Principal Examiner Feedback

November 2013

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

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GCSE Mathematics 1MA0
Principal Examiner Feedback – Foundation Paper 1

Introduction

The work of some candidates was spoiled because they had missed crucial details in many questions sometimes leading to answers which did not make sense in context. Centres should encourage students to look closely at the detailed wording of all questions and pick out the most important pieces of information. A common sense check of final answers could often indicate that an error had been made and would be worth searching for.

On this non-calculator paper there was much evidence of poor arithmetic and inefficient methods. Students need to ensure that they set out their working in a clear, structured manner to enable them to scrutinise it carefully to check for errors themselves.

Conclusions given in starred Quality of Written Communication questions were generally good but more care needs to be taken using correct geometrical language for vertically opposite angles and the description of a rotation.

Where candidates had to solve equations, answers were often seen embedded in a trial used rather than presented on the answer line as a final solution. Students need to understand that the solution itself needs to be given separately and should do so even if the unknown is not given printed on the answer line.

Report on individual questions

Question 1

Some candidates misunderstood the context of this question and did not realise that the stated booking fee of £2.50 per ticket meant that the total of 3 tickets and 3 booking fees needed to be found. Where the total ticket price of £150 and total booking fee of £7.50 were found, some candidates made decimal point errors and added an incorrect £1.50 to £7.50 to give a total cost of £9 or £900 which was presented as a final answer without further consideration. Weaker candidates should be encouraged to set out their work as column addition on non-calculator papers.

Question 2

Candidates were very successful interpreting the pictogram in parts (a) and (b) and dealt with the key correctly.

Incorrect answers of 12 in part (a) suggest that candidates read the total for Thursday rather than Tuesday. Some successful candidates labelled every whole and half circles a 4 or a 2 or showed labels counting up 4, 8, etc

In part (c) most candidates showed a clear attempt at three quarters of a circle with a 90° sector shown missing from a full circle. A successful strategy was used to show lines dividing all circles into 4 and this helped the candidates draw the final part circle. Attempts to represent three quarters using a segment of a circle were not accepted.

Question 3

The hour hand caused most difficulties in part (a) with the clock time read as 9.55 rather than 8.55 leading to answers of 9.40 rather than 8.40 in (i) and 10.40 rather than 9.40 in (ii). Some candidates annotated the clock face with loops around the circumference or radius lines or drew timelines to help deal with the time intervals accurately. In part (b) many candidates converted the time to the 24-hour clock correctly but then spoilt their answer by adding am or pm.

Question 4

Some candidates added the 5 and 3 as unit digits forming 45 and 23 to give a final answer of 68. Others interpreted $4a$ and $2b$ as $4 + a$ and $2 + b$. Where 20 and 6 where evaluated, they were usually added correctly but sometimes a and b were retained giving $20a + 6b$ or reintroduced into a final answer of $26ab$

Question 5

In part (a) some candidates did not realise that the use of the word digit meant that this question was focused on place value. In part (i) they misinterpreted “make” to mean “add” and selected 2 and 8 from the list to give their total 10. Similarly, in part (ii) various operations were used for 3 numbers in the list to produce a 3 digit final answer. Of those candidates who did attempt to use the digits correctly, many chose 324 rather than 284.

In part (b) most had the 9 digit used in the tens column for the first number but did not realise the need to use 7 in the tens column for the second number; instead they gave 97 + 51, usually followed by a correct total 148. There were a few who lost marks due to poor arithmetic even after a correct selection of numbers was made.

Students need to be encouraged to take care that they are using the correct numbers for the question part as a few returned to the part (a) digits of 8 2 4 and 3 to answer part (b)

Question 6

Errors with all parts of this question would appear to come from candidates using the wrong colour for a question part or misinterpreting the spinner. There were only a few where the cross was positioned slightly inaccurately and so marks lost

Question 7

Candidates were rarely successful with all parts of (a) with errors appearing to mix up the terms as well as suggesting miscounting. Edges and vertices appeared to be the most commonly interchanged.

In (b), where the correct method for volume was given, some candidates made arithmetic errors with their calculation of $3 \times 4 \times 10$. When the correct method was not given, many attempted to add the 3 given lengths or find the area of a single face or complete surface area.

Question 8

In part (a) where the correct order of operations allowed for the candidate to just work from left to right, the correct answer was usually seen.

In contrast, in part (b) where working from left to right did not yield the correct answer more candidates gave the incorrect answer of 18.

In (c) the most common incorrect answer was 11. Students need to be made aware that whilst remembering "two negatives make a positive" may serve them well for multiplication and division of directed numbers, this must not be misused when adding two negative numbers.

Some appeared to ignore the negative symbol for either -5 or -6 or possibly found the difference instead and gave final answers of -1 or 1. Similarly, in part (d) incorrect answers of 11 appeared to have ignored the extra – symbol.

Candidates appeared to have found part (e) very difficult. Those that were successful sometimes showed working and a strategy of positioning the brackets in various places and evaluating until they achieved a correct answer of 4.

In part (f), candidates needed to give an answer that explained equivalence rather than just stating it. Many good answers referred to the same operation of $\times 2$ or $\div 2$ being applied to both the numerator and the denominator. Incorrect responses often stated that $\frac{2}{8}$ is double $\frac{1}{4}$

Some candidates gave good explanations that involved 2 similar diagrams with $\frac{2}{8}$ and $\frac{1}{4}$ shaded and a few converted both fractions to either decimals or percentages

Question 9

Candidates were very successful interpreting the dual bar chart for their answers in parts (a) and (b) and to find the daily figures for both Jack and Graham in part (c).

The majority of candidates took heed of the statement “You must show your working” in the starred part (c) which was testing Quality of Written Communication; they listed their readings and found totals for Jack and Graham.

A few made arithmetic errors and or incorrect conversions to hours and minutes but the majority reached a correct conclusion for their calculated totals. The final conclusion needed to be clearly stated and students need to be aware that simply circling or otherwise highlighting one name in their working will not suffice.

Question 10

Where candidates understood the question and started to present the 9 combinations, they were usually successful when a systematic approach was adopted. Setting the answers out in columns and using initial letters appeared to help avoid omissions and duplicates. Attempts to avoid writing individual combinations as pairs such as “Soup with Beef or Tuna or Veg” were not awarded marks.

Question 11

This whole algebraic simplification question was well done. The most common error in part (a) was to give b^4 rather than $4b$

In part (b) some candidates appeared to think that subtraction would eliminate the n variable and gave just 5 or they combine the n from both terms to give $5n^2$

The most common errors in (c) were to remove only one of the × symbols or rewrite the 3 as cd^3. There were a few arithmetic errors in part (d) but the most common cause of a lost mark was from incorrect further “simplification” of correct answer with $11xy$ typically given.

As in part (b) some thought the subtraction of the y terms would eliminate the y part and gave just $5x + 7$ or made a sign error giving $5x – 6y$

Question 12

Candidates lost marks through missing a crucial piece of information in both parts of this question.

In part (a) the fact only numbers from 0 to 9 were on the cards was missed and so the answer 10 was offered.

For part (b) candidates missed not only the fact that the numbers on the card were different but also that they were asked to give **all** the possible answers. Part marks were often awarded where an understanding of median was shown by correct ordering of the 4 given numbers. Students need to be aware that where slips and errors are made, some marks can be retrieved if they have shown some evidence of understanding in their method.

Question 13

Many candidates were successful in applying inverse operations. An algebraic approach to this question was rarely seen. Some appeared to use a trial and improvement method and were usually successful. Unfortunately, 4 was often not presented as a final answer but instead left embedded in $3 \times 4 - 7 = 12$ thus losing the final mark

Question 14

In part (a), there was a little evidence of a lack of rulers to measure accurately with some candidates resorting to marking off centimetre intervals along the line.

The angle 78° was given correctly by most in part (b)(i) with some errors involving subtraction from either 180° or 360°.

There was a wide variety of incorrect answers for part b(ii) with references to alternate angles seen as well as incomplete reasoning involving angles on a straight line.

Fully correct geometrical language was very rare indeed with the word “vertically” frequently omitted leaving just “opposite angles are equal” which was not awarded the mark. Students need to be encouraged to learn and use the fully correct terms for such explanations.

Question 15

As with question 1, the context of this question caused many candidates difficulties. They failed to realise that while 3 of the costs were fixed, the entry fee needed to be multiplied by the number of tickets sold. This meant that a total cost of £324 was often given but candidates were not prompted to spot their error by finding this value low compared to the ticket sales in this context. Others who did realise that the £14 ticket price needed to be multiplied by 100 used 140 as the answer to this calculation and so spoiled their work. Some otherwise excellent calculations were spoilt by lack of a final concluding statement.

Question 16

The fact that the sides of the original kite sloped on the grid caused most difficulties. Some candidates drew diagonals of the kite along the actual grid lines and this helped them count the squares more easily and complete the enlargement correctly. A few used a centre of enlargement or overlapped the enlargement with the original kite; both these methods helped ensure accuracy.

Question 17

Successful candidates had usually shown correct conversions to either decimals or percentages. Particularly where conversions were all given to the same degree of accuracy, typically 3 decimal places for decimals, the correct ordering nearly always followed. There were, however, many incorrect conversions seen with 0.606 and $\frac{2}{3}$ causing most difficulties. A common misconception was that 0.6 is greater than 0.606

Question 18

In part (a) the correct method was occasionally followed by incorrect evaluation but most incorrect answers were due to use of an incorrect operation, typically 30 ÷ 4. This sometimes followed an incorrect formula triangle diagram. Where students use such diagrams they need to ensure that they memorise the correct positions for the component parts.

Part (b) was a starred question where candidates needed to follow their correct working with a conclusion showing correct units miles or km as appropriate. Many struggled with the arithmetic in this question and made slips with long lists of repeated additions instead of using more efficient methods. A lack of knowledge of the relative size of kilometres and miles was evident and meant candidates were not able to spot arithmetic errors after unexpected answers.

Question 19

Incorrect answers in part (a) gave 3.5 from 7 ÷ 2 or 5 or −5 from a subtraction of 7 and 2.

Although this question was presented as an equation, many candidates did not use a formal algebraic approach but instead applied inverse operations. Some who did so then checked their answer by substitution and others used trial and improvement as an initial method. In both these cases, the final answer was frequently not given but left embedded in the working.

Students need to recognise that solving an equation means the value of the unknown needs to be explicitly given, even when, as here, there is not the g = reminder on the answer line.

Question 20

Some candidates gave either a questionnaire or an attempt at a bar chart or similar to display the data. Those who did give a data collection sheet usually gave months but many expected individual names to be collected along with months of birth. Some gave just one of either a tally or a frequency or included frequency and total not realising that they were the same. Students need to think about whether a data collection sheet is actually fit for purpose.

Question 21

Where an equilateral triangle was attempted, it was often drawn accurately using either compasses or, more often, ruler and protractor. Some blank responses suggested a lack of equipment and a few attempted isosceles triangles with one or two 5 cm sides.

Question 22

Arithmetic errors for both 6 × 12 and 72 ÷ 2 caused most errors in part (a) where candidates appeared confident using a familiar formula.

Use of the inverse formula caused more difficulties in part (b) with failure to multiply by 2 leading to many answers of 5. Some did not present their final answer but left it embedded in the formula in the working.

In both parts there was evidence that the need for a 2 stage process was beyond the weaker candidates who stopped working after attempting just one calulation.

Question 23

Errors in part (a) involved transposing the x and y parts of the vector or moving the shape to a position where one vertex was at (−3, 2). Others used the vector incorrectly to move the top right (5,3) vertex to (0, 6), the position that top left (3,4) vertex should have after translation.

Incorrect mathematical language and lack of detail spoiled many descriptions in part (b) with “turn” often given instead of rotation and errors or omissions with the direction or centre. Students need to be clear about which of the 2 diagrams is being rotated to prevent errors with direction. All marks were lost when a candidate introduced a second transformation, usually a translation.

Question 24

In this question, good organisation in a candidate's working often appeared to enable accuracy. There were some unfortunate slips with area calculations including some where calculated areas overlapped. Weaker students need to be clear about whether area or perimeter needs to be used in a particular context.

Arithmetic errors were common when dividing to find the total cans needed or deducting a 30% figure from £19. Students need to be aware that when build up methods are used to find a percentage, the full method needs to shown otherwise no marks are awarded if the final answer is incorrect.

A few perfectly correct numerical answers did not get full marks as they were accompanied by an incorrect final decision. Students need to be encouraged to consider whether a final figure is reasonable in the context of the question and thus highlight possible errors in their working.

Question 25

Many candidates gave overlapping response boxes as issue in Question 1 for part (a) but some did not appreciate that this was only a problem for age 25 but instead referred to only ages 15 and 40 where there was no actual overlap. The vague response boxes, lack of time frame and lack of option for no exercise were all identified as reasons for Question 2.

In part (b), candidates needed to take care to note the detail that the question was to be about time and not frequency, with questions about how often exercise is done not worthy of full marks. Response boxes were generally good although a few candidates who had criticised overlapping boxes in part (a) went on to show them in their own part (b) question. Others replicated the vague response boxes or omitted a time frame or units.

Question 26

The lack of coordinate axes did appear to trouble many candidates with many blank answers seen. Those who did draw axes and make an attempt at the question often lost a mark through omission of x or y labels or O marked on their grid.

Use of a table of values often preceded correct work but errors when dealing with negative values of x were common. Students could be encouraged to plot coordinates for positive values of x and then extend their line to check all calculated values.

Question 27

There were many correct solutions to this question but, once again, arithmetic errors spoiled much work, particularly where lists of multiples were attempted.

Some candidates who reached the correct 3 and 5 in part (i) doubled the common multiple they had used and gave 120 instead of 60 in part (ii).

Question 28

Fully correct algebraic solutions were rare and where sometimes attempted with an assumption that the question would involve a perimeter or even angle total equation.

Some candidates set up a correct equation and found $x = 6$ from incorrect algebra so failed to gain maximum marks. Many candidates used trial and improvement to find $x = 6$ and proceeded to gain full marks following correct substitution in individual side lengths that were then added

Grade Boundaries

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