AQA
Realising potential

GCSE
MATHEMATICS

8300/2F: Paper 2F (Calculator) Foundation

Report on the exam

November 2022

Contents

The below table is interactive. You can press the control button click on the title of the question to go directly to that page.

Summary

Overall performance compared to last year

Most students were able to access many of the questions and were rewarded for good use of mathematics at different levels of ability. Many students resorted to using build-up methods, not the most sensible approach on a calculator paper, and these were often inaccurate or incomplete. Some students did not set out their solutions clearly and numbers were often written ambiguously, occasionally leading to them miscopying their own handwriting.

Topics where students excelled

- multiples
- ordering directed numbers
- calculating with decimals and fractions
- completing a pictogram
- substitution in a word formula
- money calculation
- use of a calculator.

Topics where students struggled

- simplifying an algebraic expression
- interpreting a composite percentage bar chart
- cube root problem
- negative square root
- edges and volume of a cuboid
- algebraic perimeter problem
- highest common factor from product of prime factors.

Common misunderstandings

In question 5(c) quite a few students used 0.3 for $\frac{1}{3}$.

In question 20 many students misunderstood that the composite bar chart showed percentages and not numbers of drinks. Some students also did not understand the stacked nature of the bars.

In question 27 many students included the internal lines as part of the perimeter of the L-shape so thought that the L-shape perimeter was double that of one rectangle.

Multiple choice questions

Which questions did students find most accessible

Question 1 was very well answered with students showing a good understanding of multiples. The most common wrong answer was 55.

Question 3 was also very well answered showing a good recall of ordering of directed numbers.

Here the common incorrect response was –2.1°C.

Question 11(b) was well answered, although a reasonable number of students chose each of the distractors.

Which questions did students find least accessible

Question 2 was not particularly well answered for the start of the paper and all the distractors were equally popular.

In Question 22(b) many more students chose the answer $36a^2$ than gave the correct answer.

Question 23 was poorly answered with almost as many students choosing the answer (–6, 0) as choosing the correct answer.

Common distractors

The common incorrect response for Question 4 was to say that the circle had exactly one line of symmetry.

In Question 11, the most common incorrect response was $p = m - 5$.

Individual questions

Question 5

In part (a), although many gave the correct answer, the common wrong answer was $2d$.

Part (b) was very poorly answered. The most common answers were n and $\frac{n}{n}$.

In part (c) common wrong answers were 2^t, $18t$ and $1.8t$. There were some answers that were not fully simplified.

Question 6

This question was very well-answered, particularly parts (b) and (c).

In part (a) some students gave the answer 100 and some multiplied and gave the answer 0.256.

Almost all responses were correct in part (b), although sometimes the digits were ambiguous.

In part (c) some students answered 4 or $\frac{1}{6}$ or $\frac{1}{8}$ and occasionally students gave the answer as a decimal.

Most students worked out the correct answer in part (d) but the common incorrect answer was 180.5×180.5. Some students just gave a pair of different numbers that multiplied to make 361.

Question 7

Part (a) was well-answered with many fully correct pictograms. Some students assumed that each symbol represented 2 people or started with the correct key but switched part way through. The third row sometimes had two separate half symbols instead of one whole one. Occasionally students knew the numbers represented in the first pictogram but struggled to complete the second. A few thought the third row should have 5.5 symbols which is 10 more people than the row above.

Part (b) was also well answered. Common incorrect answers were 8, $\frac{1}{8}$ and 8 : 25. However, most students worked out the number who failed correctly.

Question 8

Most students substituted either partially or fully correctly. Sometimes the -2 caused an issue and 47 was a common incorrect answer. Some students added rather than multiplying to work out each term. Occasionally students gave their answer as $39 - 8$. Some students left variables in their answers, for example $39r - 8t$ or $31rt$. Some weak responses came from thinking $3r$ was 313.

Question 9

This question differentiated well. Those who used the method to work out the number of coins left usually performed better. Weaker students often worked out $295 - 20 \times 8$ and gave the answer 135. Students were often able to work out that each child should get £7.375 but some then thought they should truncate to £7 and gave the answer £3, while others truncated to £7.37 which gave the answer 4p. Many students started by dividing the total number of coins by 20p and made little or no progress.

Question 10

Although there was a reasonable number of correct answers, many students did not have a strategy to solve this problem and just swapped various numbers and added up. Many did work out that the totals were 8 apart but did not always know how to use this information.

Question 12

Part (a) was well-answered. Some students forgot to state the units of their answer. Some misread the scale and thought the second stationary section was 5 minutes or 10 minutes.

In part (b) many students were able to read 29 correctly from the graph. Some misread the first return part of the journey of 4 miles and it was quite common to see it missing from their calculation altogether.

Question 13

This question differentiated well. Many students managed to answer one or two correctly. Most were able to state that *AC* was not an arc but often found the other statements harder to answer.

Question 14

Part (a) was very well-answered. Common errors were not using brackets when dividing and getting the answer £212.25 or simply dividing £567 by 12.

In part (b) many students were able to gain some credit for either substituting and setting up an equation or for multiplying 50 by 15. However many then put 750 back into the equation as the cost of the minibus. Some students worked out 165×50 and then divided by 15. Some used values for the group of 12 from part (a).

Question 15

Although some students were successful in working out at least one set of coordinates, many students struggled with this question. It was common to see (3, 5) or (0, 3) for *P* and (3, 5), (5, 3) or (4, 5) for *Q*.

Question 16

Part (a) was well-answered. Most students were able to work out that the missing angles totalled 68 degrees but some gave this as their answer. Some even went on to work out that each angle was 34 degrees but still chose 68 degrees as their answer. Some students used the wrong value for 360 degrees or for 90 degrees. A common error was to omit the right angle altogether.

Although many students were able to make a link between 90 degrees and 135 people in part (b), many then worked out $162 + (135 - 90)$ and gave an answer of 207. Those who wrote down a correct proportion sometimes divided instead of multiplying or vice versa.

Question 17

This question was poorly answered with most students giving the full value of 100 000 000. Some attempted to convert this into millions but sometimes gave the answer 1, 10 or 1000.

Question 18 (a) and (c)

Part (a) was very well-answered. A minority of students thought that the answer was in pence so converted to pounds. Some students divided the values and others started correctly but thought they needed to double or halve because there were two matches. Some students made slips transferring their answer to the answer line.

Most students were able to gain some credit in part (c). Some students forgot to state a conclusion or stated the wrong conclusion, particularly when using the method comparing 54 000 and 55 000. Some students worked out 35% of 40 000 and 35% of 55 000 and compared these two values. A large number of students decided to compare the income from ticket sales rather than just using the tickets sold. This was an acceptable method but involved a lot of extra work and students often became muddled as to what they were comparing.

Question 19

Some successful solutions using different strategies were seen. The most popular strategies were noticing that 63 was a multiple of 9 and using that fact or listing equivalent ratios to 5 : 4. Those who picked a number between 60 and 70, usually 65 and tried to divide it in the ratio 5 : 4 often ended up where they started. Some students divided 60 by 5 and 70 by 4 and made no progress. Similarly, those who started by dividing 130 by 9 rarely managed to gain any credit. 81 from 45 : 36 was a common incorrect answer from 9×5 and 9×4.

Question 20

In part (a) many students worked out that she sold 6% more teas but some thought this meant she sold 6 more and gave this as their answer. Some students used the data from 2019 instead of, or as well as, the data from 2007. There was a common misreading of the scale that meant students thought 41% of her sales were teas, however there was some accommodation for this in the scheme. A large number of students used build-up methods for the percentages, often unsuccessfully, even though this is a calculator paper.

Part (b) was very poorly answered. The vast majority of students ticked Yes and explained that 50% was greater than 42%. Of the few students who ticked Cannot tell, most gave a good explanation about not knowing the number of drinks for that year.

Question 21

There were many blank responses in part (a) or students who explored multiples of 3 or square roots. However, some students managed to find the cube root of a value in the given range or to cube a relevant value.

Part (b) was very poorly answered. Many students restated the question or suggested that there were many other possible answers. Some said x could be any value or could be a decimal. Some students gave examples using factors, for example $2 \times 50 = 100$. A small number of students realised that the missing answer was -10 but occasionally went on to state that $-10 \times -10 = -100$.

Question 22 (a)

This was very poorly answered. Most students did not have a strategy to answer this question and many just picked three values which sometimes added to 80. Some students divided 80 by 12 but then did not know how to deal with the decimal result or how to get three different values for their answer. A small number of students chose three values that totalled 20 but often one was repeated.

Question 24

Part (a) was very well-answered with most students giving the correct full value, although some gave a correctly rounded value. The most common error was to give a truncated answer without showing any intermediate working.

In part (b) the vast majority of students worked out the answer as 145 000 but many did not know how to convert it to standard form. 1.45×10^3, 145×10^3, 145^3 and 1.45×10^{-5} were all common incorrect conversions. Some students divided 6.09 by 4.2 but then added the powers.

Question 25

In part (a) most students that knew what to do showed sufficient working, only a relatively small number did not show sufficient working to gain the mark. The most common error was to divide 20 by 12.

In part (b) some students managed to work out one of the values correctly and occasionally both. Students often misread the scale for the first value and gave answers such as 2.6 or 6. Very few students realised that they needed to work out the gradient for the second value and, if they did, rarely showed any working. Some gave the answer 1 probably from a misread of the horizontal scale. Many students gave answers such as 15 and 40 or vice versa, probably from the coordinates of the end point of the graph.

Question 26

A reasonable number of students made a start on Pythagoras' theorem, although many went on to add the squares of the sides. Some did not realise they needed to square root their answer or did not know how and divided by 2 or 10. Some students attempted to use trigonometry or just worked out 14 – 9. Occasionally methods involved using 180 or 90.

Question 27

The vast majority of students were not able to work out a successful strategy for this problem-solving question. The most common answer by far was 49.4 from assuming that the perimeter of the L-shape was double the perimeter of one rectangle. Those who attempted to find an expression for the perimeter of the L-shape often missed one or more of the sides or included the internal sides. A small number of students used area.

Question 28

This question was very poorly answered with a large proportion of blank responses. Some students did a lot of work dividing the two numbers by prime factors to reproduce the information given in the question. Others listed multiples of the two given numbers. Common wrong answers were 9 and 7. Those who used a Venn diagram approach often performed better.

Further support

Mark ranges and award of grades

Grade boundaries and cumulative percentage grades are available on the results statistics page of our website.

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Contact us

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