AQA
Realising potential

GCSE
Mathematics

8300/2H: Paper 2 (Calculator) Higher

Report on the exam

November 2020

Contents

Summary

Overall performance compared to last year

There was an improved performance this year, particularly in the second half of the paper. The common questions were more accessible than last year and only the ratio question was poorly attempted. The repeated percentage increase question was directly comparable to one from last year and the responses were better this year. The later questions were also more accessible with the probability question involving discs the only one that had a similar performance to many of the later questions in November 2019.

Topics where students excelled:

- Identifying the reason for congruence
- Completing a time series graph
- Using a time series graph
- Working out the highest common factor
- Identifying the effect of a change in the surface area on the volume of a cuboid

Topics where students struggled:

- Problem solving involving ratio
- Algebraic reasoning
- Angle problem involving polygons
- Problem solving probability question
- Area under a graph problem

Multiple choice questions

Which questions did students find most accessible?

Question 2 was answered very well. Question 3 was answered well with 12×10^7 the most common incorrect choice. Question 9(b) was answered well. In the second half of the paper Question 22 was answered quite well with B the most common incorrect choice.

Which questions did students find least accessible?

Question 1 and particularly question 4 were less well answered. In question 4 nearly as many chose $\frac{1}{2}a$ as chose the correct answer.

Common misunderstandings

Question 7(a)

Many students did not understand what the roots of a quadratic equation were. Often coordinates were given as the answer while others gave the factorised form of the quadratic expression as their answer.

Question 16

Although nearly all students could work out how many main dishes and naan breads were gluten-free it was quite common to see the three relevant numbers added rather than multiplied. However there were a significant number of students who gained full marks.

Question 17(a)

85 was a common incorrect answer, possibly from reading from a cumulative frequency of 120.

Individual questions

Question 5

Part (a) was very well answered with only a few misinterpreting the vertical scale. Part (b) was also answered well with the common error being to work out the mean of the times given in the table.

Question 6

Many correct answers were seen with most other students scoring one mark for either an answer of 3 or an answer of 5 or from expressing one of the given numbers in prime factors. The most common error was to work out the lowest common multiple.

Question 7(b)

Answered quite well with many also giving a y-coordinate which was treated as further work and not penalised.

Question 8

This question was poorly answered. Many students did not get to grips with the context and worked with the 48 and 42 as a ratio. Another common incorrect approach was to divide 90 in the ratio 10 : 11

Some students approached the problem in a correct manner by listing equivalent ratios to 10 : 11 and tested whether they fitted the context. Others used multiples of 21 (from $10 + 11$) and tested whether these totals fitted the context.

Question 9(a)

This question was a good discriminator. Correct answers were obtained from formally setting up and solving an equation as well as from a less formal but equivalent approach. Confusing surface area and volume led to a significant number of students failing to score any marks.

Question 10

This problem solving question produced some very good answers with many different approaches being seen. The most common approach was to work out 60% of 50 and 52% of 50 and then to use the two answers and the given 24 to arrive at Bev's score in the sixth test. Part marks were often scored and the question was a good discriminator.

Question 11

Most students knew the relationship between mass, density and volume. The majority of these were also able to convert units successfully. Overall this question was quite well answered.

Question 12

Those who applied the formula for gradient correctly usually obtained the correct answer. Common errors were to invert the fraction or to give the equation of the line.

Question 13

A minority seemed to recognise the shape to be a trapezium. Many did not know the formula for the area. The most common response was to divide 39.2 by 2.8 giving an answer of 14.

Question 14

This question was well answered with many using the most economical method of multiplying 6500 by 1.05^3. Nearly all students who applied a correct method made the correct decision about the prediction. A relatively small number of students increased 6500 by 15%.

Question 15

This question was a good discriminator. Most success resulted from a first step of subtracting 5 from both sides. A common error when the first step was attempting to multiply both sides by c was to write $ac = b + 5$.

Question 17(b)

This part was quite well answered. Most students were able to read from the graph accurately. Some thought there were an equal number of each size of apple and others used 90 as one of the numbers of apples.

Question 18

A good discriminator with a significant number of students realising that they needed to use trigonometry in the triangle on the left and then transfer the length of the vertical line to the triangle on the right. Students should avoid premature approximations as this can lead to a final answer outside the accepted range.

Question 19

The novel nature of this question meant that many students were not sure what to do after simplifying the expressions in the numerator and the denominator. The simplification of the denominator was sometimes incorrect, written as $10a - 5b$.

Question 20

This question was very poorly answered. Some did work out 144° but did not make any further progress. Some thought a decagon had 9 sides but it was often difficult to understand what students were attempting to do.

Question 21(b)

Although a significant number of students correctly identified that the point at $x = 4$ was plotted in the wrong place, there were many more who thought that the graph should be a straight line or that the labels on the axes were incorrect.

Question 23

Many students applied Pythagoras' theorem correctly to work out *AC*. Some who tried to apply Pythagoras' theorem to triangle *ACM* did $13^2 + 16^2$. Some of those who obtained $\sqrt{87}$ made an error when working out the volume. This often involved either failing to double *CM* or omitting the $\frac{1}{2}$ in the area of the triangle formula. Students should avoid premature approximations as this can lead to a final answer outside the accepted range.

Question 24

This question produced a good spread of marks. Students who drew the image of the quadrilateral or of point *C* after the rotation were more likely to go on to score both marks. Some who tried to rotate the quadrilateral labelled the vertices incorrectly. There were some answers of (–5, 2) and (–2, –5) with no working.

Question 25

This question was usually fully correct or scored zero. A few did score one mark, usually from an answer of $(3x + 5)(x - 4)$ or $(3x + 4)(x - 5)$.

Question 26

This was answered quite well for a question towards the end of the paper. Mostly the decisions were correct after a fully correct method. Using bounds of 25.4 and 7.54 was quite common as was using one upper bound and one lower bound. Some students made no attempt to use bounds at all and just performed a simple calculation using the numbers given in the question.

Question 27

This question was answered poorly with only a very small proportion of responses being fully correct. Most students did not understand how to sensibly tackle the condition that the first disc had to have a smaller number that the second disc. A small number worked all the way through to

an answer of $\frac{29}{80}$ having assumed that the first disc was replaced. These responses scored two marks.

Question 28

Most students did not understand that the distance was worked out using the area under the graph. Some of those who did consider area obtained 40 (metres) for the distance travelled in the first 4 seconds. Others divided 75 by 10 and 7.5 was a common wrong answer.

Question 29

Although a challenging question, students were quite often able to gain part marks. A significant number obtained the correct quadratic equation but did not make any further progress. A few solved the equation but gave the solutions to 3 decimal places instead of the required 3 significant figures. Many who kept denominators in their early working were only able to score one or two marks whereas those who eliminated the denominators at an early stage were generally more successful.

Further support

Mark ranges and award of grades

Grade boundaries and cumulative percentage grades are available on the results statistics page of the AQA Website.

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