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Examiners' report

GCSE

MATHEMATICS

OCR Level 1/Level 2 GCSE (9-1) in Mathematics

J560

For first teaching in 2015

J560/01 Summer 2025 series

Version 1

ocr.org.uk/maths

Contents

Introduction

Our examiners' reports are produced to offer constructive feedback on candidates' performance in the examinations. They provide useful guidance for future candidates.

The reports will include a general commentary on candidates' performance, identify technical aspects examined in the questions and highlight good performance / where performance could be improved. A selection of candidate responses is also provided. The reports will also explain aspects that caused difficulty and why the difficulties arose, whether through a lack of knowledge, poor examination technique or any other identifiable and explainable reason.

Where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report.

A full copy of the question paper and the mark scheme can be downloaded from Teach Cambridge.

Paper 1 series overview

This paper is the first of three taken by Foundation tier candidates for J560 GCSE (9-1) Mathematics.

Candidates are expected to use a calculator on this paper. Some candidates did this efficiently and produced correct working and accurate answers, however many used non-calculator methods that often lead to arithmetical errors.

Some candidates were unable to convert between metric units, which caused issues on Questions 14 and 19. Challenging topics included equations of straight lines, trigonometry, population density, inverse proportionality, bearings and identifying types of graphs.

Presentation continues to cause concern, with some responses being almost unreadable due to poor formation of words or figures.

Better candidates usually had a clear idea of the route to a solution and working was logical, brief and well set out. Most questions appeared to be accessible for the majority and there was no evidence to suggest that lack of time was a factor for even the less successful candidates. Most tried to answer all the questions in the paper and common questions towards the end were generally attempted.

Candidates who did well on this paper generally:	Candidates who did less well on this paper generally:
• attempted all questions • read questions carefully and followed instructions • provided working in 'show your working' questions • used appropriate methods and wrote all the steps in their working, including correct notation and operators • used a calculator • wrote concise and relevant comments when asked to explain something.	• did not read questions carefully • did not show their working very clearly/concisely, with poor presentation and little logical working • drew diagrams in pen and struggled to alter them • did not know the correct formulae or use the formulae sheet • did not always use a calculator (instead, often using inefficient non-calculator methods leading to arithmetic errors).

Question 1 (a)

1 **(a)** Write down an odd number between 10 and 20.

(a) ..... **[1]**

Many candidates were able to give a correct answer to this question. Those who did not often gave an odd number outside the region, or an even number.

Question 1 (b)

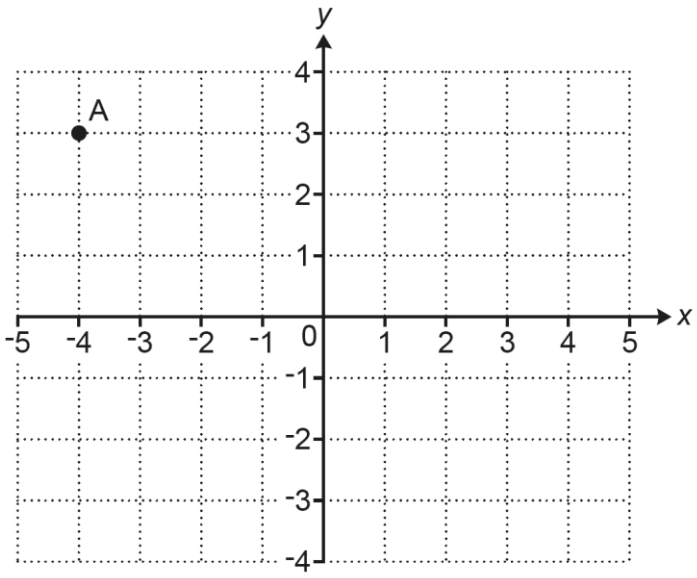
(b) Write down **two** cube numbers less than 10.

(b) ..... and ..... **[2]**

Most candidates scored at least 1 mark here.

Question 2 (a)

2 Point A is shown on this grid.



(a) Write down the coordinates of point A.

(a) (..... , ...) **[1]**

Most candidates gave the correct answer.

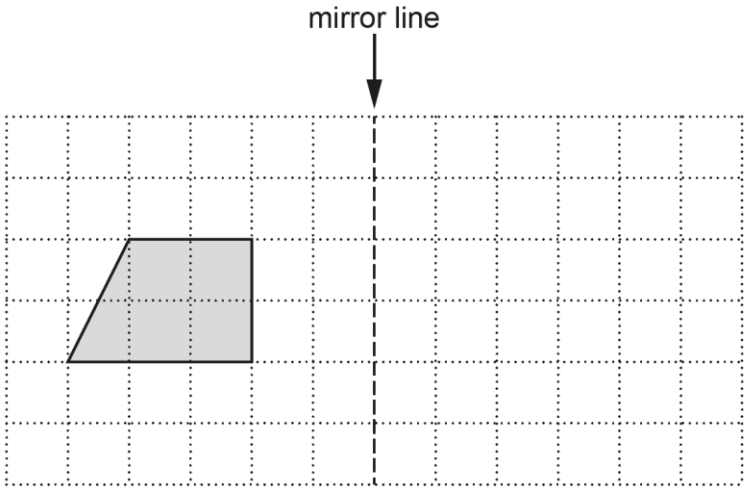
Question 2 (b)

(b) Plot point B on the grid at $(2, -2)$ **[1]**

Many plotted this point correctly. Although the negative sign was printed slightly higher than usual on the question paper, it did not have a significant effect on candidates.

Question 3

3 Reflect the trapezium in the mirror line.



[2]

This question was generally well attempted by candidates, with many giving the correct answer.

Candidates who did not score full marks often drew a trapezium with the correct shape but placed one square too close to the mirror line (earning one mark overall). Some candidates also scored only 1 mark as they lacked accuracy when drawing and drew one of the vertices outside of tolerance.

Question 4 (a)

4 Here is a list of numbers.

34 42 17 26 34 12 27

(a) Write down the mode.

(a) ..... **[1]**

The majority of candidates recognised 34 as the mode.

Question 4 (b)

(b) A student says,

The median is 26 as it is the middle number.

Explain why the student is **not** correct.

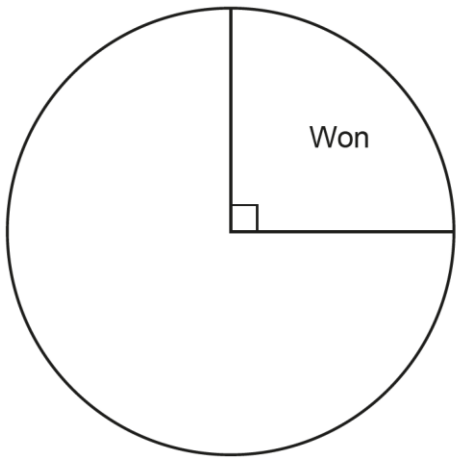
.....

..... **[1]**

This part was usually well answered. Many stated that the numbers were not in order. Others picked up the mark by ordering the numbers and stating that 27 was the middle value.

Question 5 (a)

5 The pie chart shows the proportion of games won by a sports team.



(a) The sports team won 9 games.

Work out how many games the sports team played.

(a) ..... **[2]**

Candidates who attempted this question often gave the correct answer.

Question 5 (b)

(b) The ratio of the number of games drawn by the sports team to the number of games lost by the sports team was 2 : 1.

Complete the pie chart above. **[2]**

Candidates who responded with a pie chart with 3 sectors usually scored both marks, although several did not use a ruler. Many candidates gave 4 sectors with labelling, which could gain 1 mark if they were quadrants. It was rare to see working for this question and most just drew sectors.

Question 6 (a)

6 The scale drawing shows the positions of ship A and ship B.

Scale: 1 cm represents 6 km

(a) Find the actual distance between ship A and ship B.

(a) ..... km **[2]**

This was generally well answered. Some scored 1 mark for a measurement in the allowed range.

Question 6 (b)

(b) Ship C is 33 km from ship B on a bearing of 285°.

On the scale drawing, mark and label the position of ship C with a cross. **[2]**

This part was responded to less successfully. The distance of 33 km (5.5 cm) was generally drawn within the required tolerance, but the correct bearing was rarely seen.

Misconception

Many candidates did not appear to know how to plot a bearing or how to use a protractor.

Question 7 (a) (i)

7 **(a)** Simplify.

(i) $a \times a \times a \times a \times a \times a \times a$

(a)(i) ..... **[1]**

Most candidates responded correctly. Those that didn't often gave responses such as $7a$.

Question 7 (a) (ii)

(ii) $4b \times 5b^2$

(ii) ..... **[2]**

Many picked up 2 marks. The B1 was most commonly awarded for $20b^2$.

Question 7 (b)

(b) Solve.

$6k - 3 = 177$

(b) $k =$ ..... **[2]**

Presentation of work was generally very good here and many candidates of all abilities scored full marks, generally writing down $6k = 180$ for the M1 and then $k = 30$. Most that had a correct first step went on to a correct final answer, but a small number of candidates showed an embedded answer in their working with a wrong answer on the answer line.

Question 8 (a)

8 Write a number in each box to make each statement true.

(a) $\square + 12 = -15$ **[1]**

Most candidates gave the correct answer −27. The common incorrect answers were 3 and −3.

Question 8 (b)

(b) $\dfrac{5}{\square} \times 2 = \dfrac{5}{7}$ **[1]**

Many gave the correct answer 14. Common incorrect answers were 7 and 3.5. Several did not attempt this part.

Assessment for learning

As this is a calculator paper, candidates should be encouraged to use their calculator to check their answer.

Question 9 (a) (i)

9 **(a)** Here are all the factors of a number, A.

1 2 3 5 6 10 15 30

(i) Write down the value of A.

(a)(i) ..... **[1]**

The majority of candidates demonstrated an understanding of factors. A common error was the answer 8 (possibly as there were 8 factors).

Question 9 (a) (ii)

(ii) Here is a number, B, written as the product of its prime factors.

$B = 3 \times 5 \times 7$

Find the highest common factor (HCF) of A and B.

(ii) ..... **[2]**

Although working was seen from many candidates, some did not show any. Candidates who did not achieve marks on this question commonly gave 5 as an answer, with minimal/no working out to show that they had identified other common factors.

Question 9 (b)

(b) Find a number between 150 and 200 which has factors 7 and 8.

(b) ..... **[2]**

The most common method was listing multiples of 7 and 8, with many candidates correctly identifying 56 as the first common multiple. Many gave the correct answer.

Question 10

10 Write the following numbers in order of size, smallest first.

$\frac{7}{19}$ 0.3685 $\frac{360}{1000}$ 36.8%

..... , ... , ... , ... **[2]**
smallest

Many attempted to convert the values to a common form, usually decimals. Many gave the correct answer to pick up 2 marks, but B1 was often awarded too for placing 3 values in the correct order.

Question 11

11 Here is a list of three numbers.

8 15 10

A fourth number is added to the list.
The mean of the four numbers is 13.

Work out the fourth number.

..... **[3]**

Candidates who started with 13 × 4 = 52 to find the total of the four numbers usually then proceeded to full marks. A common wrong method was to find the mean of the given three numbers, leading to 11 being given as the final answer.

Question 12 (a)

12 **(a)** Use the formula

$v = u + at$

to find the final velocity, when:

- the initial velocity is 8 m/s
- the acceleration is 6.5 m/s^2
- the time is 14 seconds.

(a) ..... m/s **[2]**

Many candidates substituted correctly, writing 8 + 6.5 × 14 and then going on to the correct answer of 99. The most common error was to confuse the values for *u* and *v*.

Question 12 (b)

(b) Use the formula

$$p = \frac{1}{2}qr$$

to find the value of q when $p = 39$ and $r = 6$.

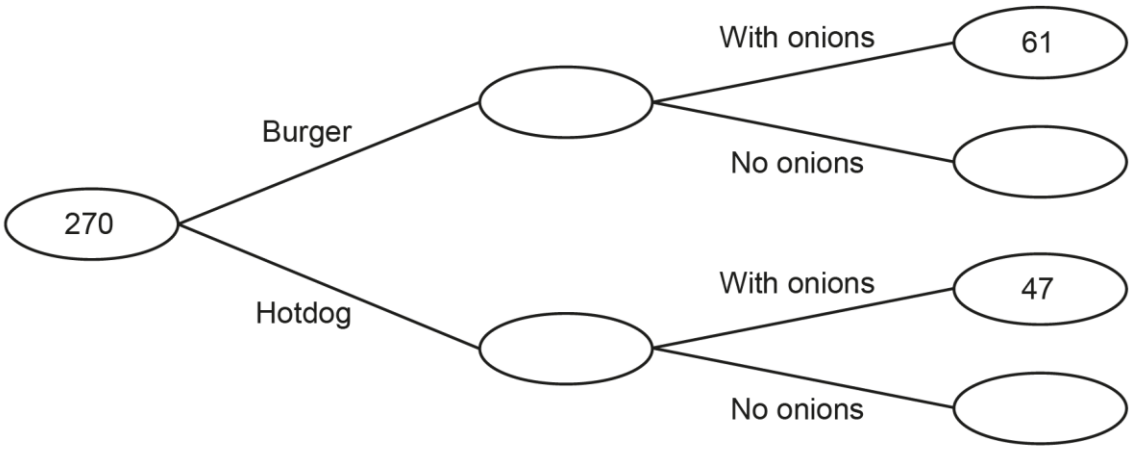
(b) $q =$ ..... **[2]**

Many candidates were able to rearrange the formula, correctly substitute the values and arrive at the answer 13. Others found it difficult to deal with the ½ in the formula; dividing p by 2 instead of multiplying it by 2 was very common.

Question 13 (a)

13 A food stall only sells burgers and hotdogs.
Each burger or hotdog is sold either with onions or with no onions.

The frequency tree below shows that one day a total of 270 burgers and hotdogs were sold.



(a) $\frac{5}{9}$ of the food sold on that day were burgers.

Complete the frequency tree. **[4]**

This was generally answered quite well. Candidates who did not correctly find $\frac{5}{9}$ of 270 often scored the follow through marks.

Question 13 (b)

(b) Show that 40% of the food sold on that day were with onions. **[2]**

Many correct answers were seen, with others scoring 1 mark (usually for 61 + 47 = 108). Some did not show their calculation for working out the percentage.

Question 14

14 A 1.5 litre carton of orange juice costs £1.30.
Gabi has £10 to spend on orange juice and buys the maximum possible number of cartons.

Each day Gabi drinks 350 millilitres of the orange juice she has just bought.

Work out how many days the orange juice will last Gabi.
You must show your working.

There was a wide distribution of marks scored for this question. Many candidates scored full marks, but there was a range of responses and quality of communication was variable and often very poor. Those with better communication skills tended to be more successful, but many responses were not set out in a systematic way. Candidates who performed well on this question often presented clear and concise working that showed all the important steps (for example, 10 ÷ 1.3 = 7.69…, so 7 cartons; 7 × 1.5 = 10.5 litres; 10.5 ÷ 0.35 = 30 days). Successful candidates also used their calculator appropriately to do the arithmetic processing; candidates should use a calculator rather than non-calculator methods. Many scored B2 for 7 cartons of orange juice. The need for multiplication to calculate the total volume of juice was generally understood, but incorrect unit conversion between litres and millilitres was not uncommon, leading to final answers of 3 rather than 30.

Exemplar 1

£10.00 ÷ £1.30 = 7 cartons

1.5 l x 7 = 10.5 litres.

10.5 litres

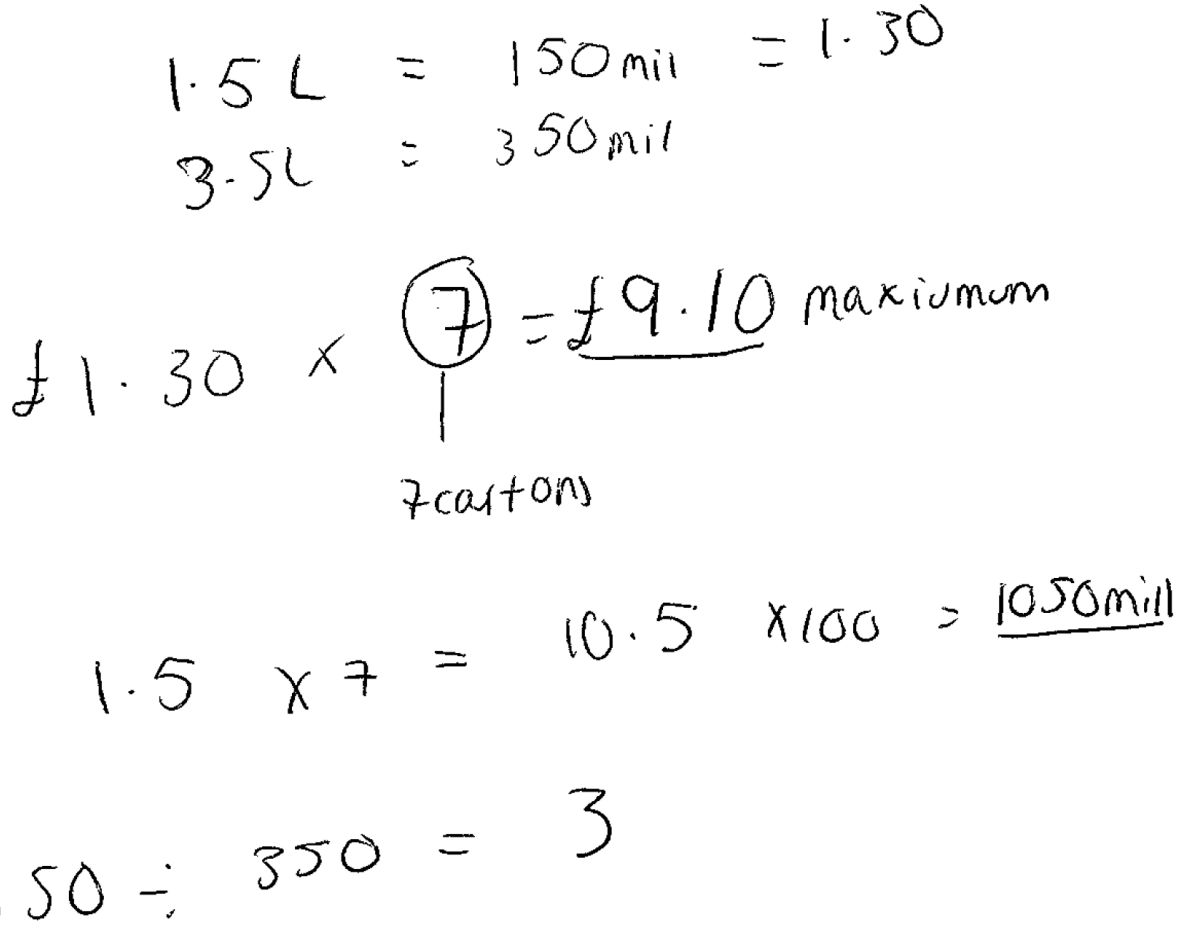
10500 millilitres ÷ 350 millilitres = 30 days

The Orange Juice will last her 30days

30 days ..... **[5]**

The candidates used a correct and concise method to show all the required steps, gaining full marks.

Exemplar 2



3 ..... **[5]**

The candidate has correctly worked out that 7 cartons can be bought. They then attempt to convert their total to millilitres but use 100 rather than 1000. Their division of 'figs 105' by 'figs 350' gains them a further mark.

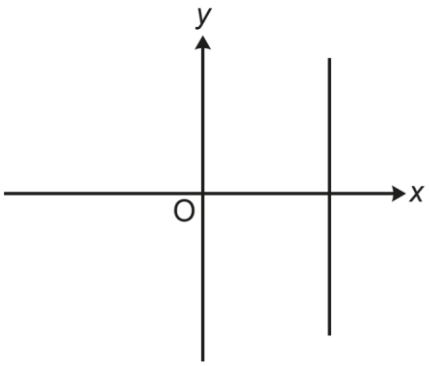
Question 15

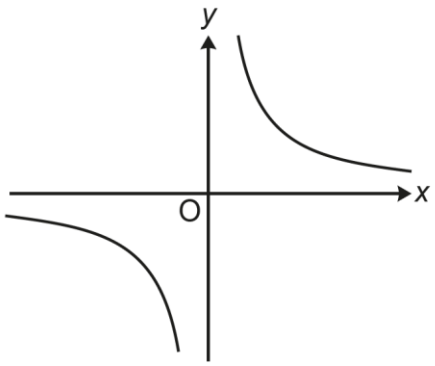
15 For each graph below, select its possible equation from this list.

A $x = 4$ **B** $y = 4$ **C** $y = x$

D $y = x^2$ **E** $y = \frac{1}{x}$ **F** $y = x^3$

Write the letter of the equation beneath each graph.





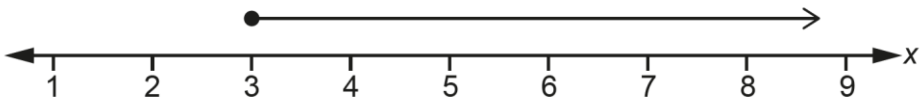
....

[2]

Many were able to give both correct answers. Common errors for the graphs were $y = x^2$ and $y = x^3$, respectively.

Question 16

16 Write down the inequality shown on this number line.



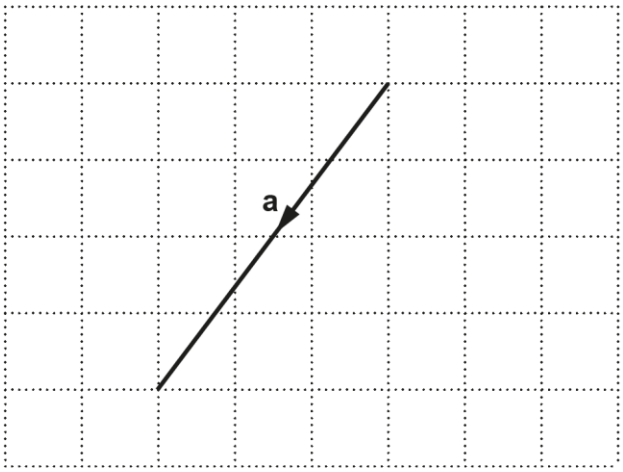
..... **[2]**

This was generally well answered, with most candidates giving 3 and the correct sign. Some inequalities lacked the required 'equal to' line, missing an important aspect of the inequality and resulting in the loss of marks. Precise notation is essential in demonstrating a clear understanding of inequalities.

Candidates who scored zero gave a variety of incorrect answers, including '3', '6', '9', '8.5', '$x < 3$' and '$3 < x < 9$', indicating an incomplete understand the meaning of inequalities. Some gave '$3 \leq 9$' or '$3 \geq 9$'. Incorrect answers often included 9, not recognising the arrow on the inequality line shown.

Question 17 (a)

17 (a) Vector **a** is drawn on this grid.



Write vector **a** as a column vector.

(a) $\begin{pmatrix} & \\ & \end{pmatrix}$ ..... **[2]**

Many candidates gave no response to this question and part (a) was more frequently left blank than the subsequent two parts. Few candidates correctly indicated the direction of the vector and common incorrect responses included $\begin{pmatrix}3\\4\end{pmatrix}$ and $\begin{pmatrix}4\\3\end{pmatrix}$. Where a correct 'negative' direction was indicated, it was often applied to the vertical element only. A 'fraction line' was occasionally given between their two numbers, but rarely consistently across all three parts.

Question 17 (b)

(b) Work out.

$$\begin{pmatrix}2\\4\end{pmatrix}+\begin{pmatrix}3\\-1\end{pmatrix}$$

(b) $\begin{pmatrix}\quad\\\quad\end{pmatrix}$ ..... **[1]**

Parts (b) and (c) were generally answered better than part (a). This was possibly due to them requiring less knowledge of the negative direction, although it still caused issues here. Common incorrect answers to part (b) were $-\begin{pmatrix}5\\3\end{pmatrix}$ and $\begin{pmatrix}-5\\3\end{pmatrix}$.

Question 17 (c)

(c) $\overrightarrow{PQ}=\begin{pmatrix}2\\4\end{pmatrix}$

Work out $3\overrightarrow{PQ}$.

(c) $\begin{pmatrix}\quad\\\quad\end{pmatrix}$ ..... **[1]**

Many correct answers were seen. Some cancelled down however, for example giving $\begin{pmatrix}1\\2\end{pmatrix}$.

Question 18

18 Calculate.

$$\frac{4.5^3}{1.8}+\frac{3.6}{2.4^2}$$

Give your answer correct to **3** significant figures.

..... **[2]**

Full marks were often awarded and many others scored 1 mark for giving the answer not rounded to 3 significant figures, for example 51.25. Unsuccessful responses often added the numerators and the denominators separately, then divided these figures. Candidates who attempted the calculation in stages often used their calculator inefficiently and rounded prematurely or produced inaccurate figures. Few candidates could be given the SC1 (for their answer to more than 3 figures rounded to 3 significant figures), as most gave their final answer without an intermediate answer being seen.

Question 19

19 The ratio 40 grams to 1 kilogram can be written in the form 1 : n.

Find the value of n.

$n =$ ..... **[2]**

Most candidates gave the correct answer, but some just scored 1 mark for giving the correct ratio or 0.025. Common incorrect answers were 40, 1000 and 0.04.

Question 20 (a)

20 Complete each statement by writing the missing power in the box.

(a) $(4^3)^2 = 4^{\square}$ **[1]**

The two most common incorrect answers to this question were '5' (from adding the indices) and '4096' (from working out the calculation).

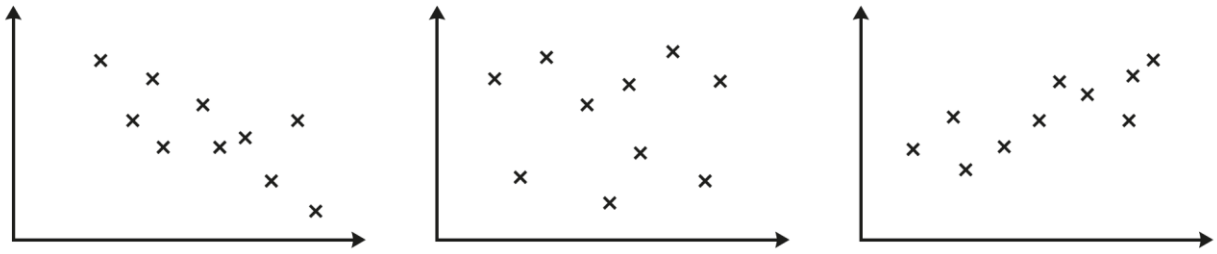
Question 20 (b)

(b) $\frac{1}{4} = 4^{\square}$ **[1]**

Fewer candidates gave the correct answer to this part than the previous one. Common incorrect answers were 1 and 0.25.

Question 21 (a)

21 **(a)** Describe the correlation shown in each of these scatter diagrams.



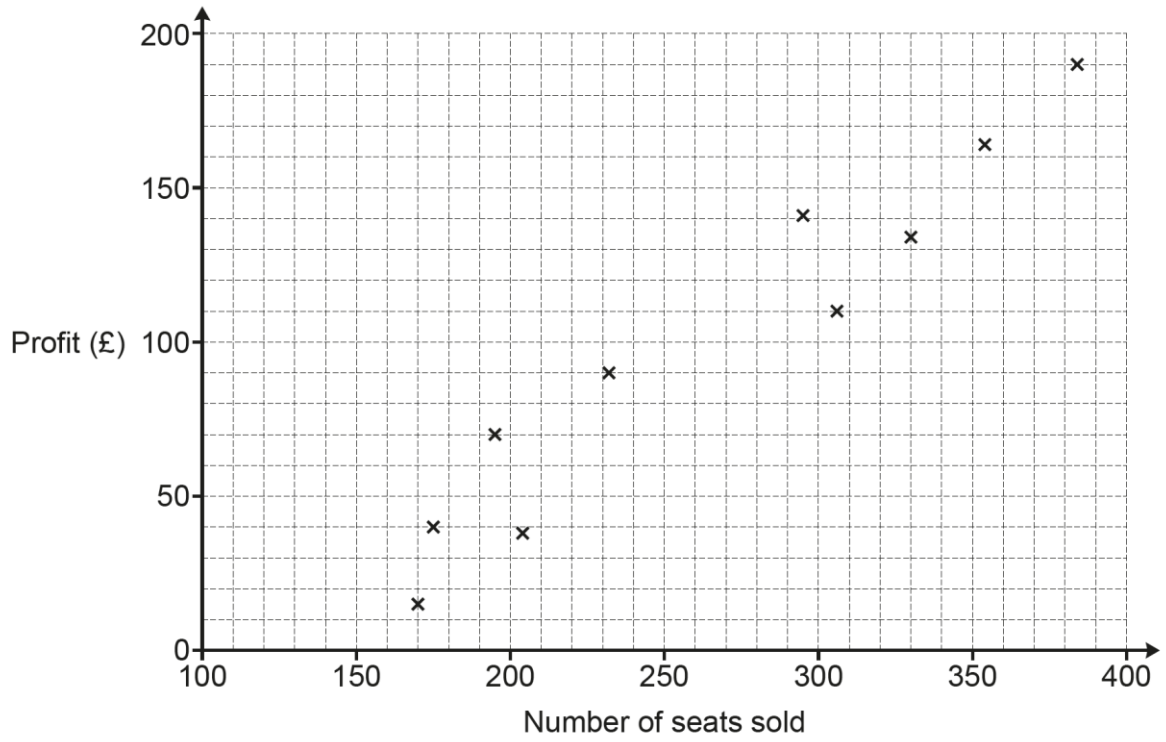
....

[2]

The majority of candidates were able to identify negative and positive correlation although many struggled to accurately describe the central scatter graph, with 'random' or 'scattered' often being used rather than 'No correlation'. Others described the graphs with words such as 'descending' or 'increasing'.

Question 21 (b)

(b) A theatre records the number of seats sold and the profit made for 10 performances. The scatter diagram shows these results.



By drawing a line of best fit, estimate the profit made when 250 seats are sold.

(b) £ ..... **[2]**

Many candidates were able to draw a line of best fit within the given tolerance. Those that did not score were often out of tolerance or not ruled, although a small number of candidates joined all the points. For the estimated value, almost all candidates knew that they needed to look up from the value of '250 seats' to where this met their line and then look across to read their 'profit'. The majority provided an answer within the acceptable tolerance and picked up the mark, but some did not correctly read the scale.

Question 22

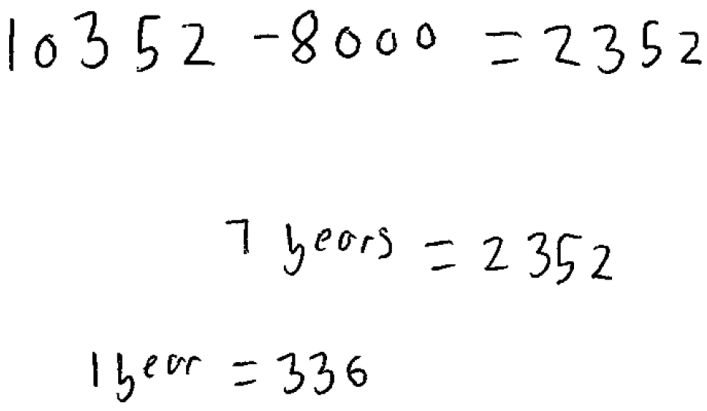
22 £8000 is invested at a rate of r% per year simple interest.
After 7 years the value of the investment is £10 352.

Find the value of r.

$r =$ ..... **[4]**

Many candidates found this question challenging. The most successful method was to first find the total interest (£10 352 – £8000) and then divide by the number of years (7) to find the annual interest as £336, then to express £336 as a percentage of the original amount. Several candidates responded as if the question involved compound interest.

Exemplar 3



[4]

The candidates shows clear working and correctly finds the amount of interest earned in one year, but doesn't carry on finding the value of r. This response scores 2 marks.

Question 23 (a)

23 (a) For each of the algebraic statements below decide whether it is an equation or an identity.

$(x-1)(x-2)=12$ is an .....

$(x-1)(x-2)=x^2-3x+2$ is an .....

$x^2=3x+10$ is an .....

[1]

Most attempted this part, but only a small number were successful. Unsuccessful responses showed every possible combination of answers.

Question 23 (b)

(b) A straight line is parallel to $y=3x$ and passes through the point (2, 11).

Find the equation of the line in the form $y=mx+c$.

(b) ..... **[3]**

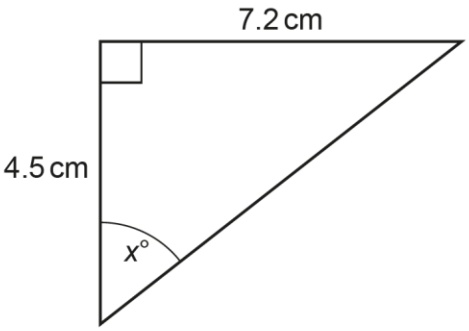
Few correct answers were seen to this part. Of those that scored, most received the mark for $y = 3x + k$.

Misconception

Not all candidates demonstrated awareness that parallel lines have the same gradient.

Question 24

24 Here is a right-angled triangle.



Not to scale

Use trigonometry to work out the value of x.

$x =$ ..... **[3]**

Candidates who followed the direction to use trigonometry were often able to select the correct formula and gain full marks. Of these candidates, common errors included selecting an incorrect formula and mis-identifying the opposite and adjacent sides. A number of candidates attempted to apply Pythagoras' theorem and frequently correctly calculated the hypotenuse but often provided incomplete solutions by either not going any further or not using the value correctly with the given ratio.

Candidates should be reminded to use the formulae sheet provided.

Question 25

25 A town council are going to do a survey on how people travel to work or school and for how long they travel.

One day their interviewer stands outside the town railway station and chooses 20 people at random to form their sample.

Make **three different** criticisms or suggestions for improving the council's method for selecting their sample.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

Only a few candidates were able to suggest three correct and different criticisms or improvements. Most valid criticisms given were about the location of the survey or the small sample size. Candidates often recognised the limited location, but many made suggestions that were not an improvement (for example, suggesting that the interviewer should stand at a bus station rather than a railway station). Very few gave suggestions for improvement that recognised the need to ensure different genders or ages were included, or to ensure several days were covered. Vague or unclear comments were often seen.

Question 26

26 There are 483 counters in a bag.
The counters are blue, red or yellow.

The ratio of blue counters to red counters is 1 : 5.
The ratio of red counters to yellow counters is 4 : 9.

Work out the number of red counters in the bag.

..... **[4]**

Many candidates found this question challenging, with few giving the correct answer of 140. There was very little evidence of understanding the need to make the red component of the ratio common. Many added a combination of 1, 4, 5 and 9 (most commonly arriving at 19), then dividing 483 by that total. Several candidates did not attempt this question.

Question 27

27 It takes 36 hours for 7 people to paint a fence.
Assume that all people paint at the same rate.

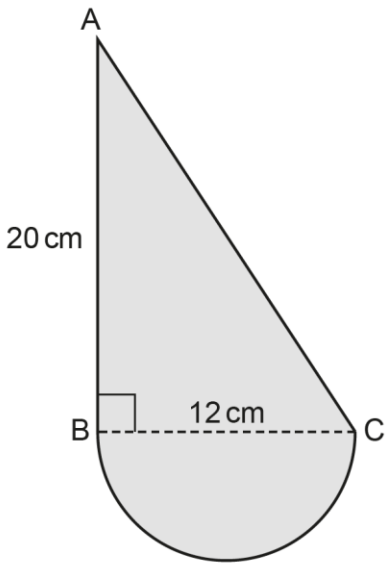
How long would it take 15 people to paint the same fence?
Give your answer in hours and minutes.

..... hours ..... minutes **[4]**

Very few candidates were awarded full marks on this question, with many not recognising that it was an inverse proportion question. A common issue was not recognising that an increased number of people carrying out a task should reduce the time taken. The most successful method was to start with 36 × 7 to find the total number of hours required as 252, then divide by 15. Some did this correctly and reached 16.8 to pick up 3 marks, but many then struggled to convert this to hours and minutes; 16 hours 8 minutes was often seen as a final answer, as was 17 hours 20 minutes, presumably from converting 0.8 of an hour to 80 minutes.

Question 28

28 The shaded shape below is made from a right-angled triangle, ABC, and a semicircle. The length of AB is 20 cm and the diameter of the semicircle, BC, is of length 12 cm.



Not to scale

Calculate the perimeter of the shaded shape.
You must show your working.

..... cm **[6]**

Many candidates attempted this question. Some realised that Pythagoras' theorem was required to calculate the length of AC and those that attempted this generally produced work that could be credited. Of those who attempted the lower part of the shape, the majority realised the need to use π and generally either gained M2 for a correct value or M1 if they did not halve their circumference. The use of πr^2 was quite prevalent; candidates should ensure they are using the correct formula. Some candidates additionally included the length BC (12 cm) in their perimeter.

Question 29 (a)

29 (a) Write 0.0037 in standard form.

(a) ..... **[1]**

This was generally well answered, with most candidates correctly writing numbers in standard form. Common incorrect answers were 37×10^{-4}, 3.7×10^{3} and $\frac{37}{1000}$.

Question 29 (b)

(b) A country consists of a south island and a north island.
The table below shows the population and area of each island in June 2023.

	Population	Area (km^2)
South island	1.2×10^6	1.5×10^5
North island	4.0×10^6	1.1×10^5

Work out the overall population density of the country in June 2023.

(b) ..... people per km^2 **[4]**

Quite a few candidates scored full marks. Many correctly converted numbers from standard form to ordinary form and worked confidently with these numbers. The understanding that density = population ÷ area was usually evident. Some calculated the densities of individual North and South Islands, rather than combining them into one country. A common error was to add all four values. Some candidates demonstrated that they had calculators that operated in standard form and that they knew how to use them correctly.

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If any of your students' results are not as expected, you may wish to consider one of our post-results services. For full information about the options available visit the OCR website.

Access to Scripts

We've made it easier for Exams Officers to download copies of your candidates' completed papers or 'scripts'. Your centre can use these scripts to decide whether to request a review of marking and to support teaching and learning.

Our free, on-demand service, Access to Scripts is available via our single sign-on service, My Cambridge. Step-by-step instructions are on our website.

Keep up-to-date

We send a monthly bulletin to tell you about important updates. You can also sign up for your subject specific updates. If you haven't already, sign up here.

OCR Professional Development

Attend one of our popular professional development courses to hear directly from a senior assessor or drop in to a Q&A session. Most of our courses are delivered live via an online platform, so you can attend from any location.

Please find details for all our courses for your subject on **Teach Cambridge**. You'll also find links to our online courses on NEA marking and support.

Signed up for ExamBuilder?

ExamBuilder is the exam paper builder platform for a range of our qualifications. Find out more.

Free for all OCR centres with an Interchange account, it allows unlimited users per centre. We require an Interchange username to verify your centre's users for ExamBuilder.

If you do not have an Interchange account, please contact your centre administrator (usually the Exams Officer) to request a username.

Once you have an Interchange username, use the form on this page to sign up for ExamBuilder, or ask an existing user at your centre to create an ExamBuilder account for you.

Active Results

Review students' exam performance with our free online results analysis tool. It is available for all GCSEs, AS and A Levels and Cambridge Nationals (examined units only).

Find out more.

Tell us what you think

Your feedback plays an important role in how we develop, market, support and resource qualifications now and into the future. We want you and your students to enjoy and get the best out of our qualifications and resources, but to do that we need your honest opinions to tell us whether we're on the right track or not.

You can email your thoughts to resources.feedback@ocr.org.uk or visit our feedback page to learn more about how you can help us improve our resources.

Designing and testing in collaboration with you and your students

Helping young people develop an ethical view of the world

Equality, diversity, inclusion and belonging (EDIB) are part of everything we do

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Contact the team at:

01223 553998

ocr.org.uk

To stay up to date with all the relevant news about our qualifications, register for email updates at ocr.org.uk/updates

Visit our Online Support Centre at support.ocr.org.uk

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