GCSE

MATHEMATICS

8300/1H: Paper 1 (Non-Calculator) Higher
Report on the Examination

8300
June 2019

Version: 1.0

General

The majority of the paper was accessible to most students and comprised many questions which discriminated well. In the second half of the paper, however, there were a large number of non-attempts on a few questions. The mean mark was slightly higher than previous June series, and there was also a rise in the standard deviation.

Topics that were done well included:

- similarity
- standard form
- completing a tree diagram
- drawing and interpreting a graph
- money problems
- Fibonacci-style sequences

Topics which students found difficult included:

- probability with more than one event
- simplifying an algebraic fraction
- writing an equation
- difference of two squares
- trigonometric proof
- vector problem
- changing bases in an index problem
- coordinate geometry problems

Question 1

This question was well answered with 11 being the most frequent incorrect answer.

Question 2

Just under half of all students answered this question correctly. $1\frac{4}{9}$ was a very popular incorrect answer.

Question 3

Just under half of all students answered this question correctly. There was good support for all of the incorrect options.

Question 4

This question was well answered with the incorrect responses spread fairly evenly among the other options.

Question 5

Part (a) was well answered. The most common error was to give the power as 4 instead of –4.

Part (b) was also well answered. Most students arrived at the digits 75, but some inserted a decimal point or added zeros.

Question 6

In part (a), the probabilities for the first roll were generally correct. Students also did well with the probabilities for the second roll, although $\frac{1}{3}$ and $\frac{2}{3}$ were often given.

Students were less successful in part (b). Many simply added probabilities and others selected the three correct values from the tree diagram but multiplied them all together. The vast majority gave a decision based on their final probabilities.

Question 7

Most students multiplied 3 by 5 to arrive at 15, which was the original number of people at the party. The majority of these went on to give the correct answer, but about a quarter gave 15 as their final answer.

Question 8

Most students were able to deal with the laws of indices, and achieved at least 2 marks for 3^4. However, many of these did not realise that ‘the value of’ indicates that a purely numerical answer is required and failed to gain the third mark for a final answer of 81.

Question 9

This question discriminated well. Most students gained at least one mark for a correct area, and many went on to score more marks. The most common error was to fail to subtract the area of the semicircle from the area of the circle to find the unshaded area. This could still lead to 3 marks.

Question 10

In part (a), the vast majority of students plotted the four integer points correctly, but the standard of graph drawing was variable. Students should try to join the points with a single, smooth curve. Part (b) was also well answered, although a minority of students thought that 3 minutes 30 seconds was equivalent to 3.3 minutes.

Question 11

This question was very well answered with nearly all students scoring at least 2 marks. A sizeable number of students, however, made an arithmetic error when dividing 330 by 11, with 33 a common incorrect result.

Question 12

This question was very well answered with a low level of support for each of the other options.

Question 13

This question was not particularly well answered. Many students failed to round one or both values and tried to complete calculations with at least one of the given values. In questions where students are asked to use approximations, they should round the given values to one significant figure. Of those who did round successfully, approximately half treated the prism as if it was a cuboid.

Question 14

Several different approaches were taken to this question, and many students were successful. The most common methods, after working out that $b = 54°$, were:

- subtract 90 and 54 from 360 to get 216 and then divide that by 4 to get 54
- assume that x was also 54°, multiply this by 3 to get 162 and show that 90 + 54 + 54 + 162 = 360

Some students failed to complete the second of these methods correctly, as they did not show the multiplication of 54 by 3.

Question 15

Most students gave the three correct values in part (a). In part (b), most students plotted the points accurately, but again the standard of curve drawing was variable. Students should note that a cumulative frequency diagram should begin and end at the correct points. Those students who had a graph to use were generally successful in part (c).

Question 16

This question was not well answered with half of all students failing to score any marks. Those who made some progress generally came unstuck when trying to deal with the brackets $(1 – 2x)$ and $(2x – 1)$, often just cancelling them.

Question 17

Part (a) was very poorly answered. A large majority of students took 'product' to mean 'sum', and many took 'three more than the number' to be $3y$. Of those who wrote the correct expressions, many omitted the required brackets and therefore gave an incorrect equation.

Students were more successful in part (b), although only about one third answered correctly. Those who understood where the error had occurred could usually explain it satisfactorily, but many thought that you couldn't have a negative answer.

Question 18

In part (a), over half of all students factorised correctly, but the majority of these then failed to realise that this led to a fairly easy calculation of 200 × 186. Many students tried to work out 193^2 and 7^2, but this approach led to no marks, even when successful, as they had been told to use the identity.

Part (b) was answered correctly by only about one quarter of the students, with most getting nowhere near the correct answer.

Question 19

Approximately two thirds of all students chose the correct option, with $\frac{1}{99}$ being the most popular incorrect choice.

Question 20

Very few students scored more than 2 marks in part (a) with most working on the assumption that *ABCD* was a parallelogram. Those who made some progress often failed to give any reasons for their statements. Students should give a reason for each calculation or statement in geometric proof questions.

Less than a quarter of all students were successful in part (b). Many did not select the first statement, even though it had been given in part (a). Although they had been told to tick two boxes, a minority of students only ticked one.

Question 21

Most students failed to take the easiest approach to this question and use substitution, instead trying to manipulate the second equation into a form equivalent to the first. There were many errors in rearrangement, and those who were successful in their manipulation often then made errors in adding or subtracting their equations. The question was a good discriminator, however, with a good proportion of students scoring each mark.

Question 22

The majority of students were successful in part (a), although some failed to actually show the required calculation, stating only that *AC* was $-3\mathbf{b}$ and *AD* was $6\mathbf{a} + 7.5\mathbf{b}$

Little accurate working was seen in part (b), although a reasonable number of students picked up one mark for stating that *BC* was $k\mathbf{a} + 3\mathbf{b}$ or that *BD* was $k\mathbf{a} + 6\mathbf{a} + 7.5\mathbf{b}$

Question 23

While relatively few students scored full marks, a fair proportion scored one for converting one of the terms into base 2. This mark was scored more commonly on $32^{\frac{2}{5}}$ than on 8^4.

Question 24

Approximately 40% of students chose the correct option with a very even spread of answers among the incorrect options. Those choosing correctly had often sketched the sine curve in the space below the options.

Question 25

In part (a), most students used the 4 and the 8 to get to the correct value, but a common argument was ‘$4 \div 8 = \frac{1}{2}$ and the line is going down, so it’s negative’, which did not score any marks. Those who did get full marks usually explained the link between 2 and $-\frac{1}{2}$ in words rather than showing the calculation incorporating -1.

In part (b), many students assumed P was the midpoint of AB, and it was common to see 8 and 16 used in Pythagoras calculations. Those who did follow a correct method almost invariably used alternative method 1 in the mark scheme. There were a large number of non-attempts.

Question 26

Few students made any progress with this question and again, there was a large number of non-attempts. The majority of working was based around a, x and y, with correct substitution of values rarely seen.

Question 27

More than half of all students scored at least one mark for a correct trig value, but only about half of these went on to score more marks.

Use of statistics

Statistics used in this report may be taken from incomplete processing data. However, this data still gives a true account on how students have performed for each question.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.