Questions matter

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

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Summary

Overall performance compared to last year

The mean mark was much higher than in November 2023. Students seemed far more comfortable with the questions in the second half of the paper, indicating that there was a spread of entries across the range of grades, rather than mainly grade 4 and 5 resit students.

Topics where students excelled

- Subtracting a fraction from a mixed number
- Adding vectors
- Converting a recurring decimal to a fraction
- Multiplying out three brackets

Topics where students struggled

- Constructions
- Enlargement by a negative fraction
- Truncation
- Equation of a circle
- Interpreting a tan graph
- Transformation of graphs

Individual questions

Question 1

The vast majority of students knew to multiply 1.5 by itself, but over one quarter of those who did made an arithmetic error. Overall, over three quarters of the marks were awarded.

Question 2

Parts (a) and (c) were well answered, but students struggled with part (b). The modal answer to part (b) was –24

Question 3

This question discriminated very well, with a fairly even spread across all four possible marks. Within the question, students seemed to have more understanding of the effect on the mode and median than on the range.

Question 4

Part (a) was very well done, and the vast majority of students scored at least one mark in part (b). Those students who went awry in part (b) usually completed more complicated calculations than the ones required.

Question 5

Both parts were done well, with the vast majority scoring the mark in part (a) and three quarters of the marks being awarded in part (b). Some students made arithmetic errors in part (b) when dividing 3500 by 20, and others multiplied instead of dividing.

Question 6

This was the most successfully completed question on the paper, with most students scoring both marks. Those who went wrong often incorrectly converted $1\frac{1}{5}$ to $2\frac{2}{10}$.

Question 7

This question was well answered, with over three quarters of the marks awarded. Very few students failed to realise that the radius of the smaller circle was 3 cm, but some used incorrect formulae to work out the area. A common error was to say that $12^2 - 3^2 = 9^2$

Question 8

Approximately half of the marks were awarded in part (a), where a very common misconception was to say that each person had to work for 0.9 hours, giving an answer of 13.5 hours. Students should check the sense of their answers, as here this meant that more workers led to a greater time. Part (b) was done slightly less well, where the most common incorrect answer was 'It is less than the answer to part (a)', presumably because more people worked at a faster rate than at a slower rate.

Question 9

This question was very well answered. The majority of the students who didn't score attempted some form of matrix multiplication.

Question 10

This question discriminated well, with a good spread of marks. Those who made a mistake in one of the three numbers inside the circles usually still scored the final mark by making their values sum to 150. The main example of this was the students who worked out that 69 is 46% of 150, forgot to subtract 18 and put the 69 in A only, got 18 and 60 correct and then put 3 outside the circles.

Question 11

Most students struggled with this question, as is often the case with constructions. Approximately one quarter of the students achieved full marks, but few of the others made any progress, with over 10% making no attempt.

Question 12

Students were more successful in part (b), where converting from a recurring decimal to a fraction is becoming a well-known standard procedure. While over 40% of the marks were awarded in part (b) there were many incorrect attempts, with relatively few students realising that dividing 27 by 11 would lead to the answer.

Question 13

The vast majority of students understood what was needed in part (a), with very few attempting to use the given numbers in calculations. Evaluating cos 60 was usually the sticking point, with a variety of incorrect values seen. Overall, over 50% of the marks were awarded, which is a good return for questions of this nature.

In part (b), again over 50% of the marks were awarded, with nearly three quarters of the students identifying that the subtraction should be addition and/or that the addition of the square numbers was done incorrectly. Relatively few students identified the other error, perhaps because they already thought they had found two.

Question 14

This question was not answered well, although just over one third of the students scored one mark for drawing a triangle of the correct size. Students who were successful usually drew in the rays to find the vertices of the image. One eighth of the students made no attempt.

Question 15

Most students scored at least one mark in part (a), but over half of these went wrong when dealing with the negative values and ended up with the inequality symbol the wrong way round. Approximately 40% were successful in part (b), with the usual errors of filling in the circle and forgetting to add an arrow regularly seen.

Question 16

This topic has not been regularly tested, and students struggle with both the required reason and the correct error interval. The most successful students often identified that the given interval was for rounding to the nearest whole number.

Question 17

Students were slightly more successful in part (b) than in part (a). In part (a), over 40% of the students identified 18 as the radius, but only about one third of these used this correctly in the equation. Using 6 instead of 18 was the most common error. In part (b), roughly 20% of the students were correct, another 20% scored the first mark only for working out the gradient, and nearly all of the rest scored zero or made no attempt.

Question 18

Both parts were done reasonably well, with between 40% and 50% of the marks awarded. In part (a), approximately one third of the students who correctly gave $(x+4)^2$ forgot to then subtract 16 and left the trailing value as –5. In part (b), students generally used two of the values 7, 8 and 0, sometimes going wrong with the sign of the value and sometimes using them for the wrong coordinate.

Question 19

Students are becoming more proficient at multiplying out three brackets, and nearly 70% of the marks were scored in part (a). There were very few non-attempts, and the fairly small number of students who failed to score at least one mark often tried to multiply all three brackets in one go.

In part (b), very few students used their answer to part (a), despite being led to it in the question, but over one quarter of the students achieved the correct answer by long multiplication methods.

Question 20

Approximately half of the marks were awarded in both parts of this question. Although it wasn't perhaps the most efficient method, many students used rationalisation in part (a) as well as in part (b).

Question 21

Students struggled with both parts of this question, with over 20% non-attempts in each. In part (a), –78.69 was an understandable incorrect attempt, but many other values were given with no apparent link to $\tan x$ being 5. It was a similar story in part (b), where students seemed to either be correct or have no understanding of how to reach the answer.

Question 22

This question was done very well for a question at this stage of the paper, with nearly two thirds of the marks awarded. The most common incorrect answer was to link the bottom value to $\frac{1}{2}x$.

Question 23

Part (b) proved to be the best-answered part of this question, closely followed by part (a). Part (c) was the worst-answered question on the paper, with a success rate of less than 10%

Further support

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

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