AQA
Realising potential

GCSE
Mathematics

8300/2F: Paper 2 (Calculator) Foundation

Report on the exam

November 2020

Contents

Summary

Overall performance

Students appeared to find the first half of the paper very straightforward. The second half of the paper, especially some of the questions that were common to the Higher tier, proved very challenging for Foundation students. However, most students were able to access many of the questions and were rewarded for good use of mathematics shown at different levels of ability.

Topics where students excelled:

- Simple equations
- Criticising a report
- Number machines
- Simplifying expressions
- Rate of pay problem
- Time series graph

Topics where students struggled:

- Coordinate problem
- Money notation
- Scale drawing interpretation
- Roots of a quadratic graph
- Volume and surface area of a cuboid
- Ratio problem
- Gradient of a line joining two points

Multiple choice questions

Which questions did students find most accessible?

Questions 1 and 4 were exceptionally well answered with students showing a good understanding or equivalent ratios and the term-to-term rule of a sequence.

Question 17(a) was very well answered with the vast majority of students able to demonstrate their understanding of reflections.

Which questions did students find least accessible?

Question 25(b) was less well answered. Many students thought that the volume would be bigger and a significant minority thought that any of the answers could be correct. There were a large number of non-responses for a multiple choice question.

Common misunderstandings/distractors

Although most students applied their knowledge of angles at a point in question 2, some took the given angles away from 180° and chose the answer of 70°.

In question 3 all the distractors were chosen equally by students getting the answer wrong.

Question 17(b) was less well answered and many students chose translation as their response.

An answer of 31 was popular in question 26 among those students who did not realise that they needed to total the frequencies from more than one class.

Individual questions

Question 5

Part (a) was exceptionally well answered. Occasionally the correct answer was seen embedded but the student then chose the answer 56.

Most students answered part (b) well and even those who gained no credit at least made some attempt. Common errors included $25 + 18 = 43$ and $18 - 25 = -7$

Question 6

Part (a) responses were mostly correct, however some students gave the answer 18. Quite a few median calculations for part (b) took place in the answer space for part (a).

In part (b), mistakes were often seen in the ordered list, with some students eliminating any duplicate numbers. Some worked out the mean or the range. Often students chose two 'middle' values and averaged them. Occasionally students simply gave the middle number of the given unordered list.

Question 7

In part (a) many students gave the correct answer, with the common error being (4, 3).

Part (b) was very poorly answered. Here the common errors were (5, 8), (8, 8) and (8, 0) and there were quite a few non-attempts.

Question 8

Students answered part (a) well but common incorrect answers were 2, 6, 10 or an odd square number.

Although fully correct solutions were seen in (b), some gave their answers unevaluated as 5^3, 6^3 and 7^3 and some incorrectly as 5, 6 and 7. Occasionally students gave extra values. Some students listed multiples of 5 or 25 and others listed odd numbers, multiples of three or square numbers. There was a large number of blank responses for this stage of the paper.

Although part (c) was answered well, some found two multiples that added to make 216. Sometimes students wrote lots of correct working but then selected a pair that did not match.

Question 9

Part (a) was very well answered with the majority adding to gain a total of 110 and many of these also commenting that this was above the expected 100%. Some realised that the total was above 100 without providing evidence. Occasional arithmetic errors or comments that the seniors should be more than juniors were seen.

Although there were many fully correct solutions in part (b), some worked out a fifth of the cost for two adults. Some took a fifth off the adult price rather than working out a fifth of the adult price. Students were unsure about how to work out a fifth and often did not show their method but used 30 (a quarter) for the junior price. There was a significant number of misreads of how many tickets were required.

Question 10

Part (a) was exceptionally well answered.

Part (b) was not so well answered but even those who did not score made some attempt. Common errors included inappropriate use of a calculator in this context ie $-48 + 6 \div 2 = -45$ or using -48 as the output to give $-48 \times 2 - 6 = -102$.

Part (c) was very well answered with the occasional answer of -2 or 15 given.

Question 11

Most students were able to work out the calculations correctly. However, it was common to see A selected. Some worked out 10^3 as 30 or 100, while others gave the answers as 11 and 13.

Question 12

This was well answered with many students giving fully correct solutions. The most common errors were to switch the answers for $a + a + a + a$ and $a \times a \times a \times a$ or to think that $a + a + b + b$ was $2ab$.

Question 13

Although the majority of students knew the method required, money notation errors were common with 0.35p a frequently seen answer. Most working was clearly set out but a few students just gave the pay per hour with no method shown. Weaker students subtracted the total pay to give an answer of £31 and some of these then divided by 28 or 30 or 2 hours.

Question 14

Many students answered 2 or 3 correctly with the common errors being firstly that the shaded section was a sector and, slightly less frequently, that arc *XY* wasn't part of the circumference.

Question 15

Most students worked out the cost of the cement and then tried to work out the cost of the sand but often just worked out the cost of 4 kg. Poor money notation was frequently seen with an answer of £70.5 quite common.

Question 16

In part (a), most students were able to find one relevant area but usually went on to work out an overlapping area and add the two. Some students worked out the perimeter and others multiplied all the given values together.

In part (b) the successful approach was to state that the method needed to be divided by 2, although some students also added an incorrect statement. A significant minority thought that the 14 should have been used and some said he should have added. Some thought that he had found the area of a square, rather than a rectangle, with his calculation.

Question 18

This problem-solving question proved to differentiate well. Most students managed to work out how many kilograms were needed for 14 weeks but many didn't take account of the packs she already had. The few who divided the mass she needed usually rounded correctly and gave a fully correct solution. Those who attempted to multiply different numbers of packs frequently failed to show that 5 packs would be insufficient and to 'sandwich' the correct answer. Weaker responses muddled packs, kilograms and weeks and it would have helped students if they had included the units they were using.

Question 19

This question was very poorly answered with most students unable to make much progress. Many attempted to convert the given values to millimetres or metres but this gave them no help with the solution. It was common to see students multiplying the lengths or dividing them by 50. Some students used the more intuitive approach of scaling up the two lengths until they were 50 apart.

Question 20

In part (a) use of $b = 9$ or $a = 11$ was frequently seen. Some were unsure how to substitute into the expression and others gave answers still containing a and/or b.

In part (b) there were many good examples from those who knew that $\frac{y}{x}$ means $y \div x$. Some students did not realise that the fraction meant a division so gave examples of subtracting, multiplying or adding. A few stated the rule that 'two minuses make a positive' but they were unable to successfully apply it in this question.

Question 21

Most students accessed the question and were able to work out that the small bags had 240 sweets so the other two bags needed a total of 200 sweets. Some muddled up bags and sweets

and many did not take into account that there were twice as many medium as large bags. A few found the solution but gave their answer as a ratio of sweets. Some divided 240 or 200 by 12 or 16 or 28 and made no further progress. A number of students used 8 : 12 : 16 as a starting point and then worked out 440 ÷ 36 but this did not help them.

Question 22

A very high number of responses in part (a) were blank. Most students did not understand the term 'roots'. However occasionally 2, 0 or 0, 5 with or without brackets were seen. Some stated 10 as part of their answer.

Part (b) was slightly less poorly answered. Most students at least attempted this part but many gave the answer 3, -2 and most also gave the y-coordinate, which was often incorrect. Some gave one or both roots in this part.

Question 23

The points were usually well plotted on the graph with the occasional scale error for 2016 and sometimes 2019. Most students joined the points accurately. In part (b) the majority of students were able to extrapolate the trend but some worked out the mean of the given values.

Question 24

Most students were able to at least partially access this question, usually with an answer of 5 or by showing one or both factor trees. Giving the LCM as the answer was common and some just gave one pair of factors for each of the given values.

Question 25

Foundation students found part (a) challenging so it was poorly answered on this tier. Many used 200 as a volume and worked out that y would be 8 cm. Some students worked out that the surface area of the four larger faces was 150 but usually only divided that by 4 and assumed the answer was y. Students also calculated the perimeter of the two ends or the area of only one end.

Question 27

There were very few correct answers to this question. The vast majority did not know where to start and quite a few students just ticked a box and ignored the request to show working. Most students said that you did not know how many left or arrived so you could not tell. Some worked out equivalent ratios for 10 : 11 and this was the most successful route to the answer. A few students thought they should divide 90 by (10 + 11) and some did recover from there to find 40 and 44 but most kept the full decimal values. Often students attempted to add and subtract numbers to the values given for men and women, but usually the numbers chosen to add/subtract were the same. Others checked that 48 and 42 added to give 90 or found that 10 + 11 was 21.

Question 28

Very few fully correct attempts were seen on the Foundation tier. Many students did access part of the question and gained credit for working out the marks scored by Alex or Bev per test. Some

students simply converted 24 out of 50 to a percentage and did no further creditworthy work. Occasionally students worked out that Alex had 8% more than Bev so needed 4 more marks per test. Not many were able to provide a completely correct solution but those who did usually started by working out the total score for Alex and Bev. A small number knew what to do but failed to include the 24 in the last step, so had $150 - 130 = 20$. There was some poor work seen with students muddling percentages and marks.

Question 29

The vast majority of students multiplied the two values and some divided volume by mass. Those who divided the right way rarely could convert to the correct units. Students often gave a choice of more than one method.

Question 30

Very few students knew what was required and a very large number did not even attempt the question. Most gave a pair of coordinates as their answer which usually came from a combination of the given values. Amongst those who attempted a gradient there were almost as many who inverted it as who worked it out correctly.

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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