Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

Summer 2022

Pearson Edexcel International GCSE
In Mathematics A (4MA1) Paper 2FR

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Summer 2022 Principal's Examiner Report
International GCSE Mathematics
4MA1 Paper 2FR

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, indices and working with prime factors.

On the whole, working was shown and was easy to follow through. Some students could not recall the conversion that there are 1000m in 1km as in Q5. There were some instances where students failed to read the question properly such as Q10.

A striking weakness in students was solving problems with areas, writing a number as a product of prime factors in index form, applying trigonometry and using median, mode and range in context. Overall, students struggled with problem solving questions and questions assessing mathematical reasoning. This was particularly apparent in questions 15, 20 and 27.

Question 1
At the start of the paper students were presented with a very familiar style of question on ordering numbers, writing numbers in figures from words and place value and they were almost all able to achieve full marks. Some students confused themselves when ordering decimals between the decimal numbers 0.15 and 0.155

Question 2
(a) This part was answered well as the majority of students could easily draw a bar chart to a height of 8.
(b) and (c) These two parts were answered well.
(d) This part was answered well. Some students wrote their answer as 13 000 000 which was accepted.

Question 3
(a) Many students answered this part correctly with 3.6 being the most common incorrect answer.
(b) This part was answered well. Students should try to be clear in drawing the arrow to indicate 0.04 no just writing 0.04 under the correct tick.
(c) Many students could write a value with 2 decimal places correct to 1 decimal place but there was a large variety of incorrect answers with assorted numbers of decimal places. A common incorrect answer given was 56.8

Question 4

(a) Many students could draw a parallelogram, however, there was a sizable minority who drew a trapezium.

(b) Many students did not recognise the 3D shape as a pyramid. Common incorrect answers were triangular prism and square based prism.

(c) A majority of the students answered this part well.

Question 5

Many students used the conversion 1km = 1000m correctly. Some students converted 14.5km into 14 500m and proceeded to add the two other distances to show the total distance as being 29 450m. The alternative way was to convert 5950m and 9000m into kilometres and then showed the total distance was 29.45km. Some students made the conversion(s) and then did not add up the three distances to show their final answer gaining only 1 mark.

Question 6

(a) Both parts were answered well. It was encouraging to see many students using their calculator correctly.

(b) The use of BIDMAS is still causing problems to some students. Candidates struggled with the first part. A common incorrect answer was 8. The second part was answered well.

Question 7

(a) Most students were able to continue the number sequence but students who had clearly been able to continue it accurately, were then able to describe what they had done to continue the sequence by adding 6. Descriptions such as 'the difference is 6' were not sufficient.

(b) It was pleasing to see so many correct responses for the explanation needed in this part, with students often continuing the sequence and realising that 187 was the closest number to 188, so 188 could not be. Arguably, the more efficient answer was to recognise that the sequence contained only odd numbers (or numbers ending in 1,3,5,7,9 as many students put it) and that 188 is even.

Question 8

The problem posed in this question was well understood and most students could divide 256 by 8 and then multiply their answer by 2.48 correctly to find the total cost of the notebooks. An alternative approach was to divide 2.48 by 8 to find the cost of one notebook and then multiply by 256 correctly to find the total cost of the notebooks. However, some students were confused as whether to multiply or divide. An incorrect method was to multiply 8 by 2.48 and then multiply the answer by 256 leading to a wrong answer.

Question 9

(a) A majority of the students answered this part well. A common incorrect answer was 5*a*.

(b) A majority of the students answered this part well.

(c) Most of the students answered this part well. Some students did not know how to expand the brackets giving incorrect answers such as 3*x* + 4 or *x* + 12 or 12*x*.

(d) Many students substituted the value of $\frac{1}{2}$and $\frac{1}{4}$into the equation correctly. A common approach was to write $5\frac{1}{2}^2 - \frac{1}{4}$ gaining the first mark. Some students multiplied the 5 with $\frac{1}{2}$and then squared the answer or squared $5\frac{1}{2}$ leading to incorrect answers. Students are encouraged to use brackets for substitution.

Question 10

Finding the time difference between 09 30 and 16 10 was poorly done. The problem was the 10 minutes after 4 in the afternoon and counting correctly for the number of whole hours. Students need to be encouraged to consider whether their answers are reasonable – answers such as 6 hours 10 minutes or 7 hours and 10 minutes were regularly seen thus losing the first mark. Students had the opportunity to gain the next mark by converting their time into minutes or seconds or to find the number of bolts produced in one minute or in one hour. Some students correctly gained the second M mark by dividing their number of seconds by 8 and then losing the accuracy mark.

Question 11

This question was well attempted, and many students gained full marks having drawn an equilateral triangle with the correct construction arcs. Some students were clearly not constructing the triangle using compasses and so could only gain a maximum on 1 mark for drawing an equilateral triangle. It was very rare to award 1 mark for seeing a correct construction arc without an attempt at drawing the triangle. It was obvious that some students were drawing free hand.

Question 12

(a) This part was done well. Most students were able to write down all the possible combinations from BCD and LMS. A common mistake by some students was to write down the correct combinations and then continue writing out combinations in different orders, e.g. (B, L) and (L, B) or the occasional pairing was missed. A few students simply stated the number of combinations, but such responses were rare.

(b) This part was answered well. A few students wrote the probability in ratio form i.e. 47:100 which did not gain a mark.

(c) Many students interpreted the question correctly by giving a correct answer of $\frac{49}{53}$ thus gaining 2 marks. Some students gained 1 mark by giving answers such as $\frac{49}{100}$or $\frac{4}{53}$.

Question 13

Generally, this question was answered well. Most students could correctly work out the area of a given trapezium. Almost all of these used the formula for the area of a trapezium; attempts to split the shape into a rectangle and triangles were extremely rare. Some students were able to gain 1 mark for at least substituting the dimensions correctly, then evaluating wrongly, but some simply added the given values or multiplied them all, this despite the formula being one of those given on the paper.

Question 14

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 positive gradient going through (0, –1) 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 15

Many students could convert $\frac{1}{4}$to 25% or 0.25 or convert 40% to 0.4. Most students then added 40% with 25% or 0.4 with 0.25 to find 65% or 0.65 then correctly subtracting from 1 to gain 2 marks. Many students did not read the question carefully and gave an incorrect ratio of 35:65. Many students did not realise that the total spent, $*N*, was represented by 1 or 100%.

Question 16

(a) Most students gained the one mark in this part of the question with some giving a correct answer of 2. A common incorrect answer was to write 12; the frequency which is not accepted.
(a) The majority of students gave the correct answer to this question. Of those that didn't, the most common error was for students to find the products correctly but then divide by the sum of the number of mobile phones (16) rather than the sum of the frequencies (40) which was given in the question. The other error was to divide the sum of the number of stars by 6. A common arithmetic error was to evaluate 0 × 1 as 1 rather than 0.

Question 17

This question was quite challenging for students with many failing to gain full marks. Students who followed the number machine, for example, by simply writing $T = 0.2 \times 12n + 50$ or equivalent gained two marks. Many students failed to use brackets in the correct place. Some students wrote down *n* = f(*t*) thus gaining no marks.

Numerical methods were seen occasionally but gained no marks at all.

Question 18

(a) The majority of students were able to recognise enlargement and a good number the scale factor of 3. Far fewer knew that the co-ordinates for a centre of enlargement were also required for the award of full marks. Marks were awarded independently for each of these facts, so a good number of students scored at least one or two. However, many students ignored the demand in the question for a **single** transformation and combined their recognition of enlargement with most usually, translation; they either stated it as such or described it in words as a horizontal and vertical movement. Thus, they could not be credited with any marks.

(b) Translating a triangle posed many problems and a very high number of incorrect solutions were seen.

Question 19

Students, on the whole, showed an insight into prime factors in this question, although a large proportion expressed 1200 as a product of prime factors rather than as a product of powers of its prime factors. Others found a set of factors that multiplied to 1200, often achieving 1 mark. Some students wrote the correct factors in a sum rather than as a product.

Question 20

The marks were well spread out in this question with many failing to score at all. Those who adopted a systematic approach usually found the three correct numbers. Trial and improvement was more likely to score one mark. Some students felt that they could manipulate 160 to be the median by putting it in the middle of their list, regardless of the order of the numbers. Similarly, the range was sometimes taken to be the difference between the first and last numbers instead of the lowest and highest values. A common error was to find the lowest value as 158 and then work out 158 + 21 to find 179 as the height of Candela. There were some instances where an attempt was made to involve the mean, usually in place of the median.

Question 21

(a) Neither part of this question was well done by students, although some produced fully correct solutions, but they were rare. Commonly seen errors in this part arose by simply listing the members of set A or set B. Some students confused the union and intersection symbols.

Generally, students with a limited grasp of set theory struggled with this question as they could not cope with the notation for intersection and union.
(b) Many students failed to gain the mark because they focussed on the property of "Set A" being multiples of 3. In doing so, they overlooked the fact that the universal set included only whole numbers between 9 and 20 inclusive.
(c) This part was poorly done by the majority of the students. Common incorrect answers were 10 and 18 or writing down 4 even numbers from the universal set.

Question 22

A few students gained full marks in this question. Many students could find the length of the square by square rooting 36 to find 6. They did not divide 6 by 2 to find the radius of the semicircle thus losing the final three marks. Some students worked out the area of the circle correctly and then multiplied the answer by 4 which gained the second mark. A common incorrect approach to the question was to divide 36 by 4 to find 9 losing the first mark. Students then went on to find the radius of the circle (9 ÷ 2) and used a correct method to find the required area of the shape thus gaining two marks.
Some students could not recall the area of the circle but used the formula for the circumference of the circle. Students are encouraged to read these types of problem solving questions carefully.

Question 23

(a) A few students were able to score full marks on this question, though many were able to score at least one mark for removing the denominator to obtain $10p = 3p - 5$
Many students had difficulty in isolating the terms on either side of the equation. Students wrote down $10p = 3p - 5$ but many could not isolate the p terms and the numbers. Common errors were based on fundamental misunderstandings of algebraic processes, e.g. $10p + 3p = -5$, $15p = 3$, incorrectly moving terms from one side of the equation to the other side, usually by not changing the sign of the term.
As the question clearly states, 'Show clear algebraic working', some of those students who attempted to find the solution by trial and improvement gained no marks.
(b) This part was poorly done by the majority of the students. Many students did not realise that $a^0 = 1$
(c) There were very few correct answers for this algebraic division. There were many blank responses, with common incorrect responses being $2xy^2$, $0.5xy$, where students had done a combination of multiplying and dividing.

(d) It was encouraging to see a fair number of correct responses for factorising a two term expression with common factors. Where full marks were not awarded, others gained one for a correct factorisation with at least one factor outside the bracket. There were also many and varied incorrect attempts, with $25c^4d^6$ being the most commonly seen incorrect answer. There were also many non-responses.

Question 24

This question was poorly attempted. Many students failed to transform the expression 4^n to power of 2 and then made use of index rules to find an expression for x. Some used trial and improvement which was not a valid method to award marks. Students should use an algebraic process to find an expression for x.

A common incorrect expression for x was $k - n$.

Question 25

This was a 'reverse percentage' question, but this was not how the large majority of the students interpreted it. By far the most commonly seen, but incorrect, method was to find 12% of the new amount or to increase the new amount by 12%

Where students understood the question, they were nearly always able to show the working required and give the correct answer for all 3 marks.

Question 26

(a) Most students could write a number given in standard form as an ordinary number.

(b) This part was answered well. Some students gave the answer as 5.5×10^6 and credit was given. A common incorrect answer was Lagos.

(c) It was clear that those able to use their calculator for standard form calculations had no trouble finding the correct answer. Many place value errors were the cause of incorrect answers where students simply found the difference between 3.7 and 7.7. Other errors were due to selecting the wrong data, such as for the wrong city. Many students left their answer as 29 300 000 or 29 000 000 thus losing the final mark as they have not written the final answer in standard form as stated in the question.

Question 27

This was a challenging question for the majority of the students. Many students could not recall the trigonometric ratios. There were two ways to gain some marks,

(i) A minority of students gained one mark for writing $tan\, BAP = \frac{2}{5}$ and then gained the second mark for finding the angle, or

(ii) A minority of students found the exterior angle or the interior angle

It was very rare that students used a complete method to find the final answer of 98.2

There were many blank responses.

Summary

Based on their performance in this paper, students should:

- learn to write a number as a product of its primes in index form
- learn how to apply trigonometry to problems
- learn the formula for the area of a circle
- 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
- make sure that their working is to a sufficient degree of accuracy that does not affect the required accuracy of the answer

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