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OCR
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Examiners' report

GCSE

MATHEMATICS

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

J560

For first teaching in 2015

J560/05 Summer 2025 series

Version 1

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 and where performance could be improved. A selection of candidate responses is also provided. The reports will also explain aspects which 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 5 series overview

This non-calculator paper is the second of three papers taken by Higher tier candidates for the Mathematics GCSE (9-1) specification. Candidates were generally correctly entered for this tier. An analysis of candidate responses suggests that the paper was appropriately pitched in terms of accessibility, with little evidence to indicate that candidates were unable to complete all questions within the time allocated.

The distribution of marks reflected the full range of attainment. Candidates generally showed sound mathematical communication across their responses. In questions requiring written justification or explanation, many candidates demonstrated an understanding of the question's intent and responded with clarity, using appropriate mathematical terminology. However, when proving congruency, candidates should be guided to write concise, well-structured explanations using correct terminology, instead of relying exclusively on annotated diagrams. To support accurate assessment, it is essential that candidates are encouraged to present their working in a logical, well-structured manner with complete calculations shown. Responses that followed a clear and concise format typically gained most or all of the available marks. Marks were difficult to award where working was more random or where multiple methods were presented without a clearly indicated final approach. Notably, candidates who actively engaged with visual elements – by annotating diagrams and highlighting key words or instructions – achieved greater success.

Topics that appeared to be more familiar to candidates included the multiplication of directed numbers, the division of decimals, solving an inequality and representing the solution on a number line, constructing two-way tables, proportion, statistics involving histograms, rewriting recurring decimals as a fraction and simplifying an algebraic fraction.

The topics that seemed less familiar included finding working with sectors in a problem solving context, using the cosine rule to find the length of a side of a non-right-angled triangle within a problem, proving that two triangles are congruent, and rearranging a formula where the subject appears twice.

Candidates who did well on this paper generally:	Candidates who did less well on this paper generally:
• had good computational skills, knowledge and understanding of the specification, including the recall of key terminology, formulae and routines • applied standard procedures and calculations in alignment with the assessment rubric • demonstrated a clear, structured approach in multi-step responses, with concise and logical working • used precise mathematical vocabulary when proving answers, showing attention to detail in reasoning • displayed confidence in using algebra to complete routine tasks and solve unstructured questions.	• struggled to structure calculations • made frequent computational errors, particularly when working with fractions or decimals • had an inconsistent problem solving strategy, including reliance on trial and improvement methods in Question 5 and Question 8 • displayed limited grasp of key specification content, with gaps in recalling essential terminology, formulae and procedural routines • struggled to apply accurate mathematical vocabulary and interpret notation correctly within the context of questions.

Question 1 (a)

1 Work out.

(a) $^-3.5 \times {}^-4$

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

Nearly all candidates answered this question correctly, stating the answer to be 14 or 14.0. A common incorrect answer was $^-14$.

Question 1 (b)

(b) $0.1 \div 0.4$

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

This question was quite well answered. Some candidates struggled to deal with the place value in this division; they showed a correct initial method to create an equivalent division, e.g. multiplying both values by 10 to give 1 ÷ 4, but then gave the answer as 0.025 or 0.0025. Other common incorrect answers included 4 and 0.4.

Question 2

2 An examination has two parts.
A student scores 10 out of 15 marks on Part 1.
They score 4 out of 10 marks on Part 2.

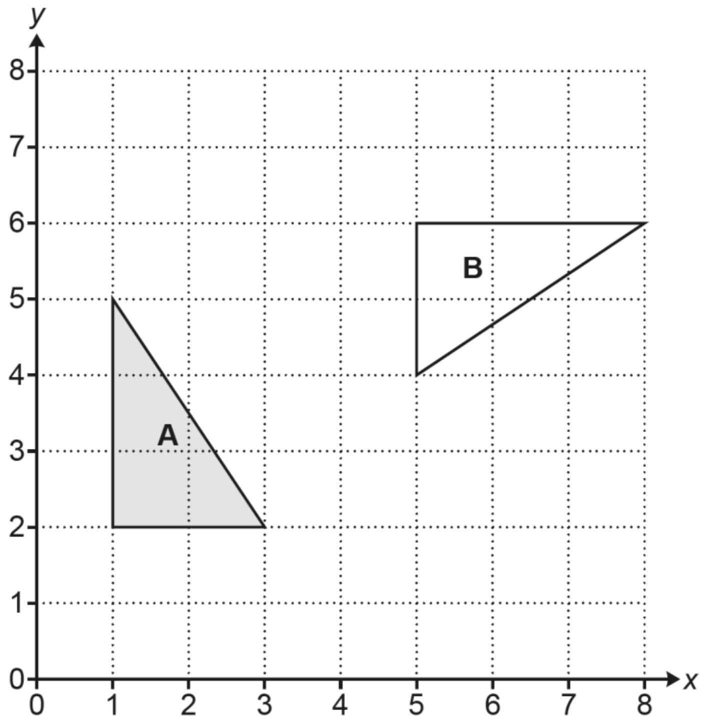
To pass the examination the student needs to score 54% of the total marks.

Show that the student passes the examination. **[3]**

This question required candidates to determine whether a student passed an examination by achieving at least 54% overall, based on scores of 10 out of 15 in Part 1, and 4 out of 10 in Part 2. It assessed candidates' ability to combine marks, calculate percentages, and draw clear conclusions. Many were successful with the most common approach converting $\frac{14}{25}$ to 56% for the comparison. The most common error observed was for candidates to add the fractions $\frac{10}{15}$ and $\frac{4}{10}$ together, rather than combine them into a total for the two papers of $\frac{14}{25}$. A few candidates incorrectly worked with both $\frac{10}{15}$ and $\frac{4}{10}$ individually, converting each to a percentage and then attempting to find the mean of the percentages.

Question 3

3 Triangle **A** and triangle **B** are drawn on the coordinate grid.



Describe fully the **single** transformation that maps triangle **A** onto triangle **B**.

....

.... **[3]**

Almost all candidates correctly identified the transformation as a rotation, with most scoring either full marks or 2 marks for a combination of 'rotation' and either '90 degrees clockwise' or '(5, 2)'. The most common error was candidates not specifying 'clockwise' when stating '90 degrees'. Some candidates made correct statements about the rotation, but their answers were spoiled by writing down a second transformation. This was most often a translation.

Assessment for learning

When describing a rotation, there are two other properties of the rotation required: the angle and direction of the rotation and the centre of the rotation.

Candidates should avoid stating, for example, rotate 90° clockwise and then move 2 squares right and 2 squares up. The extra information 'move 2 squares right and 2 squares up' is classed as a second transformation and invalidates any marks earned.

Question 4 (a)

4 **(a)** Solve.

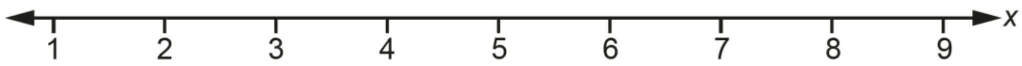
$4x \leqslant 20$

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

Nearly all candidates attempted this question, and most answered it correctly. A small number of candidates, however, expressed their solutions using an equal sign (=) instead of the correct inequality symbol (≤), which resulted in 0 marks. Candidates should note that in inequality problems, both the working and the final answer must be expressed as an inequality rather than an equation.

Question 4 (b)

(b) Show your solution to part **(a)** on the number line.



[2]

This question was attempted by nearly all candidates. While most responses were fully correct, there were varied errors among those who scored 1 mark. Common mistakes included using an open circle with the correct arrow/line, using a solid circle with the correct line but including an extra circle at the end of the line, or using a solid circle but drawing the line in the wrong direction (to the right of 5). In a few cases, candidates were given 0 marks for using an open circle with either an incorrect or missing arrow/line.

Assessment for learning

Candidates should learn the conventions of representing inequalities on a number line. Specifically, candidates need clear instruction on when to use:

- an open circle (for $<$ and $>$),
- a solid circle (for $\leq$ and $\geq$), and
- a leftward or rightward arrow as appropriate to indicate the solution set.

Question 5

5 $1\frac{1}{5} + \frac{22}{d} = 1\frac{3}{4}$

Find the value of d.

d = ... **[3]**

A good proportion of candidates managed to answer this question correctly. In general, candidates realised that they needed to find a common denominator and chose to use 20. Some candidates found 20 but then did not realise that they needed to subtract the given fractions in the equation. Once the subtraction had been made, the candidates tended to continue to use similar fractions and find a denominator of 40. A small number of candidates tried the algebraic approach. This tended to score either full marks for the most successful or 1 mark for setting up the correct common denominator, but some were then unable to clear the fractional denominator.

Question 6 (a)

6 Sara and Tom both make a sequence of numbers.
The first term in both sequences is 10.

The term-to-term rule for Sara's sequence is add 14.
The term-to-term rule for Tom's sequence is add 35.

Each sequence stops when a term reaches or goes above 500.

(a) Find the **number of terms** that are the same in both Sara's and Tom's sequence.
You must show your working.

(a) .... **[4]**

The vast majority of responses involved candidates listing several terms in Sara and Tom's sequences and being given at least 2 marks for getting as far as the common term '80' or '70' if they did not start from 10. For those who continued their lists to 500, many identified all the terms in common, although many candidates did not appreciate that the first term, '10', should be counted too. A smaller number of candidates found the prime factors of 14 and 35 and used these to find the lowest common multiple of 14 and 35. A small minority of candidates demonstrated that the LCM corresponded to the gap between successive common terms in the sequences and were then able to give the correct answer of 8. However, a small number of candidates stated the answer of 7, not including the 10 as a common term.

Some candidates attempted to find the *n*th term of both sequences, but this often led to no constructive further work in this part.

Question 6 (b)

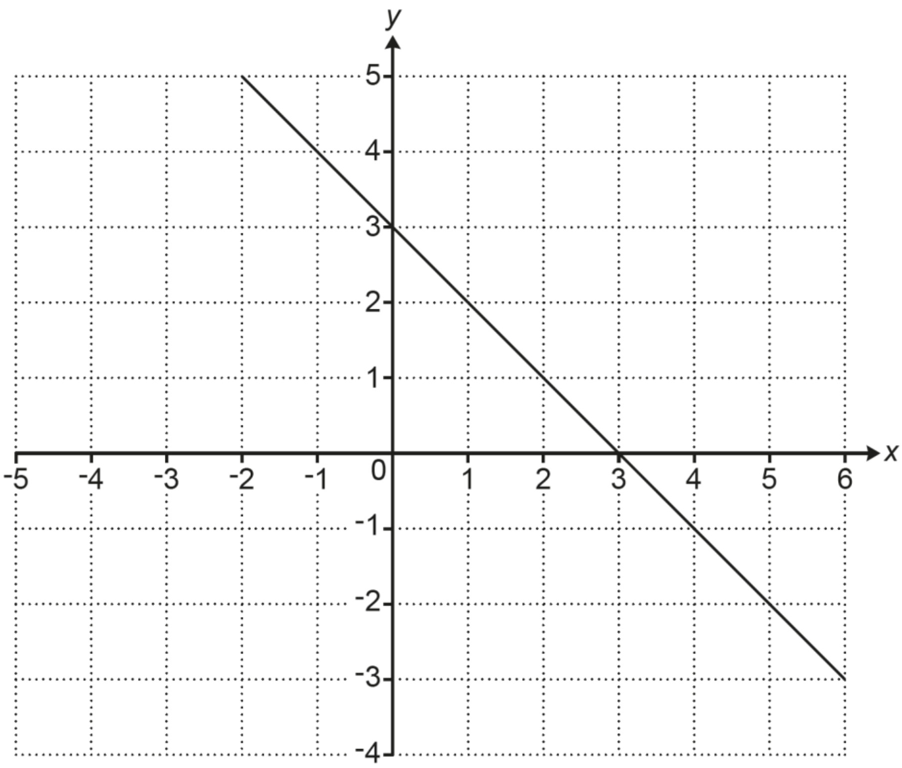
(b) Find an expression for the *n*th term of Sara's sequence.

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

Over half of the candidates were familiar with the *n*th term and were able to score full marks on this question. Some realised that the expression contained $14n$ but commonly then added 10 as the sequence started at 10. Candidates not familiar with the concept of *n*th term gave answers such as $an + 14$.

Question 7 (a)

7 The graph of the line $x + y = 3$ is shown on this grid.



(a) By drawing a suitable line on the grid, solve these simultaneous equations.

$x + y = 3$ and $y = 2x - 3$

(a) $x =$ ....

$y =$ ....
[4]

Most candidates were able draw the graph of the equation $y = 2x - 3$ correctly to pick up the first 2 marks. Of those who did this, most went on to correctly to find the solutions to the simultaneous equations to achieve the remaining 2 marks. There were also many candidates who chose to use an algebraic method to find the solutions and then tried to form a graph to match. This often had either the wrong gradient or the wrong *y*-intercept or both. Candidates who were unable to draw the graph of the equation $y = 2x - 3$ correctly were still able to score FT marks for their intersection point. A few candidates drew a graph parallel to the one in the question, which resulted in no intersection point, no solutions, and therefore no marks unless they used an algebraic method.

Assessment for learning

When drawing linear functions, candidates should always rule the line and not draw it freehand.

Question 7 (b)

(b) Umi says,

The simultaneous equations $y = 2x + 3$ and $2y - 4x = 7$ will have no solutions.

Is Umi correct?
Explain how you decide.

Umi is .... because ....

.... **[2]**

Most candidates seemed to find this question challenging. The working out was either incorrect, insufficient or not shown, and in each of these cases no marks were gained. The most common successful approach involved rearranging the equation $2y – 4x = 7$ into the form $y = 2x + 3.5$ which then allowed candidates to compare the gradients of the two lines. Solving the equations using substitution was a less commonly used method. Candidates who did this generally formed the equation $2(2x + 3) – 4x = 7$ and after expanding the brackets were able to state, for example, $6 \neq 7$, thereby proving there were no solutions.

Question 8

8 Three lengths of wood are in the ratio 2 : 5 : 7.
The difference in size between two of the lengths of wood is 30 cm.

Kofi says,

The sum of the three lengths of wood **must be** at least 120 cm.

Is Kofi correct?
Show how you decide.

Kofi is .... because ....

.... **[5]**

This was quite well answered. Many candidates gained at least 2 marks for this question. This was usually from finding the total length of the wood to be 140 cm, using the parts 20 : 50 : 70. Often, once they had found that 140 > 120 they wrote the conclusion and moved on without considering the other two possible totals. Some candidates then calculated the second total of 210 cm from 30 : 75 : 105 and then wrote the conclusion and moved on without finding the last, and important total. Finding two totals was less common than finding only one. The 84 cm total length from 12 : 30 : 42 was rarely the first that was found. Usually, this was found by the candidates who calculated all three totals.

Assessment for learning

A methodical approach was the most successful here. Those who worked out all the possible choices and used them to answer the question were more successful. Adapting this question in the classroom to be a 'goal free problem' might help candidates develop this skill.

Misconception

There was a definite preference for taking the 30 cm difference to be the difference between only the adjacent parts of the ratio, either between 2 and 5, or between 5 and 7. Most candidates did not consider the difference between the parts 2 and 7.

Question 9

9 A school has three terms, Autumn, Spring and Summer.

In class A there were 90 absences in the Autumn term, 120 absences in the Spring term and 40 absences in the Summer term.

Compared to class A, class B had:

- $\frac{3}{10}$ fewer absences in the Autumn term
- 5% more absences in the Spring term
- 7 more absences in the Summer term.

Design and complete a two-way table to show this information. **[6]**

This question was generally answered very well. Most candidates scored 4 or more out of the 6 marks available, with many getting full marks. They were able to interpret the information accurately and apply the required calculations when comparing the number of absences for class A and class B.

The two-way tables were usually set out clearly and included appropriate headings.

A few candidates did not score the construction marks for the table where they missed, misplaced or repeated headings. The most common errors in the calculations were not subtracting 27 from 90 for the Autumn term or not adding 6 to 120 for the Spring term. A small number presented a bar chart in place of a two-way table, but most showed a good understanding of what was required.

Question 10

10 Heidi is x years old.
Finley is 5 years younger than Heidi.
Zayn is 4 times Finley's age.

Find an expression in terms of x for the **total** age of Heidi, Finley and Zayn.
Write your answer as simply as possible.

.... **[4]**

Almost all candidates attempted this question, with over half scoring full marks and others scoring at least 1 out of the 3 marks available for writing down an expression for Finley as (x – 5). Some did not use a bracket when writing an expression for Zayn's age, e.g. 4x – 5, and there were also some that gave an incorrect expansion of 4(x – 5). In the addition some candidates did not write down an expression for each of Heidi, Finley and Zayn. A few candidates, having obtained 6x – 25, then went on to treat it as an equation and tried to solve it.

Candidates should note that in questions requiring algebraic simplification, examiners will mark the final answer when considering awarding full marks.

Question 11

11 A solid steel cube has a mass of 1.05 kg.
The density of the steel is 7.9 g/cm^3.

Orla says,

The length of one side of the cube is approximately 10 cm.

Use estimation to decide if Orla's statement is reasonable.
Show how you decide.

Orla's statement is .... because ....

....

.... **[5]**

Most candidates demonstrated a sound understanding of how to approach this question, particularly in recognising the relationship between mass, volume and density. To access full marks, they were required to round key values to one significant figure and convert mass into grams. Those who followed these steps typically arrived at accurate conclusions.

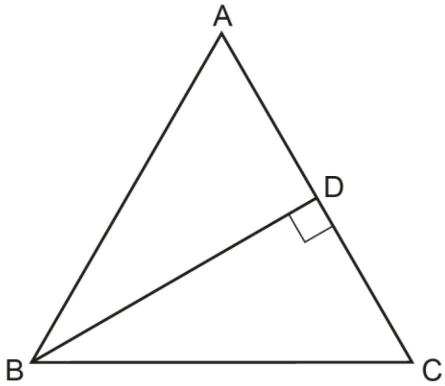
While the majority applied the correct method, usually by calculating the volume of the cube by dividing the mass by the density and comparing this to the volume of a cube with side length 10 cm – some successfully used alternative formula arrangements to arrive at comparable values. A few either did not convert the mass to grams or made an incorrect conversion to grams.

A number of candidates were unsure how to determine the cube's side length from its volume, with several incorrectly dividing by 6 instead of finding the cube root.

A smaller group of candidates did not understand the mass-volume-density relationship or were unable to rearrange the formulae effectively, making it difficult for them to gain marks.

Question 12

12



Not to scale

ABC is an equilateral triangle.
BD is perpendicular to AC.

Prove that triangle ABD is congruent to triangle CBD.

....

....

....

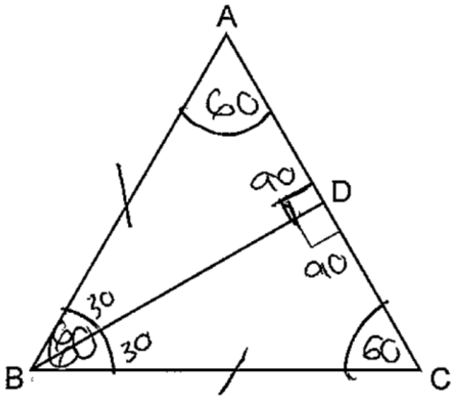
....

.... **[4]**

The majority of candidates attempted this question and demonstrated a basic understanding of what they were aiming for. There was, however, for a significant number of them, a misunderstanding as to how to present their proof. This question required a clear structure, with three statements relating pairs of equal sides and pairs of equal angles in triangles ABD and CBD stated with appropriate reasons; this should have been followed by a condition of congruency that fitted the three given statements. The proof required more than a description or information marked on the diagram. Many candidates wrote in general terms, e.g. all the angles are 60, all the sides are equal, without focusing on the specific equality of pairs within the relevant two triangles.

The best approach to this question was three distinct statements, with a statement sticking to minimum facts, e.g. AB = BC as equilateral triangle.

Exemplar 1



Not to scale

$3\overline{)180}$ 60

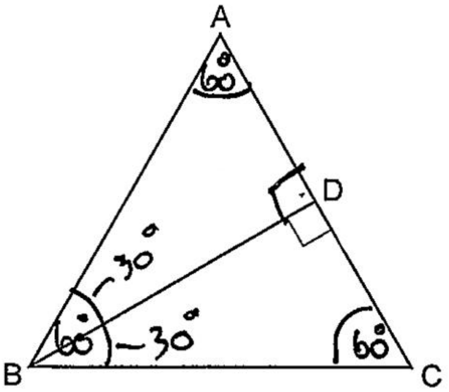
ABC is an equilateral triangle.
BD is perpendicular to AC.

Prove that triangle ABD is congruent to triangle CBD.

they both share a side length & and together they make 2 equilateral triangles meaning their lengths & and angles are the same

In this exemplar, the candidate has annotated the diagram indicating equal lengths and angles but as a proof of congruency this is insufficient. In the text, the candidate has written in general terms about equal angles and equal lengths without specifically naming pairs of equal angles or pairs of equal lengths in triangles ABD and CBD, which is required for the proof. The statement ‘they both share a side length’ is not sufficient unless they name BD as the shared side.

Exemplar 2



Not to scale

ABC is an equilateral triangle.
BD is perpendicular to AC.

Prove that triangle ABD is congruent to triangle CBD.

SAS
SSA
~~SSS~~
AAS

A

Angle BAD = Angle BCD because ~~they are half of both in an~~ angles in an equilateral triangle = 60°

Angle ABD = Angle DBC because Angles in an equilateral triangle equal 60° and the line BD perpendicularly bisects Angle ABC ~~meaning the~~ A
∴ each half is 30°

Both triangles share the side BD S

In this examplar, the candidate has written specific named pairs of equal angles from triangle ABD and triangle CBD with a reason for each; they have also named BD as a shared side. The layout is clear and there are three correct distinct statements with reasons to score M3. The correct condition for congruency has not been given as we are left with a choice so A0 is given in this case.

Question 13

13 p is directly proportional to the square root of m.
$p = 15$ when $m = 25$.

Find the value of p when $m = 81$.

$p =$ .... **[3]**

Overall, this question was successfully completed by the majority of candidates, many of whom produced well-structured and fully accurate responses and were clearly familiar with the approach. Errors among those who struggled typically stemmed from being unable to state the proportional relationship as an equation, most notably confusing squared notation with square roots.

Question 14 (a)

14 (a) Find the value of $4^{\frac{5}{2}}$.

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

This question was successfully attempted by over half of the candidates. Where errors did occur, they were primarily due to misconceptions around interpreting the given power – some misread the expression and calculated five halves of 4 rather than applying the power correctly.

A number of candidates took a more complex route by evaluating 4 to the power 5 first, but were then unable to proceed, as they could not recall or compute the square root of the resulting value.

Misconception

Fractional indices were misinterpreted by a number of candidates. For example, $4^{\frac{5}{2}}$ was treated by some as 4 ÷ 2 × 5 instead of the square root of 4 to the power of 5.

Assessment for learning

Candidates are advised when calculating with fractional indices without a calculator to consider the denominator of the fraction as the root first. Focusing on the numerator first will usually involve a lengthy, more difficult calculation.

Question 14 (b)

(b) Simplify.

$(3x^2)^{-3} \times 9x^8$

(b) .... **[4]**

Most candidates attempted this question, and it was common to score 1 or 2 marks usually for work with the indices either showing x^{-6} in working or for an answer of the form kx^2. This proved to be a challenging question, and few were able to give a fully correct simplified expression. The main issue seemed to be the application and understanding of negative powers with the coefficient 3 for the first term and $27x^{-6}$ or $3x^{-6}$ was a common error. The most common incorrect answer $27x^2$ resulted from the first term as $3x^{-6}$.

Question 15 (a)

15 **(a)** Write $x^2 - 6x + 5$ in the form $(x - a)^2 - b$.

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

This question was generally well answered, with many candidates achieving full marks. Candidates who did not gain any marks often attempted to factorise the quadratic into two brackets, indicating a misunderstanding of the method required. Some candidates forgot to halve the coefficient of x so had $(x – 6)^2$ as their bracket. Candidates generally had more success finding $(x – 3)^2$ than they did finding – 4; occasionally, 9 was added to the square rather than subtracted. Candidates with an incorrect square occasionally went on to find the term outside the brackets correctly and earned partial credit.

Question 15 (b)

(b) Write down the coordinates of the turning point of $y = x^2 - 6x + 5$.

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

Many correct answers were seen but this part was not answered as well as part (a). A number of candidates did not make use of their response to part (a), instead attempting to identify the turning point using the coefficient of *x* and the constant term from the original quadratic expression, e.g. (6, 5). While many candidates were able to correctly state the *y*-coordinate of the turning point, a common error was to give the *x*-coordinate as $^-3$ instead of 3. A few candidates confused the signs for both coordinates. Some candidates scored follow through marks from part (a), demonstrating an understanding of how to find the turning point, even if they did not correctly complete the square. A small number of candidates omitted this part or did not make the link between this and the previous part.

Question 16

16 Rearrange this formula to make *a* the subject.

$$p = \frac{a + 2b}{3 - a}$$

.... **[4]**

Candidates generally found this question difficult with a minority of candidates scoring full marks. Many identified how to remove the fraction by multiplying both sides of the equation by $3 - a$, however some performed the operation incorrectly. A common mistake was to not include brackets, often leading to $3p - a = a + 2b$. Some candidates were able to correctly give the first two steps to $3p - ap = a + 2b$. However, many struggled with the subsequent steps, particularly isolating the terms in *a*, and those that did rarely factorised correctly. Errors included subtracting $2b$ to give the answer $a = 3p - ap - 2b$ or subtracting $3p$ and dividing by *p* to give answers such as $a = \frac{3p - a - 2b}{p}$.

Some candidates also spoiled their method with sign errors between lines of working. The stronger candidates that obtained the correct expression occasionally omitted the '*a* =' on the answer line which limited them to 3 marks.

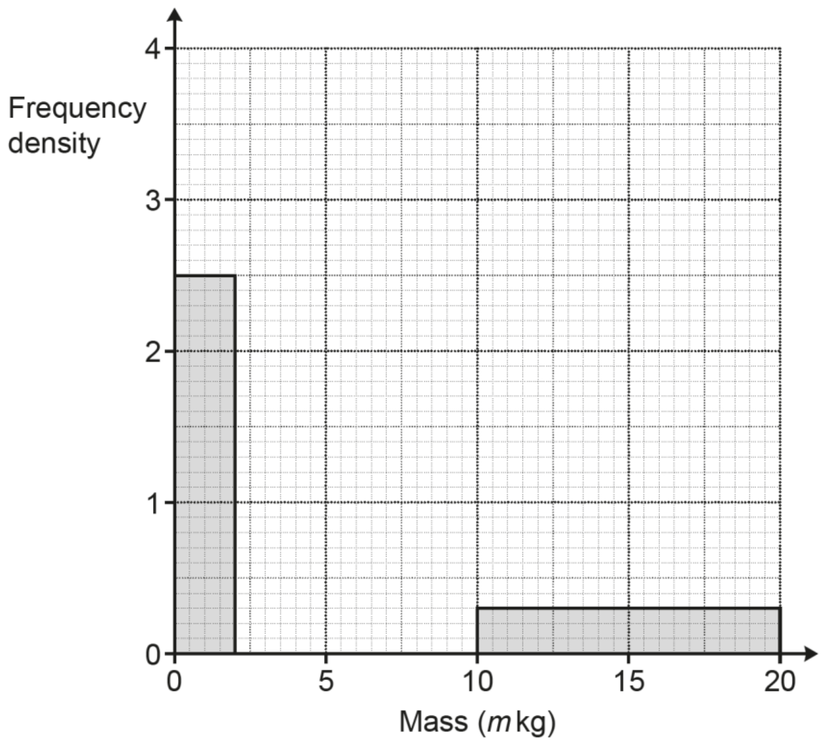
Misconception

Many candidates lacked a clear strategy for isolating the terms in *a*, suggesting a lack of familiarity with multi-step rearrangement problems where the subject appears more than once.

Question 17 (a)

17 The mass of some parcels are recorded.
The table and the histogram each show part of this information.

Mass (m kg)	$0 < m \leqslant 2$	$2 < m \leqslant 5$	$5 < m \leqslant 10$	$10 < m \leqslant 20$
Frequency		12	18	



(a) Complete the table and the histogram. **[4]**

This was well answered by most candidates, and almost all candidates were able to earn at least partial credit. Very few candidates left this question unanswered. In the table, common mistakes included giving 30 instead of 3 from errors in calculating 0.3 × 10 and 10 or 25 instead of 5, with 10 coming from misreading the horizontal scale. The first bar was usually drawn correctly. Those not drawing the correct bars usually had incorrect frequency density calculations. For the $5 < m \leq 10$ class, candidates were sometimes unable to correctly divide 18 by 5, leading to an incorrect value for the height of the bar.

Assessment for learning

Some candidates drew freehand lines to complete the missing bars in the histogram. Candidates are advised to draw ruled lines to make sure that bars are drawn at the correct height with no gap between the top of the bar and the correct vertical scale point.

Question 17 (b)

(b) The heaviest parcel is 19.5 kg.

Complete the inequality to represent the range, R kg, of the masses of the parcels.

(b) .... $\leqslant R <$ .... **[2]**

Many candidates correctly identified the upper bound of 19.5, but very few found the lower bound from 19.5 – 2 (2 is the largest possible mass for a parcel in the first interval). The most common incorrect lower bound given was 0. Occasionally, candidates gave 19.5 as the lower bound rather than the upper bound.

Some candidates misinterpreted the question as requiring an error interval for 19.5, with 19.45 and 19.55 sometimes given for the bounds.

Misconception

Some candidates misunderstood what was being asked here, as well as the information on the answer line, responding as if it needed the range of possible masses that a single parcel could be and an answer of 0 and 19.5. The question requires the bounds of the range itself, which could be from 17.5 up to (but not equal to) 19.5.

Some candidates misinterpreted the question as asking for an error interval for 19.5.

Question 18

18 Work out.

$1.4\dot{2} \div 0.\dot{2}$

Give your answer as a mixed number in its simplest form.

.... **[5]**

This question was answered well, with most candidates realising they needed to convert both recurring decimals to fractions. It was attempted by almost all candidates. Most candidates correctly converted $0.\dot{2}$ to $\frac{2}{9}$, however they were not as successful at converting $1.4\dot{2}$ to $\frac{128}{90}$. Most demonstrated a correct method, usually setting up x = 1.42… and $10x$ = 14.2… or $100x$ = 142.2…, earning at least partial credit. Arithmetic errors leading to $\frac{138}{90}$ were sometimes seen. A small number misunderstood the notation and worked with 1.4242… instead of 1.4222…, usually leading to a denominator of 99. Candidates were usually able to divide their two fractions, with significant numbers obtaining the answer $\frac{1152}{180}$ for the multiplication of the fractions.

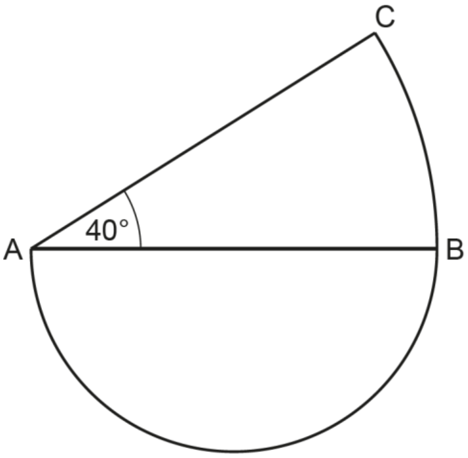
A minority added or subtracted their fractions. Candidates using the inverse method for division are advised to cancel the fractions first before multiplying to make the multiplication easier; mistakes are often made in cancelling and converting to the final answer when there are larger numerators and denominators. Not all candidates gave the answer in the required form; common answers in the wrong form included $\frac{32}{5}$, $6\frac{4}{10}$ and 6.4. A small minority of candidates attempted to divide 1.42 by 0.2, earning no credit.

Misconception

Some candidates misunderstood the meaning of $1.4\dot{2}$, and interpreted it as 1.4242… instead of 1.4222…

Question 19

19 The diagram shows a shape formed by a semicircle joined to a sector of a circle, BAC, along a common length AB.



Not to scale

The area of the sector BAC is $16\pi\,\text{cm}^2$.

Work out the total area of the shape.
Give your answer in terms of π.
You must show your working.

.... cm^2 **[5]**

Although this question was attempted by most candidates, they found it challenging with only the most successful candidates scoring full marks. A number of candidates were able to work with the sector BAC and set up an equation for the area before finding the length of AB as 12 cm. A number of candidates reached $\frac{AB^2}{9} = 16$ but were unable to rearrange correctly to find AB.

The most common error was then using 12 cm as the radius of the semicircle and obtaining an answer of 88π. Some candidates correctly used 6 cm as the radius but then calculated the area of the circle instead of the area of the semicircle.

Question 20

20 Simplify.

$$\frac{x^2 - 36}{x^2 - x - 42}$$

.... **[4]**

Many candidates achieved full marks for this question. They identified that the numerator was a difference of two squares and correctly factorised to $(x + 6)(x - 6)$, then factorised the denominator to $(x + 6)(x - 7)$, and then cancelled the common factor of $(x + 6)$. A few candidates spoiled a correct answer of $\frac{x - 6}{x - 7}$ by cancelling the x's and giving a final answer of $\frac{-6}{-7}$; this obtained only 3 marks. Some made the error, after correctly factorising, of cancelling $(x - 6)$ in the numerator with $(x + 6)$ in the denominator. Another common error was to incorrectly factorise the denominator as $(x - 6)(x + 7)$. For less successful candidates, no attempt was made to factorise, and a number incorrectly cancelled the x^2 terms in the original fraction.

Question 21 (a)

21 There are 10 sweets in a bag.
4 of the sweets are red, 4 are green and 2 are yellow.

(a) Charlie says,

The probability of picking the two yellow sweets at random from the bag can be found by working out $\frac{2}{10} \times \frac{2}{10}$.

Write down the assumption that Charlie has made.

....

.... **[1]**

This question was well answered, with most candidates stating that the sweets were replaced. A few candidates stated that the number of sweets in the bag stayed the same.

Question 21 (b)

(b) Mia takes one of the 10 sweets from the bag at random and eats it.
Ben then takes a sweet from the bag and eats it.

Find the probability that the bag now holds more red sweets than green sweets.
You must show your working.

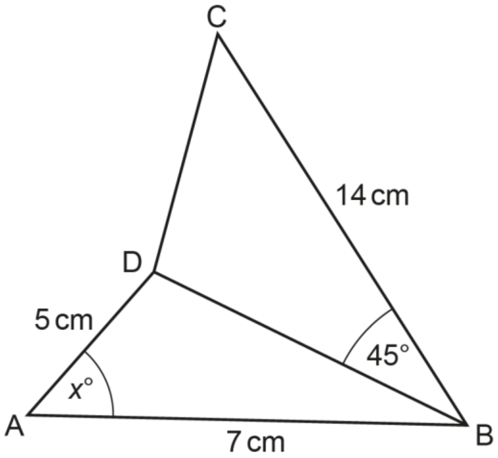
.... **[5]**

Candidates found this question challenging, and only a small number of fully correct answers were seen. A common approach to solve this problem was to draw a tree diagram, allowing most candidates to achieve partial marks. Most candidates calculated the probability of picking two green sweets and obtained 2 marks for $\frac{4}{10} \times \frac{3}{9}$, but did not consider picking one green sweet and one yellow sweet. If they did, they did not consider that it could be green then yellow or yellow then green. This often resulted in answers of $\frac{12}{90}$ or $\frac{20}{90}$ which gained partial marks.

Method marks were often spoiled for one of two reasons: either correct probabilities for the different correct options were multiplied and not added together, or because the probability of picking two yellow was incorrectly included in the total. A few candidates gained no marks because they assumed that the events were independent.

Question 22

22 The diagram shows a quadrilateral ABCD.
DB is a diagonal of the quadrilateral.



Not to scale

AD = 5 cm, AB = 7 cm and BC = 14 cm.
Angle DAB = x° and angle DBC = 45°.

cos x° = 0.8 and sin x° = 0.6.

Work out the area of triangle BDC.
You must show your working.

.... cm^2 **[6]**

Candidates found this question challenging, although some were able to achieve partial marks. Candidates needed to find the length BD and then use this within the area calculation for triangle BCD. A number attempted to use the cosine rule to find BD and, in applying the rule, a number of common errors were seen; these included writing cos(0.8) instead of just 0.8, omitting the 2 from the formula or using incorrect signs. Candidates who correctly substituted into the correct formula often could not find an accurate length for BD due to not using the correct order of operations. A common incorrect answer was $\sqrt{3.2}$ but candidates could still achieve marks for correct substitution into the area formula for triangle BCD. Those who did correctly find BD = $\sqrt{18}$ sometimes struggled with the simplification of $\frac{1}{2} \times 14 \times \sqrt{18} \times \frac{1}{\sqrt{2}}$.

Candidates making multiple attempts at a question should clearly indicate which method leads to their answer. This will aid in the awarding of method marks by examiners.

Many candidates added right angles to the diagram to form two right-angled triangles, while other candidates did not label sides correctly. Some candidates need to be more methodical in their approach when answering this type of multi-step question.

Misconception

A number of candidates assumed that triangle ABD was a right-angled triangle and attempted Pythagoras to find the length of BD.

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