Qualification Accredited

OCR
Oxford Cambridge and RSA

Examiners' report

GCSE

MATHEMATICS

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

J560

For first teaching in 2015

J560/03 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 3 series overview

Many candidates responded well to the first ten questions on the paper in particular, although some did use inefficient methods at times.

Most candidates kept going to the end of the paper and notably some of the less successful candidates still picked up marks on later questions such as Questions 20 (a), 22, 23 and 26.

Most candidates appeared to be able to use their calculator, ruler and compasses although there was often unfamiliarity with the calculator fraction keys and also sometimes inaccuracies in attempting constructions.

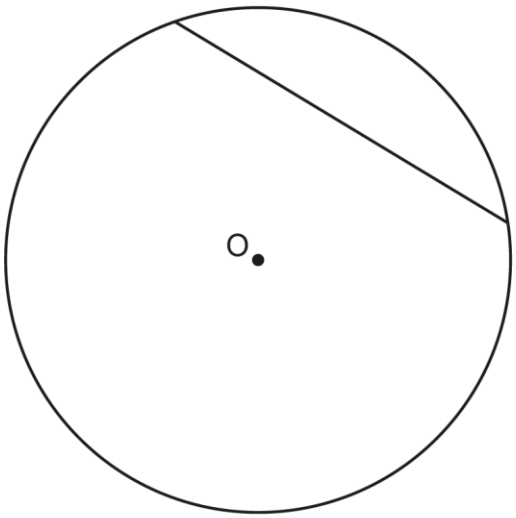
Arithmetic on straightforward problems was generally good, although a significant number of candidates demonstrated weakness with understanding and solving problems in context.

Candidates often demonstrated unfamiliarity with geometric terms.

Candidates who did well on this paper generally:	Candidates who did less well on this paper generally:
• read the questions carefully, paying close attention to the command word(s) used • knew geometric terms and could apply these to shapes • knew and could apply standard methods • set out work carefully and deleted unused working • annotated their work with brief notes, labels and/or units • used a sharp pencil, ruler and compasses accurately • showed clear substitutions into correct formulae • used calculator methods for calculations • used their calculators efficiently • attempted all or most questions • could interleave topics within one question • had good algebraic skills and were not reliant on trial and improvement methods • used correct arithmetic and algebraic processes • gave clear and concise reasons • demonstrated a good knowledge of percentages, ratio and fractions • planned and recorded solutions in an orderly manner.	• overlooked key information in the questions • did not know geometric terms associated with the circle • did not know/use standard methods, but resorted to trial and improvement or non-calculator methods • worked in a random fashion, with working given around the question and workspace • attempted multiple methods without making it clear which was their final response and which had been abandoned • used figures and calculations without annotation • used freehand for drawings and did not know construction techniques • did not show clear substitutions into formulae and sometimes used incorrect formulae for a task • used non-calculator methods (especially for percentage questions) and/or did not check their arithmetic using their calculator • did not use the fraction function on their calculator • did not attempt every question • misunderstood questions, possibly through not fully reading the given information • did not use money notation correctly, nor round correctly to decimal places • did not recognise sequences of square numbers nor triangular numbers • did not use brackets or BODMAS correctly • did not consider the reasonableness of answers • wrote lengthy and poorly constructed reasons.

Question 1 (a) (i)

1 The diagram shows a circle, centre O, and a straight line.



(a) Write down the mathematical name for

(i) the straight line

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

The whole of Question 1 highlighted that many candidates were uncertain with circle terms.

Common answers to this part were 'sector', 'tangent' and 'segment'. Many did not respond.

Assessment for learning

Candidates showed unfamiliarity with the required terms and would benefit from both using and practising correct geometric terms.

Question 1 (a) (ii)

(ii) the perimeter of the circle.

(ii) ..... **[1]**

Many candidates answered this question correctly, however '360', 'arc', 'radius' and 'area' were common incorrect answers. Some candidates attempted to calculate the circumference.

Question 1 (b)

(b) On the diagram, draw a diameter. **[1]**

A large number of ruled diameters were seen; however freehand lines were not uncommon.

Some attempts missed the centre, didn't reach the circumference or extended beyond it.

Tangents, radii, chords and sectors were seen. A significant number did not respond.

Question 2 (a) (i)

2 (a) (i) Round 4352 to the **nearest hundred**.

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

This was often correct. Common errors were 4300, 4000, 400 and 4350, with the occasional 4352.

Some candidates tried to overwrite digits, leaving it unclear what the intended answer was. Wrong answers should be crossed through and replaced.

Question 2 (a) (ii)

(ii) Round £5.3725 to the **nearest penny**.

(ii) £ ..... **[1]**

Many picked up this mark, but fewer than part (a)(i). The common error was £5.40, although £5.3700 and £5.3725 were also seen.

Candidates should be aware of how monetary terms (e.g. pounds and pence) relate to place value.

Question 2 (b)

(b) A decorator works out how much to charge for some painting.

The decorator
- rounds **up** the area to be painted to the next $10\,m^2$
- then charges £65 for every $10\,m^2$.

Work out how much the decorator charges for painting an area of $74\,m^2$.

(b) £ ..... **[2]**

Some correct answers were seen, however 481 (from 7.4 × 65) and 455 (from 7 × 65) were the most common answers; both of these were given a special case mark in the mark scheme. Many attempted 65 × 74, sometimes without a calculator. Answers of thousands of pounds were not uncommon.

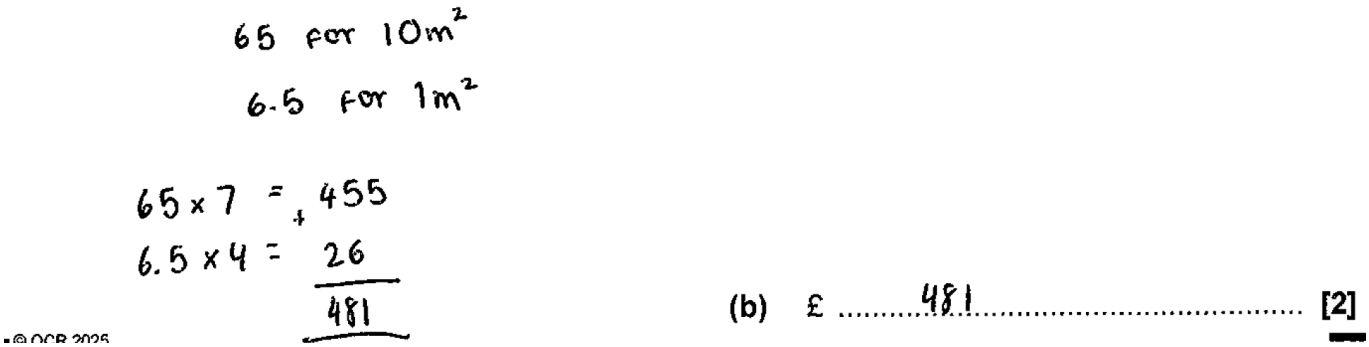
The question stated the decorator rounds up (with 'up' given in bold), but a common error was to round 74 down to 70.

Assessment for learning

This question should have been accessible to most candidates; however many did not provide a realistic solution.

Candidates would benefit from working with 'functional' aspects of maths and judging whether or not their answer is sensible.

Exemplar 1



This candidate reaches 481 to pick up the SC1, but it was one of the more unusual methods.

It is equivalent to calculating 65 × 7.4 but broken into stages. They recognise the decorator was charging in units of $10\,m^2$ but haven't dealt with the rounding up aspect.

Question 3 (a)

3 **(a)** Write $5 \times 5 \times 5 \times 5 \times 5 \times 5$ as a power of 5.

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

This was well answered. The common errors were 6^5, 5^5 and 15 625.

Question 3 (b)

(b) Write down the value of 1^{10}.

(b) ..... **[1]**

This was well answered. Common errors were 1 × 1 × 1 × 1 × 1 × 1 × 1 × 1 × 1 × 1 and 10.

Question 3 (c)

(c) Work out.

$4 \times 4 \times 4 - 3^3$

(c) ..... **[2]**

This was often correct. When 1 mark was given, it was generally for 64 and less often for 27.

A common error was $3^3 = 9$. Some multiplied 64 by 27.

Question 4 (a)

4 **(a)** Write 1% as a decimal.

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

This was often correct. The common error was 0.1, along with also 0.10 and 0.1%.

A few fractional answers were seen.

Question 4 (b)

(b) Write 35% as a fraction.
Give your answer in its simplest form.

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

This was very well done. Most picked up 2 marks and if they didn't, the B1 for $\frac{35}{100}$ could often be given.

Some candidates wrote both $\frac{35}{100}$ and $\frac{7}{20}$ on the answer line, leaving examiners to mark the less successful (as per the marking instructions).

Sometimes $\frac{35}{100}$ was seen, then converted to a decimal. Candidates are reminded to read questions carefully and check they're responding as requested.

Question 4 (c)

(c) Work out 15% of 2 litres.
Give your answer in millilitres.

(c) .....ml **[3]**

Many correct answers were seen, however most candidates used inefficient non-calculator methods to reach their answer.

While non-calculator methods were generally used successfully to reach the right answer to this question, candidates rarely showed their operations or labelled working and so if an error did occur, there was often no working that could be credited. Had candidates been asked to find a more challenging percentage (e.g. 16.5%) where non-calculator methods might have been less successful, not showing operations or labelling working may have had a much greater impact on marks.

Candidates should be aware that '15% of 2000' or '15% × 2000' (for example) are not operations that can be credited; instead, working such as '0.15 × 2000' or '$\frac{15}{100}$ × 2000' should be written.

A significant minority of candidates used the conversion 100 ml = 1 litre, usually reaching an answer of 30. If they showed working then they could still pick up the SC2 mark, but many did not show working.

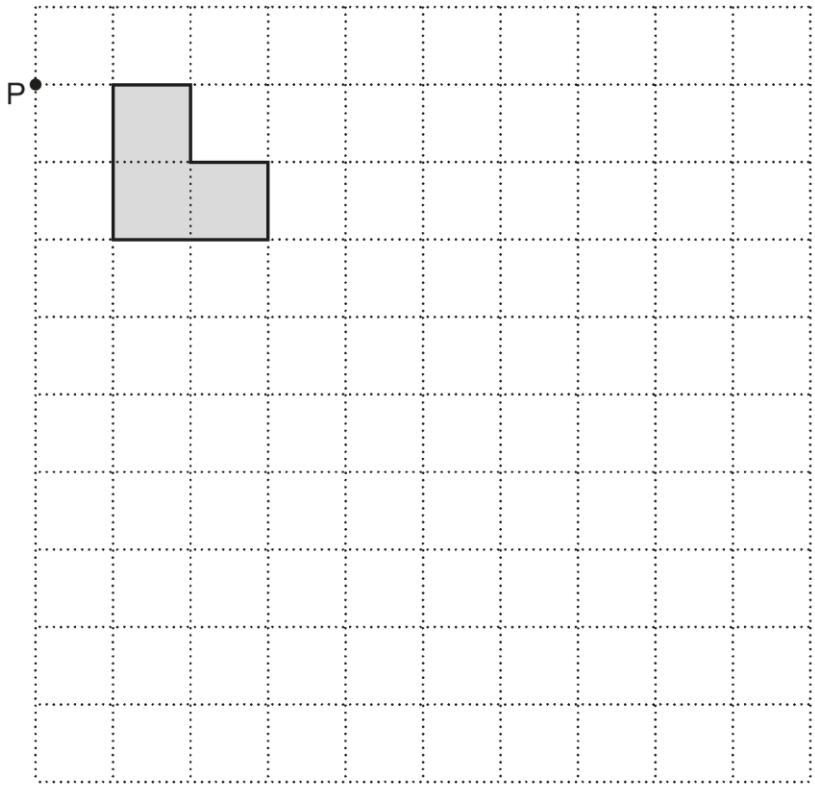
Some worked in litres and gave the answer 0.3; as mentioned in the comment above for part (b), candidates should read questions carefully.

Assessment for learning

Candidates should practise standard calculator methods for working with percentages, rather than resorting to inefficient non-calculator methods that can often lead to errors.

Question 5

5 Enlarge the shaded shape with scale factor 3 and centre of enlargement at point P.



[2]

Many candidates drew an enlargement with scale factor 3, but few managed to place it correctly. Common errors were to have the top-left vertex on point P itself, or one square to the right of where it should have been.

A small number showed construction rays and these usually resulted in correctly placed images.

Stronger responses plotted the points for the vertices and joined them accurately using a ruler and sharp pencil. However, others used freehand and/or drew enlargements with inaccurate vertices.

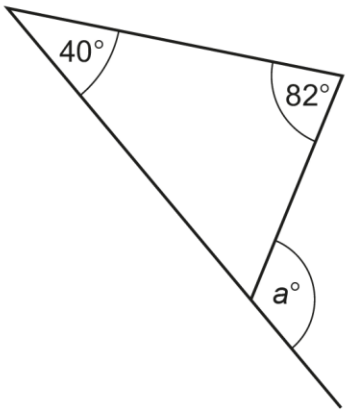
Some drew enlargements with scale factor 2.

Misconception

Sometimes the longer sides of the shape were enlarged by scale factor 3 yet the 'thickness' of the shape remained at 1 square, resulting in 'skinny' images.

Question 6 (a)

6 **(a)** The diagram shows a triangle with one side extended.



Not to scale

Work out the value of *a*.

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

Many correct answers were seen.

Several worked out 40 + 82 but then misused the result. Some gave 58 as the answer.

A few responded as if angle *a* was the exterior angle of a regular 3-sided polygon.

Misconception

Several calculated 180 – 40 – 82 = 58 and give 58 as their final answer, rather than going on to calculate angle *a*.

Question 6 (b)

(b) Complete the statement below using the correct symbol and value from this list.

$< 90°$ $= 90°$ $> 90°$ $< 180°$ $= 180°$ $> 180°$

When the two smallest angles in a triangle are added the answer is always ..... **[1]**

Few candidates gave the correct answer.

The options with 180° were given in roughly equal proportions. Those responding with '> 180°' may have been unsure about the difference between > and <.

Question 7

7 A shop assistant works for 7 hours each day for 5 days.
The shop assistant is paid the same amount for each hour they work.
In the 5 days, the shop assistant earns £448.

How much does the shop assistant earn per hour?

£ ..... **[3]**

A large number of correct answers were seen to this, however many candidates' working implied they were not using a calculator.

Some divided either by 5 or by 7, but not both (this could pick up 1 mark).

Some candidates multiplied 448 by 5, 7 or 35, while others divided by 24.

A number of candidates found £12.80, but then divided by 5, 7 or 35; very few annotated working and so this may have been through losing track of units relating to the method, e.g. £ per hour, etc.

A number of candidates misread 448 as 488.

Assessment for learning

As with Question 2 (b), this question should have been accessible to many, but a large number did not give a reasonable answer.

Practicing 'functional' questions set in context and considering the reasonableness of answers would benefit many candidates.

Question 8 (a)

8 **(a)** A student thinks of a number.
The student takes 16 from the number and then divides by 4.
The answer is 8.

What number is the student thinking of?

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

A large number of correct solutions were seen.

A number of candidates wrote $x - 16 \div 4 = 8$, but without brackets or as a flow chart. This led to inverse operations being applied in the incorrect order, with these candidates often adding 16 to both sides first.

Question 8 (b)

(b) A teacher thinks of a number.
150% of the number is 36.

What number is the teacher thinking of?

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

Quite a few correct solutions were seen, but also many didn't pick up a mark.

Candidates often had 150% = 36, but a common error was to then treat it as 100% and write 10% = 3.6.

Another incorrect method was work out 150% of 36 by calculating 1.5 × 36. Others calculated 36 ÷ 2 to arrive at 18.

Assessment for learning

Candidates should be familiar with percentages such as 150% and how to work with them.

Question 9

9 Sam sees a computer tablet for sale on the internet for 126 euros (€).
Sam has £105 to spend.

The exchange rate is £1 = €1.15.

Can Sam buy the tablet?
Show how you decide.

..... because .....

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

This question was very well done and many candidates gained both marks. They often worked out 105 × 1.15 to obtain two values in the same currency that could be compared. Sometimes they used a vertical layout.

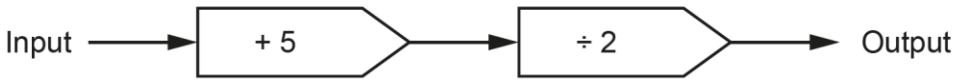
Some candidates carried out a correct currency conversion but then made the wrong conclusion. This picked up 1 mark for the correct conversion.

The common error was to use the exchange rate incorrectly, such as 105 ÷ 1.15.

Some compared 105 and 126 directly.

Question 10 (a) (i)

10 (a) This is a function machine.



(i) Find the output when the input is 10.

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

Many correct answers were seen to this. The common wrong answer was 12.5.

Question 10 (a) (ii)

(ii) Find the input when the output is 24.

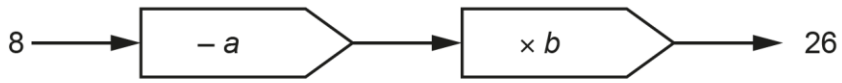
(ii) ..... **[2]**

This part was also responded to very well.

Those that did not show 24 × 2 (the first stage in the reversed process) often made errors.

Question 10 (b)

(b) This is a different function machine.



a and *b* are both positive integers.
When *a* is 7 the value of *b* is 26.

Find another pair of values for *a* and *b*.

(b) *a* = ...

b = ... **[3]**

Quite a few correct answers were seen, but fewer than (a)(i) and (a)(ii).

Some correctly wrote down 26 ÷ 2 = 13 or 26 ÷ 13 = 2 but then misinterpreted this and gave the answer as 2 and 13.

A few gave the answer **–** 6 and **×** 13 to pick up SC2. These not the values of ***a*** and ***b***.

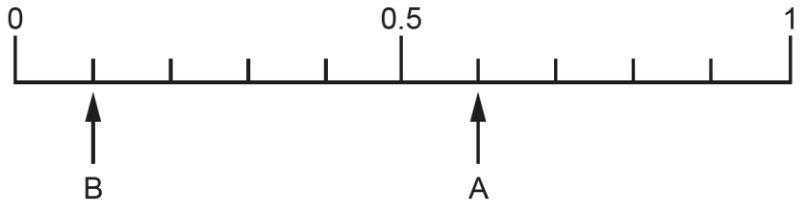
Those who didn't pick up marks generally didn't have a systematic approach, often instead attempting undirected trial and improvement.

Some candidates gave negative or decimal answers. Again, candidates should check that they have read the question carefully.

Question 11 (a)

11 A student has a three-sided spinner with sides labelled A, B and C.
They spin the spinner a number of times and record the results.

The student works out the correct relative frequencies for the spinner landing on sides A and B.
The relative frequencies are shown on this scale.



(a) Write down the relative frequency that the spinner landed on side A.

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

This was usually correct.

A few mixed fractions and decimals, giving the incorrect $\frac{0.6}{1}$. Some gave 0.4 or 0.06.

Question 11 (b) (i)

(b) (i) The student then works out the relative frequency that the spinner landed on side C is 0.4.

Explain, using a calculation, why the relative frequencies show that the student has made a mistake.

.....

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

Most did not pick up marks here. A number of candidates ignored the instruction that they should 'Explain, using a calculation…' and responded just with a comment such as 'it doesn't add to 1' or 'side C should be 0.3'. Without any evidence to support their comment, this picked up no marks.

Some showed a calculation but omitted a comment that the relative frequencies should add to 1 or similar.

Responses that didn't score often had an incomplete calculation such as 0.1 + 0.6 or subtracted 0.1 from 0.6.

Assessment for learning

Candidates should practise using information to give clear and valid explanations.

Question 11 (b) (ii)

(ii) On the scale above, mark with an arrow (↑) the **correct** relative frequency that the spinner landed on side C. **[1]**

Many candidates gained a mark here for an arrow placed with reasonable accuracy. However, arrows were also seen at 0, 0.4, 0.5 and 1 among many others.

Question 11 (c)

(c) The student says

The **probability** that the spinner will land on side B on my next spin is 0.1.

What assumption is the student making?

.....

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

Correct answers were very rarely seen. Most said that the assumption was that relative frequency = the probability, or that the probability won't increase / that it will stay the same. Others stated the assumption was that the spinner would land on B.

Candidates did not appreciate that in order for the relative frequency to equal the probability, the spinner had to have been tested many times.

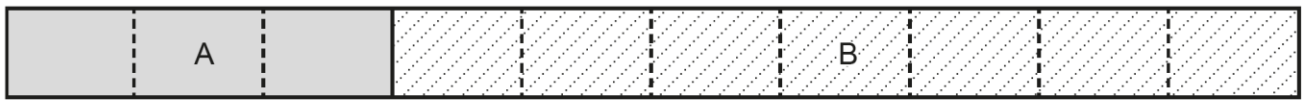
A few stated the assumption was that the same spinner was still being used.

Assessment for learning

Candidates need to be aware of what forms 'an assumption' in the context of the question.

Question 12 (a)

12 The diagram shows a large rectangle made from 10 smaller rectangles of equal area.
The large rectangle is divided into two unequal parts, A and B.



(a) Tick (✓) all the correct statements.

A : B = 3 : 10	
A : B = 3 : 7	
A is $\frac{3}{10}$ of the large rectangle	
A is $\frac{3}{7}$ of the large rectangle	

[2]

Most candidates scored here, with the majority gaining the full 2 marks. Very few however showed any working.

Those who picked up 1 mark usually gained it for ticking 'A : B = 3 : 7'. This statement was almost always ticked.

Question 12 (b)

(b) The area of Part A is $18k$.

Write an expression, in terms of k, for the area of Part B.
Give your answer in its simplest form.

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

Many picked up at least 1 mark here, but candidates often found this a challenge and some gave no response at all.

Quite a few gave the correct $42k$ with little or no working.

Those that gave 42 or $B = 42k$ (this is not an expression, which the question asks for) gained 1 mark.

The calculation $6 \times 3 = 18$ was often seen, or less commonly $18 \div 3 = 6$, but candidates then often seemed unsure what to do next.

A fairly common incorrect answer was $18k : 42k$, which picked up 0 marks. This was often simplified to $3k : 7k$, but also to 3 : 7. In some cases it was converted to $18k + 42k$.

Assessment for learning

Candidates need to be aware of the difference between an expression and an equation.

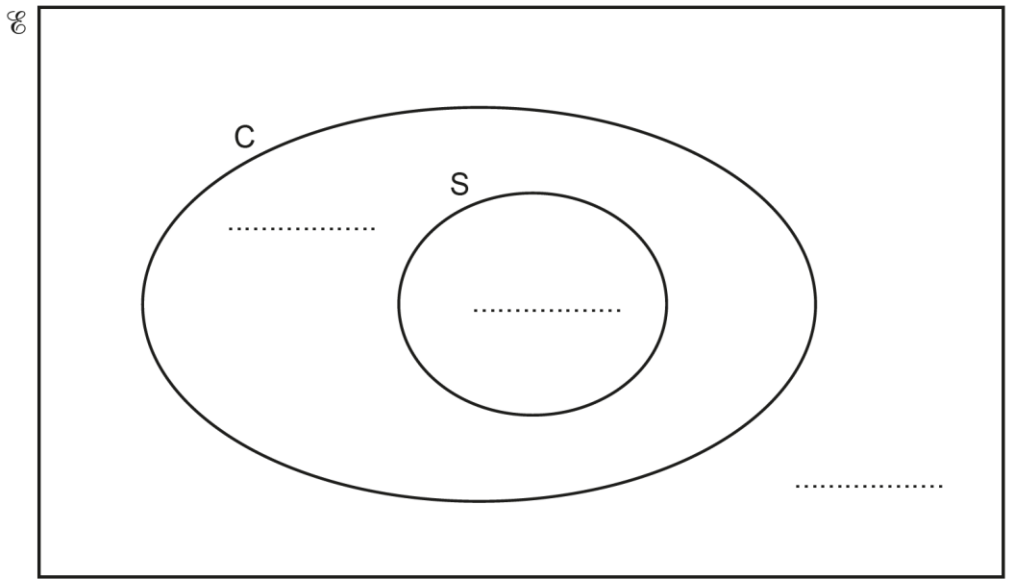
Candidates need to understand the meaning of requests to give an answer in a particular form, such as 'an expression' or phrases such as 'in terms of…'.

Question 13

13 40 people are asked if they like spiders (S) and if they like cats (C).

- 32 people like cats.
- The number of people who like spiders is the same as the number of people who don't like either spiders or cats.

Complete the Venn diagram to show this information.



[3]

Few fully correct solutions were seen. The most common response was the type that picked up the SC1 (three numbers other than the correct solution that sum to 40, with two equal numbers in the appropriate positions).

The most successful candidates used an algebraic method, which also allowed them easy access to method marks.

A few correctly placed 8 on the middle and right-hand answer lines but had 32 on the left-hand answer line.

Many showed no clear strategy to respond to the question.

Question 14 (a) (i)

14 (a) (i) Write down the 4th term of this sequence of numbers.

1 4 9 ..... 25 36 49

[1]

Most responded correctly with 16.

Common errors were 13, 14 and 15, often from using a term-to-term rule and not recognising the sequence of square numbers.

Question 14 (a) (ii)

(ii) Write down the name for the sequence of numbers.

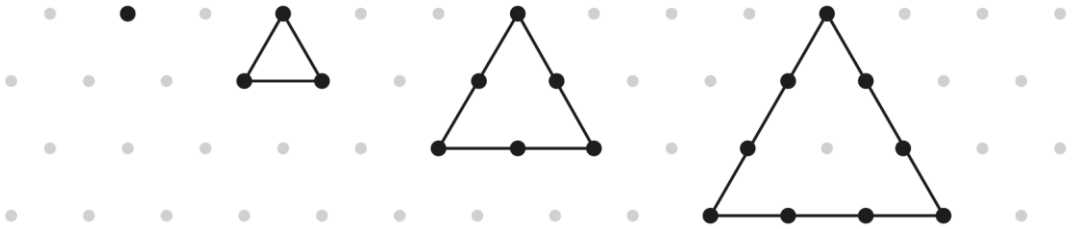
(a)(ii) ..... **[1]**

Very few candidates recognised the square numbers.

Common errors were Fibonacci, linear, increasing, n^2, n^{th} term and $n + 3$.

Question 14 (b) (i)

(b) (i) Amit draws these four diagrams.
Amit writes the number of dots on the perimeter underneath each diagram.



Number of dots on the perimeter	1	3	6	9

Amit says

My diagrams show the first four triangular numbers.

Complete this statement.

Amit is incorrect because .....

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

Only a few candidates either recognised that 9 wasn't a triangular number or identified that the triangular numbers should be 1, 3, 6 and 10 to pick up this mark.

Most responses indicated that Amit's error was the inclusion of 1 in the sequence, with comments such as '1 is not a triangle, it is a dot' or 'there are only 3 triangles'.

Assessment for learning

As highlighted earlier, candidates should practise using given information to give clear and valid explanations.

Question 14 (b) (ii)

(ii) Use the grid below to draw the correct diagram for the 5th triangular number.

[1]

Few picked up this mark and most just drew what would be the fifth diagram in the previous sequence (i.e. with no internal dots used) rather than the 5^{th} triangular number.

Some drew what would have been the sixth diagram in the previous sequence, possibly because they weren't recognising 1 as being a valid term and hence were counting the second diagram in part (b) (i) to be the first term.

Question 15 (a)

15 (a) Heidi and Ben both work with the same positive number N.

Heidi works out $\frac{5}{8} \times N$.

Ben works out $0.63 \times N$.

Tick (✓) the correct statement.

Heidi gets a larger answer than Ben	
Heidi gets a smaller answer than Ben	
Heidi gets the same answer as Ben	

Give a reason why you ticked the statement.

.....

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

Many gained both marks here by correctly converting $\frac{5}{8}$ to 0.625 and then comparing it to 0.63.

A number did the conversion correctly, but thought 0.625 was greater than 0.63 and gave reasons indicating they thought this because it has more decimal places.

Some converted $\frac{5}{8}$ to a percentage but did not also convert 0.63 and so did not have comparable formats.

Some candidates found $\frac{5}{8}$ of an amount and then 0.63 of the same amounts, which is a valid method although not the most efficient.

Misconception

Candidates need to understand that the length of a decimal number does not determine its magnitude.

Question 15 (b)

(b) Heidi correctly works out the area of a circle with radius 10 cm.
Heidi uses the formula $A = \pi r^2$.

Heidi's answer is 314.1592654 cm^2.

Ben correctly works out the area of the same circle using the same formula.
Ben's answer is bigger than Heidi's answer.

Show how this can happen. **[2]**

Almost no candidates showed they recognised that different approximations of π would lead to different answers for the calculation. Very few candidates gave a valid response, such as $3.142 \times 10^2 = 314.2$.

Most gave statements like 'He must have rounded', although a few said, 'He should square π' or 'He has used a different radius' (or '…a different diameter').

Question 16 (a)

16 A fair four-sided dice is numbered 3, 4, 5 and 6.
The dice is rolled twice and the two scores are multiplied together.

(a) Complete the table to show all the possible outcomes.

		First roll			
	×	3	4	5	6
Second roll	3		12	15	18
	4	12	16	20	24
	5	15	20		30
	6	18	24	30	

[1]

This was the first of the questions common with the Higher tier paper J560/06. It was very well answered with very many picking up the mark.

Some made the error that $3 \times 3 = 6$.

Question 16 (b)

(b) Find the probability that the outcome is a multiple of 8.

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

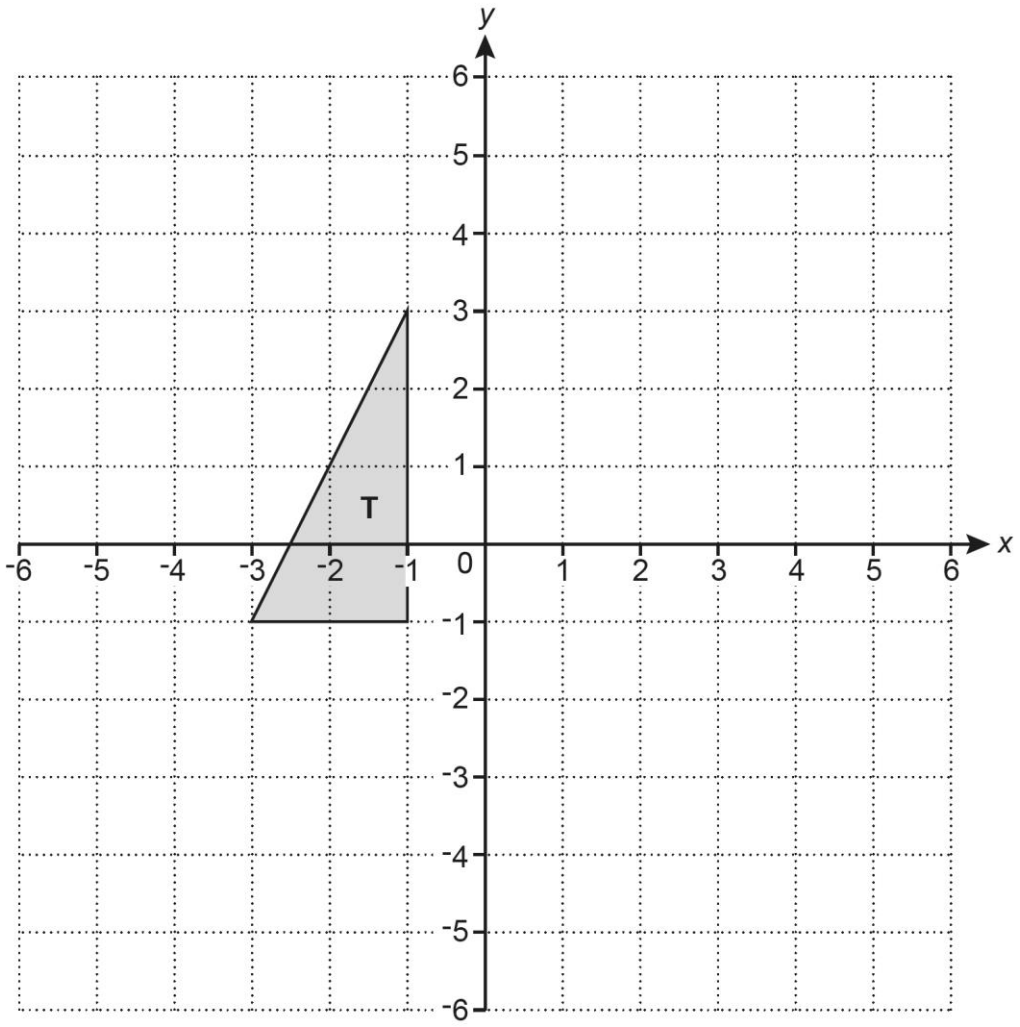
Many picked up the full 2 marks here.

Common errors were to not identify all the multiples of 8, or to give an integer answer (sometimes this seemed to be their count of how many multiples of 8 there were, for example 3, even though other values were seen).

Some responses indicated that they were including 36 as a multiple of 8. Incorrect denominators such as 13 or 36 were sometimes used.

Question 17

17 Triangle **T** is drawn on a coordinate grid.



Translate triangle **T** by vector $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$. **[2]**

Many responded well here and the triangle was quite often correctly placed. Candidates using 'looped steps' were often successful in placing the image.

A few candidates gave a translation correct in one of the directions, picking up 1 mark.

Many candidates moved the triangle 3 up and 2 to the left, indicating a misconception with vector notation.

Rotations, enlargements and stretches were however seen, along with inaccurate drawings.

The use of a ruler was reasonably common.

Question 18 (a)

18 (a) The price of a laptop is reduced in a January sale from £450 to £382.50.

Work out the percentage reduction in the price of the laptop.

(a) ..... % **[3]**

Many candidates gained full marks here marks, however most used inefficient non-calculator methods. As in Question 4 (c) earlier, the percentage that candidates were calculating here was a relatively straightforward integer and many reached the correct answer, however candidates rarely showed their operations or appropriately labelled working, so those that made an error often came away with no marks.

Few used a direct method such as $\frac{67.5}{450} \times 100$.

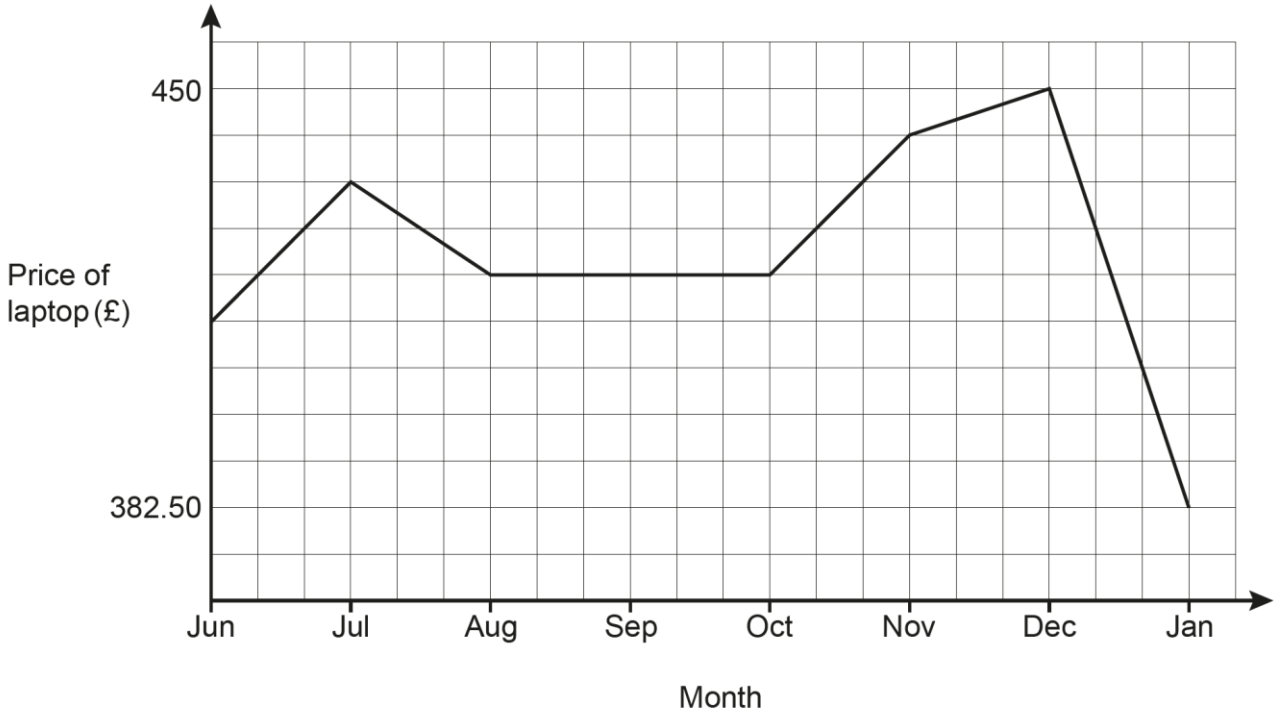
Some reached 67.5 and then gave it as the answer or worked out $\frac{67.5}{100}$.

Assessment for learning

As highlighted earlier, candidates should become much more familiar with standard calculator methods for working with percentages.

Question 18 (b)

(b) The graph shows the price of the laptop in the months before the January sale.



Explain why this graph is misleading.

.....

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

Few picked up the mark here.

Some said the graph was misleading because 'it does not start at 0', without specifying what 'it' was. Others stated that 'it' did not start in January, presumably referring to the horizontal axis, but this axis is not misleading.

A common response was to say there were only two values on the price axis so it was hard to work out values. Another was to say that the months were in the wrong order. These picked up no credit.

Some described the changes in the price rather than giving a reason for the graph being misleading.

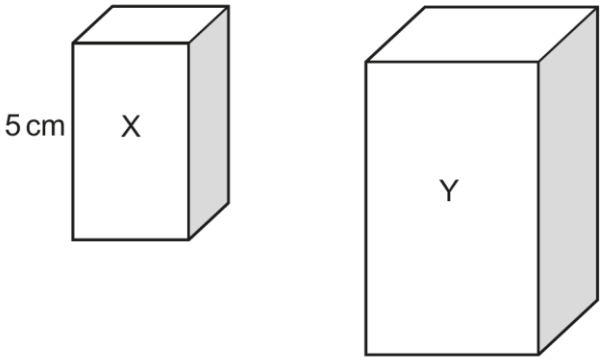
Candidates could pick up the mark for stating that if the price axis had started at 0, then the changes in value would appear less exaggerated than they do here, but very few gave this.

Assessment for learning

As highlighted earlier, candidates should practice giving clear and valid explanations. They should also ensure they name what it is they're commenting on and don't refer to things as 'it'.

Question 19

19 The diagram shows two similar cuboids, X and Y.



Not to scale

Cuboid X has a square base with area 16 cm^2 and height 5 cm.
Cuboid Y has a square base with area 36 cm^2.

Work out the height of cuboid Y.
You must show your working.

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

A small number of very succinct responses of $\frac{6}{4} \times 5$ were seen, leading straight to the correct answer. This received full credit here, but candidates should be weary of skipping steps in working in questions stating, 'You must show your working'.

Many candidates used the incorrect method of $\frac{36}{16} \times 5$ leading to 11.25, or they calculated $16 \div 5$.

Some realised that the side lengths of the bases were needed in order to identify the scale factor and correctly wrote down $16 = 4 \times 4$ for Cuboid X, but then incorrectly used that side length in a calculation for Cuboid Y, for example $36 = 9 \times 4$.

Some found the side lengths of the bases correctly as 4 and 6 but then abandoned them and found an answer by a different method, so these values could not be credited.

Many seemed unsure of how to respond here, producing one or more calculations with the given values that were not valid calculations to reach the answer.

Question 20 (a)

20 Sasha makes some cupcakes.
Each cupcake is topped with red or white or yellow icing.

$\frac{1}{3}$ of the cupcakes have red icing.

$\frac{1}{4}$ of the cupcakes have white icing.

(a) Work out the fraction of the cupcakes that have yellow icing.

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

A good number of correct answers were seen. Many appreciated that the two fractions needed to be subtracted from 1 to find the remaining fraction, even if not all were able to do this correctly.

Most converted the given fractions to decimals, added them and then subtracted this from 1 before finally converting the result back to a fraction. In doing this accuracy was almost always lost (often due to incorrectly converting/rounding $\frac{1}{3}$ to the decimal 0.3), however a method mark was earned.

Of those that retained the given fractions, the incorrect calculation $\frac{1}{3} + \frac{1}{4} = \frac{2}{7}$ was often seen. This was however generally followed by the answer $\frac{5}{7}$, showing that candidates otherwise had a correct method. Candidates would benefit from being able to use the fraction keys on their calculator, as this would likely have helped avoid the incorrect addition (as well as any need to convert values to decimals). For those who had a valid method to add fractions, most arrived at $\frac{7}{12}$.

Some candidates responded with $\frac{1}{5}$, perhaps from believing that there was a sequence to the fractions.

Assessment for learning

Candidates should become much more comfortable with working with fractions, so that they can avoid the need to convert to decimals.

Candidates should practice using the fraction keys on their calculators. They should also realise that rounding/truncating decimals will reduce accuracy, which can be avoided by keeping fractions as fractions in calculations rather than converting them.

Question 20 (b)

(b) Sasha makes all of the icing using butter and sugar in the ratio 1 : 2.
Each cupcake has 60 g of icing.

Sasha uses 0.7 kg of butter to make the yellow icing.

Find the **total** number of cupcakes Sasha makes.
You must show your working.

(b) ..... **[5]**

This problem-solving question was a challenge for many.

Working was often unstructured and unclear, making it difficult to follow the strategy being used. Many presented multiple attempts without either indicating their final response or crossing out abandoned attempts, often meaning that marks could not be given. Examiners cannot favour correct working if it's presented alongside additional incorrect attempts.

Very few candidates labelled working or gave units with their values.

Converting between grams and kg was a problem, with many seeming unsure about whether there were 100 or 1000 grams in a kg, but method marks could still be earned by showing clear working.

Many candidates worked out that 1.4 (kg) or 140 or 1400 g of sugar was used but then made an error by dividing this by 60.

An alternative approach was to use 1 : 2 to work out that each cupcake requires 20 g of butter, but many did not then know how to use this. A few calculated 700 ÷ 20 and identified that 35 yellow cupcakes had been made, but many assumed this to be the final answer. Only a few of these went on to find the total number using their fraction from part (a).

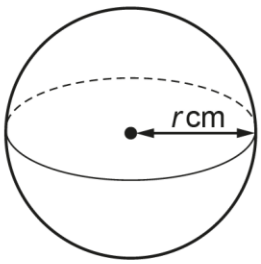
Assessment for learning

Candidates need to practise planning and structuring strategies to arrive at correct solutions to questions.

Candidates should delete unwanted attempts at a question.

Question 21

21 The diagram shows a sphere with radius r cm.



The sphere has a circumference of 50 cm.

Work out the surface area of the sphere.

[The surface area, A, of a sphere with radius r is $A = 4\pi r^2$.]

..... cm^2 **[4]**

Few fully correct responses were seen and a significant number did not attempt this question.

Successful responses began by equating 50 with $2\pi r$ and many that did this found a value for the radius. Quite a few prematurely rounded their value to 8 meaning their final answer was out of tolerance, but these candidates could still pick up 3 marks.

Some may have trialled potential values for r on their calculators because sometimes $2\pi 8 = 50$ was given with no other working. This could not pick up method marks.

Others substituted 50 (or 25) into $4\pi r^2$, which gained no marks. Other common errors were to equate 50 with πr^2 or $4\pi r^2$ to find a value for r.

Candidates should know how to work with these required formulae, as well as knowing to show clear substitutions and to not round prematurely.

Question 22

22 Kai plays an online game.
Kai collects diamonds and rubies.
Each diamond and each ruby is worth a fixed number of points.

In game 1, Kai collects 4 diamonds and 3 rubies and scores 47 points.
In game 2, Kai collects 3 diamonds and 5 rubies and scores 49 points.

Work out the number of points for a diamond and the number of points for a ruby.
You must show your working.

diamond = ... points

ruby = ... points **[5]**

Some very good solutions were seen here that successfully used simultaneous equations and correctly solved them.

When multiplying the two equations in order to equate coefficients, a few candidates made errors such as not multiplying each term in the equation by the same number.

Quite a large number of candidates attempted trial and improvement, but many were unsuccessful. A few candidates wrote equations but then ignored them in favour of trial and improvement; the method leading to the answer was marked.

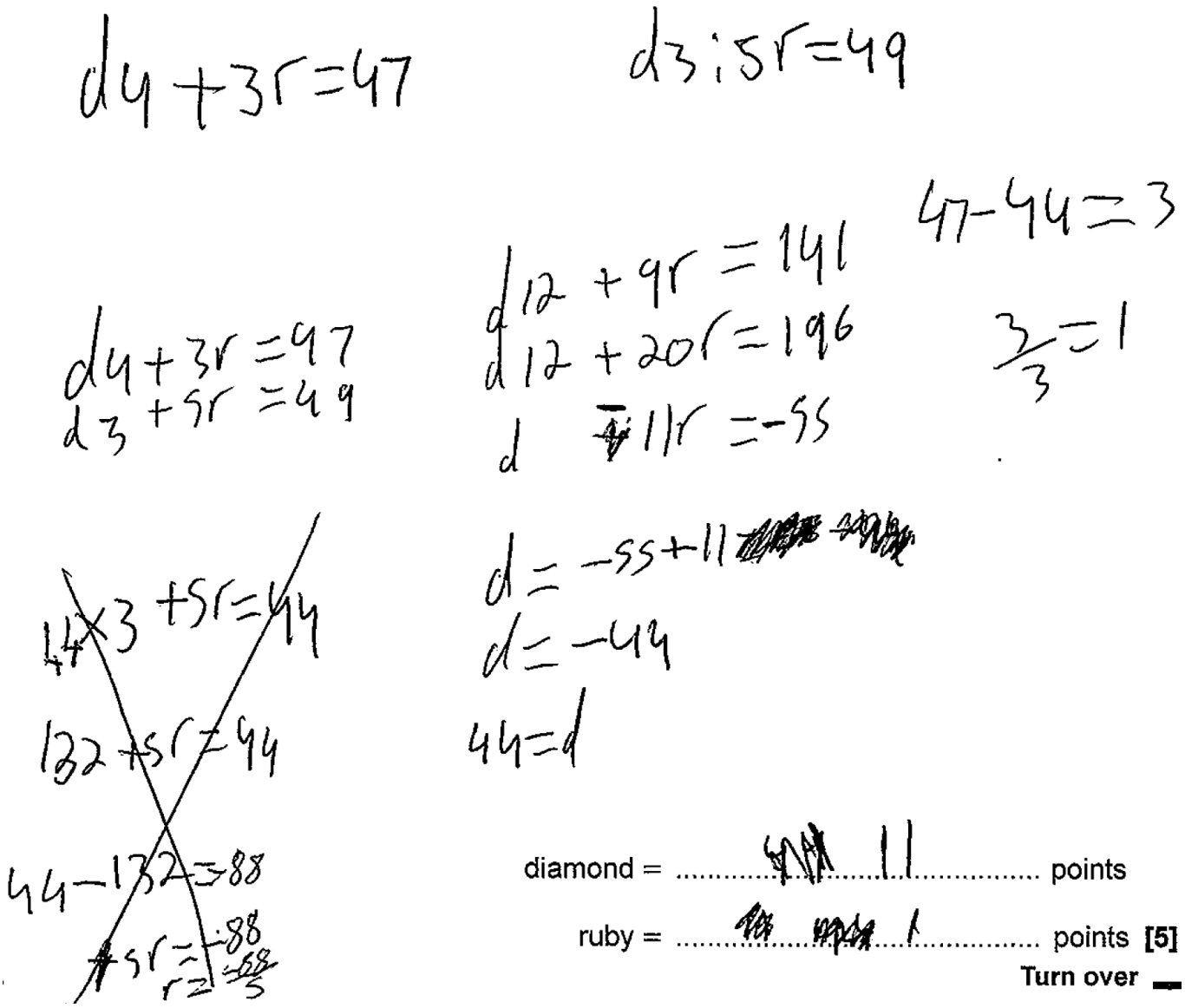
Trial and improvement is rarely an efficient method and is not encouraged. In this question, candidates who showed full trials leading to the correct answer were able to gain the full marks, however this question states, 'You must show your working' and it was not uncommon for candidates to pick up SC2 for the correct answer with limited or no working.

Incorrect responses often added the numbers of diamonds to the number of rubies, then divided 47 and/or 49 by the result.

Assessment for learning

As highlighted previously, candidates should practice planning and structuring their work, as well as crossing out abandoned attempts. Labelling work would also help many candidates follow their own working.

Exemplar 2

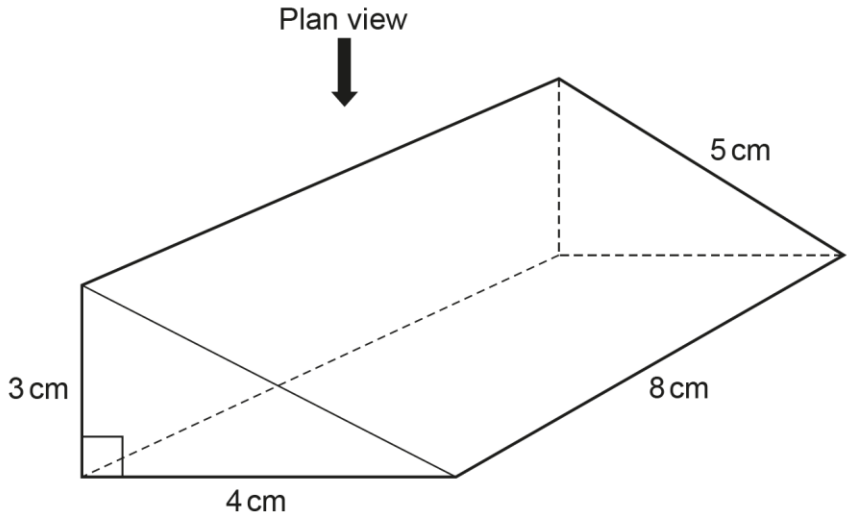


The candidate has used a method of simultaneous equations. The initial equations aren't well ordered algebraically but are otherwise correct (picking up M1M1) and their method of equating two coefficients is also correct (picking up another M1).

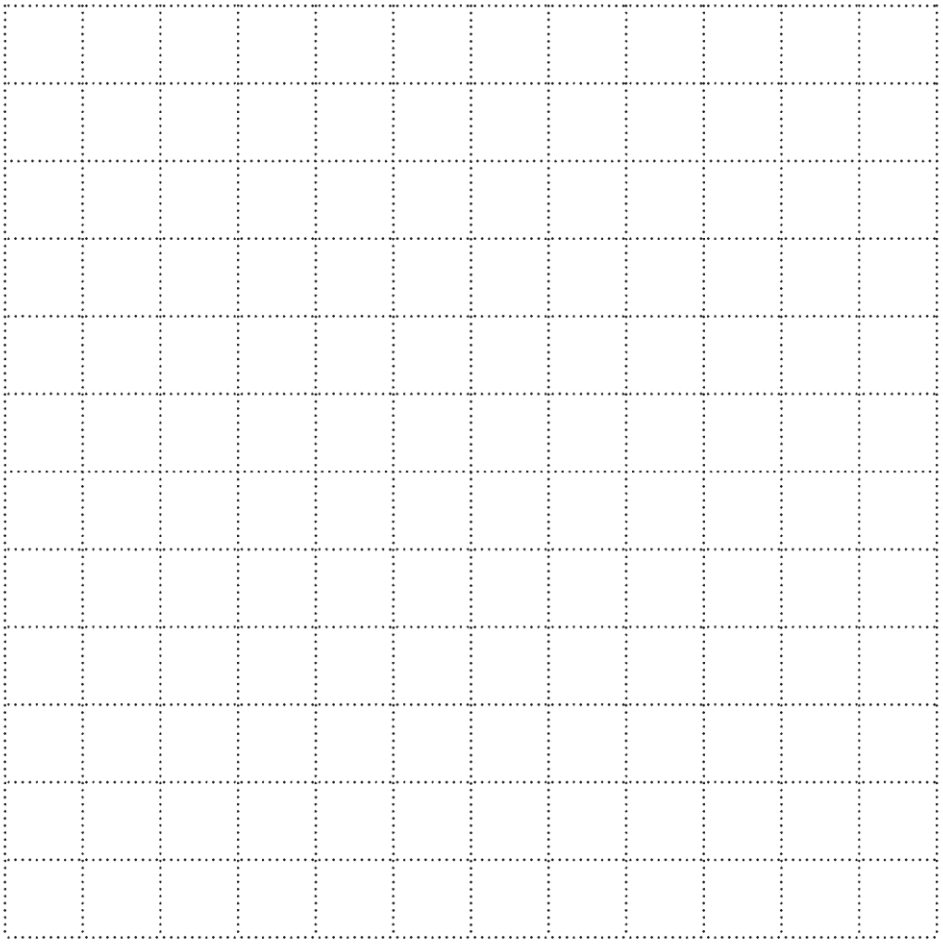
From here they know that they need to subtract their equations but make an error in $12d - 12d$ and arrive at d rather than 0. From this point onwards the response is incorrect and so no further marks can be given.

Question 23

23 The diagram shows a prism of length 8 cm.
The cross-section of the prism is a right-angled triangle.



Draw an accurate plan view of the prism on the one-centimetre grid below.



[2]

Quite a few accurate drawings were seen for the plan. A common error was to draw the rectangle with one incorrect length, which gained B1. Other common errors were to redraw the given view, to show two (or more) surfaces or include additional internal or external lines.

Question 24 (a)

24 A kitchen has space for a fridge.

(a) The width, w, of the space is 70 cm, correct to the nearest centimetre.

Complete the error interval for the width, w.

(a) ..... $\leqslant w <$ ..... **[2]**

A significant number of correct values were given, but quite a number of candidates did not attempt the question.

Sometimes only one of the values was correct and responses such as 69.5 and 70 were not uncommon.

Several gave 69.5 and 70.4, indicating a misconception with the symbol <.

Giving 65 and 75 was a common error.

Question 24 (b)

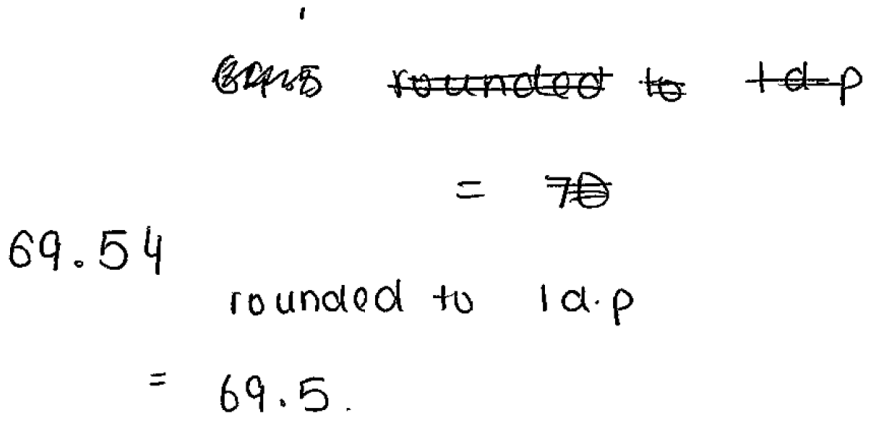
(b) A fridge is advertised as having a width of 69.5 cm, correct to 1 decimal place.

Show that this fridge may **not** fit in the space. **[2]**

Very few candidates picked up marks here. Many candidates made no attempt.

Most did not label whether values related to the fridge or to the space. Some gave descriptions referring to 'it', but it wasn't clear if this 'it' was a value such as 69.5 or the space or the fridge. Candidates would benefit from writing clear reasons using values.

Exemplar 3



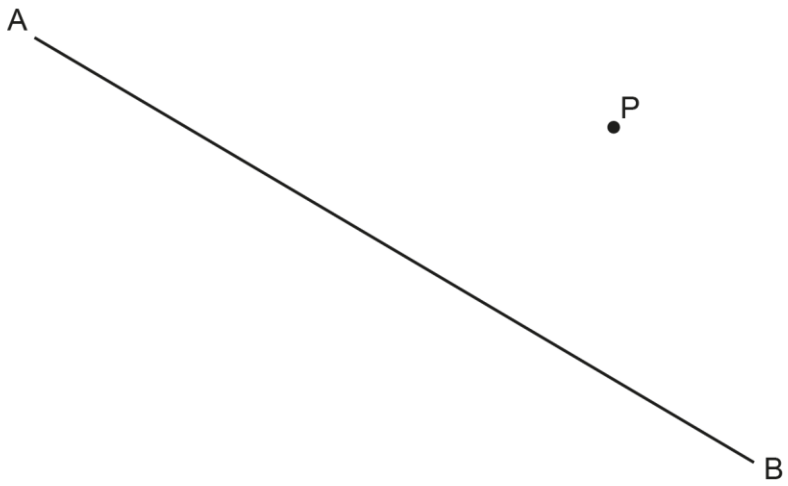
If this response had been annotated to show what their values represent, either 1 or 2 marks could have been scored.

If they had stated that the fridge may be 69.54 cm wide, B1 could have been awarded.

If they then said that the space may be 69.5 cm (and hence the fridge won't fit), a second B1 could have been awarded.

Question 25

25 Construct the perpendicular from the point P to the line AB.
Show all of your construction lines.



[2]

Some good constructions were seen here; however a considerable number made no attempt at all.

Successful candidates either used arcs centred at A and at B that both pass through P, or an arc centred at P that cuts the line AB twice and then bisecting the line within the arc.

A number of candidates drew the perpendicular and then afterwards attempted to draw arcs, but these often did not pass through the right place in order for their line to have been constructed.

A number of lines from P to the midpoint of AB were seen, possibly revealing a misunderstanding of 'perpendicular'.

Some drew lines from A to P and B to P, or drew a line parallel to AB that passed through P.

A few freehand drawings were seen, some of which missed P.

Question 26 (a)

26 (a) Solve.

$$8x - 11 = 6x + 3$$

(a) $x =$ ..... **[3]**

A large number of fully correct responses were given here.

Common errors included subtracting 11 from both sides and arriving at $8x = 6x - 8$ or adding $6x$ to both sides and arriving at $14x - 11 = 3$.

Some candidates worked separately on the elements of the equation by term; often this led to simplification or at least calculations such as 3 + 11, but candidates generally could not reform their resulting elements back into an equation.

Algebraic errors such as $8x + 11 = 19x$ were not uncommon.

Candidates reaching a simplification such as $2x$ = ... could gain a follow through mark for a 'correct' answer following their simplification.

Very few candidates used trial and improvement to reach a solution, although some that did reach a correct solution.

Question 26 (b)

(b) Solve by factorising.

$x^2 + 15x - 16 = 0$

(b) $x =$ ..... or $x =$ ..... **[3]**

A small number of candidates correctly factorised this. Some of these went on to give the correct solution, even though a common error was to follow the correct $(x + 16)(x - 1)$ with answers 16 and $^-1$.

A reasonably common error was to factorise this as $(x + 15)(x - 1)$. Those that had an incorrect factorisation yet gave correct solutions based on it could pick up follow through marks, but some missed out with solutions such as 15 and $^-1$ from this example.

Less successful attempts treated this as a linear equation or attempted trial and improvement. Some did not attempt a solution.

Supporting you

Teach Cambridge

Make sure you visit our secure website **Teach Cambridge** to find the full range of resources and support for the subjects you teach. This includes secure materials such as set assignments and exemplars, online and on-demand training.

Don't have access? If your school or college teaches any OCR qualifications, please contact your exams officer. You can forward them this link to help get you started.

Reviews of marking

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

---

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

CAMBRIDGE
UNIVERSITY PRESS & ASSESSMENT