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Examiners' report

GCSE

MATHEMATICS

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

J560

For first teaching in 2015

J560/02 Summer 2025 series

Version 1

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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 2 series overview

This non-calculator paper is the second of three taken by Foundation tier GCSE (9-1) Mathematics candidates.

Candidates generally engaged well with the paper, particularly in the earlier questions, which most found accessible. It was encouraging to see that the majority attempted most of the paper and consequently even if they couldn't reach an answer, were often awarded part marks. The tree diagram (Question 25) was especially pleasing to mark, as this question appeared towards the end of the paper and showed that candidates did not stop working when the demand increased. Candidates demonstrated a good understanding of topics such as identifying numbers according to their properties, reading information from statistical diagrams (such as bar charts), multiplying single brackets and placing probabilities onto a pre-drawn tree diagram.

Candidates would benefit from improving the structure and presentation of their work. Some did not show their working in a clear and logical format, which often resulted in numbers or calculations being scattered across the page, seemingly unconnected. Presentation could be improved with simple measures, such as using rulers for diagrams and spacing work so that it is clearly readable.

Engagement in problem-solving questions (where candidates are often expected to show their working, see above) remains an area for development. Too many candidates either did not respond to these questions or did not show sufficient working when required. Those who did engage with problem-solving questions used a variety of approaches, many of which were well-considered and clearly communicated.

Candidates would benefit from a stronger understanding of finding the area of a triangle, rotational symmetry, division by decimals, negative indices and solving simultaneous equations graphically. Unit conversion also continues to be a particular weakness, particularly with the conversion of capacity and time.

Candidates who did well on this paper generally:	Candidates who did less well on this paper generally:
• were able to correctly add fractions • could identify number properties from lists • could read, represent and interpret information on a bar chart • were able to convert accurately between decimals and percentages, as well as between improper fractions and mixed numbers • were able to multiply out single brackets in algebra correctly • demonstrated a clear and systematic approach to problem-solving questions • were able to access and complete questions involving the use of money • could accurately label probabilities on a tree diagram.	• were not able to correctly calculate the area of a triangle, often forgetting to halve the product of base and height • did not demonstrate knowledge of the properties of quadrilaterals or differences between them • were not able to state the rotation symmetry of a quadrilateral • were not able to correctly notate shapes or diagrams • did not know the correct conversion between metric units, such as between millilitres and litres or metres and kilometres • were not able to convert between minutes and seconds • did not structure working in a clear and systematic way that was logical to follow • were not able to divide a number by a decimal correctly • were not able to find the *n*th term of a linear sequence that was described • were not able to process negative indices correctly • were not able to solve simultaneous equations graphically • were not able to link $y = mx + c$ to the gradient or y-intercept of a graph.

Question 1 (a)

1 Here is a list of numbers.

15 17 21 28 39 49

From this list, write down

(a) the prime number,

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

The majority of candidates correctly identified the answer as 17.

Those who didn't score tended to select another odd number as their response. A few candidates provided more than one number, which resulted in the mark not being given; candidates should note that the question asks for 'the prime number' and so only one should be given.

Key point: Prime numbers

It is important that candidates understand a prime number has exactly two factors and be able to identify prime numbers (often from a list). This will also aid understanding of prime factors and potentially Highest Common factors (HCF) and Lowest Common Multiples (LCM).

Question 1 (b)

(b) the square number,

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

The majority of candidates gave the correct answer of 49.

Candidates who did less well made a range of errors. Some gave 7^2, which was not given a mark unless accompanied by 49. Candidates should always ensure their calculations are fully processed. Others selected an incorrect number from the list (usually either 15, 21 or 28) or gave more than one answer, which resulted in the mark not being given. As in part (a), this part also just asks for one number.

Question 1 (c)

(c) **two** numbers with a difference of 18.

(c) .... and ....**[1]**

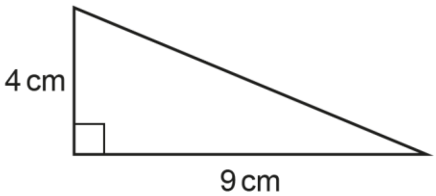
The majority of candidates gave the correct answer of 21 and 39.

Others selected two numbers that did not have a difference of 18, or chose numbers that did have a difference of 18 however were not included in the list provided.

It was rare to see any evidence of calculations in the working space. Those who chose numbers that did not have the required difference of 18 would likely have benefited from carrying out a check.

Question 2

2 The diagram shows a right-angled triangle with base 9 cm and height 4 cm.



Not to scale

Work out the area of the triangle.

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

Over half the candidates did not receive any marks here. The most common answer was 36 cm^2, from calculating 4×9.

Some candidates showed the correct method of $\frac{4 \times 9}{2}$ (which was given 1 mark) but made arithmetic errors in calculating either 4×9 or $\frac{36}{2}$.

Some provided only a final answer without any working. Working was not required to be given but meant that candidates could not be given 1 mark and either received 2 marks for the correct response of 18, or no marks for any other response.

A small number of candidates misinterpreted the question and attempted to find the length of the hypotenuse using Pythagoras' theorem. This results in an irrational number and some candidates spent excessive time trying to evaluate $\sqrt{4^2 + 9^2}$.

Misconception: Area of a triangle

Candidates very commonly calculated base × perpendicular height for the area of the triangle, without dividing by 2. This resulted in 0 marks being given here.

Question 3 (a)

3 Work out, giving your answers as fractions.

(a) Half of $\frac{1}{2}$

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

Many candidates gave the correct answer of $\frac{1}{4}$. Some gave an equivalent fraction (usually either $\frac{2}{8}$ or $\frac{25}{100}$), which also picked up the mark.

Although working was not required for this question, those who reached the correct answer were often those who showed a method (typically calculating $\frac{1}{2} \times \frac{1}{2}$, or using a visual representation such as halving a square or circle twice).

Those who did not score generally either responded with a decimal or percentage answer, a fraction involving a decimal (for example, $\frac{0.5}{2}$), an answer of 1 (from $\frac{1}{2} \div \frac{1}{2}$), or a calculation (such as 0.5 ÷ 2).

Question 3 (b)

(b) $\frac{1}{5} + \frac{2}{5}$

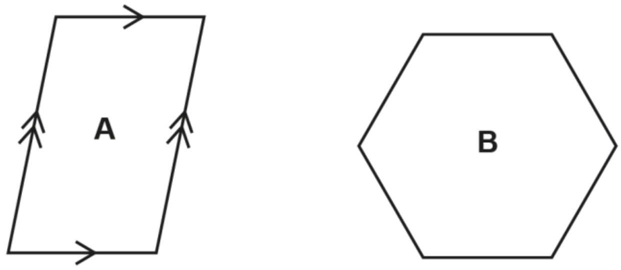
(b) .... **[1]**

The vast majority of candidates gave the correct answer of $\frac{3}{5}$. A small number gave an equivalent fraction (most commonly $\frac{6}{10}$ or $\frac{15}{25}$), which also received the mark.

The common incorrect response was $\frac{3}{10}$, from adding the numerators and adding the denominators. Others gave a decimal or percentage answer instead of the requested fraction.

Question 4 (a) (i)

4 (a) Shape **A** and shape **B** are drawn below.



(i) Write down the mathematical name of each of the shapes.

(a)(i) Shape **A** ....

Shape **B** ....

[2]

Many candidates achieved 1 mark here, although only a minority were able to achieve both marks.

Most errors were in identifying shape A as a parallelogram, with common errors being rhombus, trapezium and rectangle. Many candidates correctly identified shape B as a hexagon. Spelling errors were frequent but were generally accepted (and this is noted in the mark scheme), however 'hectogon' or 'hectagon' for shape B were not accepted as they are too closely associated with heptagon.

Misconception: Classification of quadrilaterals

Many candidates were unable to identify Shape A as a parallelogram. Candidates would benefit from greater understanding of the geometrical properties and distinctions between quadrilaterals.

Question 4 (a) (ii)

(ii) Write down the order of rotational symmetry of shape **A**.

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

This question proved challenging and the majority did not score. A significant minority did not attempt the question at all.

Common incorrect responses were 0, 1 and 4. Some gave responses such as 'clockwise', 'left', '180°' or 'parallel', likely from confusion with concepts of rotation. A number of candidates confused rotational symmetry with reflectional symmetry, which led to incorrect answers.

Misconception: Order of rotational symmetry

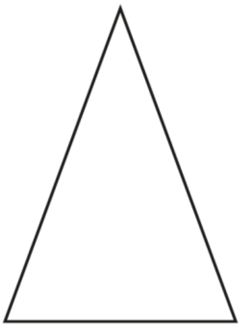
?

Many candidates found Question 4 (a) (ii) challenging and showed a lack of understanding in how to determine the rotational symmetry of a 2D shape.

Many confused rotational symmetry with reflectional symmetry or applied knowledge of describing rotations on a coordinate grid. '180°' was often seen, likely referring to the angle the shape can be rotated through to reach the same shape again.

Question 4 (b)

(b) Add correct notation to the shape below to show that it is an isosceles triangle.



[1]

Over half of the candidates scored 0 marks on this question.

The most common error was to mark the two equal sides with arrows. Arrows are used to denote parallel lines, not equal side lengths.

Successful candidates typically indicated the two equal sides correctly only without also focussing on the angles. A very small number of candidates marked both side lengths and angles. Some candidates added extra details to the triangle, such as angle measurements, lines of reflection or markings on all three sides; these were not penalised as long as they didn't conflict with the required notation.

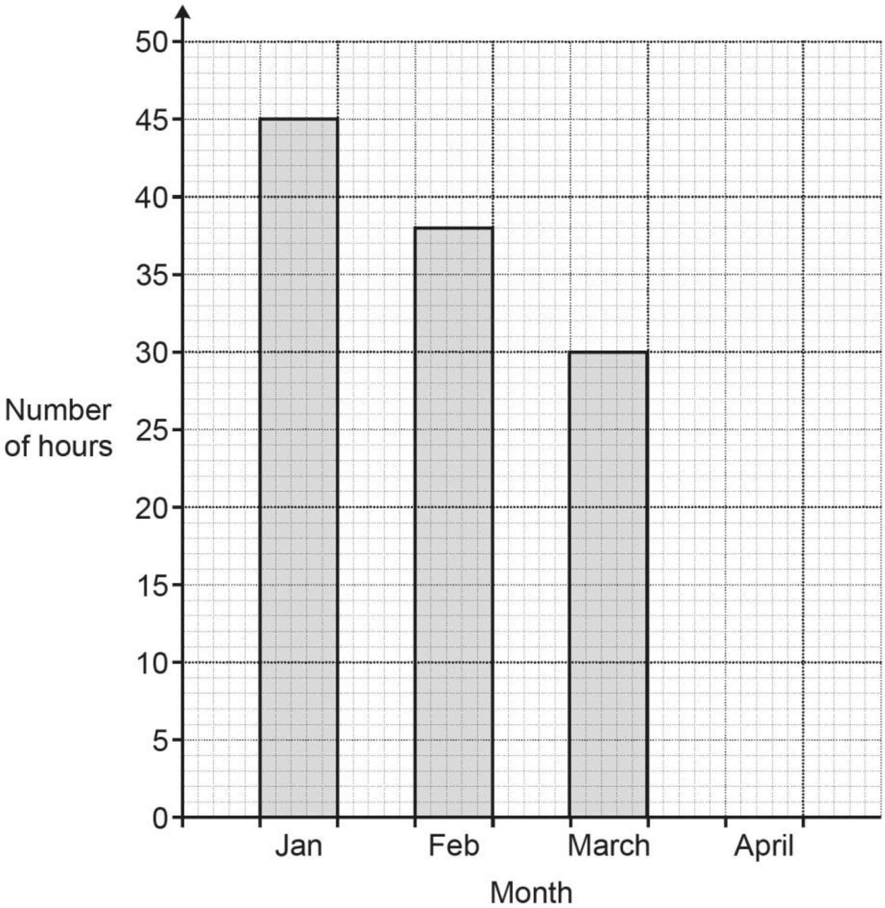
Misconception: Shape notation

A large number of candidates were not able to distinguish between notation for parallel lines and notation for equal sides or angles. The use of 'parallel line' arrow notation was very common in this question.

Some candidates interpreted 'notation' as involving the measurement of angles or lengths, reflection lines or explanatory written comments. While these did signal engagement with the question, they weren't what the question was looking for.

Question 5 (a)

5 The bar chart shows the number of hours per month Riley spends at the gym in each of January, February and March.



(a) How many hours did Riley spend at the gym in February?

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

The vast majority of candidates answered this question correctly.

Those who did not score typically gave a response close to the correct value of 38, such as 37 or 39.

Question 5 (b)

(b) Find how many **more** hours Riley spent at the gym in January compared to March.

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

The vast majority of candidates answered this question correctly and many of those that didn't were able to pick up 1 mark.

It was encouraging to see many candidates showing working (typically 45 – 30).

Common errors included calculating 45 + 30, misreading one of the required values, using data from February or incorrectly calculating 45 – 30. Credit was given for 45 or 30 identified either in the working space or on the chart itself.

Question 5 (c)

(c) In April, Riley spent a total of 18 hours at the gym.

Complete the bar chart for April. **[1]**

The vast majority of candidates correctly drew a bar showing 18 hours.

Very few candidates gave no response. It was also encouraging that most bars had a width consistent with the bars given for other months.

For some, accuracy continues to require improvement. A few drew their bar freehand, which often resulted in a slight loss of accuracy and those drawn with heights other than 18 hours could not pick up the mark.

Question 5 (d)

(d) Riley says,

I spent 50% less time at the gym in April than in March.

Is Riley correct?
Show how you decide.

Riley is .... because ....

.... **[2]**

The majority of candidates made a correct and valid comparison to gain 2 marks here.

The most common approach was to calculate 50% of 30 hours as 15, then compare this against either April's 18 hours or the difference between March and April's hours (i.e. 12 hours). Some candidates calculated the actual percentage and gave answers involved 40% or 60%, which was also a valid method.

A few did not calculate the 15 hours or the actual percentage and therefore were unable to make a valid comparison.

Some had correct working but concluded that Riley was correct. These picked up 1 mark.

Question 6 (a) (i)

6 **(a)** Work out.

(i) $10 - 2 \times 3$

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

This was well attempted by all candidates and the majority gave the correct answer of 4.

The most common incorrect answers were 24 (from an incorrect order of operations) or $^-4$ (from calculating 6 – 10).

Question 6 (a) (ii)

(ii) $^-1 + 3^2$

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

Again, this was well attempted by all and the majority gave the correct answer of 8.

Most correctly processed the 3^2 and then combined this with the $^-1$.

The most common incorrect answers were $^-8$ (from incorrectly equating $^-1 + 9$ to $1 - 9$) and 5 (from incorrectly calculating 3^2 to be 6).

Question 6 (b)

(b) Insert **one** pair of brackets to make this calculation correct.

$$6 \times 10 \div 2 - 4 = 6$$

[1]

Correctly placing the brackets here proved challenging and the majority of candidates did not score this mark.

Many attempts only considered brackets around two numbers and the operator between the numbers, suggesting unfamiliarity with brackets around more than two numbers and/or operators. It was also common to see responses with more than one pair of brackets.

Despite these difficulties, the question was generally well attempted. Candidates often persevered and even those that struggled often showed several trials in their working, reflecting their effort to engage with the task.

Question 7 (a)

7 **(a)** Write $\frac{4}{5}$ as a decimal.

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

Many candidates answered this question correctly.

Successful responses either used short division or demonstrated equivalence such as '$\frac{4}{5} = \frac{80}{100} = 0.8$'.

Those that didn't reach the correct answer often showed limited or no working. Both 0.45 and 4.5 were common incorrect answers, suggesting that some just incorporated the digits 4 and 5 directly into a decimal. Other incorrect answers were 0.9, 1.25 and 0.2.

Question 7 (b)

(b) Write 0.06 as a percentage.

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

This question was very well attempted and the vast majority gave the correct answer of 6%.

Incorrect answers commonly involved place value errors, so for example 60, 0.0006 or $\frac{6}{100}$.

Question 7 (c)

(c) Write $\frac{16}{3}$ as a mixed number.

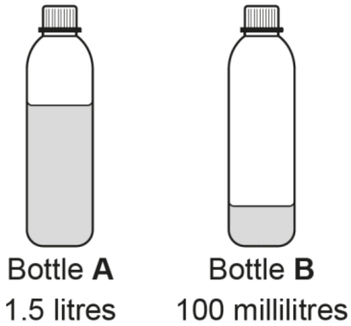
(c) .... **[1]**

The majority of candidates were able to successfully convert this improper fraction to the mixed number $5\frac{1}{3}$.

Common incorrect answers were $1\frac{5}{3}$ from incorrect processing or $4\frac{1}{3}$ from arithmetic errors.

Question 8

8 Bottle **A** contains 1.5 litres of water and bottle **B** contains 100 millilitres of water.



Not to scale

Water is poured from bottle **A** into bottle **B** until both bottles contain the same amount.

How many millilitres of water are poured from bottle **A** into bottle **B**?

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

Many candidates scored 3 marks here and many others picked up part marks from either a correct method or a correct conversion.

Candidates who correctly converted 1.5 litres to 1500 ml were generally able to secure at least 2 marks, with many progressing to pick up all 3. Those who achieved 2 marks typically calculated the quantity of water needed in both bottles, but not the amount to be poured from Bottle A to Bottle B.

Most candidates who picked up marks worked in millilitres, with very few working in litres.

Those given 1 mark had often made errors in conversion (usually stating that 1.5 litres = 150 ml) or had a correct conversion yet were unable to process the numbers further (often calculating $\frac{1500}{2} - 100$ instead of $\frac{1500 - 100}{2}$).

Question 9 (a)

9 **(a)** Simplify.

$4x - 3y + x + 7y$

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

The question was very well attempted by all and the majority scored marks here. Many reached the correct answer of $5x + 4y$.

Credit was given for getting each term correct. Many were able to identify $5x$, but candidates often found reaching the $4y$ term more challenging, likely due to it involving a negative. The most common incorrect answer was $5x - 10y$, which picked up 1 mark.

A very small number of candidates correctly simplified, but then incorrectly combined the terms further, for example stating $5x + 4y = 9xy$.

Some candidates converted one or both terms to be quadratic, for example giving $4x^2 + 4y$. This resulted in 0 marks, as both terms must be linear.

Question 9 (b) (i)

(b) Multiply out.

(i) $5(2 - x)$

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

The majority of candidates obtained the correct answer of $10 - 5x$.

Successful candidates typically showed their expansion clearly in the working space, often using arrows or a grid method.

The most common error was to only multiply the first term in the bracket by 5, resulting in $10 - x$. Another frequent mistake was correctly expanding the bracket yet then proceeding to 'reverse' the terms and give $5x - 10$, perhaps from a misconception that the x term should appear first.

Question 9 (b) (ii)

(ii) $2x(x+3)$

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

The majority scored at least 1 mark here and many reached the correct answer of $2x^2 + 6x$.

Credit was given for each correct term. The most common response worth 1 mark was $2x^2 + 6$, where candidates did not multiply the second term in the brackets correctly.

A small number of candidates struggled with the quadratic aspect and gave $2x + 6x$.

Question 10

10 By writing each number correct to **1** significant figure, find an estimate for this calculation.

$$\frac{3.81 \times 19.8}{2.1}$$

.... **[3]**

The majority of candidates scored full marks on this question.

Most candidates rounded all three values accurately to arrive at $\frac{4 \times 20}{2}$. The mark scheme condoned trailing zeros (e.g. 20.0 rather than 20).

Common rounding errors included using '3.8' rather than '4' and '19' rather than 20. This resulted in calculations involving long multiplication and/or awkward divisions that were more challenging and time-consuming to process.

The question requested candidates write their rounded values, but a small number just gave the answer 40 without showing their values. These were awarded SC1.

Some candidates would have benefited from presenting their calculations more clearly, as some approximations appeared alongside attempts to produce more accurate values.

Question 11

11 Leo and Eve attempt the same puzzle.
Leo takes 1 minute 15 seconds to solve the puzzle.
Eve takes 2 minutes 5 seconds to solve the puzzle.

Write Leo's time as a fraction of Eve's time.
Give your answer in its simplest form.

.... **[3]**

The majority of candidates scored at least 1 mark here and many picked up full marks, however there were also many that did not score at all.

Those who correctly converted the times to be 75 seconds and 125 seconds were generally able to form a fraction and simplify it appropriately, however some either did not simplify or only completed a partial simplification ($\frac{15}{25}$ was a common response).

The most common incorrect answers came from incorrect time conversions and resulted in candidates trying to process calculations such as $\frac{1.15}{2.05}$ or $\frac{1.15}{2.5}$. A very small number of candidates were able to pick up 1 mark for simplifying their incorrect fraction (usually $\frac{115}{205} = \frac{23}{41}$).

Candidates who converted the times to $1\frac{1}{4}$ minutes and/or $2\frac{5}{60}$ minute picked up a mark for the conversion, but usually did not proceed further due to the complex simplification of the fraction.

Misconception: Time calculations and conversions between hours and minutes

Candidates often struggle to convert between units of time. The most common misconceptions here were that 1 minute 15 seconds = 1.15 minutes and 2 minutes 5 seconds = 2.05 minutes.

Question 12 (a) (i)

12 (a) A straight line has equation $y = 5x + 2$.

(i) Write down the gradient of the line.

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

The majority of candidates did not pick up this mark. A large proportion gave no response.

Common incorrect responses included $5x$, 2, $7x$ or re-writing the equation.

Assessment for learning:

A large number of candidates were unable to state the gradient from an equation given in the form $y = mx + c$.

To support deeper understanding between the structure of linear equations and the gradient (as well as the y-intercept), centres could implement a range of assessment for learning techniques. These might include matching activities that pair equations with graphical features, regular retrieval practice focused on identifying components and/or multiple-choice questions designed to check conceptual understanding.

Question 12 (a) (ii)

(ii) Find the value of y when $x = 7$.

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

The majority of candidates gave the correct answer of 37.

Common incorrect answers included 5 and 1 (from substituting $y = 7$ rather than $x = 7$).

A small proportion of candidates gave no response.

Question 12 (b)

(b) Make x the subject of $y = 5x + 2$.

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

The majority of candidates did not score any marks here.

Those who were most successful clearly wrote down each separate step of their rearrangement.

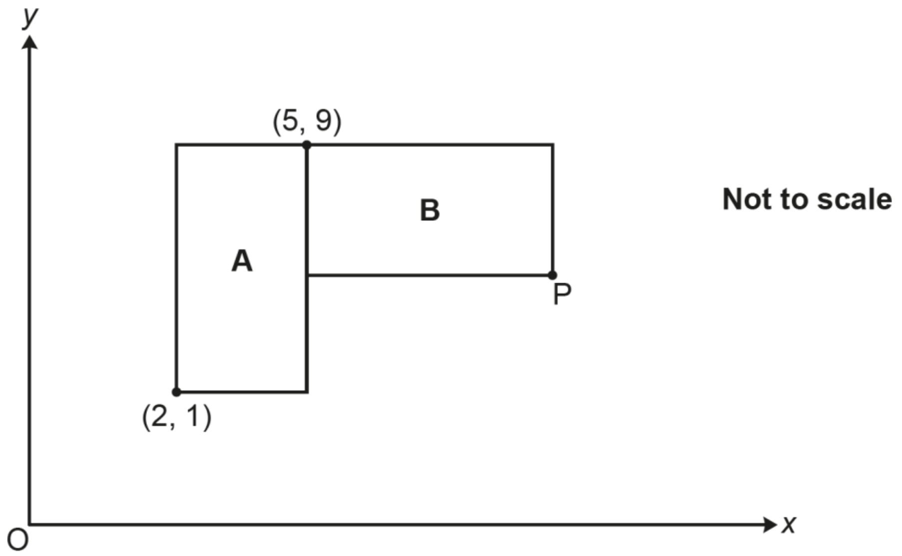
A number of candidates used a flow diagram approach, for example giving '$x \rightarrow \times 5 \rightarrow + 2 \rightarrow y$' followed by the reverse '$y \rightarrow - 2 \rightarrow \div 5 \rightarrow x$'. This often led to the correct answer and full marks; however it is important to note that candidates using this method and not achieving the correct answer could not be credited any marks.

Candidates who were given 1 mark usually did not include '$x =$' in their final answer, or had made an incorrect first step yet then followed it with a correct second step, e.g. reaching the incorrect $\frac{y}{5} = x + 2$ and following it with $\frac{y}{5} - 2 = x$, or reaching $5x = 2 - y$ and following it with $x = \frac{2-y}{5}$.

Candidates often just swapped the x and y in the equation and gave $x = 5y + 2$, which received no marks.

Question 13

13 The diagram shows rectangle **A** and rectangle **B**.
Rectangle **A** has two labelled vertices at the points (2, 1) and (5, 9).



Rectangle **A** is rotated 90° anticlockwise around the centre (5, 9) to form rectangle **B**.

Find the coordinates of the vertex marked P.

(.................. , ...) **[3]**

The vast majority of candidates did not score here.

Only a very small number of candidates successfully identified the length and width of the rectangle and then could relate them to the given information to correctly identify one or both parts of the coordinate.

Candidates were often able to subtract coordinates to reach the values 3 and 8 but then could not interpret these as the length and width of the rectangle. (3, 8) was a common answer.

Question 14 (a)

14 (a) Sundip has some £5, £10, £20 and £50 bank notes.
She buys 30 litres of fuel for her car.
One litre of fuel costs £1.50.

Sundip pays the exact amount of money for the fuel using three bank notes.

Work out the three bank notes that she uses to pay for the fuel.

(a) £ .... , £ .... and £ .... **[3]**

The majority of candidates picked up full marks here.

Candidates showed strong understanding of the context and many were able to identify 1.50 × 30 as the first step and then correctly reach £45. This was usually followed by the correct final answer of £20, £20 and £5.

A small number of candidates misread or misinterpreted the first sentence and attempted a response as if Sundip only had one of each note.

The main challenge was often calculating 1.50 × 30. Most used long multiplication methods, although others decided to use a partition method (usually splitting 1.50 into 1 and 0.50).

Those who received 0 marks often showed limited or no working.

Question 14 (b)

(b) On one journey, Sundip's car uses fuel at a rate of one litre every 16 kilometres.
At the start of the journey, her car has 50 litres of fuel.
At the end of the journey, her car has used $\frac{7}{10}$ of this fuel.

Use the conversion 5 miles = 8 kilometres to work out the number of **miles** Sundip travels on this journey.
You must show your working.

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

There was a range of marks given here, but the majority of candidates were able to score.

A range of valid methods were clearly presented and used to reach the correct answer. Exemplar 1 below shows one such example.

Most candidates achieved the correct answer of 350 miles but showed little or no working despite the statement 'You must show your working'; these were awarded SC3.

Some correctly calculated that the journey was 560 km ($16 \times 50 \times \frac{7}{10}$) to pick up 3 marks, but then made errors in converting to miles, often getting the conversion incorrect or leaving it incomplete.

Some candidates misinterpreted the question and calculated the number of miles that the remaining fuel could cover (i.e. 150 miles). This picked up 3 marks if accompanied by valid supporting working or 2 marks if not.

Candidates that found the amount of fuel used in litres picked up 2 marks for it. There was a variety of different approaches to this that are given in the mark scheme but just stating '$\frac{7}{10}$ of 50 = 35' was most common.

Lower performing candidates tended to show little or no working, or disorganised working. Candidates should practice how to structure working to present a logical and systematic method.

Exemplar 1

5 8 7
25, 80, 35

10 miles = 16 k ilometers

$\frac{7}{10} = \frac{35}{50}$ used fule

10 × 35 = 350 miles

(b) ....350........ miles **[5]**

This candidate correctly builds up the conversion from 5 miles = 8 km to 10 miles = 16 km. This method was very common and meant candidates could also make the connection that 1 litre would be used to travel 10 miles.

They use equated fractions ($\frac{7}{10} = \frac{35}{50}$) to establish the amount of fuel used and then use 35 with the 10 miles from their conversion.

The candidates shows $\frac{7}{10} = \frac{35}{50}$ and then uses 35 in the calculation 10 × 35 = 350, which is working that could be awarded M4.

The candidate gives the correct answer with appropriate supporting working, so picks up the full 5 marks.

Question 15 (a)

15 Work out.

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

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

Many did not score this mark.

Successful candidates usually showed a correct column multiplication, then correctly applied the laws of negative numbers.

Errors were often made in calculating 3.5 × 4 (140 and 1.4 were common incorrect answers) or incorrectly stating that the final answer was $^-14$ and not 14.

Question 15 (b)

(b) $0.1 \div 0.4$

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

Few candidates were able to reach the correct answer.

Successful candidates tended to remove the decimal element of the question by equating it to 1 ÷ 4. A small number of candidates that did this however then incorrectly divided by 10, presumably to 'compensate' for the earlier multiplying by 10.

Most candidates were unable to divide by 0.4 and common incorrect answers were 4, 0.4 and 0.04.

Question 16

16 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]**

Many did not score any marks on this question, but of those that did, many were able to reach the correct answer.

Successful candidates either worked out the overall percentage that the student had achieved (the efficient method $\frac{14}{25} = \frac{56}{100} = 56\%$ was seen from some) or worked out that 13.5 marks were required to pass and then compared this to the overall mark scored.

A few correctly calculated a value that could be used to make a comparison but then fell short of a valid comparison. This was often showing that 13.5 marks were needed to pass, but then not stating that across the 2 parts the student scored 14 marks. Some candidates used a decimal method to reach 0.56, but then did not state that 0.56 = 56% or that 54% = 0.54. These scored 2 marks.

Those who scored 1 mark picked it up most often for stating $\frac{14}{25}$ or 14 out of 25.

The most common incorrect method was to find the percentage scored on each part and then try to combine them. Another incorrect method was to work out $\frac{10}{15} + \frac{4}{10}$ using common denominators.

Candidate work often lacked structure and it was not always clear which numbers were being compared to each other.

Candidates who tried to find 54% of 25 often used 'build-up' calculations and made numerical errors. Candidates who use this method should be reminded that their method must be shown for method marks to be awarded, they can't be implied from lists of percentages.

Question 17

17 Solve.

$2x - 1 \leqslant 11$

.... **[2]**

Many did not pick up marks here, but there were also many that did.

Successful candidates manipulated the inequality correctly and maintained the inequality sign throughout their response.

Others tended to ignore the inequality and did not give an answer including one.

Some candidates used a flow diagram to achieve an answer of 6, which was given 1 mark. Candidates should however improve their familiarity with more formal methods.

Question 18

18 $1\frac{1}{5} + \frac{22}{d} = 1\frac{3}{4}$

Find the value of *d*.

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

This question proved very challenging for candidates. The unknown was the denominator of a fraction and required several steps of manipulation to be isolated.

Those who successful answered the question changed the two mixed numbers to improper fractions, completed the correct subtraction and then equated the two fractions.

Candidates were able to pick up a mark for showing the subtraction $1\frac{3}{4} - 1\frac{1}{5}$ or converting the fractions to common denominator improper fractions, i.e. $\frac{35}{20}$ and $\frac{24}{20}$. Many of those that reached one of these stages stopped there and didn't proceed further.

Several of those that reached $\frac{11}{20}$ were unable to successfully equate it to $\frac{22}{d}$ and identify *d*.

Question 19 (a)

19 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]**

This was well responded to. Almost all candidates attempted to answer this question and many achieved at least 1 mark, however only a small proportion reached the correct answer of 8 with supporting working to pick up full marks.

The vast majority of attempts involved listing terms of each sequence and a large proportion of candidates were able to do this up to the next common term (80). Candidates that did this correctly picked up 2 marks, or picked up 1 mark for getting either sequence correct up to this point. Arithmetic errors resulted in candidates not getting 80 as the next common term and these were more common in Sara's sequence.

With 10 and 80 identified as common terms, candidate could have gone up in steps of 70 to produce a list of common terms up to 500 (e.g. 10, 80, 150, 220, 290…), however instead candidates continued to list terms in each sequence up to 500. This was a time-consuming and inefficient method; arithmetic errors were common and candidates often abandoned their listing due to the time and effort required.

Those that found the common numbers sometimes did not include either 10 and/or 500 in their count, leading to a final answer less than 8.

A small number of candidates found the *n*th term of both sequences, but unfortunately this did not lead to the correct answer.

Question 19 (b)

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

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

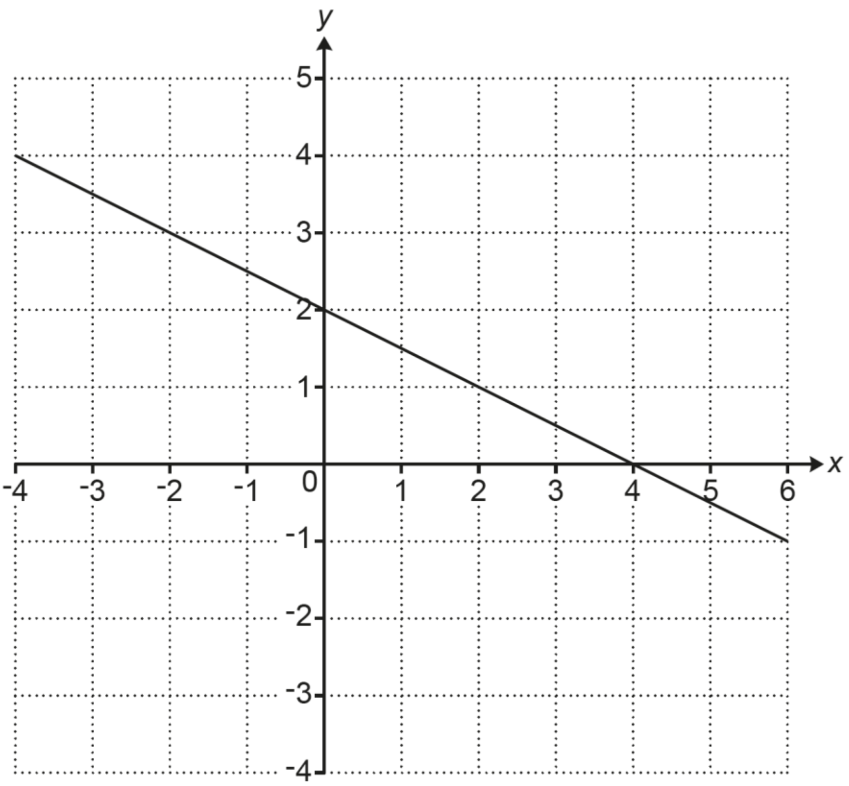
Candidates responded to this part less successfully than part (a). Without the sequence being explicitly given, many candidates struggled.

Successful candidates generally wrote out terms from Sara's sequence, then found the difference between them and used this to determine the *n*th term of $14n - 4$.

Some candidates responded with $10 + 14n$ because the sequence starts at 10 and increases by 14. Other common incorrect responses were $n + 14$, $4n + 14$, $4n - 14$, $10n - 14$, $10n + 14$, $n - 4$ and $n + 10$.

Question 20

20 The graph of the line $y = 2 - \frac{1}{2}x$ is shown on this grid.



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

$y = 2 - \frac{1}{2}x$ and $y = x - 1$

$x =$ ....

$y =$ ....

[4]

Few candidates picked up marks here. The majority of candidates were unable to draw the required line.

The most common method for solving the simultaneous equations was actually algebraic rather than the requested graphical approach, however this was challenging, particularly because most candidates attempted the elimination method.

The most common response was $x = 4$ and $y = 2$, from the two points where the given line intercepts the axes.

Assessment for learning

A large number of candidates demonstrated familiarity here with solving simultaneous equations algebraically, suggesting that this has been well taught.

However, many candidates struggled with the graphical approach that was intended here, particularly in accurately drawing the linear graph $y = x - 1$.

It would be beneficial for candidates to practice a wide range of questions involving graphical methods. This would strengthen their conceptual understanding of how solutions can be visually represented and interpreted.

Question 21

21 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]**

The majority of candidates found this ratio question challenging and few picked up marks here.

Of those that did score, many did so by increasing the given ratio of 2 : 5 : 7 to 20 : 50 : 70, but some did not then show the total of these lengths. Of those that went further, the majority considered the difference of 30 cm between 2 : 5 or between 5 : 7 and these were often able to score 2 marks by correctly calculating the total length in these cases to be 140 cm or 210 cm respectively, or 3 marks if they correctly calculated both.

It was rare for candidates to consider that the 30 cm size difference could apply between the smallest and largest lengths, therefore very few produced working showing that the total of the three lengths could be 84 cm.

A large number of candidates applied their knowledge of ratio and plenty of working was seen, however it was often inappropriate for this question. The two most common incorrect methods were to make this into a ratio sharing question and start with dividing 120 by 14 or multiplying each part of the ratio by 30 (in some cases reaching the total of 420, but not always).

Exemplar 2

$2+5+7=14$

Is Kofi correct?
Show how you decide.

$5-2=3=30_{cm}\div 3=10\times 14=140$
$7-5=2=30cm\div 2=15\times 14=210$
$7-2=5=30\div 5=6\times 14=\cancel{1}84$

15×14: 60, 150, 210

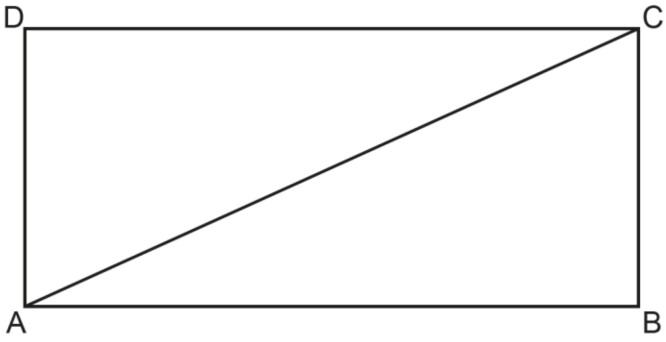
Kofi is incorrect because the least the sum can be is 84cm [5]

The above response was given 5 marks. They correctly investigate the 30 cm size difference for each of the three possible pairings of lengths (including the 2 : 7 pairing, which was missed by many) and reach the correct conclusion.

This response shows a very efficient method by working out the length of one part of the ratio in each of the three cases, then multiplying each by the total of 14. Most other high-scoring responses showed candidates finding the length of each piece of wood separately and then summing the three lengths.

Question 22

22 The diagram shows a rectangle ABCD with diagonal AC.



Not to scale

Complete each statement to show that triangle ABC is congruent to triangle ADC.

Angle ADC = angle .... because both angles are 90°.

Side AD = side .... because opposite sides of a rectangle are equal.

Side CD = side .... because ....

The above three statements show that triangle ABC is congruent to triangle ADC because

of ....

[4]

This was responded to well and the majority were able to pick up at least 1 mark.

The question provided plenty of scaffolding that allowed many to complete the first three lines. Most candidates were able to state that side AD = side BC in the second line to pick up 1 mark.

In the first line, a large number of candidates did not use three-letter angle notation and instead just used a single letter.

In the third line, most identified side AB, but the majority were unable to provide a correct justification. To repeat the reason already given in the second line was sufficient, but most of the comments weren't valid reasons, for example stating that the sides are parallel or just stating that they are equal without any geometric reasoning.

While many candidates were successful in the first three lines, very few candidates were able to identify SAS as being the reason for congruence to pick up the fourth and final mark. To pick up this mark candidates did have to have already picked up the first 3 marks, but incorrect reasons referring to symmetry, parallel lines or trigonometry were common.

Question 23

23 Work out.

2^{-4}

.... **[2]**

Few candidates were successful on this question.

While it was encouraging to see many correctly state or work out that $2^4 = 16$, few were able to apply this knowledge to work out 2^{-4}.

Common incorrect answers included 8, $^-8$, 16, 32 and $^-16$.

Misconception: Negative powers

?

Many misconceptions were seen in this question, with a common one being that a negative power makes the final answer a negative value.

Candidates would benefit from a greater focus on this topic.

Question 24

24 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 was an accessible question for candidates across the ability range and the majority scored at least 1 mark.

Many demonstrated a sound understanding of how to construct a two-way table with correct headings. A good proportion completed their table with six correct values, gaining full marks.

The most common error in constructing the table was the use of duplicate headings. Others didn't include headings for either the classes or the school terms, or both. A few drew separate tables for class A and class B. Some candidates added an extra column and row showing totals; this wasn't necessary and didn't affect their final mark. While the majority adhered to the requested table, a small number produced alternative representations such as bar charts, line graphs and tree diagrams.

For the calculations, some mixed up the words 'fewer' and 'more' in the given bullet points, resulting in them adding 27 to 90 instead of subtracting, or subtracting 6 from 120 instead of adding. Others gave 27 as the final value for Class B's Autumn term, rather than subtracting it from 90.

A small number of candidates included the fractions and percentages in their table without finding the missing values.

Misconception: Two-way tables

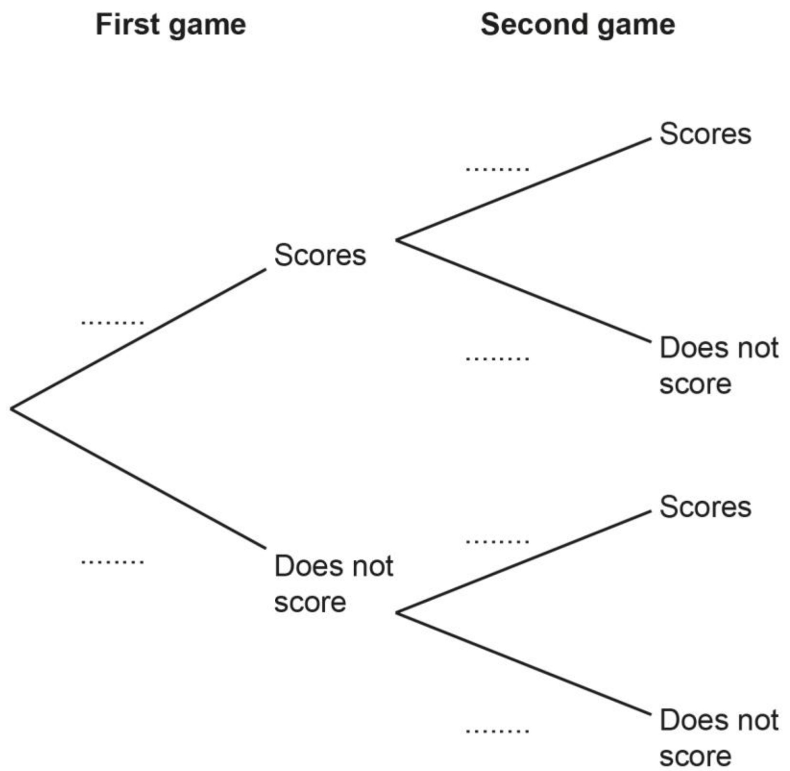
There was some confusion among candidates regarding the concept of a two-way table. A noticeable number of responses gave alternative presentations including bar charts, pictograms, line graphs and tree diagrams.

Candidates should become familiar with clear distinctions between these charts and diagrams. This might be done through emphasising when and why each representation is used, particularly highlighting that two-way tables are designed to organise categorical data across two variables.

Question 25 (a)

25 Casey plays two games of football.
In each game, the probability that Casey scores a goal is 0.3 .

(a) Complete the tree diagram.



[2]

The vast majority of candidates were able to access this question successfully. More than half picked up the full 2 marks.

Candidates gained 1 mark for correctly completing one pair of branches (most commonly the first set) or for consistently placing either 0.3 or 0.7 in the correct positions on the tree diagram.

Question 25 (b)

(b) Work out the probability that Casey scores in only one of the games.

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

While the majority of candidates were able to correctly label the tree diagram in part (a), there was less success in using it here in (b). A high number of candidates did not attempt this question.

Successful candidates showed the correct calculations, evaluated the decimal multiplications correctly and then added the correct probabilities to achieve an answer of 0.42.

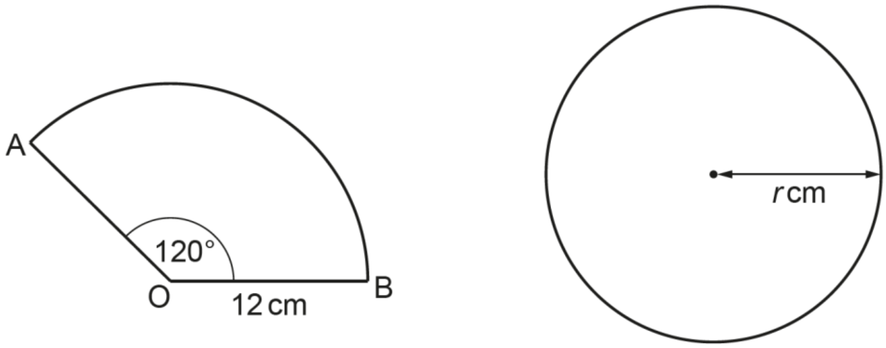
The most common mistake was to add the relevant fractions, rather than multiply.

For those that did multiply, the most common error was $0.7 \times 0.3 = 2.1$. Candidates should have recognised that a probability of 2.1 is not possible. Candidates that showed the calculation 0.7×0.3 were given a method mark, but often candidates just wrote 2.1 without any working and this picked up no marks.

Some candidates showed their working for this part on the tree diagram itself, which was credited.

Question 26

26 The diagram shows a sector of a circle AOB and a circle with radius r cm.



Not to scale

The sector has radius 12 cm and angle AOB = 120°.
The ratio of the area of the sector AOB to the area of the circle is 3 : 4.

Calculate the value of r.
You must show your working.

r = ... **[6]**

This final question was the most challenging on the paper. Many candidates made no attempt and few of those that did produced work that could be credited.

Successful candidates showed their workings clearly. This was important in this multi-step problem-solving question.

The question involved three stages, calculating the sector's area, finding the circle's area and then using the circle's area to find its radius. The most common approach was to first consider sector AOB and start by finding the area of a whole circle with radius 12 cm (which is 144π cm^2). Some candidates did then find the area of the sector, but some did not and used 144π in the ratio instead; those that did this and then proceeded otherwise correctly to reach a value for r could pick up 3 marks.

A small number of candidates struggled to deal with π, especially as this was a non-calculator paper. Some candidates consequently used an approximation for π (such as 3.1 or 3.14), however this made calculations more challenging to evaluate and these candidates often struggled to pick up more than 4 marks. Those that kept the sector's area in terms of π often found they could eliminate it later in the question to reach the integer answer.

A very small number of candidates gave the answer 8 cm without working or with limited working. These were given SC2.

Exemplar 3

AOB area

$\frac{144\pi}{3} = 3\overline{)144}$ → 048

48π = AOB area

$90°$ = ÷ 4

$10°$ = ÷ 36

$180°$ = ÷ 2

$120°$ = ÷ 3

Circle area

AOB : Circ

3 : 4 → 48 ÷ 3 × 4

$3\overline{)48}$ → 16

$16 \times 4 = 64\pi$

Circle radius

$r^2 \times \pi$

inverse of

$64\pi \div \pi = 64$

$\sqrt{64} = 8$ cm

r = 8cm **[6]**

The above shows a clear and correct method for this complex question. They show a correct method for finding the area of the sector and clearly arrive at $\frac{144\pi}{3}$, which is given 2 marks. They then evaluate this correctly as 48π. They then use this in the ratio to work out the circle's area as 64π, then proceed to $\sqrt{64} = 8$.

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