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Principal Examiner Feedback

Summer 2015

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

Pearson Edexcel Certificate
Mathematics (KMA0)
Paper 1F

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Introduction

All the questions could be answered by some of the students taking this paper but there were a disappointing number of blank responses across the questions.

It is worth noting that a significant number of students tend to round values prematurely, sometimes at every step of their calculations, and all too often the accuracy mark is lost as a result. Lack of working continues to penalise students, who often get close to the required answer, but not quite close enough for the accuracy mark, and without working they then lose all the marks for that question, sometimes as many as 5 marks.

There is also occasional evidence of lengthy computational processes being used, for example to find a percentage, suggesting that some students may be working without a calculator.

A final general observation is that in many cases it seems unlikely that students give consideration to the practical sense of their answers, in questions where the context relates to the 'real-world'.

Report on individual questions

Question 1

It was rare to see an incorrect answer to part (a) or part (c). 530 and 98 were common incorrect answers in part (b), possibly because they started rather than ended with an odd number although it was rare to see 384 given as the answer.

In part (d) all but a handful of students gained the mark for their answer to this straightforward subtraction, although a very small number added the two values. Had they mis-ordered the numbers in part (a), then the mark was available for them in (d) if they found the difference between their highest and lowest values.

Question 2

Parts (ii) and (iii) were generally correct. In part (i) the most common answer was the incorrect response of 'unlikely' rather than the correct 'evens'.

Question 3

Part (a) was well done; when the answer given was incorrect it was frequently either 4900 or 4700. Part (b) was also well answered.

Question 4

'Radius' was the most common answer in (a), but a whole host of other words were seen such as fraction, obtuse, area, diameter etc. The selection of words offered was even wider in part (b) but the correct answer of 'sector' was rarely seen. While many students gained either 2 marks for 1/6 or 1 mark for 60/360 or a partially simplified fraction, a surprisingly high number used 60/100, which they sometimes, but not always, simplified. 60/180 was seen, alongside a range of other seemingly random fractions. The occasional decimal or percentage made an appearance. There were more blank responses than might have been expected.

Question 5
Part (a) was well done, very occasionally (1, 5) rather than (5, 1) was given for the coordinates of *B*. It was clear that some students were using a ruler graduated in inches to measure the line in part (b). Similarly, some gave an answer of 5.7 mm rather than the correct 57 mm.

In part (c), the correct answer of $8cm^2$ for the area of the triangle was seen regularly, achieved either from counting squares or from using the formula. Counting methods also produced answers other than 8. Some students clearly attempted to find the perimeter rather than the area. Many students could correctly plot point D at (1, 4). Placing D at (1, 3), (1, 5) or (3, 3) were the most commonly seen incorrect answers. Blank responses were seen quite regularly.

Question 6
Part (a) was invariably answered correctly. Part (b) was also well answered although there were a few more incorrect answers than in part (a). Unsurprisingly, part (c) proved more challenging than (a) or (b). It was clear that some students used 140 as the input rather than the output, as an answer of 720 was frequently seen. While a pleasing number of students could give a fully correct algebraic formula for y in terms of x, there were also a noticeable number of blank responses. Where full marks were not gained, often 1 mark could be given for $5x + 20$. For some, however, the concept was unfamiliar and a variety of miscellaneous algebraic terms occurred, together with numerical answers and responses that simply repeated the flow diagram.

Question 7
A reasonable number of students found this to be a straightforward question and gave clear working with correct answers to gain 5 marks. However, a significant number found the question rather challenging, linking the numbers given in the question in ways that showed little understanding. Between these extremes were students who started well with the correct multiplication but failed to give an integer number of notes or rounded down to 8 instead of up to 9 or simply gave the original product as their answer.

Many who were successful in part (a) went on to gain marks in part (b). Of the rest, many were still able to pick up at least a method mark and sometimes the accuracy mark as well, provided that they had an integer value in (a) and that the amount of change they received was not negative. Premature rounding was seen too often and frequently resulted in the loss of the accuracy mark. There were blank responses, more in part (b) than part (a).

Question 8
It was rare to see an incorrect answer in part (a). Part (b) was nearly as well done but 1 and 3 were occasionally seen as incorrect answers. Finding the total number of students in Year 11 in part (c) was correctly answered by almost all students. A few benefitted from the award of a method mark if they had misread a value from the graph but showed that they had added the values.

In part (d) it was more common to see an incorrect answer than the correct answer of 40% (40% being the number of students (26) in class 11A as a percentage of the total number of students in the year (65)). Incorrect responses of 26% (simply the number of 11A students) occurred the most often, with 39% (65 – 26) and 16.9% (26% of 65) also appearing frequently.

Question 9
While many students could draw the next shape in a sequence of patterns, surprisingly large numbers made errors in producing pattern number 4. The most common of these was in placing one or more diagonals in the wrong direction or drawing four separate ‘boxes’. Parts (b) and (c) were very well done. Students had some difficulty in interpreting the demand of part (d) correctly with some giving the total number of sticks rather than the total number of short sticks. Success was very varied in the final part of the question.

Question 10
Most students showed that they know some facts about angles and used them to calculate the size of various angles. However, failing to identify which angle, either by notation or by indicating them on the diagram, cost many students the marks, unless they were able to arrive at a fully correct solution, which a pleasing number did. Adding the two angles shown on the diagram and subtracting them from 180^{o} was a false approach taken by a noticeable number of students. Blank responses were not uncommon.

Question 11
Using a formula to work out the cost of hiring a bicycle for 4 days was another question that many students found straightforward and for which they gained full marks. Failing to add the constant was an error that some made, while others ignored the order of operations and wrongly added the number of days to the constant before multiplying.

Part (b) was slightly less well answered than part (a) but there was still a high success rate. Again the order of operations proved a stumbling block for some. Embedded answers were noticeable here, which gave students the method mark only.

Question 12
Substituting numbers into $4x - 5y$ and evaluating it was accessible to the majority of students. The award of 1 mark, either for showing the full substitution or for partial evaluation, benefitted others. 47 – 54 (instead of 4×7 – 5×4) was sometimes used, while others produced an answer of −1 from 4 – 5.

Part (b) proved far more challenging than part (a) and more blank responses were seen. However, there were students who arrived at the correct answer, some with clear algebraic working. Incorrectly substituting 100 for x instead of for w to give 400 and then subtracting 110 (the value for $5y$) led to many answers of 290; 2.5 was also seen regularly, from (110 – 100)/4

Part (c) allowed a good number of students to gain a mark for showing the initial substitution or for getting as far as $24t$ and $10t$. Marks were then often lost when students added rather than subtracted or when t was omitted in the final answer, which correctly was $14t$. Others lost the mark after the initial correct substitution as they tried to link the two terms in t separately to the two numbers. Some students combined the terms in a variety of flawed ways. An increasing number of blank responses was apparent.

Question 13
Some students arrived confidently at the correct answer in part (a), either by calculating 52% of 34 million or by subtracting their found 48% of 34 million from that figure. Others took the latter approach but forgot to subtract, hence losing 2 marks. Some students struggled to cope with the numbers being in millions, often trying to work with the figures written out in full, usually with too many or too few zeros; they were penalised with a maximum of one mark for this error. 48(%) – 34(million) gave rise to a noticeable number of answers of 14 million. Another common answer was 17 million, coming from students who knew that 48% was close to one half, so they simply divided 34 million by 2. A high number of responses had no working and just a seemingly unrelated number on the answer line.

Part (b) was almost invariably done correctly, with any un-simplified version of the fraction or a fully simplified one gaining the mark. 4/8 was the most frequently seen incorrect answer.

Part (c) was generally well answered although the incorrect answer of 4.8 was seen relatively frequently.

Question 14
It is noticeable that there are a number of students who cannot work with time to find how long a journey takes, especially when the start and end times both involved exact quarter hours. Wrong answers, which were very varied, often followed lengthy and muddled working. Some answers were given as a time and therefore only gained one mark.

Part (b) was intended to be more challenging than part (a) but on the whole students coped better with it. A significant number gained full marks by multiplying together the three required values, usually in a 2-step process. Many gained one mark by multiplying together two of the given values.

Question 15
In this ratio question, one mark was available for converting 345 metres to centimetres and one for division by the scale factor of 200. Doing both correctly also gained the accuracy mark. While a good number were thus rewarded with 3 marks, many others scored only one. Some students disregarded the question and took the approach that because it was ratio, it must be 'share the given amount in that ratio'. Some stopped part way through this method and gave 1.7 as their answer; those who multiplied this by 100 gained one mark for conversion of metres to centimetres. Many were unable to interpret the question in any meaningful way; thus multiplication and addition using 345 and 200 were seen regularly, as was 345 × 1.2, with many blank responses.

Question 16
All but the most able students failed to progress far with this question but a few competently gained the two marks. Adding or subtracting with 13 and 33, division of 33 by 3 and division of 13 by 4 were common starting, and often ending, points. A few students realised that the 4 integers had to total 52 but were unable to move beyond this; however, they were rewarded with a method mark.

Even fewer were successful with the demand of part (b), although fully correct answers with working were seen. Where full marks were not scored, one mark was available for calculating the value of w. Other attempts saw 33, 13 and 10 combined in assorted ways and 'think of a number' also seemed to feature for those who clearly did not understand but wished to write something.

Question 17
It was pleasing to see clear working and correct answers occurring regularly. However, while most attempted some working, for many this consisted of using the numbers in the question without seeming to know where they should be heading. For example, a popular wrong approach was to start by finding the difference between the given weights of gold and then using this value in a further calculation.

Full working leading to a correct answer was seen in part (b), with slightly greater success than in part (a). It was quite common to see 7.5 being subtracted from 15 960 as the method for decreasing 15 960 by 7.5%.

Question 18
This was another question where it was disappointing to see so many students unable to arrive at the correct answer. The formula sheet gives the formula for the circumference of a circle but far too many could not apply it correctly or they chose the formula for the area of a circle. Others used $2\pi d$, or $3d$.

In part (b), when 1000 was divided by the circumference found in part (a), whether or not it was correct, a method mark was awarded and if an integer answer was given that was rounded down from a decimal quotient this also scored the accuracy mark. Lots of multiplication was seen here instead of division, sometimes not even using the value found in part (a) but using instead the 1.5 metres of the wheels' diameter. As in part (a), there were many blank responses.

Question 19
Changing £450 to euros was relatively well handled by students. A variety of incorrect approaches were also seen, with a noticeable number of students adding the exchange rate, 1.16, onto £450. A number of students used 1.6 rather than the 1.16 given in the question.

There was also a reasonably good success rate with the subsequent part (b), although premature rounding often caused the loss of the accuracy mark. A common mistake was for students to add £3.50 onto 850 euros and to give this total as their answer, not realising that 850 had first to be converted. Dividing 850 euros by £3.50 also featured.

Question 20
While pie charts are a familiar topic, the two-step element of this question was not obvious to many students, although some produced succinct working and the right answer. The most popular first step was to work out the angle for the services sector, usually correctly, as 86^{o} but frequently students then gave this as their answer for how much was spent, not appreciating that further working was needed. Others struggled with convoluted manipulation of angles and money, with assorted numbers of zeros, but most attempted something rather than leave the response blank.

Question 21
Although many correct responses were seen in part (a), $9k$, $18k$ and k^{18} were the common incorrect answers given. The majority of students felt able to attempt part (b) and the correct answer of $20y^3$ was given regularly. However, $20y^2$ (worth 1 mark) and $9y^2$ (no marks) appeared far more often. $9y^3$ could also gain 1 mark but this was rarely seen.

Question 22
It might be expected that a Pythagoras question would be well answered by most students but incorrect approaches and answers were far more common than the right one. Some did find it straightforward and were readily able to gain full marks. For those who at least had some understanding of Pythagoras' theorem, a common error was for the lengths of the given sides to be squared and added, rather than subtracted, with the loss of all the marks. Others manipulated the numbers in various ways, for example adding the two given sides or multiplying them and sometimes dividing by 2. Some clearly measured the length *AB*. Attempts at trigonometry were usually wrong from the outset and did not lead anywhere towards a solution.

Question 23
Some clear and accurate responses were provided for calculating the volume of this prism, which gained students all 5 marks. However, this was rare, although most students felt able to attempt something, even though this was only adding or multiplying two or more of the given dimensions. For some who understood something of working out a volume, the difficulty started when they failed to appreciate that the height of the trapezium was not half of 20cm, although these students could still potentially progress to gain 3 of the 5 marks. Working out the area of a trapezium was a further issue for many, even though the formula is provided. Part marks could be gained for finding the volume of the cuboid part of the prism or for the trapezoidal part, or for attempts that multiplied a partially correct cross-section area by 80. Working towards finding the surface area of the prism gained no credit.

Question 24

Again, most students made an attempt at this question. Some appreciated what was required and in a few lines of clear working produced a fully correct answer; others were rewarded with 1 mark for progressing as far as the total height of all 32 students. However, the majority adopted what to them was the 'obvious' method of simply adding 151cm and 148 cm and dividing by two, or occasionally by 32.

Summary

Based on their performance on this paper, students should:

- take care with basic arithmetic and ensure that accuracy is retained until the final stage of a question
- ensure that they explicitly name any found angles or mark these on the diagram and link any calculations to angles when answering geometry questions
- ensure that working is shown for all questions
- think carefully about answers to questions in a 'real-world' situation
- when appropriate, use the correct formulae for the area of a trapezium and the circumference of a circle; both are given on the formula sheet
- utilise a calculator to perform operations stated in working

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