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Examiners' Report/ Principal Examiner Feedback

Summer 2016

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

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Introduction

The paper was fairly typical of those in previous years with a good number of more straightforward questions at the beginning of the paper and more challenging lengthier questions at the end.

The more able students made a good effort on all questions and it was good to see relatively few blank responses.

There was evidence of students not taking time to correctly read questions and giving responses typical of similar questions that we have had in the past.

Some showed a lack of knowledge of basic mathematical terminology, such as names of parts of the circle and faces, edges and vertices of solid shapes.

It was good to see some sound algebraic working on the equations found in this paper.

Report on Individual Questions

Question 1

(a) All but a small handful of students were able to write down the number of laptops sold in Week 1.

(bc) The majority of students gained 1 mark for the correct number of symbols drawn in the pictogram. For part (c) the correct sum was frequently given, generally without working – for those who gave an incorrect answer, M1 was available for the sum of 4 numbers, 3 of which had to be correct. Students should be persuaded to show working on such a question. The answer of 32 was a frequent incorrect solution, probably linked to the 4 computer symbols drawn for week 4 or for 4 weeks.

Question 2

(a) The vast majority of students were able to correctly write the number in words.

(b) the correct answer of 70 or 7 tens or tens was given by the majority of students; a small number gave ‘tenths’ as an incorrect answer.

(c) The correct answer of 240 was given by most students, but a few rounded the number to the nearest 100 rather than the nearest 10.

(d) Most students realised they needed to subtract the distance from London to Moscow from the distance from London to New York; when the answer was incorrect it was generally because the student had added the distances.

(e) Most students were able to change 4 hours 40 minutes to minutes; those that were incorrect, generally thought there were 100 minutes in an hour.

(f) The majority of students were able to add on a time of 6 hours 20 minutes to 0250; a few gave an answer 1 hour more or 1 hour less than the answer.

Question 3

Students clearly find the terminology linked to the circle difficult to remember. Although we saw a number of correct responses, some of the answers instead of 'diameter' were obtuse, hypotenuse, circumference and congruent. A range of responses where the answer was 'chord' were segment, tangent and circumference. It was pleasing to see a good number of correct responses for the type of angle, i.e. acute.

Question 4

(a)(i) Although the correct answer of metres was frequently given, we saw a fair number of centimetres and kilometres.

(a)(ii) the correct answer of millilitres was frequently seen but we also saw litres, kilograms and centilitres.

(b) The majority of student realised the need to multiply by 1000 to change kilograms into grams. A few incorrectly multiplied by 10 or 100.

Question 5

(a) We saw many correctly ordered decimals, and those incorrect often started with 0.06 thinking it was smaller than 0.043.

(b) Many correctly recognised the value of the 4 as tenths, but a few thought the value was 4 units or hundredths.

(c) We had many correct responses for value midway between 2.24 and 2.25. The most common incorrect answer was 2.24.5, an answer with two decimal points.

(d)(i) Virtually every student was able to write down the smallest number that could be made with the four cards.

(d)(ii) The students found it slightly harder to write down the largest even number and many misread the question and after writing the smallest number, merely wrote the largest number that could be formed. Students must be reminded to read the question carefully and not assume they know what it will say.

Question 6

(a) We saw many completely correct responses; some students gave the unrounded fraction 6/15 and were able to benefit from a method mark. Incorrect answers were few, but those who were wrong often gave the fraction unshaded or wrote their answer as a decimal.

(b) A fair number of students were able to correctly change 7/25 to a percentage but 7% was common and also 0.28.

(c) Almost all students were able to correctly convert 3/20 to a decimal but those that could not often gave 0.3 for the answer.

(d) All but a small handful of students were able to gain the correct answer for this part.

(e) We saw many correct answers for the number to make the calculation correct. We saw a number of 70.5 and 7.5 where one wonders if the student misread the answer from their calculator.

Question 7

(a) Almost all students were able to continue the sequence and write down the next two terms.

(b) Many student were able to correctly explain how they found their terms, giving answers such as 'add 4', plus 4', 'increase by 4'; all of which were satisfactory. Those that were unable to explain often tried to give long winded reasoning that never said that they added on 4, e.g. I subtracted 18 from 22 and found the difference was 4. It should be noted that stating 'the difference is 4' is insufficient as it does not explain whether the terms are increasing or decreasing.

(c) We saw a good number of correct responses for the 20^{th} term of the sequence, some found this by continuing the sequence and some used the formula for the nth term. Some students found the 19^{th} or 21^{st} term and were able to pick up a method mark for this or showing a sound method that should have given the correct answer.

Question 8

In parts (a) and (b) many students were able to give the number of edges and faces correctly but it is clear that some students get confused by the terminology and gave incorrect answers that were usually the number of edges, faces or vertices but for the incorrect term.

In part (c) it was very common to have the incorrect answer of 4800 where students had found the volume of a cuboid, failing to divide by 2. A few students simply added the lengths of the edges.

Question 9

Students generally performed well on this question, but the reason was done poorly. We were looking for key words of 'angles' 'straight line' and '180' but many told us that the angles = 180 or just showed us the calculation they did to gain angle *y*. It is important that students learn the key words that are required and the word 'angle' or 'angles' is the most commonly missed. Part (c), the third angle in a triangle was probably done best of all.

Question 10

Many students showed they were confused with the terms range and median and often got them mixed up with the total, or the mean. Even if they knew the terminology, they were confused with the numbers they should use to find the range of pets and many used the range of the frequencies, 10 – 1 = 9. Some students added 10 + 1 and gave the popular incorrect answer of 11. For part (b) incorrect answers of the median of 1, 2, 3, 4, 5 ie 3 or the median of the frequencies 1, 2, 4, 8, 10 ie 4 were frequently seen rather than finding the number of pets owned by the middle person. Several students also calculated the mean.

Question 11

(a) We saw a good number of fully correct responses and there were many students who were able to gain one mark for one correct term. It was evident that many students did not understand which term the negative sign was linked to.

(b) We saw many correct responses with common mistakes being to forget to multiply 2y by −7 or to think that $2y \times 3y$ is $5y^2$.

Question 12

Students generally performed very well on parts (a) and (b), by using the number machine correctly. When asked to find an expression in terms of x, students often struggled and there were many blank responses. Some students worked in reverse as if they were finding an expression for the input and some subtracted 5 before dividing by 3. It was also common to write the answer as an equation, eg output = $\frac{x}{3} - 5$ or y = $\frac{x}{3}$ − 5 which was condoned but x = $\frac{x}{3} - 5$ was only awarded one mark.

Question 13

This question was very well attempted with the majority of students knowing which numbers were the square number and the multiple of 7.

Question 14

(a) Most students were able to find the value of 2^5 the most common mistake was to believe the answer was 2×5.

(b) Students were less sure of the cube root of 64, with 8 being a common incorrect answer. Students should avoid giving the answer 4^3 for such a question.

Question 15

(a) Many students were able to give a fully correct answer to the substitution; a few left p and q in their answers and some did an addition or subtraction sum thinking that $2p$ meant $2 -5$ rather than 2×-5. Some students were able to benefit from a method mark for showing a fully correct substitution.

(b) this question was done well by the majority of students who generally showed a full algebraic method. Those not gaining full marks often gained 1 mark for a correct first stage – usually correct expansion of the bracket. Those who gained 0 marks were generally the ones who did not expand the bracket correctly and so used $5x – 4 = 14$.

Question 16

(a)(i) & (ii) This part of the question was fairly well done, with the majority understanding what was required. It must be noted that ratio is not a form we accept for probability and that words such as 'likely' and 'unlikely' alone will not gain any marks for a question with clear numbers of items, in this case marbles in a bag. When words are required, the student would be asked for a word that correctly describes the probability, rather than being asked 'what is the probability....'

(b) The students were asked for an estimate for the number of brown marbles taken and it is important for the students to realise this is not asking for a probability as an answer. If the answer of 210/300 was given instead of 210, only 1 mark was awarded. Students did fairly well on this questions, but a few confused it with finding a percentage and divided by 100 rather than 50.

Question 17

(a) A good number of students were able to get the correct answer for this ratio questions but there were a number that left the answer blank and some incorrectly thought the answer was 210 gained from multiplying Rafael's share (7) by the number of times they played each other (30). A small number gave the number of times Roger, rather than Rafael had won.

(b) A pleasing number of students gave the correct answer of 100, but it was also very common for 75 to be divided by 7 (4 + 3) rather than realising that 75 girls amounted to 3 shares. Students who used this incorrect method got a fractional amount of boys

which they rounded, but must be reminded that if we are talking about people in a ratio, they have made an error if the answer is not a whole number.

Question 18

(a) Although the correct answer of 0 or 0% was given by a good number of students, a few gave decimals such as 0.01 or fractions such as 1/7. It must be noted on questions such as this that if we are asking for a probability then words such as 'impossible' or 'never' will not gain any marks; we saw a fair few of these.

(b) Many students were able to get the correct answer of 0.35. Mistakes were made when adding the given probabilities and if they added the percentage equivalent to the decimals then e.g. 15 instead of 0.15 they made a mistake by adding 1 for 0.1 and 2 for 0.2. Again, words such as 'unlikely' gained no credit.

Question 19

(a)This question was very well done by the students taking this paper. Some were only able to gain 1 mark for finding 8% of £28 and omitting to subtract £2.24 from £28; they had forgotten or not realised the need to find the sale price of the jacket. A few rounded their final answer to 25.8 and were unable to gain the final accuracy mark for the correct sum of 25.76. However on the whole it was pleasing to see the number of good attempts at the question.

(b) When students are given the amount by which the item is decreased by, they generally find it more difficult than having to find a percentage of an amount. This was generally the case here and it was evident that many students struggled to understand the calculation that was required. A few were able to pick up a mark for realising that £3 was equivalent to 8% (8% = £3 or equivalent was awarded a method mark).

Question 20

Full marks on this question were only gained by a very small number of students at this level and there were a large number of blank responses. The inequality with 'three' parts seemed to be something that the majority had no idea how to solve. Some students worked with just the right hand side of the inequality and gained a mark for $3x \leq 6$, ie one end of the inequality correct for $3x$, or 2 marks for $x \leq 2$, ie one end completely correct for x. Some students who appeared to have no idea how to solve the inequality in part (a), were able to give the integer values of x that would satisfy the inequality for part (b). A few students showed that they thought integer values could only be positive.

Question 21

Some students were not sure what was required here, some just writing a list of factors of 792 and some showing a list of products of 2 numbers that came to 792. Those who knew what to do were generally able to gain at least 2 marks for completing a factor tree

or factor ‘ladder’. Some did not realise the need to write the primes as a product with dots or multiplication signs between the numbers. It must be noted that because it is possible to use the calculator to give any number as a product of prime factors, we asked the students to ‘Show your working clearly’. Without clear working, a correct answer gained no marks; the number of students who did this was few, but nonetheless significant.

Question 22

(a) Most students were able to gain some marks on this question, but full marks were rare. Many students forgot the name ‘translation’ but were often able to tell us that the shape moved 5 to the right and 4 down. Many also were able to give the correct vector; it must be noted that a full description or vector gained the mark for the description of the translation, but we did not condone coordinates (5, -4). Some students thought that a reflection or rotation had taken place and some even said there had been no transformation.

(b) There were some correct responses, but many students gained just 1 mark for a shape of the correct orientation in an incorrect place on the grid, i.e. a 90° clockwise rotation, but about a point other than (1, 0); one mark could also be gained for an anticlockwise rotation of 90° about the correct point and some students benefitted from this mark.

Question 23

For a question targeting the top grade for the paper, it was done quite well. The most common mistake made by students knowing about Pythagoras’ theorem, was to square and add the 2 given sides rather than squaring and subtracting them. Students who did not recognise this as a Pythagoras’ theorem question, found the area, added the sides or various other incorrect calculations.

Question 24

Many students showed that they did not understand what was meant by an exterior angle of an 8 sided polygon, with only a minority achieving full marks on this question. Some multiplied 180 by 8 and some divided 180 by 8. Some used totals of angles in a polygon such as 720 and divided by 8. The most popular incorrect answer was the interior angle of an 8 sided polygon which gained no marks as it showed a lack of understanding of what was required.

Question 25

This question was fairly well attempted, given its position at the end of the paper. There were some students who were used to this format of question, but more used to finding the mean, which they continued to do after finding the total number of exercise sessions – these students gained 2 marks, forfeiting the final accuracy mark. A few students multiplied each frequency by 6, the width of each interval and some multiplied by the

top end of the interval. It was also common to find students adding together the frequencies or cumulative frequencies to find what they thought was the total. Students need to be reminded what they are finding in terms of the total or the mean.

Summary

Based on their performance on this paper, students are offered the following advice. They should:

- Know the meaning of ‘integer’
- Be fully aware when it is appropriate to use words such as ‘likely’ and ‘certain’ for probability and when numerical values should be given;
- For angle questions, write values you know or have found in the appropriate place in the diagram
- Read questions carefully and do not assume it is like one you have done before
- Show careful working
- Take care when transferring values from your calculator to the page

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