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Examiners’ Report/ Principal Examiner Feedback

Summer 2016

Pearson Edexcel International GCSE in Mathematics A (4MA0) Paper 1F

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While many correct responses were seen throughout the paper, there were a significant number of blank responses to questions particularly towards the end of the paper. Of the early questions, the responses to questions 5a and 5b were particularly disappointing, clearly showing that many did not know the appropriate metric conversions needed.

1 When asked to write a given number in words, students should be reminded to write **all** digits as words.

Part (b) was not answered as well as would be expected. It was not unusual to see students get the correct answer in (a) but then round the number in (b) to the nearest hundred, thus 3700 and even 3800 were common incorrect answers.

Given that students are allowed to use a calculator in this paper, there were a surprising number of errors from subtraction seen in part (c). Additionally, some decided to employ the wrong method and so added the given numbers.

In part (d) many of those who failed to gain full marks were able to gain one mark for a correct fraction left unsimplified. $24 \div 4 = 6$ was a regularly seen error, as was 4/20.

In part (e) there were many fully correct responses from working out 1/8 of 48 and then subtracting 6 from 48 to give the number of seats that were **not** empty, while at least as many responses gave the number of empty seats as their final answer, which gained one mark. Stating that 7/8 of the seats were not empty was insufficient to gain credit. Subtracting 1/8 from 48 and dividing 48 by 1/8 appeared often enough to be noted.

2 Part (a) was well done with only occasional wrong answers seen, the most common of which was 28.

In part (b) many students were able to interpret the pictogram correctly as showing 21 emails on Thursday and then add 10 to give 31; this gained them 2 marks. 1 mark was awarded if they concluded the number was 22 and went on to add 10, or if the correct value of 21 was given without the addition of 10.

Part (c) was well done.

3 Part (a) saw many full mark answers for an accurate length given with appropriate units. Almost as many students were able to gain 1 mark either for giving the unit of measure as centimetres alongside a slightly inaccurate length or for a correct length with units omitted.

In (b) most students were able to mark a pair of parallel lines, although some failed to gain the mark by indicating two different pairs but using the same symbol on all the lines.

The trapezium in part (c) was correctly named by many; rhombus was the most common incorrect name and there was also a noticeable number of blank responses.

Most students were able to label an obtuse angle in part (d), although complete misunderstanding saw some students place a label in the centre of a shape or half-way along a line.

4 This was generally a well answered question, with a high number of students able to list all the factors of 40 for 2 marks or at least three factors for 1 mark. One misinterpretation of the question that appeared was that the product of prime factors of 40 was being asked for. Common omissions were 1 and/or 40.

5 Performance in both (a) and (b) was disappointing; conversion of metric units is a weakness. While many students were readily able to score all 3 marks in part (c), others struggled to interpret this question. Converting 5 litres to 5000ml as a starting point often gained them the first method mark but, if they then subtracted only 750ml instead of the 6 x 750ml of water needed to fill the 6 bottles given in the question, they gained no further credit. Other misunderstandings and thus inappropriate working were varied and fairly frequently seen.

6 Success was varied in all three parts in (a) but more correct answers were seen in (iii) than in the other two parts. In (b), asked why someone giving a probability answer of 1.2 must be wrong, a fair number of students were able to articulate in some way that 1 is the maximum value for a probability. A few wrongly suggested that probabilities could not be given as a decimal. The context of this question, involving the probability of rain, sent many students into varying descriptions about the unpredictability of rain, often also telling us their 'correct' answer of 50/50.

The concept of listing combinations for two events, part (ci), is well understood by a good number of students, who systematically wrote the eight possible combinations and gained 2 marks. A less organised approach often gave all or most of the correct eight, in amongst repeats and incorrect combinations, for the award of 1 mark. Other responses simply listed the six colours or expressed what was in the question in their own words. Pairing were sometimes difficult to distinguish.

Asking for the probability of taking a red counter and a green counter in part (ii) allowed a significant number of those who had given the correct eight combinations the chance to gain a further mark with an answer of 1/8. A follow-through mark was available here from an incorrect but appropriate response in part (i), but this was applied very rarely. The most common answer seen in (ii) was 2/6, either from wrongly adding ¼ + ½ or from thinking of red and green as being two colours out of six colours.

7 Part (a) was reasonably well done although a number of students just shaded 7 squares. Whilst many correct answers were seen in (b) there were a number of variations of the incorrect answer using the digits 2 and 3 from the decimal in the question, for example, 2.3 and $\frac{2}{3}$. In part (c), 0.6 was a very common wrong answer. Part (d) was generally correct although 7 was occasionally seen as an

incorrect answer. Calculating 14% of 350 in part (e) was a straightforward question for a majority, for 2 marks. Given that this is a calculator paper, a surprisingly high number of students attempted to work this out by finding 10% and then breaking this down further to try to find 4%; such methods were often not quite complete and so could not gain the method mark. 350 ÷ 14 and 14 ÷ 350 occurred very regularly.

8 The common incorrect answer in part (a) was 16 from those students who used the wrong inverse operation of subtraction rather than division. In part (b) the most common incorrect answer was 24 from those who added 9 to 15 rather than subtracting 9 from 15.

While many students were able to collect like terms in part (c) to give the correct answer of $3m + 11p$, a significant number found the directed number aspect to the question more problematic. So answers including $7m$, $3p$ and $-11p$ were common. Sight of either $3m$ or $11p$ could gain one mark but responses such as $7m + 3p$ did not. One mark was also often lost when students arrived at $3m + 11p$ but tried to 'simplify' further to give final answers such as $14mp$.

Expressing a total in terms of x and y proved a familiar and straightforward question for many in part (d) and the correct answer of $4x + 10y$ was seen regularly. However, responses such as x=4 and y=10 or $x + y$ or a numerical answer, usually 14, appeared equally often. As in 8c, a mark was often lost when further working led to an incorrect final answer such as $14xy$. Blank responses were noted.

Part (e) showed that many students understood the idea of substituting numbers into an algebraic expression and evaluating it but the majority failed to grasp the implication of 'a' being negative for finding the value of a^2. Thus they did not include brackets round -5 when writing out their substitution, arrived at −62 as an answer and lost both the method and the accuracy mark. A few ignored the need to multiply and simply added or subtracted the substituted values. Other answers incorporated in various ways the 'a' and 'c' from the given expression. However, a handful of fully correct answers of 38 was seen.

9 Part (a) was reasonably well done. In part (b) the trapezium was identified by most students as having no lines of symmetry but the rhombus was frequently selected instead of the parallelogram. In part (c) the rectangle was more often identified correctly than the rhombus.

Almost all students were able to reflect the shape in part (d) in the mirror line to gain the mark. Inaccurate drawings, translations, rotations and blank responses occurred but were very rare.

A clear majority correctly added the given angles of the quadrilateral in part (e) and subtracted this total from 360° to give 114° and gained two marks. Very occasionally, subtraction was from 180° or 380°, denying students both the method and the accuracy mark. Seemingly random answers with no working also made an appearance.

10 Part (b) was correct more frequently than part (a). While a good number of correctly completed graphs were seen in part (ci), difficulties with linking the scale with the required times caused some students to draw one or both their lines wrongly. Where one mark was awarded, it was more usually for the time spent at the lake. Graphs that showed travel away from the lake or going back in time appeared, as did a noticeable number of blank responses.

Correct answers were rare in part (ii), where the method for working out speed was not understood by many and much confused working was in evidence. Where 1¼ hours had been wrongly converted to a decimal as 1.15, one mark could be awarded for dividing 27(km) by 1.15. Some students attempted to work in minutes but almost all of these failed to gain the method mark as they did not realise the need to multiply by 60.

11 The full range of marks from 8 to 0 was awarded for this statistics question. Stating the mode in part (a) was the most well done of the four parts but there was still a significant number of students who seemed either to guess or to give one of the other averages. 5 was the most popular wrong answer, this being the value that occurred most in the numbers in the frequency column and 12 was a common error.

In (b), where the median was required, the most common (and wrong) answer was 3.5, this being the median of the values in the 'Number of visits to the gym' column. Finding the median of the frequency values was another often seen incorrect approach. While the right answer was given by a fair number, any working for this was not often seen.

Part (c) produced the usual range of responses. Correctly finding the sum of the products (118) and dividing by 40 to give 2.95 for the mean was a straightforward question for some, who gained all 3 marks. The award of 1 mark occurred regularly, for students who found 118 but divided by something other than 40, mostly 28 from the sum of the 'Number of visits to the gym' column or by 8, from the 8 rows in the table. Unfortunately, the most common method seen was $40 \div 8$

In part (d), giving the correct probability (3/40) of one of the adults making more than 5 visits to the gym was done both by students who had succeeded with the earlier parts and those who had gained no marks to this point, but this correct response was rare. An answer of 8/40, being the probability of 5 or more visits, rewarded a few students with 1 mark. Other answers coming from muddled working were also seen.

12 The answer to part (a) was frequently a set of numbers. Those who gave a word often wrote 'factors' or 'prime factors' rather than the correct 'multiples'. In (b), (i) was answered correctly more often than (ii).

In (c), explaining why A intersection B is a null set produced many correct answers, some with responses about the two sets having no members in common and others stating that all the numbers in set A are even and all the numbers in set B are odd. Beyond this, there were many muddled, ambiguous and wrong statements and numerous blanks whilst some did not recognise the empty set symbol.

13 Given the quantities of ingredients needed for 12 muffins, many students could readily work with this information to find in part (a) the quantity of sugar needed for 60 muffins. Multiplying the original quantity for 12 muffins by 60 was an error seen regularly. A variety of approaches was used in part (b) to find how many muffins could be made using 625ml of milk; as well as formal multiplication and division, many 'built up' their answer in multiples of 250ml milk from the original recipe and were usually successful, although some were unsure what to do with the final 125ml. Much muddled working was also seen, invariably leading to no marks.

14 For some students, drawing the straight line graph of $y = 3x - 5$ was a well-practised skill and they were rewarded with 4 marks. A handful gained 3 marks for a partially correct line or for plotting the points correctly but not joining them; the award of 2 marks or 1 mark was equally rare. Far more frequent was the plotting of a few incorrect points, often incorporating some or all of 3, –5, –2 and 3 (numbers taken from the equation and from the range of x values asked for in the question). Additionally, there were many blank responses.

15 Showing that the addition of two given fractions was correct gained some students two straightforward marks; 9/30 + 4/30 = 13/30 or 45/150 + 20/150 = 65/150 = 13/30 were the most common versions. With the latter, responses without the 65/150 as an interim step could be credited with only 1 mark. There was a large number of students who did not attempt this question and others who appeared simply to manipulate the numbers at random. Adding the numerator and denominator of the first fraction (3/10) to give 13 and multiplying the numerator and denominator of the second fraction (2/15) to give 30 was a creative but obviously flawed approach to justify an answer of 13/30 but was seen noticeably. The use of decimals did not gain any marks.

For many, the multiplication of two fractions proved just as much of a mystery as the addition in part (a). While clear and fully correct solutions were produced, so was a great deal of confused and nonsensical working. Where marks could be gained, the final mark was often lost due to the lack of writing down an interim stage. A fair number of responses indicated that students knew that something had to be 'changed' and something 'flipped' but such steps were often misapplied. Again, a high number of blanks appeared.

16 The concept of factorising was not well understood; common incorrect answers in part (a) were $5y^2$ and $5y^3$. In part (b) expanding two brackets and simplifying the terms provided the opportunity for some to gain 2 marks. A further number showed some understanding and were able to give three or four correct terms; often it was the directed number aspect that caused errors.

Appreciating the meaning of an inequality was an issue in part (ci), with many, who could find the value of k, losing one mark for failing to present their answer with an inequality sign. The link between the two parts of this question passed many by, with even students who had a correct answer in (i) sometimes starting again or giving an answer that did not relate to their previous working. Conversely, some who had not gained marks in part (i) gave a correct answer in (ii).

17 Finding the length of a side of a triangle using trigonometry was accessible only to the stronger of the students at this tier. Succinct and accurate responses incorporating sine 53° were produced by them and they were rewarded with 3 marks. A few used cosine and so found the length of AC instead of AB. Many other responses did include working but this simply showed creative but flawed links between 13.4cm and 53° or attempts at applying Pythagoras' theorem. Answers of around 6.3cm presumably came from measuring the line. A fair number did not attempt this question.

18 It was encouraging to see some success with this multi-step question, which combined problem solving with sharing a quantity in given ratios and with percentages, and there were those who gained all 5 marks. Others were able to progress part way, but failed to deal with the percentage demand; such students usually scored 3 marks. Correctly finding one of the amounts received when the money was shared provided some with 1 mark and finding 3/5 of one of these amounts a further mark. Again, there was a significant amount of often convoluted working that made little sense mathematically; amongst this were attempts to divide the total amount of money by each separate ratio number. There was evidence that some students did not read through the question carefully enough.

19 Where full marks were not scored, it was usually just 1 mark that was gained; this was for showing the method to find the area of the rectangle or of the circle, more often the rectangle. A very high number were unable to do this as they worked out the perimeter of the rectangle or the circumference of the circle.

Summary

Based on their performance in this paper, students should:

- learn all conversions between metric units
- take care with very simple arithmetic and check answers
- make sure your calculator is in degree mode before the examination
- use the correct formula for the area and circumference of a circle; these are currently on the formula sheet
- ensure that brackets are used around negative numbers when using a calculator, for example, entering $(-5)^2$

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