were on the bus. The most common method was to start with 16 then add the number getting on and subtract the number getting off for each school. Wrong answers were usually due to simple arithmetic errors or to students writing one of the numbers from the question incorrectly.

Question 7

In part (a), most students were able to work out the size of angle x as 95º but giving a correct reason proved more difficult. It was pleasing that many students attempted to give a reason using words but often the reason given missed out the crucial word 'angles'. "A triangle is 180 degrees", for example, or "There are 180º in a triangle" were insufficient for the mark. A few students wrote "Angles on a straight line add to 180 º". Too many students thought that showing their working was reason enough.

Part (b) was generally answered well with a large number of students gaining full marks for a fully correct triangle. When just one error was made it tended to be in the size of one of the angles although triangles with both angles correct and an incorrect base were seen. As the 40º angle was on the left, a common error was to use the protractor scale incorrectly and draw an angle of 50º. It seemed that most students had a protractor.

Question 8

Most students worked out the length of time as 15 minutes in part (a) with very few failing to include 'minutes' in their answer.

In part (b), many students worked out the correct time. Students with an incorrect answer could be awarded a method mark if they had shown that they were adding 10 minutes and 55 minutes to 2 pm but incorrect answers were often given with no working.

In part (c), students were very good at providing a statement as to whether Samantha could get to the meeting on time and this was usually backed up by appropriate working. The most widely used approach was to add 75 minutes to 3.05 pm (or to their incorrect answer to part (b)) to find the time that Samantha would get to the meeting. Errors sometimes resulted from 75 minutes being converted incorrectly into hours and minutes, eg 1 hour 25 minutes. Some students chose to work backwards from 4 pm, working out that Samantha only had 55 minutes to get to the meeting.

Question 9

Part (a) was answered quite poorly. Despite having access to a calculator, many students were unable to write 1/8 as a percentage. Some converted it to 0.125 and gave that as the answer. A wide variety of incorrect answers were seen including 80, 8 and 0.8.

Part (b) was generally answered quite well with the most common method seen being $600 \div 6 \times 5$. Students who converted 5/6 into a decimal before multiplying by 600 often truncated the decimal and gave an answer such as 498, thus losing the accuracy mark. Those who gave an answer of 498 with no working shown could not be awarded a method mark. A common error was to use ÷ 5 and × 6.

Question 10

Many students wrote down the correct probability in part (a). A few used incorrect notation, such as 68 : 105 or 68 in 105, and gained no mark. Common incorrect answers were 68/83, 68/100 and 1/68. Some students simply described the probability as 'likely'.

Part (b) was well answered. A few students wrote 22/105, rather than 22, as the answer and scored one mark. Students who made an arithmetic error could be awarded a method mark if a correct method was shown but some gave incorrect answers with no working and therefore no mark could be awarded.

Part (c) was not well answered and the majority of students achieved either full marks or, more frequently, no marks. Those with the correct fraction 15/105 often left this as 1/7 or 0.142..., failing to multiply by 100, and scored no marks. Some rounded 0.142… to 0.14 before multiplying by 100 and lost the accuracy mark. An answer of 14 without any working scored no marks. Rather than work out 15 as a percentage of 105 many students attempted to work out 15% of 105. Some students worked out 105/15 = 7 and gave 7% as their answer.

Question 11

In part (a), students were very successful when using the graph to find the number of adults who went to the museum in March.

Part (b) was answered well. The majority of students subtracted the total number of adults from the total number of children with relatively few choosing to start by finding the difference for each month. Many students did not interpret the scale of the graph correctly when finding the number of adults in February and the number of children in March. Marks were also lost through arithmetic errors. However, when sufficient working was shown, the method marks could usually be awarded. Where students found the monthly differences instead, they often included only January and March, the months when there were more children than adults, and failed to take account of the differences for February and April. The minority of students who attempted this approach were less successful than those who followed the first method.

Question 12

Students who first subtracted the old reading from the new reading to find the number of units used were usually able to go on and find cost of the electricity with most giving an answer with correct monetary units. Unfortunately many students did not realise that Dani was only paying for the units used since the old reading. The most common approach was to multiply both 2968 and 2675 by 18 and then add, rather than subtract, the two results. Students who did this could only be awarded one of the four marks available. Dividing by 18 or by 0.18 was a common error.

Question 13

The vast majority of students were able to write down the next term in the sequence in part (a) and most could explain how they got their answer.

In part (b), most students gave 43 as the 11th term in the sequence. Incorrect answers were usually due to arithmetic errors.

Although part (c) was answered less well, some very good explanations were seen. Some students stated that it is the 20th term; some said that 79 is in the sequence because 19, 39 and 59 are in the sequence and some continued the sequence up to 79. However, many explanations were insufficient. Some students stated, for example, that 79 is in the sequence because it is an odd number and all the terms in the sequence are odd or wrote "I kept adding 4", without providing any evidence that this did result in 79 being in the sequence.

Question 14

In part (a), the mode was well understood.

Part (b) was answered very well with most students able to find the range correctly. Incorrect answers were often the result of students using 17, not 18, as the highest value.

In part (c), the majority of students knew that the median was the middle number even if they tried to find the median without ordering the list. Most students did order the numbers with many then able to give the correct answer. A common error was to identify the two middle numbers as 15 and then give 15.5 as the answer.

In part (d), the majority of students knew how to work out the mean. Errors included keying into a calculator so that only the final value was divided by 12 or adding up the numbers but arriving at an incorrect total. Some students lost the opportunity of gaining a method mark because they showed insufficient working. Those who wrote 159 ÷ 12, for example, could only be awarded a method mark if it could be seen that 159 had come from an attempt to add up the numbers.

Errors in this question were often the result of students confusing the averages, eg giving the mode for the median and vice versa or giving the mean for the median.

Question 15

Generally, this question was answered quite poorly with many students unable to cope with the mix of kilometres and metres. Most students appreciated the need to add the four distances and often attempted to do so using consistent units, most commonly kilometres. However, the conversion of the distances into kilometres was littered with errors. For example, 12 050 m was frequently written as 12.5 km, 14 km 250 m as 14 km + 2.5 km and 20½ km as 25 km or 10 km. Some students added up the kilometres and metres separately but were unable to combine their two totals correctly with 100 often used as an incorrect conversion factor. Students were usually able to communicate a correct decision based on their total distance.

Question 16

Many students were able to design a suitable table for a data collection sheet with three columns and labels of colour, tally and frequency for the columns. A common error was to include only two columns, either colour and tally or colour and frequency. Another was to leave a column unlabelled so that its purpose remained unclear. A few students lost a mark as they had columns headed frequency and total rather than tally and frequency though total was condoned instead of frequency. Some students designed a question for a questionnaire or drew a graph and scored no marks.

Question 17

It was pleasing that many students did manage to write a formula for T in terms of d and f but unfortunately the most common formula seen was T = d + f which scored only one mark. Students who used both 6d and 15f usually gave a fully correct formula although some gave the answer as 6d + 15f or as 6d +15f = 21T and scored only two marks. Some students thought they had to work out a numerical answer.

Question 18

Part (a) was answered quite well although a significant number of students were unable to identify a prime number. Some students thought 1 was prime.

In part (b), the majority of students wrote down three numbers that added to make 21 but in many responses the three numbers were not all square numbers. Some students did not recognise 1 as a square number. Many students listed two square numbers, eg 4, 8 and 9, or 1, 2 and 4, and gained one of the two marks. It was common to see the answer given as 12, 22 and 42 instead of 1, 4 and 16.

Question 19

In part (a), some students were able to gain the first mark for showing the intention to subtract 19 from both sides of the equation; others only wrote 15 – 19 = –4 without associating this with 8f. Some collected number terms on the right-hand side but ended up with 19 – 15. In some cases the correct method resulted in 8f = 4 rather than 8f = –4. Having reached 8f = –4 or 8f = 4, it was common to see the answer given as –2 or 2. Many of those who did divide both sides by 8 gave the answer as 0.5 rather than –0.5. A common incorrect answer was –12, from 15 – 19 – 8, which scored no marks. The fact that the equation couldn't be solved by sight appeared to stump many students.

It was pleasing to see some well presented solutions in part (b) but it was common to see the correct answer given with no working. Algebraic approaches were often quite poor with solutions lacking good structure. Attempts to collect the c terms on one side of the equation and the number terms on the other side were not always successful. When students scored one mark for a correct step it was usually for collecting the number terms, with 3c = 3 being quite common. Some students added both c and 5, instead of taking them away, to get 3c = 13. A large number tried to use flow charts to solve this equation, with no success.

Question 20

Students who found 6% of £2000 as £120 usually went on to give the correct answer but working with percentages proved a problem for many students and a surprising number were unable to work out 6% of £2000. Some students did not use their calculator which often resulted in inefficient build-up methods and errors in calculations. Working such as "10% = 200, 5% = 100, 1% = 2" was quite common and gained no credit due to students failing to show the operations they had used. Some students divided 2000 by 6.

Question 21

The level of success in this question was very disappointing. Rather surprisingly, a large number of students struggled to make any meaningful progress and gained no marks at all because they were unable to use the fact that 2.5 kg of oranges cost £1.40 to work out the cost of 1kg, let alone 4.5kg, of oranges. Many simply subtracted £1.40 from £3.87 and divided by 3; some doubled £1.40 and took off an arbitrary amount; others used an incorrect cost for 4.5kg of oranges with no working to show where this cost had come from. Those students who did show a complete method sometimes lost the final mark because they gave the answer as 0.45p, not 45p. Some of those who found £1.35 as the price for 3kg of apples then forgot to divide by 3 to find the price of 1kg.

Question 22

Part (a) was well answered though not as well as might have been expected. The most common errors were giving the probability as 1/10 rather than 1/30 and working out the probability that the sweet is a dark chocolate, rather than a dark chocolate caramel. Some students gave a description of the probability, usually 'unlikely', but did not give a numerical value.

Part (b) was also answered well. Many of the students with an incorrect answer gained a method mark for summing the white chocolates. Some students used incorrect notation such as 9:30 and some gave the answer as 'unlikely' without giving a numerical value. Some students added up the wrong row in the table, giving an answer of 11/30 and scoring no marks.

Many students answered part (c) correctly. There were some arithmetic slips and some students added 0.35 and 0.17 but did not subtract the result from 1. Some gave 48 as the answer but without "%" this could not gain full marks. It appeared as though some students used the table from part (a) instead of the table given in part (c).

Question 23

Many students showed a correct first step, dividing 1155 by 15 to work out that 77 students went to the revision day and gained the first method mark. Many got no further. Students who then used a trials approach that did not result in the correct answer gained no more marks. Some went on to work out how many students were sent by each school but correct answers almost always came from a trials method rather than from an algebraic approach. Those that attempted an algebraic solution often failed to give three correct expressions, using x^2 rather than $2x$ or $2x - 7$ rather than $x - 7$, and were unable to use their expressions to form an equation. Most students who got an answer did communicate which school each number represented.

Question 24

This question was answered very poorly with few students able to demonstrate a complete understanding of the requirements of this type of question. Some students were able to deal with one of the two constraints and gained one mark for drawing either a horizontal line 3 cm from BC or an arc of radius 4 cm centre C. Many of the horizontal lines drawn were too close to BC. Instead of drawing an arc of radius 4 cm with centre C, some students drew a vertical line 4 cm from CD. Most students did shade a region on the diagram although some simply shaded a part of the diagram without drawing any lines or arcs at all, or shaded parts near the left hand corner rather than the right hand corner. Some freehand lines and arcs indicated either a lack of equipment or a lack of understanding of how to use it.

Question 25

Those students who appreciated the need to calculate the circumference of the circle and remembered the appropriate formula often went on to gain full marks. The simplest and most common approach was to calculate the circumference of the circle in centimetres and compare it with the length of the ribbon (50 cm). Fewer students chose to find the circumference of the circle in inches and then convert the length of the ribbon to inches to give a comparable value. Marks were sometimes lost through a lack of accuracy or through making an incorrect conclusion. Some students calculated the circumference of the circle but got no further and some divided the circumference by 2.54. Some students used the formula for the area of the circle. There were very many students who converted the diameter into cm and did nothing else or had no idea how to start.

Question 26

This proved to be a difficult question for Foundation tier students. Many students did not know how to work out the length of a diagonal and gained no marks. Area calculations were very common. Those who did use Pythagoras' theorem were usually able to find the length of a diagonal and then go on to find the total length of wire needed. Some, however, thought that the total length of wire needed comprised of just the two diagonals and failed to include the four sides of the rectangle. A common incorrect answer was 100 cm, the perimeter of the rectangle.

Summary

Based on their performance on this paper, students should:

- write probabilities as fractions, decimals or percentages.
- label the axes when drawing a bar chart.
- practise writing algebraic expressions and formulae.
- read the information given in each question very carefully.
- include a simple statement of what is being calculated, eg "area =", with calculations.
- write numbers neatly so that their meaning is clear.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
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