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Examiners' Report
Principal Examiner Feedback

November 2021

Pearson Edexcel GCSE (9 – 1)
In Mathematics (1MA1)
Foundation (Non-Calculator) Paper 1F

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November 2021
Publications Code 1MA1_1F_2111_ER

GCSE (9 – 1) Mathematics – 1MA1
Principal Examiner Feedback – Foundation Paper 1

Introduction

The paper was accessible to students with a good amount of working shown over most of the paper. Areas of the curriculum that need more attention are, Ratio (Q12 and Q24), Factorisation of simple expressions (Q15b), Linear graphs (Q18), Long multiplication and long division (Q20), Volume of a prism (Q25) and $y = mx + c$ (Q28).

Again, it was pleasing to see many students clearly showing their working and using their communication skills when required.

Report on individual questions

Question 1

Very few failed to earn the mark here. Those with incorrect answers usually wrote 3%.

Question 2

Ordering of negative numbers was correctly carried out by most students.

Question 3

An incorrect answer of 0.9 was common.

Question 4

A very well answered question, although incorrect answers of 30 and 320 were common.

Question 5

This was surprisingly poorly answered with 14 as the most common incorrect response. A significant number of students just wrote 7 × 7 without giving a value.

Question 6

Part (b) was usually answered well; cube, cuboid and sphere being the most common errors. Part (a) less well done with ‘parallelogram’ seen far too often.

Question 7

Few failed to get the correct answer of 14 when dividing 42 by 3 although a small minority insisted on halving then halving again thinking this was the correct method of finding a third of a quantity. This error was repeated in question 14 when trying to divide £1.80 by 3. Many students also used repeated addition or listed multiples, the majority eventually arriving at 42.

Question 8

The great majority of students spotted the error in the bar chart. Quantifying their response was not required.
Common incorrect responses included: 'no title on the bar chart', 'the *x* and *y* axes are not labelled' and 'the frequency axis should not go up in 2s'.

Question 9

Failure to gain full marks in this question was usually a result of considering just one packet of cheese instead of two. However, arithmetical errors were made far too often in either the addition or in subtracting £6.50 from £10; £4.50 being a common incorrect result given. Some failed to give a conclusion and so failed to gain the final mark. Lack of working let some students down and the subtraction from £10 was incorrect in a significant number of cases.

Question 10

It was pleasing to see many students dealing with the arithmetic of negative values well. Most were able to compute Wednesday's temperature as – 2ºC although many offered this as their final answer; clearly not having read the question carefully. While getting the negative temperature on Wednesday was good some students struggled to go from negative to positive integers and often missed counting 0 and got an answer of 6 degrees. Many used number lines and were usually successful. Quite a few students calculated -5 + 3 as -8. It was common to see 5 – 2 = 3 for the difference rather than 5 – (-2) = 7.

Question 11

The vast majority of students answered part (a) correctly and thus showed clear understanding of the key. Part (b) was not as well answered, many students were happy to count the complete symbol as 8 but then thought that the smaller squares represented1 video game, giving 19 and 9 for Tuesday and Wednesday respectively. Many students were able to find the 22 or the 10 but not both or gave the answer 6 from 22 -16, the difference between Monday and Tuesday

In part (c), there were very many correct solutions. Some reversed their diagrams for Thursday and Friday, some simply shared the 32 video games equally between the two days. Mistakes were also common in the division of (or inability to divide) 32 by 4.

Question 12

This question was not well answered with only a few understanding what was being asked in the question. Many did not realise that they had to find the ratio of boys to girls for each of the two drama groups. A common approach was to find $\frac{3}{7}$ and in some cases $\frac{4}{7}$ of 84 (36 + 48) concluding that there were 36 boys and 48 girls also in the second group and therefore Ann must be correct. This was not enough to get full marks without ratios (or fractions) being considered. Very few wrote $\frac{3}{7} \div \frac{4}{7}$ for the second group, 3 : 7 frequently appearing. Those that did usually went on to gain full marks.

A common error when considering fractions was to express the boys in group one as $\frac{36}{48}$ rather than $\frac{36}{84}$.

Those students who set up two columns and worked separately on the two groups had the greater chance of success.

Question 13

In part (a), the great majority of students recognised and were able to explain why 7 could be the next term of the given sequence. The usual incorrect response was from those who insisted that Emma must be wrong since the pattern was one of doubling resulting in 8 as the next term. Many students did not explain the rule well or gave an ambiguous explanation. Those that annotated the original sequence made their explanation clearer. Another common incorrect response was 1+2+4=7, using the sum of all previous terms.

In part (b) most students usually gained at least one mark for a 5th term of 15. Many correctly completed subsequent terms of the sequence but then chose 45 as the 8th term, applying eight differences by mistake.

Question 14

Most students knew to calculate the cost of one kilogram of carrots by dividing £1.80 by 3 and subsequently secure a second mark for working out the cost of four kilograms. Problems arose when trying to work out the cost of one kilogram of potatoes. Many subtracted £1.80 (instead of £1.20) from £3.45 and then divided by 5. Some subtracted £1.20 but then made an arithmetical error, usually resulting in a value of £2.20 giving 44p as the cost of one kilogram of potatoes. A considerable number ignored the 2kg of carrots and divided 3.45 by 5 to find the cost of 1 kg potatoes as 69p.

Question 15

The first two parts of this question were not answered well. $2ad$ or $2a + d$ were common incorrect answers in part (a), whilst in part (b) very few demonstrated any understanding of factorisation. y and y^2 were often incorrect answers offered here.

Students had greater success with part (c), gaining full marks for an answer of 11. Many students showed the value of x as 11 in their working but then gave an answer of 44 on the answer line. Very few students used algebra explicitly in the question and many took the wrong first step by subtracting instead of adding 7.

Question 16

In part (a) many argued that Jasper was not correct because x could not be a decimal. The few who did substitute $x = 0.5$ into the given expression usually got the right idea and correctly explained the error. Only a very small minority gained any credit in part (b). Use of algebra was very nearly non-existent with students instead preferring to attempt numerical methods which were usually doomed to failure. The most common incorrect approach was to assume all 4 sides of the kite were equal and divide 64 by 4. A few students gained a mark for writing $3(4x – 2)$ or $12x – 6$, some then went on to incorrectly equate that to 64. Some thought they were dealing with angles and introduced "360 degrees" into their working. Even when students correctly calculated *AD*, they were then unable to link this to an equation or expression for perimeter. Lots of incorrect responses featured students simply setting $4x - 2 = 64$ and then attempting to solve from there; this gained no credit.

Question 17

Whilst the context of this question was not unfamiliar, many students worked purely on complete batches of 12 biscuits in part (a), not realising that additional biscuits could be made from the remaining ingredients. Consequently, an answer of 36 was the modal answer which gained 3 of the 4 available marks. A variety of processes were seen in determining the greatest number of biscuits (or batches), build-up methods being most prominent. Work was often poorly laid out and not shown sequentially and many worked with only one or two ingredients, losing potential credit.

In part (b) it was sufficient to identify 'flour' solely as the critical ingredient preventing more biscuits (or batches) being made. However, few did this, referring to "other ingredients" or butter as well as or instead of flour.

Question 18

Tables of values were seen but very often with very many errors in them, especially for the calculations involving negative values of x. Often correct values shown in a table were contradicted by incorrect points plotted on the grid, thus negating any award. It was still not uncommon to see the correct points plotted, but not joined with a straight line. However, there were some indications that stronger students managed this by using the gradient and y-intercept rather than by drawing a table of values.

Question 19

Most students gained at least one mark for correctly calculating the actual loss of £24 but very many were unable to represent this as a percentage of the cost price of the watch. 24% was the most common incorrect answer seen. Some students correctly quoted £80 = 100% but were unable to use this to answer the question.

Question 20

Complete solutions of this long multiplication of two decimal numbers in part (a) were scarce. With whichever method adopted, students need to be aware that initially ignoring the decimal points and multiplying, in this case, 367 by 42, was the best way to approach this calculation. Far too many students made place value errors in their chosen method largely by trying to include the decimal parts in their calculation. Where students had a correct method, it was common to see incorrect answers due to times table errors.

In part (b), again fully correct solutions were few and far between. Simply dividing 59 by 16 was too great a demand for many. Those that attempted the division were often able to gain the first mark for the first digit being 3.

In both parts, encouragement should be given to work out an estimate to identify the size of the answer and hence place the decimal point correctly.

Question 21

Many students were able to gain at least one mark, and often more in this question. The universal set was often incomplete with the omission of the numbers 4, 8, 10 and 16. Some students lost marks by duplicating entries in each region, so it was not uncommon to see, for example, the intersection containing, 6, 6, 18 and 18 or 6 (18) in all three sections.

Question 22

It was very pleasing to see many good attempts at this question. Many students scored at least one mark for either writing both fractions as improper fractions or for writing two fractions with a common denominator. In each case one error was condoned. Some students found it difficult to subtract $\frac{10}{15}$ from $\frac{3}{15}$ to give a negative value of $-\frac{7}{15}$ and simply wrote $\frac{7}{15}$. Some reached a solution of $\frac{23}{15}$ but then failed to convert it into a mixed number. There were still many who simply subtracted the three separate components, whole number, numerator and denominator leading to a common incorrect answer of 2½. Where improper fractions were used, many students failed to realise that a common denominator was still required for the subtraction of the fractions, getting $\frac{21}{5} - \frac{8}{3}$ then subtracting to get $\frac{13}{2}$.

Question 23

Whilst some students were able to fully complete a solution for this problem, many were unable to find 20% or 30% of the required value, often getting confused with the numbers of 'zeros' involved. It was not uncommon to see 10% of 220 000 given as 2200 or 220. A great many students lost marks because they did not show a mathematical method, simply writing "20% of 220000" gains no marks whereas $\frac{20}{100}$ × 220 000 gets the method mark.
Many students found the correct decrease or increase of £44 000 and £48 000 respectively and went no further. The fact that one was an increase in value and one a decrease in value was often missed. Again, students must read the questions carefully. Of those who did gain the correct values many failed to say which was the larger amount, thus failing to gain the final mark.

Question 24

Many students found the sum of the ratios (26) perhaps thinking that they were required to share an amount with the given ratio. Some ignored the 24 and simply subtracted 4 from 15 for their answer. Marks were available for build-up methods of finding equivalent ratios, but 12 (:21) : 45 was required for both method marks.

Question 25

This question was not well answered. Many students gained some reward for dividing the volume (750) by the length (25) but were then unable to equate their result to the area of the cross-section. It was rare to find any formula given for the area of the cross-section or volume. An answer of 6 was awarded one mark for those students incorrectly working with a cuboid.

Question 26

This question was not well answered. Some students gained a mark, usually for substituting 3 into the given formula for the surface area of the sphere. Some gave a numerical value for pi and attempted to find the surface area of the sphere, with varied success.

Question 27

Only a few students correctly found either bound for the length of the pencil; 7.1 and 7.2 or 7.3 were the best of the sensible incorrect attempts.

Question 28

In this cohort, very few students showed any understanding of $y = mx + c$
Closest attempts were 3 or 4 in part (a) and (3, 4) or (3, -4) in part (b).

Summary

Based on their performance on this paper, students should:

- show clear, ordered working for all questions
- show full working if using a build up method for finding a percentage of an amount
- practice long multiplication and long division of decimal values
- ensure that they read the question carefully and so provide the answer required by the question

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