

# GCSE

# Mathematics

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8300/2H: Paper 2 (Calculator) Higher

Report on the exam

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November 2021

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## Summary

### Overall performance compared to last year

The opening four questions were more straightforward than last year, but overall the paper was of a similar standard to November 2019.

### Topics where students excelled

- identifying a ratio from a statement
- selecting a term in a geometric sequence
- solving a linear equation
- identifying the signs of expressions
- drawing a relative frequency graph
- simple interpretation of a distance-time graph

### Topics where students struggled

- describing a single transformation
- probability from a two-way table
- graphical representation of inequalities
- working out speed from a distance-time graph
- trigonometry in an obtuse-angled triangle
- setting up a quadratic equation

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## Multiple choice questions

### **Which questions did students find most accessible**

Questions 2 and 3 were answered very well. Very few students chose options 3 and 4 in question 2. In the second half of the paper, Question 19(a) was answered well.

### **Which questions did students find least accessible**

A significant number of students chose SAS in Question 4. In Question 16(a), the most popular choice was option 3. The most common answer in Q16(b) was option 1. In Question 20, the correct answer was the third most popular choice.

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## Individual questions

### Question 5

This question was well answered. The most common error was to subtract  $3x$  from  $10x$ .

### Question 6

Many students were able to work out at least one other angle, but fully correct answers were not seen very often. It was quite common for students to assume that another pair of lines were parallel in addition to the given pair. In addition to this, some assumed that the triangle containing angle  $x$  was isosceles.

### Question 7

A common error was to add 85 and 72.4 and divide the total by 2. The question was not well answered.

### Question 8

Only a small proportion of students gave a fully correct answer. Identifying that it was an enlargement was the most common reason to score a mark. The scale factor, when given, was often 4 or  $-4$ . There were a lot of attempts that did not use any correct language to describe transformations.

### Question 9

Most students were able to make some progress on this multistep problem and score at least one mark. A common error was to ignore the  $5000 \text{ cm}^3$ . Most students who got to the stage where they could make a decision did communicate their decision. The question was a good discriminator.

### Question 10

This question was well answered with a majority scoring at least three of the four marks. The second row was most often correct with the third row quite often incorrect. The question was a good discriminator.

### Question 11

Part (a) was well answered. Part (b) was not well answered. A common error was to work out the mean of the five relative frequencies. 0.2 was also seen quite often, probably from 1 divided by 5.

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## Question 12

The majority of students attempted to set up and solve an equation. Many of these did so correctly but did not then substitute into an appropriate expression in order to confirm the line was a diameter. Those who approached the question by using algebraic expressions only were usually successful. Only a few students did not communicate their conclusion at the end.

## Question 13

Although a significant number of students gained full marks there were more who could make no progress at all. Most of those scoring part marks did so by writing their answer in the form  $y = 6x + c$  with an incorrect value for  $c$ .

## Question 14

In part (a), students either knew what to do and obtained an appropriate value or they increased by 12% once and then multiplied their answer by 20. Many students mistakenly thought that  $4200 \times 1.12 \times 20$  was the calculation that increased 4200 by 12% each day for 20 days.

A similar comment applies to part (b). A few increased by 14% again in part (b) instead of using the new increase of 13%.

Part (c) was answered better than the other two parts. The main error was to mix up the 0.4 and 0.6. A few forgot to multiply by 30 and left their answer as 820.

## Question 15

In part (a), some students worked out 0.85 but gave this as their answer. For this reason, part (b) was answered better than part (a). Both parts were good discriminators.

## Question 17

Both parts were poorly answered. Some students added fractions rather than using multiplication, but the most common error was to use fractions with a denominator of 20.

## Question 18

Many students did not know how to tackle this question. Those who attempted to draw graphs were more successful with the vertical and horizontal lines than with the sloping line. The small proportion who drew all 3 graphs correctly sometimes drew a continuous line for  $x + y = 6$ .

## Question 19(b)

The drawing of a tangent was rarely seen with most attempts involving division of 8 by 6. Many students did score the units mark, but a very small proportion gained 2 or 3 marks.

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## Question 21

Expanding  $(3x + 1)^2$  was quite often completed correctly although omitting the  $x$  term was seen quite often. Many made a sign error when expanding the single bracket. The final term when expanding was often incorrectly written as  $-2x$  because students did not multiply  $-3$  by  $-2x$ .

## Question 22

Identifying the single digit options from the three different conditions was quite often completed correctly, but some included 16 as an option for the second digit. Others thought that there was only one cube number to choose from. Another error was to use 40 as the numerator in the final answer. The question produced a good spread of marks and was a good discriminator.

## Question 23

The angle required was often worked out incorrectly, usually as  $125^\circ$ . However, students could still access the marks for applying the cosine rule, but only a small proportion knew how to proceed after working out the angle. Some applied Pythagoras' theorem. There were a significant number who made no attempt.

## Question 24

This question was poorly attempted with most students unable to progress. There were a significant number who made no attempt.

## Question 25

This question produced a better response than the previous two questions although, again, there were many who did not know what to do and made no attempt. Some of those who completed the square correctly had incorrect signs in their turning point answer.

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## 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 supporting student exam preparation [courses](#) which aim to strengthen teacher confidence, in supporting students preparing for exams.



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## Contact us

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

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