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Examiners' Report/
Principal Examiner Feedback

Summer 2014

Pearson Edexcel International GCSE
Mathematics A (4MA0/2F)

Pearson Edexcel Level 1/Level 2
Certificate Mathematics A (KMA0/2F)

Paper 2F

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Principal Examiner's Report
International GCSE Mathematics A
(Paper 4MA0-2F)

Introduction to Paper 2F

Many questions seemed accessible to students at this tier, with fewer non-responses overall than has sometimes been the case.

Most students appreciate the need to show their working. However, the success rate with the Pythagoras question (Question 22) and constructing an angle bisector (Question 21) was disappointing and many students struggled particularly with bounds (Question 16) and drawing a quadratic graph (Question 25). Encouragingly, more students are attempting to show the algebraic working required in certain questions.

Students would be well advised to learn the conversion between common metric units.

Report on Individual Questions

Question 1

Part (a) was well done. However, students found (b) more demanding with 0.3 or 0.05 frequently chosen as the smallest decimal; at the other end of the list 0.3 was a common incorrect choice as the highest decimal number.

Part (c)(i) was well done, with 8514 being the common (although infrequent) incorrect answer. Whilst many correct answers were seen in (c)(ii), 1458 and 5841 were common incorrect answers.

Part (d) was generally answered correctly with either 42 or 48, although 46 was also seen occasionally.

Question 2

The correct answer was almost always seen in part (a) although, very occasionally, the answer was given as 3 when students failed to use the information provided in the key.

Part (b) was easily accessible to almost all students, who were able to give the correct answer of 7. For those who did not, most were able to gain a mark for correctly reading one of the two values, either 13 or 6, from the pictogram.

Part (c) required students to draw $3\frac{3}{4}$ calculators, which the clear majority were able to do.

Question 3
The majority of students were able to correctly define the line *MN* in part (a).

In part (b) virtually every student answered using metric units, with a correct answer of 7.5 cm being the one seen most often, and gaining students two marks. Where they omitted the units, many gained one for the numerical value of their answer. Where the measurement was inaccurate, it was possible to gain one mark for the units, for a limited range of numerical values.

The pyramid was correctly identified more often in (c)(i) than the prism in (c)(ii).

In (d) there was confusion between edges and faces with 5 being a common incorrect answer in (d)(i). However, in (d)(ii) the vast majority of students were able to give the correct answer of 5; a small minority forgot to count in the base and gave an answer of 4

Question 4
Many fully correct solutions were seen, with all 3 marks being awarded. The most common error, made by a significant number of students, was to include the price of only one magazine instead of the two given in the list of items; if this was their only error, they were able to gain 2 of the 3 marks. A handful of students simply added the given prices, with no attempt to calculate the change by subtracting from 20, which gave them the first method mark only.

Question 5
The correct units were frequently supplied in both (a)(i) and (a)(ii), although occasionally an imperial rather than metric unit was given.

Part (a)(iii) proved more demanding with m (or metres) being a common incorrect answer. Some students gave a correct area unit without considering the context; therefore an answer of cm^2 did not gain the mark. Conversion between metric units turned out to be a real weakness with a range of answers seen. In (b) 0.06, 60, 600 were all commonly seen. Surprisingly, the correct answer of 35 was seen more frequently in (c), although there were also more blank responses than in (b).

Question 6
m^5 was a common incorrect answer to (a)(i). There were more correct answers seen to (a)(ii) than to (a)(i).

It was rare to see an incorrect answer to part (b). When this did occur it would be “16” from students who subtracted 8 from 24. There was a similarly high level of success in part (b).

Question 7
Responses to the first two parts of the question clearly showed that students understand the mathematical meaning of the word ‘congruence’ but not ‘similar’.

E was a common incorrect answer to part (b).

Question 8
Incorrect responses were rarely seen in part (a), with most students able to gain both marks for a straightforward substitution and evaluation. From those who were not, the most commonly seen error was to give the value of $2 \times a$, where ‘*a*’ was 5, as 25.

In part (b), an encouraging number of students were able to achieve full marks, with a good number of the rest able to gain one mark for correct substitution. A common error was to replace ‘*a*’ and not ‘*w*’ with 28, as was required by the question, incorrectly repeating the demand of part (a). Numerical methods only were regularly seen, namely 28 - 3 and 28 + 3, for which no marks were available.

Question 9
The correct answer was given to part (a) by the vast majority of students.

Part (b) had a very high success rate and it was rare to see an incorrect answer. A handful of students converted the fraction to a decimal or percentage and then calculated this amount of 224. Provided a “full method” was evident, this approach gained the method mark, but generally lost the accuracy mark due to interim rounding.

In part (c) some students found the square root rather than the cube root.

It was rare to see an incorrect answer to part (d).

Question 10
A good number of students understood all the demands of the question and accurately calculated the profit, gaining them all four marks. Others lost marks for not realising that the amount that the oranges were sold for was not the profit. The concept of 3 oranges for £1 was a challenge too far for some students and lost them marks from this point onwards. While most began by working out the total number of oranges, which gained them the first method mark, others worked on one box, often gaining one mark for how much these 24 oranges sold for, but rarely returning to the fact that there were 5 boxes.

Question 11

A surprising number of students were unable to give the correct fraction in part (a).

In part (b), many were able to use ratio notation with the correct figures from the table and to simplify correctly their ratio. Where there was no simplification, or this was inaccurate, or the final answer was given as a fraction rather than the required ratio, the method mark could be gained for seeing 85 : 120. The most regularly seen incorrect approach was where students had used the gold medal values from the table and not the total values.

Part (c) also provided an opportunity for most students to gain either one or both marks. Fully correct answers of 14 silver medals were common. 14 : 21, without specifying which was silver, or 21, the number of gold medals, appeared regularly and gave students one of the two marks. The first step of dividing 35 by 5 (from 3 + 2) also gave an opportunity to gain one mark. Errors occurred when students wrongly divided 35 either by 2 or by 3, denying them any marks.

While there were many correct responses to part (d), there was also a large number of wrong answers. Dividing 120 in the ratio 7 : 10 was often seen but there were a significant number of more random calculations incorporating the values 7, 10 and 120.

Question 12

The large majority of students were able to interpret the conversion graph correctly and gain both marks in part (a).

Part (b) saw many answers of 50, from 10 × 5, or 49.6 from 8 × 6.2 and 50.4 from 8 × 6.3, all of which gained the 2 marks available. (A range of answers from 49 – 51 was accepted.) A commonly seen incorrect answer was 48, coming from a misreading of the graph or over-approximating the values, which saw students wrongly using 20 kilometres as equivalent to 12 miles.

Question 13

Almost all students were able to gain the two marks here for giving the correct probability using a correct notation. Understanding that the answer was 9 out of 20 but writing this in a form that is not acceptable for probability, or working out that there were 9 yellow counters, or showing that the given probabilities had to be subtracted from 1, gave some students the chance to score one of the two marks.

Question 14

Part (a) saw a good number of correct answers but equally many that gained no marks. A common error was to subtract 40^0 from 55^0 (seen on the pie chart) to give 15^0 and then to add 15^0 to 16 buses to give an answer of 31. Where full marks could not be awarded, showing the method to calculate a relevant ratio was sufficient to achieve the method mark. The most usual of these was 2.5 from 40/16 but often this was followed by multiplying 55 by 2.5 instead of dividing.

Part (b) likewise saw correct and incorrect answers equally often. A frequently seen wrong approach was to use a ratio from part (a), most usually 2.5, and multiply it by 9. Again, the calculation of a relevant ratio gave one method mark.

Question 15

A very high success rate was achieved on this question. There were occasional errors in the addition of the given angles, which led only to the award of the method mark, providing their seen addition total was subtracted from 360^0. Subtraction of the given angles from other than 360^0 or simply the sum of the given angles gained no marks.

Question 16

In part (a), many students were able to successfully calculate the area of a circle. However, it was common to see many errors, most commonly squaring 7.6 but omitting the use of π, multiplying only 7.6 by π, squaring π and calculating the circumference rather than the area.

Part (b) was not understood by a large number of students. Instead of the correct 7.65 and 7.55, 8 and 7 were seen regularly, as were 8.6 and 6.6 or 7.6 and 7.5, plus many other variations. There were a noticeable number of non-responses and seemingly random numbers.

Question 17

Part (a) was accessible to most students. A noticeable number calculated the 15% by working out 10% and 5% and then adding their answers – this working was usually shown in full. There were students who got as far as 40.50 dollars but then failed to subtract this discount from the normal price, denying themselves two marks.

Overall, part (b) was much more challenging, although a number of fully correct responses were seen. Where students did understand and calculated the correct amount of 90 dollars, some went on to add or subtract 13.50 dollars, losing them the accuracy mark for their answer. Starting their working with 100/15 to give 0.6 recurring, and then multiplying this by 13.50 often cost students the accuracy mark, as they over-rounded the 0.6 recurring before multiplying.

Question 18

A very large majority of students were able to give the correct probability of 0.15, while a good number of the rest could gain one mark for subtracting their addition of the given probabilities from 1. It was rare to see incorrect notation. Where values that appeared unrelated to the numbers in the question were given as answers, they were almost always within the limits for a probability answer. A common incorrect answer was 0.25 – coming from the fact that there were four different colours.

Question 19

Many students were able to divide 360^0 by 15 and give the correct answer for the exterior angle as 24^0. However, there seemed to be much confusion between interior and exterior angles for a good number of students, with 156^0 appearing as the final answer, both from 24^0 already found and from (13 x 180)/15. This was awarded one method mark. Finding only the sum of the interior angles and division by 15 of a number other than 360 failed to gain any marks.

Question 20

It was encouraging to see some good, clear responses worthy of full marks. However, using either multiplication or division for both conversions was frequently seen; one correct method or answer allowed for a subsequent mark for the subtraction. Most converted both given amounts to £s but some converted the 126 euros to £s and this amount to \$, subtracting \$165.24 from this value, for two marks. Fewer then realised the need to convert this value back to £. Some students floundered, using the given values in a variety of flawed ways, producing amounts that could not exist in any currency. However, most students did attempt something.

Question 21

This was a straightforward construction question but only a minority were able to cope with it and construct with an understanding of what they were doing. Some knew to draw arcs from B but could not continue to produce the second pair of arcs needed. There was a high number of non-responses and many scripts showed a variety of random arcs and circles.

Question 22

Candidates across all ability ranges found this question challenging. While some students appreciated the need to square the given values and then subtract, at least as many squared the values and added them, denying them any marks. A surprisingly large number simply used the given values in a variety of ways, for example adding the lengths or doubling them or multiplying them, strategies that clearly led nowhere. A few attempted to use trigonometry to find an angle, but not anything beyond this, and, somewhat inevitably, their efforts did not lead to any degree of success.

Question 23

Clear algebraic working in part (a) was shown by a good number of students, gaining them full marks. Positive and negative signs proved a stumbling block for many and incorrect statements like $7x+2x=17-6$ (instead of the correct $7x-2x=17+6$) appeared frequently. There were students who were able to make a correct start, for example, $5x-6=17$ (for one method mark) but who were unable to proceed accurately beyond this. Others with little understanding often tried at least to produce something algebraic, even though it often had nothing worthy of credit.

Part (b) had a reasonably high success rate, with a good number producing a fully correct and simplified expression for full marks, or unsimplified for one mark. Unfortunately some students wrote a fully correct version in the body of the script but went on to manipulate further their algebraic terms in a variety of incorrect ways, denying them the accuracy mark. The main errors seen in multiplying out the brackets were to lose one or two of the terms, to give x^2 as $2x$ and to add the 8 and 2 to give 10.

Question 24

This form of question is familiar to many students, who understood fully what was required, and achieved all 4 marks. Others came close but used a value other than the mid-point from the class-interval and so did not gain full marks. Partial marks were also given to students who did not divide the sum of their products, or who divided by 4 instead of 50.

Equally, this topic appears inaccessible to a large number. Adding the frequencies or the midpoint values and dividing by 4 were common false approaches. No working with answers such as 10, 20, 25 and 30 was often seen. There were also a noticeable number of non-responses.

Question 25

A small number of students were able to complete the table correctly in part (a) and draw the required quadratic graph in part (b). Some lost a mark where their graph was a series of line segments and not a smooth curve. For those who made an error working out one of the points in the table, (most commonly -27 or -5 for the y value when $x=-4$), they were often able to gain one mark in part (b) for plotting at least 6 of the points from their table. A surprisingly large number of students did not attempt to plot even the given points.

Grade Boundaries

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