AQA
Realising potential

GCSE
Mathematics

8300/2H: Paper 2 (calculator) Higher

Report on the exam

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Contents

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Summary

Overall performance compared to last year

The paper was accessible with no evidence that students did not have sufficient time to complete it. The questions towards the end of the paper proved to be challenging as expected, but most students were able to make some progress in them.

Some students lost accuracy due to prematurely approximating values. Poor presentation and a lack of clear method were other factors which affected performance.

Topics where students excelled

- Pythagoras' theorem
- Area

Topics where students struggled

- Relative frequency
- Arrangements

Individual questions

Question 1

Most students expanded the brackets correctly. Common wrong answers included $5x^3 + 15$ and $5x^2 + 15x$

Question 2

In part (a) most students correctly wrote 1.52 as an improper fraction in its simplest form. A small minority wrote it as a mixed number, whilst some correctly wrote it as an improper fraction but did not then simplify their answer. Part (b) was less well answered. A common wrong answer was 12 from 60% of 20 (or 20% of 60).

Question 3

This question was well answered. Students are encouraged to use the ANS feature of their calculators to avoid mistyping multi-digit figures.

Question 4

Only half of the cohort correctly calculated the required bearing. Common answers included 130° from 180 – 50 (and 80 + 50).

Question 5

This question was reasonably well answered with almost every student scoring at least 1 mark. Most errors occurred when subtracting one sixth from the shop C price. This was sometimes due to a lack of accuracy from the use of 0.16 instead.

Question 6

Both parts of question 6 were answered correctly by only half of the cohort. In part (a) the most common wrong answer was 15, although the other two options were also popular. Most of the correct answers in part (b) explained how the angle should have been calculated. A significant number of wrong answers thought that the 180 used in the calculation should have been 360.

Question 7

Only a third of students were able to answer this volume question correctly, with a third unable to gain any credit. A variety of methods were employed with some first calculating the cross-sectional area, whilst others divided the prism into two or three cuboids. Of the latter, some mistakenly assumed the shape comprised a $6\,\text{cm} \times 5\,\text{cm} \times 2\,\text{cm}$ cuboid and a $2\,\text{cm} \times 2\,\text{cm} \times 2\,\text{cm}$ cube, presumably forgetting that the shape had to be a prism.

Question 8

Most students were able to make some progress in this question, correctly calculating the time travelled at 31.5mph. However, only half of the cohort were able to proceed further. A common incorrect response included the calculation $\frac{45+31.5}{2}$

Question 9

Most students were able to apply the given rule to find the fourth term. Only a third of the cohort successfully demonstrated that the required sum had a factor of 3.

Question 10

Only a third of the cohort were able to correctly identify the correct notation for the shaded region. Similar numbers of students opted for $A' \cup B$ and $A' \cap B$

Question 11

This question was not well answered. Common wrong answers included 64, 32 and 128.

Question 12

Just over a half of the cohort correctly calculated the total height of each group of members, and most of these went on to calculate the correct mean height. A small number calculated $\frac{48+41}{2}$ instead.

Question 13

Some very efficient solutions to this coordinate geometry question were seen, although only a third of the cohort were able to complete it successfully. Most correct solutions calculated the gradient and then used this to find the y-intercept. However, a significant number of students were unable to make any progress.

Question 14

Just under half of the cohort made some progress in this question. Most were able to identify the region within 14km of the port P, but only a minority of students were able to identify the region which is closer to the lighthouse Q than the port. Consequently, only a small number of students were able to correctly identify the required region.

Question 15

Question 15 was not well answered. In part (a) only a quarter of the cohort understood how to use the relative frequencies to calculate the number of blue discs chosen. A significant minority treated each column of the table as an independent set of results, which would have given a total of 250 trials. A similar problem occurred in part (b) with some students finding the average of the four relative frequencies.

Question 16

The correct option of $b^3 < 0$ was the most popular, closely followed by $a - b < 0$

Question 17

In part (a), only a third of the cohort could interpret the cumulative frequency table. A common wrong answer was $140 + 184 + 190$. A similar proportion of students were able to give a correct criticism of the graph in part (b). Some incorrect criticisms included the curve should not start at 0, and that it should continue to the right-hand edge of the graph paper. Some possible references to the final point of the curve were too ambiguous to get any credit.

Question 18

A quarter of the cohort could rewrite the expression in the required form. However, only a small proportion of these could use it to explain why the expression must be positive for all values of x.

Question 19

This question was not well answered. The correct responses were usually the ones that either explained that A would be 16 times bigger or chose an example for the value of B and demonstrated that $(2B)^4$ was not 8 times bigger than B^4. Criticisms of the calculation 4×2 were often ambiguous or incorrect.

Question 20

Just over a third of the cohort were able to make some progress in the rearrangement of the given formula. Much of this was due to multiplying both sides of the equation by $1 - m$, although some errors occurred when expanding brackets. Only a minority were able to proceed to the correctly rearranged formula.

Question 21

Just over a half of the cohort showed some understanding of bounds. Most students added two upper bounds, but many of these were incorrect. Common incorrect bounds included 1150 kg and 1250 kg for the furniture already loaded, and 130 kg and 150 kg for the table.

Question 22

A quarter of the cohort correctly factorised the expression. Common wrong answers included $(5a - b)^2$, $1(25a^2 - b^2)$ and $5ab(5a - b)$

Question 23

Question 23 was not well answered. Most correct attempts in part (a) used trapezia, whilst a significant minority used rectangles and triangles. Some students approximated the velocities at the four points, rounding to the nearest 1 m/s. A significant proportion of students were unaware that they were required to calculate the area, and instead estimated four arc-lengths using Pythagoras' theorem or calculated the gradient of the curve in each section. In part (b), very few gave both the correct acceleration and the correct units. Of those who scored 1 mark it was usually for giving the correct units of acceleration. A common unit was m/s.

Question 24

Two thirds of students were unable to score any marks in this question, with some treating the multiplication sign as an equals and then cross-multiplying. Of those who managed to gain credit for their work, most multiplied the two fractions and expanded the numerator and denominator. Many of these did not spot the factorisations and could not progress any further.

Question 25

This question was not well answered. Many incorrect attempts multiplied the price of the larger stone by 4 and divided by 5. Some of these gained some credit by identifying the correct linear ratio, but only a minority of students used the volume ratio.

Question 26

Most students were able to use the iterative formula to calculate the amount owed at the end of the 1st month. Many of these correctly substituted their answer into the formula again. Some errors included a poor use of the order of operations, i.e. subtracting before multiplying. A small but significant number of answers were written as 1358.6 instead of 1358.60

Question 27

A significant minority of students did not attempt this function question. Of those who did, most made no progress. However, of those who correctly interpreted the given information, the vast majority completed the question successfully.

Question 28

Most students were unable to make any progress on this 3-dimensional trigonometry problem. A common error was to treat triangle *BDV* as right-angled. Of those who correctly used one of the triangles, usually *VBX*, the vast majority correctly calculated the length of *VB*. A minority of students first calculated the height of the pyramid and then used Pythagoras' theorem. Some of these attempts lost accuracy due to premature approximation.

Question 29

Only a minority of students made any progress in this arrangements question. A significant minority of students made no attempt. Many of those who were able to make some progress, correctly calculated the total number of possible 3-letter codes using Vinny's initial assumption. Only a small number of students calculated the correct number of impossible ones.

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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Professional development

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

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Contact us

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