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Examiners' Report/ Principal Examiner Feedback

January 2014

Pearson Edexcel International GCSE Mathematics A (4MA0) Paper 2FR

Pearson Edexcel Certificate Mathematics A (KMA0) Paper 2FR

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Paper 2F provided sufficient opportunities for candidates to demonstrate their knowledge and understanding on a range of regularly tested topics, throughout this paper.

Question 1

This question was well answered by candidates of all abilities. Incorrect answers were rarely seen, but occasionally "8" was mistaken for a square number in part (iii).

Question 2

Both parts (i) and (ii) were well answered. The most common incorrect answer to part (ii) was 4%. A follow through was allowed in part (ii) to allow candidates to gain the mark for correctly writing *their* percentage as a decimal, even if the percentage was incorrect.

Question 3

All components of this question scored well. In part (a). there were a few errors with 0.2 being the most common, possibly coming from subtracting 1.2 from 1.4

Part (b) was also generally answered correctly with 52 or 520 being the most common incorrect answers, possibly coming from an attempt to convert to grams.

Very few mistakes were seen in parts (c) and (d).

Question 4

The pictogram components of this question enable candidates from all abilities to gain some marks. Part (a) was almost always answered correctly. Some candidates did not engage fully with the details supplied in the question and put down 1, 2 or 10 for their answer to part (b)(i). These candidates could, however, pick up marks in (b)(ii) and (iii) by multiplying *their* answer in (b)(i) by 4 and by 4.5 respectively.

Part (c) was almost invariably correct.

Part (d) was generally well done, in the sense that most candidates could start by writing down the fraction $\frac{65}{100}$. Errors included writing $\frac{65}{10}$ or $\frac{6.5}{100}$. In a minority of cases some 'extra' cancelling took place from the otherwise correct $\frac{13}{20}$ to get $\frac{1}{2}$ or $\frac{1}{5}$. These latter cases resulted in the final accuracy mark being withheld.

Question 5

This was the first question on the paper where less able candidates could not achieve all available marks. Mistakes included being unable to distinguish between metric and imperial units.

Part (iii) posed the biggest challenge, with units for area often offered for the capacity of the can of cola.

Question 6

Those with some idea of probability scored well. A labelled cross was not essential to score marks, as a letter on its own was sufficient.

There seemed to be some confusion over the position of R, which was often pushed forward of halfway point, possibly because there were more red sectors than blue or yellow. The position of blue was generally correctly marked. Candidates did not have to measure the line; just put B in a sensible position. Green was the most common correct answer. A few candidates did not label any of their crosses so gained no marks.

Question 7

Parts (a) and (b) was generally answered well. Occasionally – 8 was put down as an answer for part (b) where candidates incorrectly worked out the difference between Alpe d'Huez and the resort with the **highest** temperature (instead of the lowest) but most candidates could select the correct numbers and work out the difference (– 3 or 3) correctly.

Both parts of (c) were also very well answered, with the context probably helping most candidates.

Question 8

Part (a) was generally well done with most candidates getting 11 from either $4 \times 2 + 3 = 11$ or from writing 3, 5, 7, 9 and then 11. Many candidates went on to get part (b) correct although the success rate from working backwards was not so high.

Part (c) proved to be a challenge for many candidates. The most successful candidates set their working out sequentially by going up a km at a time and looking to see when the costs and distance were the same. However sometimes candidates did not understand their own table and picked 13 as an answer, from 13 euros being the same cost for either taxi company to travel 5 km.

Question 9

All three components of this question scored well and mistakes were rare.

Question 10

Part (a) was well done with most candidates being able to find the correct answer of 80^o and then able to give a cogent explanation. A written explanation of any arithmetic performed involving 360 was allowed for the "explain" mark.

Part (b) proved more challenging. Many opted for the use of the unitary method by finding the number of litres equivalent to 1^o or to 10^o. Other candidates tried $50^o + 50^o = 100^o$ giving 90 + 90 = 180 litres, but could not deal with the 40^o, often resorting to simply adding on 40. As a result this question proved to be a good discriminator for candidates around the grade E boundary.

Question 11

Both parts of this question proved challenging for some candidates. Despite the indicators on the sides of the triangles pointing to equilateral and isosceles triangles, many thought that the side AC bisected angle *BCD* and therefore angle *x* was 52°. There were further assumptions that sides *AC* and *BD* were perpendicular and again this led to incorrect answers.

Question 12

Many candidates managed to score at least 1 mark for part (a), often by changing the given fractions to decimals. As 0.66 was already in the list, candidates were expected to work to at least 3 decimal places. A common error was to write $\frac{2}{3}$ as 0.6 and commonly the answer was written with $\frac{2}{3}$ at the start and the rest in the correct order.

For part (b) there were a variety of misconceptions displayed; squaring the fraction or writing the fraction as the decimal 0.16. Some put 0.25 but this was not acceptable, as the question asked for an answer in the form of a fraction.

For part (c), for those that could subtract fractions, this was an accessible question. The most common approaches were to work with denominators of 12 or 48, although 24 also made the occasional appearance.
Many candidates were confused about the process of subtraction and started by inverting the second fraction. A few resorted to decimals and, as in the past, scored no marks with this approach.

Question 13

"Clear algebraic working" means that numerical approaches, including flowchart algorithms, trial and error, embedded correct answers and correct answers only with no working score no marks. Candidates have to demonstrate at least one line of a correct algebraic technique. For many, this meant simply multiplying out the bracket correctly. It was disappointing to see many able candidates reach $18y = 9$ and then follow this by an answer of $y = 2$.

Question 14

Most candidates correctly answered part (a). The most common incorrect answers were 5 and 7

In part (c), the formula for the area of a trapezium was available on the formulae sheet but many candidates opted to divide the front face into a rectangle and two triangles, with some success.

In part (d), many of the candidates who got part (c) fully correct also went on to work out the volume correctly. Surprisingly, there were some who got the volume correct following on from an incorrect answer to part (c). This often happened because candidates had worked out (or attempted to work out) the total surface area in part (c). A follow through was allowed in part (d) from multiplying correctly, *their* answer to part (c), by 12.

Question 15

In part (a), a common response was to order the frequencies and then find the middle of these values. Some candidates multiplied goals scored by the frequencies and tried to find the middle of these. Candidates also added the frequencies and divided by 6 (this also came up in part (b)). Most successful candidates listed in full all 30 values and found the median by looking in the 2's. It was pleasing to see some candidates working successfully with cumulative frequencies to find the 15^{th} value or midway between the 15^{th} and 16^{th} values.

Part (b) was less well answered. Most candidates recognised that they had to find the sum of something and then divide. However, many attempts at dividing $\sum fx$, by 6 were seen, which led to a nonsensical answer in the context of the data supplied in the table.

Question 16

Part (a) was not well answered with many responses of the form "$x - 6$", "6", "$y = 0$", "$y = 6$" and "$AB = 6$" as answers. The correct equation of this line was $x=6$

Part (b) was, however, well answered. A few candidates gave an answer which looked like a translation or a reflection in $x = 5$ but usually scored 1 mark according to the criteria in the mark scheme.

In part (c), candidates need to be reminded that the key word is '**single**'. Many candidates knew that a rotation was involved but thought that it was about the 'centre' of shape P or a 'corner point' of P followed by a translation. This scored no marks as this was classified as a multiple transformation. In order to secure all 3 marks candidates have to specify a single transformation in 3 distinct phases;

1. "rotation" (not "turn"),
2. an angle and
3. a sense "90^o clockwise" ("'90^o to the right" is not acceptable) or "270" or "270 anti-clockwise" and a centre "O".

It was common to see at least one of the above three elements being omitted.

Question 17

Parts (a) and (b) were quite well done, although there were a number of responses seen as "5k" instead of the correct k^5

In part (c) (i)**,** many candidates knew the process to expand brackets but did not include sufficient precision with the signs so that the last term was often seen as –21 instead of the correct 21. This usually led to $2y + 3$ instead of $2y + 45$

In part (c)(ii) many candidates had a limited idea on how to expand pairs of brackets. Of those that did, there were again problems with signs with –24 being common and $–6x – 4x$ being simplified incorrectly as $– 2x$ or $+ 10x$

Many candidates had been well coached in handling expressions involving powers, so were able to score marks for part (d), however many candidates left their answer as v^{11}/ v^5 instead of proceeding to the final step to bring their answer to v^6

Question 18

Part (a) was generally well done, with most candidates showing they knew the form a ratio should take, and were able to reduce it to its lowest terms. A few wrote 880 : 40 or 800 : 40

In both parts (b) and (c), a number of candidates seemed unsure how to share out and what to divide by. In part (b), $105 \div 5$ was commonly seen and in part (c) $105 \div 3$ (or 4). Some wrote down 45 : 60 as their answer without identifying which were the girls and thus could not gain the accuracy mark.

Question 19

Many candidates did not realise that the formula for the area of a circle was on the formulae sheet. More surprisingly, many could not work out the area of the square and worked out 4×3.2 as the perimeter instead.

Question 20

This commonly set question was well answered with a majority of candidates scoring at least 2 marks. Some candidates completed a correct factor tree or division ladder but then wrote a list of prime factors rather than a product.

Question 21

Candidates with a limited grasp of set theory struggled with both components of part (a) as they could not cope with the notation for intersection and union.

In part (b), many candidates failed to gain the mark because they focussed on the property of "Set A" being even numbers. In doing so, they overlooked the fact that the universal set included only whole numbers less than 13.

Question 22

At foundation level many candidates were unable to secure full marks. Of those that could make a start, a common tactic was to start by trying to find 4 numbers which had a mean of 2.6. If they found 4 such numbers with 5 being one of them then they could get the first mark. For many who tried this approach, that was where the process stopped. More able candidates knew that the total had to be 10.4, and then subtracted 5 and divided their answer by 3 leading to full marks.

Grade Boundaries

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