

GCSE MATHEMATICS

8300/1H: Paper 1 (Non-calculator) Higher

Report on the exam

November 2022

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Summary

Overall performance compared to last year

The mean mark of 32.2 was slightly lower than the November 2021 mean of 34.1. The high standard deviation this year of 17.3 indicates that the entry was from a wider range of abilities.

Topics where students excelled

- dividing an amount in ratio
- column vectors
- subtracting and dividing fractions.

Topics where students struggled

- equation of a quadratic graph from points it passes through
- working out a quadratic equation from its solution
- intersection of a tangent to a circle and the x -axis
- quadratic inequalities
- geometric proof involving circle theorems.

Common misunderstandings

- On question 8, students often thought that to divide or multiply by a fraction they had to first get a common denominator
- On question 11, many students multiplied the bases as well as adding the indices when multiplying, eg saying that $3^6 \times 3^5 = 9^{11}$ (similarly when dividing).
- On question 19(a), students often thought that the negative index must lead to a negative value
- On question 19(b) it was common for students to multiply both 9 and 100 by $\frac{3}{2}$
- On question 21 a common error was to think that the given recurring decimal was equivalent to 0.6161... rather than 0.6111...

Multiple choice questions

Which questions did students find most accessible

The highest success rates on the multiple choice questions were on questions 4 and 7(c).

Which questions did students find least accessible

The lowest success rates on the multiple choice questions were on questions 3 and 17(b).

Individual questions

Question 1

Over half of the students chose the correct option, with $\frac{28}{36}$ being the most popular incorrect answer.

Question 2

Over half of the students chose the correct option, with $\sqrt{24}$ being the most popular incorrect answer. Very few students chose either of the other two options.

Question 3

Just under half of the students chose the correct option, although it was the modal choice. $\frac{3}{100}$ was the most popular incorrect answer.

Question 4

Nearly three quarters of the students chose the correct option. The rest of the answers were spread fairly evenly among the other three options.

Question 5

This standard question was very well done, with over 80% of the marks awarded. Students who went wrong generally divided 62 by 3 and/or 7.

Question 6

This question was a good discriminator, with a good proportion of students on each of 1, 2 and 3 marks. The first statement attracted the most correct responses, with a fairly even number of correct responses for the other two statements.

Question 7

Almost as many students scored 1 mark on part (a) as scored both marks. The majority of those scoring one mark had the 4 correct, while a good proportion scored one of the SC marks.

Part (b) was well-answered, with over three quarters of the students giving the correct answer.

Similarly, part (c) was well-answered, with just under three quarters of the students giving the correct answer.

Question 8

Over half of the students were fully correct on this question, with over a third scoring one or two marks. Some students were unsure about how to divide by a fraction, often inverting both fractions before multiplying.

Question 9

A generous scheme gave the first mark for dealing with either side of the inequality, which resulted in half of the marks being awarded on this question. Many students subtracted 12 from 25 and arrived at the inequality $4x < 25$, followed by $x < 6.25$.

Question 10

Students struggled with this question more than they usually do with Venn diagram questions. They seemed to find the three conditions incompatible, with 90 often written in the correct place but then changed to 87 to accommodate having 19 and 14 in the two circles.

Question 11

There was a good spread of marks on this question, with most students managing to get at least as far as $3^{11} : 3^7$. The most common error in this question was to multiply or divide the bases when adding or subtracting the indices, eg saying that $3^6 \times 3^5 = 9^{11}$ or that $3^{11} \div 3^7 = 1^4$

Question 12

Just over half of the students chose the correct option, with the vast majority of the others choosing 10 : 1

Question 13

Over half of the students chose the correct option, with the incorrect answers spread fairly evenly among the other options.

Question 14

Most students scored at least one mark on this question, with some of those repeating their first criticism as their second answer. Many students discussed an absence of a title or axis labelling, which is a standard response in this type of question but wasn't appropriate here.

Question 15

Two thirds of students scored at least the first two marks by correctly expanding the double brackets and at least one of the other two, with over a quarter of all students scoring all four marks. Most errors resulted from the minus signs, with $-22x$ often seen. Several students lost the last mark by calculating that $-20 - 5$ equalled -15

Question 16

Students found this question challenging, with many not knowing where to start and nearly a quarter making no attempt.

Question 17

Over three-fifths of the students completed the table correctly, with the incorrect responses sometimes disbaring the student from accruing any marks in parts (c) and (d). The correct answer was the most chosen in part (b), but almost as many students chose the third option and a reasonable proportion chose one of the other two.

In part (c), most students who had completed the table correctly plotted points at the correct heights, but some plotted them at the midpoints and others lost a mark by starting the curve at $(0, 0)$.

In part (d), nearly all students used their curve to get an answer rather than take the arithmetic path described in alternative method 2. While over half of the students correctly took a reading for the cumulative frequency at a height of 176 cm, about one third of these students gave the reading as their answer rather than subtracting from 60.

Question 18

Two-thirds of the students scored zero or made no attempt on this question, often basing their responses on the addition of 3 and 5 to get 8 and 7 and 4 to get 11. Those who realised that they had to equate the E elements usually went on to give a correct answer, with a few students using one of the other three methods given in the mark scheme.

Question 19

Both parts were correctly answered by approximately one third of the students. In part (a), many students thought that a negative index must lead to a negative answer, and in part (b) many students multiplied 9, and sometimes 100, by $\frac{3}{2}$

Question 20

Students found this question very challenging, with about one third scoring a mark for substituting -15 into the given equation and the vast majority of the others making no progress.

Question 21

This is a standard question on Higher papers, but less than two fifths of the marks were awarded. Most students who knew that they had to use $10x$ and x or equivalent went on to get the correct answer, but some went wrong by thinking that these values were 6.1616... and 0.6161...

Question 22

Over three-quarters of students scored no marks on this question, with one quarter making no attempt. A fair proportion of the students used Pythagoras' theorem to try and find an answer.

Question 23

Knowledge of the standard trig values is regularly tested on the Higher non-calculator paper, but just over half of the students did not know any of the values. Roughly half of the students who correctly evaluated $\sin y$ as 1 gave 1 or an incorrect angle as the answer.

Question 24

While approximately one-third of the students correctly drew the reflection less than half of these were able to draw the rotation. Those who did almost always gave the correct invariant point.

Question 25

In part (a), approximately one-third were able to factorise the quadratic expression or identify -1 and 6 as the pivotal values. Of these, about one-third gave the correct inequality.

Part (b) was follow through from any inequality, and just under one-fifth of the students were correct.

Question 26

As usual, students found this proof question difficult, with very few giving correct working and explanations. Students should note that there can be easy marks even in these tough questions, as here where there was a mark for identifying that angle RPQ was y .

Question 27

As in question 26 there was an easy mark here for converting the mixed number to an improper fraction. Over half of the students achieved this mark, and about half of those students went on to score 2 or 4 marks.

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)

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Contact us

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