GCSE
MATHEMATICS

8300/1F: Paper 1 (Non-calculator) Foundation

Report on the exam

November 2022

Contents

The below table is interactive. You can press the control button click on the title of the question to go directly to that page.

Summary

Overall performance compared to last year

The overall performance is midway between the previous two series and on a par with the series before those. The question paper felt to be around the same level of difficulty as in recent series.

Topics where students excelled

- time
- calculating a radius from a given diameter
- fractions of amounts
- comparing costs
- calculating from a given mathematical sentence
- simplifying expressions

Topics where students struggled

- indices
- solving equations
- column vectors
- calculating using fractions
- inequalities
- Venn diagram
- trigonometry

Common misunderstandings

Question 12b saw students simply subtract the 60 and work with 140 and 60 to get to their final answer.

Question 13 saw students offering the correct answer to the question Emma was solving, but not giving a criticism of the method.

Question 21b often saw students treating the column vector as a fraction and attempting to "simplify" it.

Multiple choice questions

Which questions did students find most accessible

Students found questions 1, 2, 3,4 and 10b easy to answer. These questions had few students not attempting them.

Which questions did students find least accessible

Students found questions 17, 21c and 26 difficult to answer with 21c being the question that more students missed answering.

Common distractors

On question 17, the most common response was the answer of 0.2

On question 26, the most common response was the answer of 10 : 1

Individual questions

Question 5

Students were engaging well with this question and for the most part, able to score at least one mark. The most common wrong answer was 14a – 3b, with the negative having come from the –ve attached to the 2b. There are still too many students combining 14a + 3b to give 17ab. This year it was unusual to see so many 14a 3b on the answer line, with no + or – between them.

Question 6

There was no common wrong answer on part (a), as errors usually arose from arithmetic slips. The vast majority of candidates understood what was required, although some got a little lost and stopped after finding the total for one column or row.

Part (b) was not as well done, with many students stopping at 72, not realising that they needed to halve the number as well. The most common method was to add together the 40 and 32, rather than work each value into a percentage before combining. Build-up methods often went awry, as students were building to an incorrect percentage in most cases. The students who gave the answer for "more than £25" were able to earn the SC1 mark.

Question 7

This question was well attempted by the majority of students. The calculation $\frac{5}{8} \times 80$ was the one that went awry, rather than $\frac{1}{5} \times 30$. Marks were often lost due to the students not showing their working. It was not uncommon to see answers such as $\frac{5}{8}$ of 80 = incorrect value, which is a shame, because the showing of the intended calculation (even if it cannot be done accurately) is worth a mark.

Question 8

Most students understood what was required and how to get the correct answer. Errors occurred in the addition of 65 and 19 or in the subtraction of their total from 100. Those failing to score forgot that the subtraction was necessary or wrote 84 – 100 and did not recover to give the correct response.

Question 9

The most successful students on part (a) drew the required triangle on the grid, before starting to calculate the area. The most common wrong answers were 5 × 6 = 30 or to find the area of the right-angled triangle, whose hypotenuse was the given line. The less able students measured the given line.

In part (b) it was pleasing to see many candidates drawing a parallelogram (even if the area wasn't always 24 cm^2). Students who attempted to draw a non right-angled triangle with area 24 cm^2 often miscalculated and ended up with an area of 12 cm^2.

For part (c), the most common error was to draw a kite, instead of a rhombus. For those attempting a rhombus, the mark was sometimes lost due to a counting error along the lines of symmetry. It was quite disappointing to see so many drawings that did not use a ruler. It is advisable for students to be equipped with a ruler, in order to better answer this kind of question.

Question 10

Incorrect answers on part (a) were usually a result of attempts to *do* the division, rather than to work from the calculation given, but on the whole, this was a well answered question.

Question 11

Students engaged well with part (a) of this question. The usual reason for loss of marks was to stop too soon; after the 5 had been calculated. There were many instances of repeated addition working well for the students, but for those who went awry, it was often the 36 that was omitted.

Part (b) was equally well attempted but not quite as well answered. The most successful method was $2.70 + 4 \times 0.56$, scoring two marks even if there was an arithmetic slip along the way. Mixed units used in working were often recovered to give the correct answer. Students who were unable to see their way to the end of the question, were able to score marks for calculations that would have been used in a full method.

Part (c) is another example where we would really like to see method shown, so that we could award those marks. Students who state that half of £3.20 is an incorrect value couldn't pick up the mark available for dividing £3.20 by 2 because the method must shown in order for the examiner to award the mark. Students who began multiplying the £3.20 by 4 often added the £1.60 instead of subtracting it.

Question 12

In part (a), many students were not able to make correct conversions but could still pick up the mark for a correct method; unfortunately it was often the case that the wrong values were added and subtracted. Correct conversions were awarded marks even when implied, for example, seeing 4.8 km enabled us to award the conversion mark, as that figure comes from adding the three distances, meaning that 0.8 km must have been used.

In part (b) it was unusual to see a correct answer. The students did not understand how to use the 60 metres correctly. The most common approach to the question was to subtract the 60 from 200 to get 140 and then to simplify the ratio of 140 : 60 to give their final answer. Students who scored on this question usually scored the B1ft for the correct simplification of their ratio.

Question 13

This question required a criticism of Emma's method but the students mostly told us what the answer ought to be, without any criticism. Whilst there were many scripts showing what the correct answer should be, without the criticism, we are unable to award a mark. For the student who attempted a criticism, the most common response was the Emma had added the 2c and 2d in order to get 4cd.

Question 14

A common approach to this question was to use a formal method of multiplication and simply "drop" the decimal point all the way down, effectively reaching an answer of 96.2 and not use any form of estimation to check the appropriateness of their answer. Very few pupils attempted 37×26 and subsequently replaced the decimal correctly. We saw all approaches to the multiplication and no method was particularly prone to more errors than the others.

Question 15

Lots of candidates were able to access this question and in part (a) this was shown by them collecting like terms to give $\pm 5x$ or ± 4 as a correct start. Some failed to reach the correct decimal answer from $5x = 4$ with 1.25 a common incorrect, final answer; students are encouraged to leave their answer as a fraction. Attempts using trial and improvement were not usually successfully as the answer was a decimal, therefore more difficult to "find"; students are encouraged to use an algebraic approach for this type of question. Multiplying throughout by 5 was a correct first step in part (b), made by many candidates. It was necessary to follow this up with intention to halve in order to score but it was pleasing to see so many start this way; the algebraic approach being a more efficient method for this style of question than a trial and improvement approach. Many students however are still forgetting to change the operator when using values on the opposite side, so we saw lots of attempts at $14 \div 5 \times 2$, which often went wrong due to the decimal nature of the result.

Question 16

For bag A there was a common misunderstanding of the statement "twice as many red as green" leading to 56 green discs in the bag in part (a). The ratio red to green for bag B caused fewer difficulties. The correct totals for bag A, bag B, red or green allowed many to score two marks. The students engaged well with this question and were happy to move on to part (b) where was a common misunderstanding of the total number of discs in each bag, evidenced by the variety of denominators seen. We were still seeing probabilities given as ratios or as words, eg impossible, and this style of answer cannot be awarded any marks.

Question 18

Most candidates were able to access the question and realised that they needed to divide by 10 and then multiply. Some students found it difficult to work with 6.2 in the multiplications. A common misconception (as is usual in this kind of question) was to divide the total by 3 and by 7 and give these values as the final answer. Trial and improvement often failed as the answers were both decimals.

Question 19

Students found this challenging but it was great to see a high proportion attempting the question. Few scored both marks but were able to score a B1 for odd + 1 = even or odd × even is even or correctly multiplying out the bracket to give $n^2 + n$. Many tried to use numerical examples which could not score as they'd only "prove" the statement for one or two instances. The students who stated odd + odd = even, needed to continue their argument to explain that odd^2 is odd in order to score a mark.

Question 20

The answers to this question encompassed all manner of options but the most common wrong answer was that "The women have a higher median than the men" was often marked as "Definitely true".

Question 21

It was pleasing to see so few answers written as coordinate pairs. In part (a), a large proportion of the students had a 4 and a 1 involved in their answer, but the –1 was less common.

In part (b), lots of students saw the vector $\begin{pmatrix} 12 \\ 8 \end{pmatrix}$ as a fraction that needed to be simplified, to the most common wrong answers were $\begin{pmatrix} 6 \\ 4 \end{pmatrix}$ and $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$. As is quite common on these questions, there were quite a few answers of $\begin{pmatrix} 8 \\ 12 \end{pmatrix}$.

Question 22

A large proportion of students were able to score at least one mark on this question. It was most common for them to be able to score the second mark, demonstrating their knowledge of dividing fractions. Often, the subtraction answer was given as $\frac{3}{5}$ but showing $\frac{3}{5} \times \frac{3}{2}$ as the next step enabled those students to score the second mark. Using decimals in this question was not unusual, and the final answer of $\frac{6.5}{10}$ was quite common, as students approach the division by using division, instead of inverting the second fraction and multiplying.

Question 23

Many students didn't recognize that the 4 needed to be processed, so we saw lots of answers listing the integers from 12 to 24. For those that processed the 4, the final answer was often missing the 3 or the 6. It was common to see the student split the inequality and work with one side. The most common version of this was $3 \leqslant x$, enabling one mark to be awarded for a solid start to answering the question. This question had the greatest number of non-attempts.

Question 24

Students were comfortable attempting this question but very few were able to score more than one mark. The $\frac{3}{4}$ of 120 didn't prove difficult for students to calculate, but they often placed the 90 in the wrong place on the Venn diagram. Students did not understand that there were too many people represented in the Venn diagram if they did not calculate the value of the intersection. It was common to see the 120 placed where the 90 should be, and the 90 placed in the intersection. The answer that was seen the most was to place 87 outside the circles and 0 in the intersection.

Question 25

Students appreciated the need to simplify $3^6 \times 3^5$ but were unable to progress any further. The simplification of this expression was varied, many did reach 3^{11}, but students still felt that the process was to multiply 3 by 3 as well as adding the indices and reached 9^{11} as their interim answer. Many students after reaching 3^{11}, went on to add the index of 7, to give a final answer of 3^{18}. The less able students answered by attempting to multiply out all the 3s but were unable to process the resultant, large numbers. The other approach shown by the less able students was to work with $3^6 = 18$ and $3^5 = 15$ and attempt to simplify them in some way to get a 1, as required by the question.

Question 27

The majority of students did not use trigonometry in this question. We saw lots of students finding the value of the missing angle and lots of attempts to introduce Pythagoras into their answer. Those scoring full marks had often not shown any working towards that answer. The students who were able to apply trigonometry usually got no further than identifying the need to use cosine.

Further support

Mark ranges and award of grades

Grade boundaries and cumulative percentage grades are available on the results statistics page of our website.

Enhanced Results Analysis (ERA)

Use our exam results analysis tool to create and customise as many different reports for comparison as you like.

Professional development

Attend one of our feedback courses where you can review example responses from students and commentaries from our examiners.

Contact us

Our friendly team will be happy to support you between 8am and 5pm, Monday to Friday.

Tel: 0161 957 3852

Email: maths@aqa.org.uk

Twitter: @AQAMaths

aqa.org.uk