

# GCSE

# Mathematics

---

**8300/2F: Paper 2 (calculator) Foundation**

Report on the exam

---

Published: June 2023

---

---

## 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.

Contents	Page
<a href="#">Summary</a>	3
<a href="#">Individual questions</a>	4
<a href="#">Further support</a>	9

---

## Summary

This was the first series with changes made to the assessment. Multiple-choice questions were removed from the start of the papers and efforts were made to ensure that more of the beginnings of the papers were accessible to all. We have worked hard to ensure that ramping of demand, wording of questions and the contexts used are appropriate. This has led to an increase to some of the grade boundaries. As a result we feel students were better able to demonstrate their mathematical knowledge and appeared to have a more positive examination experience.

## Overall performance compared to last year

Students found the majority of the paper more accessible than last summer, particularly the first two-thirds. They were able to make an attempt at almost all questions and the mark scheme rewarded any valid mathematical approach. 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

- Using a number line
- Simplifying expressions
- Number properties, factors and primes
- Money problem
- Percentage change problem
- Sample space and probability

## Topics where students struggled

- Perimeter by counting squares
- Probability problem solving
- Evaluating a method
- Factorising an expression
- Change of compound units

---

## Individual questions

### Question 1

Both parts were very well answered, particularly part (a).

### Question 2

This question was exceptionally well answered.

### Question 3

Some students confused area and perimeter in part (a). Those who tried to work out the perimeter often did not count some of the sides. However, the majority managed to work out at least one perimeter accurately and many gave both with a correct decision.

Parts (b) and (c) were well answered, especially part (c).

Part (d) was well answered with most students knowing how to draw a reflection of the shape. Rotations and translations were also seen. Many omitted the mirror line and some drew an incorrect line. Those who drew the shape touching to the right often did not indicate the shared mirror line.

### Question 4

Part (a) was very well answered.

In part (b) some students created a triangle with a right angle at  $P$  usually using  $(0, 3)$  or  $(-4, 3)$ , or at  $R$  using  $(1, 0)$ . Occasionally students wrote down the coordinates of  $Q$ .

In both parts some students wrote their coordinates in the wrong order.

### Question 5

Part (a) was very well answered. The common incorrect answer was 7 from rounding up 6.6... bottles. A few students divided the wrong way round and some just multiplied the two numbers in the question. A large number of students used build-up or repeated addition rather than division.

Most students could access part (b) and many managed to work out the cost of 24 bottles in shop Z. The common approach was to compare the cost of 24 bottles although responses comparing 1 or 12 bottles were also seen. A lot of students worked out the full cost of 24 bottles from shop X but did not deal with the discount. Those who worked out that 10% was 25p often only multiplied this by 6 but did not subtract it from the full cost, comparing £1.50 with £14. Some multiplied the full cost or the discount for 4 bottles by 24, comparing £15 or £6 with £14.

---

## Question 6

Almost all students gave correct pairs but some did not realise that reversals were the same pair. Those who repeated the given pair sometimes only ended up with two unique pairs. However, the vast majority managed to give at least three unique pairs and often gave the full set.

## Question 7

Part (a) was very well answered with most students selecting four values that summed to 46. Occasionally there were repeats used and a few students used all odd or all even. Some students seemed to pick numbers at random rather than using a strategy of, for example, a pair that made 40 and a pair that made 6. A few students had a set of numbers that did not total 46.

Part (b) was extremely well answered. Occasionally an answer of  $15 \times 2$  or a pair of numbers with a product outside the acceptable range of [24, 36] was seen.

Part (c) was often answered fully correctly but the vast majority of students used a square number, a prime number or both.

## Question 8

The very common incorrect response was to write 12 and 36 in the wrong positions in part (a). Some students knew that the right-hand values should total 48 but did not work out the 75% correctly. A few arithmetic errors were seen completing the 45 people who did not play.

The AO3 nature of part (b) meant that many students were unsure as to what was required and some did not attempt this part. Some worked out  $0.68 \times 93$  but then rounded their answer down. A few assumed that if the probability was greater than 0.68, it would be 0.69 or 0.7 but failed to 'sandwich' the required value with their trial. A few students tried to use the value of 48 from part (a). Occasionally students thought that they should be working with  $1 - 0.68$  and methods using 0.32 were seen.

## Question 9

Part (a) was extremely well answered. Occasionally students used 6 or 9 for the remaining number of months. A few students multiplied 11 by 12. A small number of arithmetic errors were seen.

Part (b) differentiated well. Many students worked incorrectly using a 100-minute hour so, for example, 7.5 became 7 hours 50 minutes and 450 minutes was written as 4 hours 50 minutes. A few students simply added 50 minutes onto 1 hour 42 minutes.

---

## Question 10

Part (a) was well answered. Some students only worked out one fifth and others then divided that by 2 to give 102. A few students worked out the correct answer and then subtracted it from 1020. Students often tried to convert two fifths to a percentage or decimal before proceeding. Weaker responses divided by two fifths or worked out that it was 40% and gave the answer 40.

In part (b) the common incorrect answer was  $\frac{4}{3}$ . However, there were many correct fractions seen.

Some students worked out 30% of 250 or of 220 in part (c). Others worked out the percentage of calculators that are not scientific. Those who used a build-up method often made errors and very rarely showed the full method.

## Question 11

In part (a) the majority of students gave the answer of 15 in W only, although many went on to give the correct follow through answer of 14 in (H U W)'. Another common misconception was to think that there should be 60 people in (H U W)'.

Part (b) was well answered. The common incorrect probabilities were  $\frac{7}{39}$  and  $\frac{39}{60}$ . Some students gave their answer as a decimal or percentage but often did not give a sufficiently accurate value. A few students just gave the answer 7 or wrote their answer as 7 out of 60.

In part (c), students sometimes found it hard to explain what was wrong with Marek's method and it was not always clear whether they were telling you what his calculation would give or should give. Some students thought that his method gave the correct answer of £8. Many evaluated his calculation as 25.5 but gave no further explanation or said it was not enough, or too much, or should not have a decimal. Those who recognised that brackets were needed did not always explain where to put them.

## Question 12

Most students were able to explain why Kai's statement was correct and often went on to give a valid reason for Jo. Some students thought Jo's statement was incorrect because the ratio contained a decimal. The reasons given were not always complete and students sometimes simply repeated the given statements or said that 9 : 6 could be simplified without showing the dividing factor. Those who thought one statement was wrong often only explained why they thought it was wrong and did not explain why the other statement was correct.

## Question 13

This question was well answered. Some students made arithmetic errors or increased 40 instead of decreasing it. Those who used a build-up method rarely showed full working and often made mistakes so no credit could be given. Weaker students worked out  $28 + 25$  and  $40 - 15$  or  $28 + 0.25$  and  $40 - 0.15$ .

---

## Question 14

Some students made a slip with one of the terms and some just divided through by 3. However, the most common incorrect response was  $27ab$  and this occurred far more frequently than the correct answer.

## Question 15

Most students understood what was required but did not always interpret the notation correctly. The common incorrect responses were to omit the  $-3$  or include the 2 or, occasionally, both. Some students thought that 0 was not an integer so left it out of their list.

## Question 16

There were many responses where students gave the value of the next term or the 9th term, presumably a misread of  $n$ th. Some only gave the term-to-term rule so  $+ 3$  and  $n + 3$  were frequently seen. Those who knew the correct format of the  $n$ th term often gave answers such as  $3n$ ,  $3n - 4$  or  $4n + 3$  but answers such as  $3n + 7$  and  $7n + 3$  were also common.

## Question 17

Many students made a good attempt at this question and it was common to see students correctly working out the value of the 2p coins and often the value of the 5p coins. Frequently students then gave the unsimplified ratio  $7.2 : 6$  or chose the ratio  $360 : 120$ , comparing the number rather than the value of the coins. Some students thought that the value of the 2p coins was 8 times the value of the 10p coins and others thought that 360 coins were worth £3.60. Another common misconception was to divide 360 by 2 and state the 2ps totalled £1.80.

## Question 18

Part (a) was well answered with most students getting at least one or two rows correct. The final row was often filled in with multiples of 5 and occasionally multiples of 4 which seemed to be students looking for a pattern rather than using the algebra.

Part (b) was quite well answered although some students gave the probability of scoring 10 or more than 10. Not all answers were given as probabilities and sometimes truncated decimals or ratios were used.

Part (c) was poorly answered. There were many non-attempts seen. Those who had the correct probability in (b) often just divided by 8 in this part. Students misinterpreted the meaning of the word 'estimate'. Instead of realising it meant the statistical estimate, many thought they should round their numbers and had an inexact follow through answer.

---

## Question 19

In part (a) a few students worked out the interior angle of an octagon and some the exterior angle. Many simply measured the angle on the diagram. Some students used the properties of an octagon to calculate the exterior angle as half a right angle. A common misconception was using  $180^\circ$  as the sum of the exterior angles.

Part (b) was not very well answered and all the options were seen. The most common incorrect choice was It is more than the answer to part (a).

## Question 20

Many students used coordinates or described the translation in words. Those who used vector notation often gave one correct value but  $\begin{pmatrix} -3 \\ 4 \end{pmatrix}$  was a common incorrect response. Quite a few responses had the brackets missing or students had inserted a fraction line into their vector.

## Question 21

Students were often able to calculate the volume of the sphere and many also worked out the volume of the water. However, the most common error was to continue to work with the whole sphere and not consider a hemisphere. Some students misinterpreted  $325 \text{ cm}^3$  to mean  $325^3$ . Those who worked with a hemisphere sometimes made the wrong decision about whether the water would fill 70% of the bowl.

## Question 22

It was common to see students work out the areas or the perimeters of the rectangles. Some stated that they were similar because they had four sides or four right angles. Those who worked out the scale factor usually went on to give a fully correct solution using related sides. Occasionally only the scale factor was shown or the response used arrows on the diagram but some of these did not clearly link correct pairs of sides.

## Question 23

Foundation students found this AO2 question on changing units in an algebraic context very challenging. A high number of students did not attempt the question. Those who did usually tried to work out four-thirds of 80. Very few used any algebra, although some managed to work out that  $80x$  tea bags were manufactured per hour. The most common way to access the question was to divide 80 by 60 but then it was very rare to see students go on multiply by  $x$  to create the correct expression.



---

## 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)

Use our exam results analysis tool to create and customise as many different reports for comparison as you like.

### Professional development

Attend one of our feedback [courses](#) where you can review example responses from students and commentaries from our examiners.

---

## Contact us

Our friendly team will be happy to support you between 8am and 5pm, Monday to Friday.

**Tel:** 0161 957 3852

**Email:** [maths@aqa.org.uk](mailto:maths@aqa.org.uk)

[aqa.org.uk](http://aqa.org.uk)