Questions matter

GCSE
Mathematics
8300/1F: Paper 1 (Non-calculator)
Report on the examination

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Contents

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Summary

Overall performance compared to last year

Overall the papers were of similar demand to last year.

Topics where students excelled

- Finding the square root of a number
- Cubing an integer
- Converting from pounds to ounces
- Changing an improper fraction to a mixed number
- Ordering a fraction, a decimal and a percentage
- Solving a money problem
- Completing a frequency tree
- Identifying an odd number and a prime number
- Drawing a congruent triangle
- Simplifying a ratio
- Counting the faces on a hexagonal prism

Topics where students struggled

- Enlarging by a fractional scale factor
- Creating an accurate drawing of a given shape
- Creating a number machine that didn't directly use the coefficient of x
- Recalling exact trigonometric values
- Finding the area of a circle which has a smaller circle removed
- Moving from 10 people on a job to 15 people and calculating the new time taken

Individual questions

Question 1

The first two parts of this question were answered well. A common wrong answer for (a) was 72. In part (b), the usual mistake was to do 3^4 or 3^2, giving answers of 81 or 9. For (c) we saw a lot of answers that looked like students were trying to give us standard form, eg 1 × 104.

Question 2

This was done well with most students knowing they needed to multiply 16 by 3. The incorrect answers were usually from a miscalculation. There was little difference in the success rates between those who used formal multiplication methods and those who used repeated addition.

Question 3

Students felt well placed to answer both parts of this question. 3a was not as well answered as it should have been with lots of $2\frac{1}{2}$ or $1\frac{1}{3}$ seen. The expected, incorrect answer of $\frac{2}{10}$ was seen very often, in (b).

Question 4

It was pleasing to see this quite well answered. Although not every student scored full marks in (a), the vast majority knew what we were looking for and usually only dropped a mark because one factor wasn't listed (most often 1 or 20). It was rare to see an incorrect factor creeping into the list. Students who listed the factors in pairs did not often have a missing factor. There were students (enough to mention) who treated this as a prime factorisation question due to their misconception over the word 'factor'. In (b) this was a straightforward "Give a counterexample" question and most students tackled it well. Some saw the word 'multiple' in the question and started to multiply by 5, the most common, incorrect answer being 5 × 5 = 25.

Question 5

This question was well done, most students scored both marks. Some lost a mark as they thought 0.7 was 7% or they converted 80% to 0.08. A small percentage of students got the special case mark as they put their answers largest to smallest instead of smallest to largest. It was not unusual for students to show no working but not have the numbers in the correct order. They would possibly have scored a mark if they'd shown a conversion.

Question 6

Most students correctly identified a suitable method for calculating the price of a scarf. There were a large number of arithmetic errors seen, particularly with the division but this didn't stop them scoring for using a fully correct method: students who showed their working could still gain three marks despite these errors. A number of students reversed the quantities but could still be awarded two marks.

Question 7

Students were generally happy to complete the frequency tree. The small number of errors was in finding the number of left-handed adults. Part (b) was answered reasonably well although many students struggled to correctly simplify the fraction. One common, incorrect answer was to use a denominator of 120 instead of 80, but those students could go on to score one mark for correct simplification of their fraction.

Question 8

When referring to the third bar, we needed to see that it was 'wider' or 'thicker', not simply that it was 'bigger' or that it was the 'wrong size'. The reading on the third bar was correct at 37 but was quite often quoted as being incorrect. Some strange things that were mentioned quite a bit were '80 is missing from the y axis', 'the x axis should have an arrow on it', 'the numbers should go up in 5s' and referring to the individual bars as 'bar charts'. Most students had a good go at this question and were able to score at least one mark.

Question 9

This question was well attempted on both parts. The most common wrong answer in (b) was to include 2 as a square number (perhaps remembering that it's a prime number).

Question 10

Part (a) behaved as it usually behaves. Standard incorrect answers of $6m - 11$ and $10m + 3$ were common. Many students carried on to combine the m coefficient with the constant term. Part (b) was less well answered with 30, 6.5 or 12 being seen instead of the 3. More students were able to score for cd than for 3. The less able students simply removed the × signs from the question.

Question 11

The most common approach was to use Alternative method 1 for this question and the majority of those students were successful to at least 3 marks. Arithmetic was the cause of a dropped mark, using this method, rather than a conceptual error. The students who did not show working to find 10% of their £3.30 often stopped scoring at that point because their 10% was usually incorrect (often just 10) and it was not uncommon for them to correctly find 33p and go on to multiply by 6. Alternative methods 2 and 3 were less commonly seen and when seen not often fully successful.

Question 12

5 and 8 were common wrong answers from $6 - 1$ and $6 + 2$ by students who didn't understand what was required of them and so attempting to make some sort of attempt at a 'standard' ratio question. Occasionally we saw answers of $3n$ or an unprocessed $\frac{6}{2}$.

Question 13

Those who tested some values were usually more successful than those who just juggled the numbers mentally. Often not enough values were tested to be able to answer whether 'sometimes true' was possible. Students seemed to choose one set of values and test, based on that one set. It is advisable when numbers can be from such a wide range, that students understand to check a few different sets before making their decisions.

Question 14

Part (a) was extremely well answered with most students understanding congruence. Often the triangle was reflected, but this was still a perfectly valid answer. The incorrect answers were usually an isosceles triangle. Part (b) was not well answered with the vast majority of students trying to use a scale factor of $1\frac{1}{3}$ instead of just $\frac{1}{3}$. They seemed to have no understanding that a fractional scale factor will make the shape smaller.

Question 15

It was pleasing to see so many knowing that they needed to divide by 7 and not 6, as is so often the case. Lots then went on to find that 30 is 6 parts and then stopped, missing out our requirement for how many 'more' books there were, which cost them the final mark.

Question 16

It should be noted that students are required to have a ruler and a pair of compasses to do any of the three GCSE maths papers. Very few had these mathematical instruments or attempted to use them. Most often the only mark gained was for correctly drawing three sides of a 6cm square. Even though this was also freehand, the given grid was very helpful to them. Many students incorrectly counted when drawing the straight lines and it was not uncommon to see 5cm, 6cm, 5cm going around the shape.

Question 17

The students who worked out how many sets of 5 minutes appear in one hour were usually the most successful. Those who started with 4 ÷ 5 or 5 ÷ 4 rarely completed the solution. The most common, incorrect answer was 20, coming from 5 × 4

Question 18

Students showed a good understanding of coordinates and equally spaced points. Sometimes the arithmetic went a little awry, but those students usually scored 2 of the 3 marks available. Some students muddled the x and y coordinates, but they were also still able to score 2 of the marks. Students who didn't know where to begin were answering as if we'd asked for the midpoint of the given points.

Question 19

Some students were still adding instead of multiplying and the decimal point was often in the wrong place, even when multiplication had gone smoothly. Students who tried to break the 1.5s into smaller chunks to multiply (1 × 1, + 0.5 × 0.5 etc) without writing a formal method of some sort often missed out one of the necessary calculations.

Question 20

Parts (a) and (c) were found to be easier than part (b). Quite often the correct number was written but the operator was missing. It was not uncommon to see ×6 or 0 in (c) and the most common, incorrect answer for (b) was –24. It should be mentioned that we need the operator to come before the number.

Question 21

Looking at the working space around the question, it was good to see that students know which is which on mode, median and range but they were often unsure how the change would affect each of these measures. Median was the row that was most often answered incorrectly.

Question 22

This was quite well answered in (a) but we frequently saw incorrect answers of 32 or 128 where students hadn't gone far enough or had gone too far. Part (b) was not as well answered with the main error being to treat the sequence as though it were linear with a common difference of –14. Students who had made an error on the first answer were able to score from their second answer if it was 9 less. The most common of these was –14 with –23.

Question 23

One common, peculiar, incorrect answer in (a) was 2. We can only assume they were counting the faces that showed the shape of the prism. It was not uncommon to see an answer of 7, from miscounting. In (b) we often saw 20 × 3500 from students who were unsure how to start the question. For those doing a correct division calculation, arithmetic often went awry, and we saw a lot of answers of 180. Many students were unnecessarily attempting to adjust the place value after a fully correct calculation.

Question 24

It proved troublesome to students to have to deal with the mixed number before converting it to a common denominator. $1\frac{1}{5}$ often became $\frac{7}{5}$ with no working shown. It was common to see $\frac{6}{5}-\frac{3}{10}=\frac{3}{10}$. Some students converted to decimals, but this was only successful if they'd already identified $\frac{12}{10}$ and remembered to convert back to a fraction for their final answer.

Question 25

Most students did not know the answer. The most common, incorrect answers were $\frac{1}{2}$ and 0.

Question 26

Lots of students tried to use the given ratio to split the larger circle, so we saw a lot of $\frac{5}{12}$.

Many were not comfortable leaving their answer in terms of π, even when they had fully correct calculations. 12^2 was often seen as 24.

Question 27

Students were not confident answering this question. Correct working was rarely seen, and the most common approach was to halve 9 and add the 4.5 to the 9 for the answer. Very few knew how to make a correct start or work out the total number of 'person hours' involved.

Further support

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