Examiners' Report
Principal Examiner Feedback

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Pearson Edexcel International GCSE
Mathematics A (4MA1)
Paper 1FR

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Students who were well prepared for this paper were able to make a good attempt at all questions. It was encouraging to see many students clearly showing their working. Students were less successful in using set theory, polygons and working with prime factors.

On the whole, working was shown and was easy to follow through. There were some instances where students failed to read the question properly. For example, in Q4 students did not know whether to add £8 to (3 × £4.50) or (£8 + £4.50) × 3 while in Q12 some students worked out 42% of £250.

A striking weakness in students was solving problems with polygons, finding HCF and LCM using indices and applying Pythagoras theorem. On the whole, problem solving questions and questions assessing mathematical reasoning were not tackled well, this was particularly apparent in questions 23 and 25.

Question 1

Part (a) was answered well. It was encouraging to see students write the correct answer of Makalu on the answer line rather than the number associated with that mountain range, as we have seen frequently in previous series.

Part (b) was answered well. Misspellings were condoned.

Part (c) was answered well.

Part (d) was answered well. Due to a lack of attention to detail, some students 'lost' numbers from the original list or mis-copied them to find the difference.

Question 2

Part (a) an overwhelming majority of students chose the appropriate word to describe the outcome of a red counter and the yellow counter.

Parts (b) and (c) were answered well. The majority of the students could mark the probability scale at $\frac{1}{2}$. A common error in part (c) was to mark the probability scale at $\frac{2}{6}$ rather than $\frac{1}{6}$.

Overall, the success rate for this question was very high, with students understanding the basic language of probability and the concept of likelihood and they were able to mark the probabilities of such on a probability scale.

Question 3

Part (a) was not well answered. Many incorrect names were offered in place of 'trapezium'.

Part (b) was answered well by the majority of students, however, a common incorrect answer was 136. The answer of 136 was due to the fact that the students read the protractor the wrong way round.
Part (c) caused a few problems for a number of students. Some students could not identify the two parallel sides.

Part (d) was answered well.

Question 4

A reasonable number of students found this to be a straightforward question and gave clear working with correct answers to gain 4 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 packets of seeds or rounded down to 7 instead of up to 8. There were a number of students who did not appreciate that £3.50 was the cost of one bag of soil and that they would need to multiply by the number of bags of soil bought, before subtracting from £30. Students should read the question carefully.

Question 5

Part (a) was answered well. Many students could write down the correct coordinates of point A as $(-2, 3)$. A common error was to write the coordinates of point A as $(3, -2)$.

Part (b) was answered well. Many students could plot the coordinates of point B at $(4, -2)$. A common error was to plot the coordinates of point B at $(-2, 4)$.

Part (c) was not answered well. Some students gave an answer of $y = 0x - 3$. However, common incorrect answers were, for example, $CD = -3$ or $y = -3x$

Question 6

In part (a) the overwhelming majority of students were able to shade in $\frac{3}{5}$ of the shape.
In Part (b) the majority of students were able to simplify the fraction.

In part (c) ordering 4 fractions produced many correct responses; where working was shown this was usually the conversion of the 4 given fractions into decimals, with the rare occurrence of attempts to convert to fractions with a common denominator. There were also many responses with no working; sometimes the given answer was correct but often not, in which case no marks were awarded. The correct conversions would have gained students one mark, even where their answer was incorrect. Regularly seen were three of the four fractions in order, in which case one mark could be gained.

In part (d) students were less successful in working out the answer. A common incorrect approach was to work out $\frac{5}{9}$ of 14 giving the wrong answer of 7.77……

Question 7

Part (a) was well answered. A common incorrect answer was to write down the frequency as 20.

In part (b) some students were able to work out that 12 members out of 60 should be represented by 72° on a pie chart but far more divided 360 by 12 and gave 30 as their answer; guesswork also seemed to be a favoured method.

Part (c) was well answered. Many students showed a clear method, $\frac{35}{100} \times 60$ or 0.35×60, to obtain a correct answer of 21.

Question 8

Part (a) was answered well. A small number of students gave an incorrect answer of 4*a*.

In part (b), only a small number of students were not able to multiply two algebraic terms.

In part (c), collecting like terms ~~in~~ was not well done, the directed number aspect is still an issue for some. The most commonly seen error was simplifying $2e - 5e$ giving $+ 3e$. Many students simplified $6d + d$ to $7d$ correctly whereby they gained 1 mark.

Question 9

For the most part students found this to be a straightforward question and gave clear working with a correct answer to gain 3 marks. However, a significant number found the question rather challenging, linking the numbers given in the question in ways that showed little understanding.

Many students multiplied 42 by 3 to find the weight of 9 boxes of bananas to gain 1 mark. For some reason some students worked out 68 ÷ 8 to give 8.5 and then added this to 126. Some students worked out 126 and 127.5 and then did not add the numbers to get the last 2 marks.

Students should read the question carefully.

Question 10

The majority of students were able to demonstrate their understanding of angles in an isosceles triangle and most gave clear working with correct answer to gain 3 marks. Many students took the approach of subtracting 44° from 180° and then divided by 2 to give 68°. Using the idea that 'angles on a straight line add up to 180°'they then subtracted 68° from 180°. Occasionally, some students left their answer as 136°.

When students are working out angles in questions like this it is important that any angles found as part of the working are either written on the diagram or identified correctly in the working space.

Question 11

There was a mix of blank responses and fully correct responses for this question. For those who attempted the question, a fully correct graph was often seen. Although it's disappointing to see a number of students who plot the correct points and don't put a line through them. A few students made errors such as wrongly plotting one of the points, but these were generally able to gain 2 marks for a correct line through at least three of the correct points. A small minority gained just one mark for a line drawn with a negative gradient going through (0, 3) or for a line in the wrong place, but with the correct gradient. Some students did not extend their lines through the full range of values specified, losing one mark as a result.

Question 12

Whilst many correct answers were seen, some students were unable to successfully navigate their way through this problem. There were some fully correct responses from students who could both divide £250 in the given ratios and go on to find 42% of 150 and then subtract this answer from 100 to obtain a correct answer of 37. Others dealt with the ratio but stopped at that point, gaining the first two method marks. Common errors were to divide £250 by the numbers from the ratios, or to add the ratio numbers (to get 7) and then multiply the ratio numbers by 7. A variety of other irrelevant and somewhat confused attempts made regular appearances. Some students divided £250 by 2 and then by 3. A common incorrect method was to find 42% of £250 and then use the given ratios.

Question 13

In this question, where a student knew the formula for the area of a circle and used it, they tended to gain full marks. However, other formulae were used at least equally often, the most popular being $2\pi r$, πr , $\frac{\pi d}{2}$ and $\frac{\pi r}{2}$; students who took one of these routes achieved no marks. Students would be well advised to show their working and their initial unrounded answer.

Question 14

In part (a), it was clear that there was a lot of misunderstanding regarding the information given using set language. It was not uncommon to see the numbers transferred directly onto the Venn diagram. However, a significant number of students just put the given values into sections on the Venn diagram, taking no account of intersections. Students who made these errors could gain follow through marks in the next part.

In part (b), many students gained a mark for following through their Venn diagram and giving an answer as a probability. Some students were able to score 1 mark for writing $\frac{\text{their } 4}{a}$ or $\frac{b}{12}$ provided the probability was less than 1.

Question 15

In part (a), the majority of students were able to correctly expand the brackets. A common incorrect answer was $15a + 4$

In part (b), there were a good number of correct answers but $10c$ or $-10c$ were common incorrect answers.

In part (c), it is very important that students take notice of the statement: 'show clear algebraic working' as without this working they will gain no marks, even if the answer is correct. A trial and improvement method is not satisfactory either. We also want to see student working with a correct equation throughout to gain the method marks. Many students were unable to do this and gave incorrect working such as $5x = x + 6 - 11$ or $5x + x - 11 = 6$.

Question 16

Many students found this question difficult and challenging. The added complication of the fractions being mixed numbers confused some students who did not know where to start. Sometimes we saw the correct improper fractions but then they gave $\frac{16}{5} \times \frac{11}{6} = \frac{88}{15}$ without showing the cancelling or intermediate step of $\frac{176}{30}$; these students were awarded 1 method mark. Some students tried to find the common denominator, but failed to follow this with a correct multiplication. It was essential that students showed all steps, rather than what the calculator gave, in order to be awarded full marks.

Question 17

A majority of the students found this question hard. Most of those who failed to get full marks gained one mark, usually for showing that the total of the four numbers had to be 36 either by explicitly writing 36 or, more usually, giving four numbers that summed to 36. Occasionally, students scored one mark for writing 4 numbers with a median of 8.5. Some students misinterpreted the three averages and then introduced range into the question.
A few students opted for a trial and error approach and some were able to reach the correct final answer. An often seen incorrect process was to write $\frac{7 + 7 + 8.5 + 13.5}{4} = 9$. A common incorrect solution was 7, 8.5 and 1.5. Students should take care when reading the question; some stated the formula for the mean and then used 3 as the denominator despite 4 integers being stated in the question. Students who chose not to show any method would have undoubtedly lost marks on this question.

Question 18

Part (a) was poorly done. Some students used crosses instead of circles and drew 2 lines to represent their inequality. Some students got the meaning of the open and closed circles the wrong way round.

In part (b), students were more successful with this part of the question than the previous part and a good number gained full marks. Some students missed out a value, it was often zero or they added an extra integer, it was frequently −3, thus only gaining one mark.

Question 19

The majority of the students understood the concept of finding an average speed when given the distance and time. Many students made errors and these fell into one of two categories; students either wrote 3 hours 24 minutes incorrectly as 3.24 rather than 3.4 or worked initially in minutes. Those who worked in minutes generally found an answer in km/min and then either did not realise the need to convert into km/h or else multiplied by 100 rather than 60 in an attempt to do so.

A few students did not use their calculator and tried to round the given figures; this was not appropriate for this question. If students are expected to estimate they will be told to do so in the question.

Question 20

(a) A minority of the students gained full marks on this question. It was encouraging to see these students show all their working. Many students could not find the value of x as 4.5 nor recall the formula for the volume of the cylinder. Some students lost the final two marks as they did not use the correct formula for the volume of the cylinder. Sometimes student lost the final mark by leaving their answer as 182.25π. The question clearly says 'Give your answer correct to the nearest whole number'.

(b) This part was poorly done. A majority of the students left this blank. A common incorrect answer was 1000.

Question 21

In part (a), many students did not realise that they had to either add $5z$ or multiply the whole equation by y and then rearrange for c to gain the two marks. Some students made the error of multiplying only A by y and not multiplying $5z$ by y also, thus losing both marks. Generally, this part of the question was not answered well.

In part (b), only a few students wrote the correct answer as 1. A common incorrect answer was 0.

In part (c), many incorrect solutions were seen and the most frequent of these was to write the signs the wrong way round in the brackets e.g. $(x + 3)(x – 8)$ or $(x – 3)(x + 8)$ or $(x + 3)(x + 8)$; one mark was awarded for this. A few students went on to 'solve' their factorisation; this was ignored

and so long as the correct factorisation was seen, full marks were awarded. Some students just took x out as a common factor for the first two terms and offered $x(x - 11) + 24$ as an answer which gained no marks.

Question 22

The most efficient method of multiplying the initial investment by 1.024^3 was used by some students, as was the longer method of calculating the interest and adding it to the investment year by year. Correctly worked out, these methods gained all three marks. However, the award of one mark was far more frequent for those students who worked out the interest for the first year, often but not always, multiplying this by 3 and adding it to the original investment. Clearly many do not appreciate the difference between simple and compound interest.

Question 23

Most of the students had no idea how to approach this question. A few students either quoted 540° as the sum of the angles of a pentagon or found it using $180 \times (5 - 2)$ and then divided by 5 to find the interior angle. In a similar way student quoted 720 as the sum of the angles of a hexagon or found it using $180 \times (6 - 2)$ and then divided by 6 to find the interior angle. Some used the approach of finding the exterior angles of the pentagon and the hexagon. Some students could not recall $(n-2)\times 180$ or use the method of triangles to work out the sum of the interior angles, as a consequence, many students scored no marks. It was not unusual for candidates to confuse the interior and exterior angles of a pentagon but still go on to obtain $x = 96°$. Such responses received no credit, as did all who obtained the correct answer with spurious working or with no working at all. Many students who worked out 108° and 120°, then successfully worked out angle *EDI* (132°) correctly. Of the students who were able to make progress with the question and reach an intermediate value of 132°, a small number subtracted from 180, rather than 360, thus failing to apply their knowledge of the sum of the angles of a quadrilateral.

Question 24

There was some confusion between the HCF and LCM in parts (a) and (b).

Part (a) was poorly answered as many students did not know how to work out the highest common factor of *A* and *B*. There were also many non-responses.

Part (b) was answered poorly. Some students simply worked out 2*A* and 3*B*, and did not carry on. Many responses across this question were left blank.

Question 25

This question was poorly answered and many responses were left blank.

The most common approach was to use Pythagoras theorem to work out the height of the triangle. Most students who worked out the height (4.89….) of the triangle then went on to work out the

area (24.494…) of the triangle. The area of the rectangle was usually found correctly but credit was not given to 60 cm^2 on its own. Most students then divided the total area by 16 to find the number of tins used. Some students once they found the answer of 5.28… rounded down or did not round their answer to 6.

A common incorrect method seen was 7^2 divided by 2 giving an answer of 24.5 and then 60 was added to obtain the area of the pentagon. Students divided the 84.5 by 16 and then stated the correct number of tins as 6. This approach was awarded zero marks as no credit is given when incorrect working is shown leading to a correct answer.

Summary

Based on their performance in this paper, students should:

- recall that $x^0 = 1$
- learn the difference between LCM and HCF
- learn how to apply Pythagoras theorem
- apply the formulae for a volume of a cylinder and speed = distance ÷ time
- show clear working when answering problem solving questions
- read the question carefully and review their answer to ensure that the question set is the one that has been answered
- ensure that their working is to a sufficient degree of accuracy that does not affect the required accuracy of the answer.

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