Pearson Edexcel

# Examiners' Report
# Principal Examiner Feedback

## November 2020

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

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

## Introduction

The understanding of many of the concepts on this paper was sketchy. Areas of the curriculum that need more attention include, inverse operations (Q12b), bearings (Q13), estimation (Q18), algebraic equations (Q19c), multiplication of fractions (Q21), angles on parallel lines (Q25), complex ratios (Q29) and rearrangement of formulae (Q30a).

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

A key source of error on this paper was the inability by many students to deal with multiplying and dividing by multiples of 10. This often led to unsuccessful working particularly in questions 10, 13, 18, 24 and 28.

## Report on individual questions

### Question 1

Very few failed to earn the mark here although 0.32 and 0.35 were often reversed.

### Question 2

Very few errors at all here.

### Question 3

Whilst a correct answer of 5 was given by the majority of candidates, answers of 4.7, 4700 and 5000 were not uncommon.

### Question 4

A significant number of students failed to score here with 0.25 a common incorrect answer, together with 3.4 or 0.34 or 75%.

### Question 5

Most students correctly recorded the value of the 7 as 700 or 7 hundred, a significant number just gave an answer of ‘hundred(s)’ and so failed to correctly answer the question.

**Question 6**

Both parts (a) and (b) were answered well, part (a) less so than part (b) with crosses seen between the ½ and 1 marks on the scale. While their intention is clear, some students could improve their accuracy by placing their marks more carefully.

**Question 7**

The great majority of students scored well on this question. Loss of marks usually centred on incorrect, inconsistent or ambiguous keys. Some students lost a mark by trying to describe the key in words without drawing a pictorial representation.

Many students offered alternative keys to that required, accompanied by amendment to the given representation for Monday, but were able to score full marks if their pictogram was correct in relation to their key.

**Question 8**

In parts (a) and (b), failure to score full marks was usually a result of reversing the coordinates. Similarly, in part (c) the most common error was to plot the required point at (1, -2). Many students failed to label their chosen point, but if correctly and unambiguously plotted, the mark was awarded.

**Question 9**

Whilst the correct answer of $\frac{3}{7}$ was the modal answer to part (a), an incorrect answer of ¾ was common. Part (b) was the first poorly answered question on the paper. Many did correctly partially simplify the given ratio to earn one mark or showed an intention to divide both numbers by 12, but few gave the answer in the required form, failing to appreciate that the first number in the ratio had to be 1. Answers such as 1 : 3 or 1 : 2.6 (failing to convert $\frac{6}{12}$ to 0.5) were often seen from weaker students.

**Question 10**

It was pleasing to see many students scoring well on this question; often only poor arithmetic in calculating 70 × 3 and 50 × 9, or the addition of these products, prevented the award of full marks. However, a significant number of students were unable to correctly work out ¼ of 12, a value of 4 being the most common error. This error could be followed through if a correct method to find ¼ of 12 (for example 12 ÷ 4) had been demonstrated. Unfortunately, this was not often the case.

**Question 11**

Very few errors were seen here with the vast majority of students being able to reflect a shape in a given mirror line. Mistakes that were made were usually either a reflection in a different vertical line or translating and occasionally rotating instead of reflecting the given shape.

**Question 12**

Part (a) was answered well demonstrating clear understanding of number machines.

Part (b) was less well done with a great many candidates unable to reverse the operations. Many assumed that the 41 was another input to be computed giving 79 as their answer. Some realised the need to take the operations in reverse order and so worked out 41 – 3 (= 38) or partially reversed the operations by dividing 38 by 2 thus failing to use inverse operators successfully. A number of candidates showed a correct embedded solution
$22 \times 2 = 44 - 3 = 41$ but failed to identify 22 as their answer.

**Question 13**

Part (a) was very poorly answered indeed. Clearly many students did not understand the concept of bearing and very few candidates measured an angle.

Part (b) saw more success with many realising the need to measure the length of *AB*. 5cm or 50 mm being the most common result. Many correctly used the given scale but were then often unable to convert their distance (usually 125000 cm) into kilometres with very few obtaining a correct answer in the required range. Some thought that there was a link between their bearing in part (a) and multiplied this by 25000. Some students unfortunately did not have the measuring equipment needed to be able to attempt this question.

**Question 14**

Only a handful of students failed to score at least one mark in this question, with the majority correctly filling in at least two aspects of the given information. Many correctly completed the top row and this usually resulted in a fully correct table.

**Question 15**

Many students did not read the question carefully enough and never truly realised that the drink was made from orange squash and water. The most common incorrect solution was simply to multiply 750 by 9 thinking this was the complete drink. This was often followed by 6750 being rounded up to 7000 to give an answer of 7 litres. Such ‘correct’ answers from incorrect working did not gain full marks. It was also very clear here that a great many students did not know the conversion factor for millilitres into litres; 100 m*l* = 1 litre was often seen.

**Question 16**

Part (a) was poorly answered as many students did not refer to the median of the number of points scored, choosing to concentrate their attention on the values in the frequency column, often giving 3 as the median. The 5 in the frequency column was a clear distractor for many students. Some students said the median was 2 since 2 is the middle number of 0, 1, 2, 3 and 4. This gained no credit and often prevented the award of the mark when a correct partial explanation was given.

In part (b), many spotted the error made by Tina and earned the mark. Many said that the correct answer was 37 but never described the mistake as the question asked. Jumping ahead and thinking that a calculation of the mean was required was a common fault.

**Question 17**

Again, many students failed to read this question carefully enough by simply concentrating on Tuesday, assuming the normal price of £500 needed to be reduced by 20% This gained no credit if Monday was ignored. However, it was pleasing to see that many of the most successful students identified $\frac{1}{10}$ of 500 by 500 ÷ 10, they correctly found the sale price on Monday, were very clear in separating Monday from Tuesday in their working and went on to complete a fully correct solution. Many weaker students were able to score one mark for correctly working out $\frac{1}{10}$ of £500.

**Question 18**

Far too many students tried to work out the exact result for this calculation, employing methods of long multiplication and division. It should be made clear to students that such methods are not appropriate when being asked to work out an estimate for a calculation. Much time was wasted during the examination by students failing to understand what is required in estimating problems.

800, 300 and 50 were of course the most common estimated values used but subsequent calculations using these values were often flawed. The result of 800 × 300 was often written with an insufficient number of 0s and division by 50 was poor, with many simply halving or rounding their product while some divided it by 100 and then by 2.

Students using 290 as an estimated value for 289 usually made errors in subsequent calculations.

**Question 19**

Algebraic manipulation is not a strong point for many Foundation students however it was pleasing to see many correct expressions in both parts (a) and (b). $x^2 - 4$ and $4x$ were common incorrect answers in (a) whilst in (b) the inability to factorise led to a multitude of incorrect offerings.

In part (c), many used non-algebraic methods to correctly solve the given equation by showing that the value for the bracket needed to be 4 with $28 \div 7 = 4$ and $9 - 5 = 4$ often seen. In some cases incorrect answers of, for example, 4 were written on the answer line. The most common errors in this part were either adding 5 to 28 or subtracting 7 from 28. Failure to multiply both terms in the brackets giving something like $7f - 5 = 28$ was a common first step.

**Question 20**

The great majority of students recognised 3 as the difference between terms of the given sequence of numbers. This alone gained no credit as further processing was needed to form a general expression in terms of $n$. Many students did gain full marks but incorrect answers of $3n + 2$ or $3n$ (which were awarded one mark) and $n + 3$ or $-2n + 3$ (which failed to score) were common.

**Question 21**

Many students were able to correctly convert the given mixed numbers to improper fractions, gaining one mark, though fewer demonstrated an ability to multiply two fractions together and simplifying before multiplying was seldom seen. Often attempts were made to add the two fractions or cross multiply the two fractions. For those who carried out the fraction multiplication correctly, it was necessary to show further processing or correct cancelling to complete their answer. Some candidates felt the need to convert to equivalent fractions with common denominators and then found the numbers too difficult to deal with.

**Question 22**

The most common mistakes here were in getting *B* and *C* and/or *A* and *D* the wrong way round. Having said that, many scored at least one mark.

**Question 23**

Although the correct pairing of *A* and *D* was often seen, *A* was often paired with an incorrect triangle.

**Question 24**

Many students were able to find the selling price of the 24 bars of chocolate, either in pence or in pounds, but few were able then to work out the percentage profit, often quoting the £12 selling price or the £2 profit made as 12% or 2%. Students who attempted to work out the cost of each chocolate bar usually found an incorrect value and then got no further. Some tried to achieve this by dividing 24 by 10.

**Question 25**

This question was very poorly attempted with few understanding the concepts of angles on parallel lines. Those who did, usually found the correct angles in triangle *AEB*. Of these all but a few scored no marks for either giving no or incorrect reasoning for their working. Very few students appeared confident in using correct angle notation, with the majority of the correct answers shown on the diagram rather than in the body of their working, and angle *AEB* often just referred to as *E*. Far too often the triangles were taken to be isosceles with $32^o$ as the base angles for triangle *AEB* or $63^o$ as the base angles for triangle *ADC.* Sometimes equilateral triangles were assumed. In all such cases no marks were available. Disappointingly, quite a few candidates used 360 for the number of degrees in a triangle.

**Question 26**

It is very disappointing to note that only a small minority of candidates considered any measure of spread in their solutions. Finding the median of the boy's heights was often attempted with varying success, 167 cm or 167.5 cm being common errors.

Far too many students failed to answer the question and offer any comparisons in their solutions, preferring to merely state values of the girls' and boys' heights, namely the least, the greatest and the median heights. It does seem that a good number of students were not sure what 'compare' actually meant with many simply commenting on the presentation of the data, or using words such as "whereas", "but" or "only" in an attempt to compare.

**Question 27**

Only a few students correctly found the area of the base by dividing the volume by the height of the prism. The formula was often incorrectly used with the area as 18 or 54 ($18 \times 3$). Those who correctly found the area of the base usually went on to complete a fully correct solution.

**Question 28**

Many students were able to score at least one mark here for ordering at least three of the numbers correctly. Many students were let down by their inability to write the given numbers in the same format, usually as ordinary numbers. $6.72 \times 10^5$ was often written as 6.72000 and $67.2 \times 10^{-4}$ as 0.0672 or 0.000672. Some thought that the largest powers would indicate the biggest number resulting in the largest two being the wrong way round. There were a great many transcription errors with students unable to correctly copy down the four numbers.

**Question 29**

Only a very few students were able to fully solve this problem, with many failing to even attempt this question. Some were able to write the fractions in correct ratio form gaining one mark. Some also earned one mark for $\frac{6}{15}$ or $\frac{15}{20}$ although this was often followed by fraction addition. Many gave an answer of 2 : 8 : 4 where they had simply added the two values of *b*. The layout of their solutions aided those who tackled it methodically.

**Question 30**

Part (a) was answered correctly by only a small minority of students. Some demonstrated an intention to subtract 7 but never applied this to both sides of the formula. Many tried to subtract 6 from either/both sides and some simply swapped the $p$ and $q$ around to make $q$ the subject.

In part (b), the usual incorrect answers of $m^{-5}$ and $m^{-6}$ were seen, but many did write correct answers.

**Summary**

Based on their performance on this paper, students should:

- read questions carefully.
- take care when presenting solutions. Too many students used the working out space for random calculations instead of an ordered, fully explained solution.
- ensure that they know how to find a fraction and/or percentage of a quantity.
- re-visit all aspects of bearings.
- know how to covert between metric units both of length and capacity.
- demonstrate algebraic processes in solving simple algebraic equations.
- fully revise angles on parallel lines.

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