Examiners' Report
Principal Examiner Feedback

Summer 2024

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IGCSE Mathematics 4MA1 2FR Principal Examiners Report

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 1000 kg in 1 kg as in Q5. There were some instances where students failed to read the question properly such as Q8 and Q14.

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. On the whole, problem solving questions and questions assessing mathematical reasoning were not tackled well, this was particularly apparent in questions 16, 20 and 26.

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.

In part (b), some students confused themselves when ordering decimals between the decimal numbers 0.13 and 0.7

In part (d), place value caused problems for some students, 'hundredths' being the most popular wrong answer.

Question 2

(a) This part was answered well as the majority of students could easily draw a bar chart to a height of 44

(b), (c) and (d) These two parts were answered well.

Question 3

(a) Many students answered this part correctly with 57.3 being the most common incorrect answer.

(b) This part was answered well. Students should try to be clear in drawing the arrow to indicate 240

(c) Many students could write a value with 3 decimal places correct to 2 decimal places but there was a large variety of incorrect answers with assorted numbers of decimal places. A common incorrect answer given was 0.78

Question 4

This question was answered well by almost all students.

(a) A common incorrect answer was diamond.

(b)(i) There were many interesting ways of spelling prism seen but marks were awarded as long as the meaning was clear.

(ii) Some students wrote down the number of vertices or the number of faces.

Question 5

Students generally answered this question well. Many students multiplied by 5 by 1000 and then divided by 280 and then left their answer as 17.8 or 18. Some students lost the final mark for not rounding down. Some students did not know the conversion from kilograms to grams as they were multiplying by 100. Most knew to divide by 280, so a common answer was 1 from 500/280. Repeated addition was used often with 280 g to reach 5000 g. The alternative method of dividing 280 by 1000 and then using this answer to divide into 5 was rarely seen.

Question 6

Parts (a), (b) and (c) were answered well. It was encouraging to see many students using their calculator correctly.

(d) Many students answered part (i) well, placing the brackets in the correct place. Part (ii) caused some problems for a minority of students. The use of BIDMAS is still causing problems to some students.

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 8. Descriptions such as 'the difference is 6' were not sufficient or just simply writing 8 is not enough to be awarded the mark.

(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 325 was the closest number to 326, so 326 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 326 is even.

Question 8

This question was a good source marks for many students. Students showed clear working by showing how thy obtained 13 and 15.76. Students then added 13 and 15.76 together and then subtracted from 50 to find 21.24

Question 9

(a) A majority of the students answered this part well. A common incorrect answer was $3c$.

(b) and (c) A majority of the students answered these parts well.

(d) A large majority could solve the equation, with an algebraic method seen regularly. There were many who did not write any algebra at all, but this could still gain full marks if the answer was correct. A minority of students wrote down $2g = 6 - 3$ losing both marks.

(e) This part was generally answered well. A minority of students wrote down $2x - 4x$ or $x^2 - 4$ thus losing the mark.

(f) Most students failed to write the -3 in brackets. They very often wrote $4 \times -3^2 + 2$ with most of these students then going on to use their calculators with little understanding of how to deal with the square of -3. This resulted in many answers of -34 instead of the correct answer of 38. Students are advised to put brackets round any negative numbers when working with algebraic expressions involving substitution both when writing down their working and when inputting any expression into their calculator.

Question 10

Many students were able to achieve one mark for the correct square without the construction arcs shown. Many students did not know how to draw the construction arcs in order to construct a square. Much of what was seen for construction arcs were creative but irrelevant arcs and circles.

It was very rare to award 1 mark for seeing correct construction arcs without an attempt at drawing the square. It was obvious that some students were drawing free hand.

Question 11

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

(b) This part was well answered as most students could correctly complete the two-way table.

(c) This part was answered well. A few students wrote the probability in ratio form i.e. 67:100 which did not gain a mark.

Question 12

This question met with varied success; a straightforward two marks for those who knew to divide $360°$ by $15°$ to give 24 sides for the un-named polygon and no marks for those who attempted a range of meaningless calculations, usually attempting to apply a formula based on internal angles of a polygon. A common incorrect method used by the students was to divide 180 by 15 to obtain 12

Question 13

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, 5) 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 14

This question was a good source of marks for many students. A majority of students could find a fifth of 1200 to find 240 euros for Bilpa and 42% of 1200 to find 504 euros for Claudia scoring 2 marks. A majority of students went on to find David's share by subtracting 240 and 504 from 1200 to find 456 scoring the third mark. Many students did not work out the value of n by dividing 456 by 240. May be they did not read the question carefully.

A common mistake was to subtract 240 from 1200 and then finding 42% of 960 (1200 – 240) so this student only scored the first mark.

Clear methods were shown by the majority of the students.

Question 15

(a) Most students gained the one mark in this part of the question with some giving a correct answer of 12. A common incorrect answer was to write 8; the frequency which is not accepted.

(b) 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 6 rather than the sum of the frequencies (30) which was given in the question. The other error was to add up the total number of oranges (81) then divide by 30 or 6.

Question 16

This multi-step question enabled most candidates to gain at least the first method mark, usually for multiplying 375 by 8 to find the number of footballs made on Monday. The weaker students found it difficult to work out 20% of 3000. Some students who did work out 20% of 3000 to obtain 600 did not add this to 3000 to find the number of footballs made on Tuesday. It was quite surprising to see students subtract 600 from 3000 as the question clearly indicated that there more footballs produced on Tuesday than Monday having not read the question sufficiently carefully. The more able students worked out 12 hours as the final answer.

Some students simply divided 375 with 8 and many incorrect combinations of methods were seen.

Method marks could at least be awarded to those who showed working.

Question 17

Students, on the whole, showed an insight into prime factors in this question, although a large proportion expressed 1400 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 1400, often achieving 1 mark. Some students wrote the correct factors in a sum rather than as a product.

Question 18

Generally, this question was poorly attempted.

(a) Many students were unable to give a correct description of the transformation. The 'translation' part of the answer was more commonly seen than the vector, with students preferring to use words such as 'right 3 squares, down 5 squares'. Some students were describing the vector in coordinate notation, $(3, -5)$, which is not accepted.

(b) A small number of students were able to correctly rotate shape A for 2 marks. Of those that didn't, some drew a correct shape with correct orientation but incorrect position for one mark. Rotating a shape posed many problems and a very high number of incorrect solutions were seen.

Question 19

Students found this question difficult as expected. Those who adopted a systematic approach usually found the two correct numbers. Trial and improvement was more likely to score one mark. There was a clear of understanding of median and range.

Question 20

This question was generally poorly attempted. Many students do not understand Set theory as this can be clearly seen by many blank responses.

In part (b), there were many muddled, ambiguous and wrong statements and numerous blanks whilst some did not recognise the empty set symbol.

(c) It was seen that some students found the terminology hard to understand for set C. Credit was given for three correct values with no more than one incorrect **or** for four correct values with no more than one incorrect.

Question 21

A few students gained full marks in this question. Many students could find the length of the square by square rooting 81 to find 9. Some students who worked out the length of the square went on to work out the perimeter of the square. A common incorrect method was to work out the area of the circle. Many students could not recall the formula for the circumference of a circle thus not been able to score the third mark

A common misconception was to divide 81 by 4 to find the length of the square. Students are encouraged to read these types of problem solving questions carefully.

Question 22

(a) A few students were able to score full marks on this question, though many were able to score at least one mark for rearranging their 3 term equation into the form $af = b$

Many students had difficulty in removing the denominator. The most common incorrect equations seen were $2f = 12f - 17$ or $2f = 4f - 51$ or $6f = 12f - 51$

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. Manu students do 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 $3a^4h^3$, $3a^5h^8$, 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 $32x^8y^5$ being the most commonly seen incorrect answer. There were also many non-responses.

Question 23

This question was poorly attempted. Many students failed to simplify the denominator to 3^3 losing the first mark. Students who worked out that the numerator was 3^3 went on to work out the value of n incorrectly by subtracting 3 from 10 to obtain 7. Some students did not use index rules but often put the numbers in their full form.

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 answer was 7

Question 24

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 17% of the new amount or to increase the new amount by 17% 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 25

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

(b) Most students could write a number in ordinary number into standard form.

Generally, parts (a) and (b) are a good source of marks for the weaker Foundation students.

(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 4 and 2. Many students left their answer as 200 000 and lost the final mark as the answer was not written in standard form.

Question 26

This was a challenging question to the majority of the students. Many students could not recall the trigonometric ratios. Students who generally answered the question scored 1 mark for finding the area of rectangle *FCDA* to be 108.1

It was very rare that students used a complete method to find the final answer of 150.6

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 circumference 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.