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OCR
Oxford Cambridge and RSA

GCSE (9–1)

Examiners' report

MATHEMATICS

J560

For first teaching in 2015

J560/03 Summer 2022 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 answers 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 OCR.

Advance Information for Summer 2022 assessments

To support student revision, advance information was published about the focus of exams for Summer 2022 assessments. Advance information was available for most GCSE, AS and A Level subjects, Core Maths, FSMQ, and Cambridge Nationals Information Technologies. You can find more information on our website.

Paper 3 series overview

Generally candidates were successful in achieving marks on the early questions of the paper and most made attempts at the questions throughout the paper. Most candidates did appear to have the use of a calculator but a significant minority did not.

A notable feature of the responses was that candidates were not comfortable with fractions and invariably tried to change these to percentages, even when these were inexact. This inevitably led to inaccuracies in answers. Candidates need to be taught to use, and to practise the use of, the fraction keys on their calculators.

Many candidates were less confident in using multipliers when finding percentages and chose instead to use non-calculator methods to find percentages of quantities which proved inefficient. These methods were often lengthy and inaccurate. Candidates need to understand that "of" is not a mathematical operation and, if the answer is wrong, will not enable them to score method marks.

The areas of mathematics found most challenging were problem solving, forming equations and solving equations, LCM in context and percentages. They also found questions requiring 'Explain ...' or 'Show ...' difficult and were often unclear how to respond. Drawings of shapes were challenging for some and few candidates used a ruler. Factors, money related questions such as currency conversions, and lines of symmetry were among the well answered topics on the paper.

Candidates who did well on this paper generally did the following:	Candidates who did less well on this paper generally did the following:
• attempted all questions • set out work clearly in an orderly manner • demonstrated good calculator skills • showed clear steps in working in multiple mark questions such as 6, 12, 18 and 26 and showed the steps required to reach a solution • could work with fractions in fraction questions • could work with percentages using correct multipliers • showed clear substitution into a formula • knew correct conversion factors when changing units • were careful with presentation, drawing and plotting of graphs • crossed out redundant working that was abandoned in reaching their answer.	• did not attempt longer questions requiring problem solving skills • used longwinded workings, jottings or multiple attempts that were difficult to follow when attempting problem solving questions • had a limited knowledge base and were unable to name shapes or use correct circle terminology • had limited facility with algebra • had limited knowledge of area and other geometric formulae, regardless of the provision of a formulae sheet • used trial and improvement, rather than following a mathematical process • demonstrated limited mathematical literacy, sometimes shown through answers only loosely related to the demand.

Question 1 (a)

1 **(a)** Write down a factor of 18.

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

This was well answered, although some candidates wrote more than one factor. Occasionally a candidate gave an incorrect factor, together with one or more correct factors, and scored 0 marks. Some confused factor with multiple and gave 36 as an answer.

Question 1 (b)

(b) Write down a square number between 10 and 20.

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

This was well answered, although 4^2 and 4 were common errors. Other non-square numbers also appeared and so did 25, possibly indicating that the question had not been read carefully.

Question 1 (c)

(c) Write $\frac{1}{4}$ as a decimal.

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

This was well answered. 0.14, 1.4, and 0.4 were common incorrect answers.

Question 1 (d)

(d) Find the two numbers which multiply together to make 40 **and** add together to make 13.

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

Many good answers were seen and most candidates scored at least 1 mark. Answers meeting one condition such as 10 and 4 or 9 and 4 scored 1 mark.

Question 2 (a)

2 **(a)** Here is a shape.

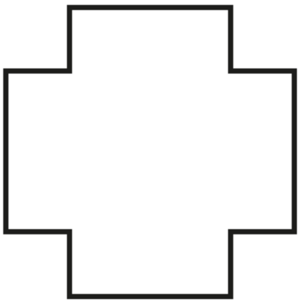
On the diagram, draw the shape's two lines of symmetry. **[1]**

This was not as well answered as might be expected. Many candidates did not use a ruler, however, credit was awarded for the correct lines being drawn. Incorrect answers included completing the inner circle, drawing only one line of symmetry, putting arrows on the parallel lines and shading half of the diagram.

Some candidates drew a horizontal and a vertical line as the lines of symmetry.

Question 2 (b)

(b) Here is another shape.



Write down the order of rotation symmetry of the shape.

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

Few candidates were able to accurately answer this question. Many responses suggested a limited understanding of the topic. Incorrect responses included drawing lines on the diagram, 1, 2, clockwise, 90°, 360° and full turn.

Question 2 (c) (i)

(c) (i) Sketch a quadrilateral that has exactly one line of symmetry. **[1]**

Few candidates were able to accurately answer this question. Incorrect responses included drawing triangles, along with many other inaccurate quadrilaterals. Many candidates omitted to answer the question.

Question 2 (c) (ii)

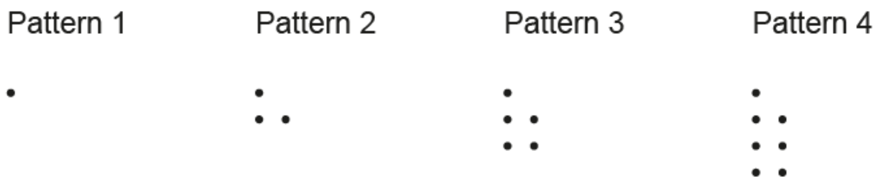
(ii) Write down the mathematical name of your quadrilateral.

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

Few candidates were able to accurately answer this question. Some candidates who had correct shapes in (c) (i) could not name them.

Question 3 (a)

3 Here are the first four dot patterns in a sequence.



(a) Draw Pattern 5 in the sequence. **[1]**

Many correct diagrams were seen, a few carefully drawn. Some candidates had the correct number of dots but not the correct configuration.

Question 3 (b)

(b) Without drawing, work out how many dots are in Pattern 8 of the sequence.
Explain how you worked out your answer.

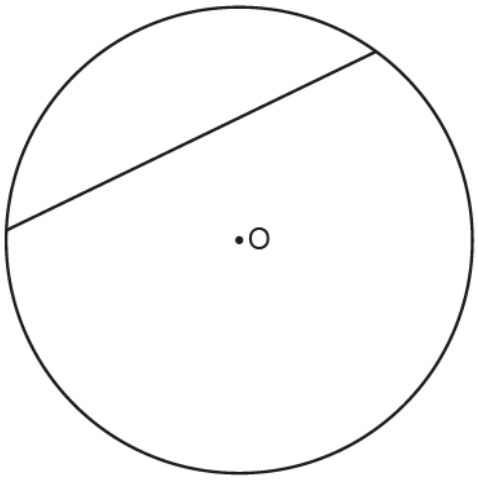
.... because ....

.... **[2]**

Many candidates had the correct reason with the most popular being "add 2 every time". Some candidates then did not give 15 and 11 or 17 were common, possibly from miscounting. A few gave the reason as, "count the dots in the pattern" and some doubled pattern 4 and did not score any marks. Very few candidates used the *n*th term to find the number of dots.

Question 4 (a)

4 The diagram shows a circle, centre O, and a line that meets the circle twice.



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

Some good answers were seen and many candidates used a ruler. Some drew a line of symmetry, extending beyond the circle and did not score. Some lines fell short of the circumference or missed the centre. The radius, a line through the centre from the chord and a tangent were popular. Some drew curved arrows indicating the circumference.

Question 4 (b)

(b) Write down the mathematical name of the line shown on the diagram.

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

The correct answer of "chord" was not common. Where it was seen, it was often not spelled correctly. Radius, tangent, sector and circumference were all popular incorrect answers.

Question 5 (a)

5 A student flips a fair coin and rolls a fair four-sided dice.
The coin can land on heads (H) or on tails (T).
The dice has sides numbered from 5 to 8.

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

Dice

		5	6	7	8
Coin	H			H7	
	T				

[2]

This question was often completed correctly. A few candidates did not insert H and T and a few candidates offered 'no response'.

Question 5 (b)

(b) Find the probability of getting a tail with an even number.
Give your answer as a fraction in its simplest form.

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

Few candidates were able to accurately answer this question. The most common incorrect answer was $\frac{2}{4}$ or $\frac{1}{2}$, from just looking at one of the conditions. A number of candidates did not cancel $\frac{2}{8}$. A few candidates gave 0.25 to score an SC mark.

Question 6

6 A test has 20 questions.

Amaya attempts all of the questions.
She gets 65% of the questions correct.
Kai gets six of the questions wrong.

Who has the smallest number of questions wrong?
Show working to support your answer.

.... because ....

.... **[3]**

Candidates produced some good responses to this question and a few of them were very succinct. There were a number of ways candidates could respond and all of them were seen. The least popular form of evidence was finding that Kai got 70% of the questions correct. Some candidates worked out 13 and 14 but misinterpreted these as the number of questions each student got WRONG; they chose Amaya, but scored B2 for reaching 13 and 14.

Careful annotation of their solutions would have improved some candidates' responses.

Use of non-calculator methods to find 65% was very common – sometimes with errors.

A common error was	10% of 20 = 2	
	60% = 6 × 2	
	5% = 1	So, 65% = 12 + **5** = 17

Question 7 (a)

7 **(a)** In a recipe, the ratio of the amount of flour needed to the amount of butter needed is $4:1$.
Rowan mixes 4 kg of flour with 1 g of butter.

Explain what Rowan has done wrong.

....

....

.... **[1]**

This was moderately well done although some candidates found it difficult to express their reasoning. Many candidates mentioned wrong "measurements" or "amounts" rather than mixed/wrong "units" and did not score the mark. Some candidates were unaware of the number of grams in a kilogram and said that he had used the ratio 400 : 1 rather than 4000 : 1.

Assessment for learning

Candidates should practise writing reasons and reading these to others to improve their communication skills.

Question 7 (b)

(b) Azmi gives $\frac{1}{10}$ of their earnings to charity and keeps the remainder.

For Azmi's earnings, find the ratio of the amount they give to charity to the amount they keep.

Give your answer in its simplest form.

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

This was not attempted by a number of candidates. Of those who did attempt it, the incorrect 1 : 10 was common. Few candidates scored part marks, often going straight to their answer. A small number scored 1 special case mark for the incorrect 9 : 1.

Question 8 (a)

8 **(a)** Simplify.

$2 \times 3a$

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

Many candidates answered this correctly, however, candidates should be reminded that $6 \times a$ can be simplified, although this response was credited as there was only 1 mark. The incorrect a^6 was seen along with $3a^2$ and some other expressions.

Question 8 (b)

(b) Simplify.

$$\frac{2x^5}{4x}$$

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

Few candidates were able to accurately answer this question. Most candidates found it difficult and very few correct answers were seen. A few candidates scored a part mark for sorting out 0.5 or x^4. Some candidates incorrectly wrote $\frac{1}{2x^{a\ power}}$ which was not credited. The answers 8, 8x and 32 were common, all deriving from a misuse of 2^5.

Question 9

9 Ling is paid £23.40 per hour for working on a weekday.
On a Sunday, Ling is paid at $1\frac{1}{3}$ times this hourly rate.

How much does Ling earn for working 8 hours on a Sunday?

£ .... **[3]**

Almost all candidates attempted the question with varying degrees of success. Many candidates scored M2 for correctly writing the full method but they were unable to complete the arithmetic correctly. Many candidates wrote $1\frac{1}{3} \times 23.40 = 7.80$, actually working out $\frac{1}{3} \times 23.40$. Others said $1\frac{1}{3} = 1.3$ and carried on using the imprecise decimal and so could not score full marks.

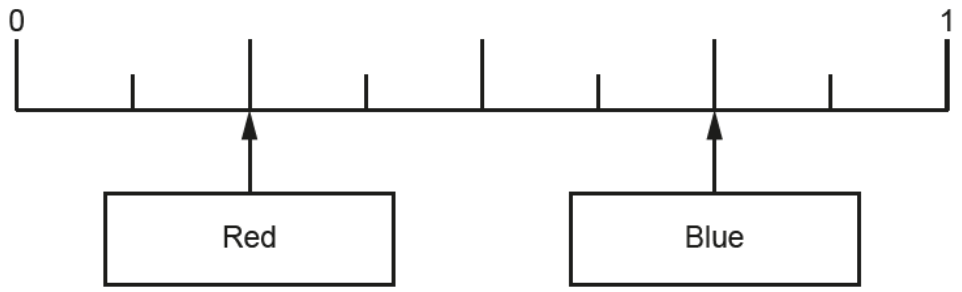
Assessment for learning

Candidates need to be proficient in using the fraction function on their calculator. Some candidates did not have confidence in working with fractions. The question was set up to use the exact $\frac{1}{3}$ and to test this competence.

Question 10 (a)

10 Each edge of a fair spinner is coloured either red or blue.

The scale shows the probability of the spinner landing on red and of landing on blue.



(a) Write down, as a fraction, the probability of the spinner landing on red.

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

Few candidates were able to accurately answer this question. Most candidates did give a fraction as their answer, as the question demanded. However, the fractions given were often incorrect such as $\frac{2}{9}$ or $\frac{6}{10}$. Some appeared to be counting the lines on the diagram, rather than the spaces on the probability scale.

A very few gave the incorrect $\frac{6}{8}$ oe from not reading the question carefully.

Question 10 (b)

(b) Show that the spinner could not have 15 edges. **[2]**

Around half of all candidates submitted 'no response' to this question. Among those who did attempt the question, many incorrectly thought that "fair" meant "an equal chance of red or blue" and said that 15 was an odd number so there could not be the same number of red and blue faces. A few candidates did divide 15 by 4 (or 8) but did not explain what their answer implied for the spinner. Some candidates stated that it couldn't be fair because spinners are round.

Question 11

11 Mr Fox invests £400 in a savings account that pays 3% simple interest per year.

Work out the **total** amount of interest Mr Fox will have earned at the end of the 5th year.

£ .... **[2]**

Most candidates attempted this question although few gained full marks. Many wrote 3% of 400 = 12 rather than 0.03 × 400 = 12 or $\frac{3}{100} \times 400 = 12$. Candidates should understand that "of" is not a mathematical operation and, if the answer is wrong, this style of working may not enable them to score method marks.

A number worked out one year's interest, added this to 400 and multiplied by 5. A number of candidates thought that 3% = 0.3.

Some candidates misread the question and spent time calculating the value of £400 after compound interest was added.

Question 12

12 Frankie goes on holiday.
They change £375 into euros (€) at a rate of £1 = €1.15.
They spend €217.49 of this money.
After the holiday, Frankie changes the remaining euros back into pounds at a rate of £1 = €1.28.

Work out how many pounds Frankie gets back.

£ .... **[4]**

This question was generally well answered and many candidates scored at least M2. Most candidates showed steps in working that could be followed to award method marks. Most candidates scored the first 2 marks for 375 × 1.15 and then subtracting 217.49. The most common errors were then to multiply by 1.28 or divide by 1.15.

Some candidates added 1.15 to 375 but could score a method mark for subtracting 217.49. Some attempted to change 217.49 using 1.15 or 1.28.

Some candidates rounded values as they worked through the steps or miscopied their own values and so lost accuracy marks.

Question 13

13 In a fish tank, the fish are either blue or gold or red.

There are 22 red fish.

$\frac{2}{5}$ of the fish are blue.

$\frac{5}{12}$ of the fish are gold.

Work out the total number of fish in the fish tank.
You must show your working.

.... **[5]**

This problem solving question was not well answered by almost all candidates, although a few very succinct solutions were seen. It was evident that many candidates were unsure how to solve the problem.

Most candidates changed the fractions to decimals as a first step, even though $\frac{5}{12}$ is an inexact decimal. These were then usually written as percentages. The next step was often 40 + 42 + 22 = 104 and 0 marks were scored.

Some did score a method mark for adding their decimals only to reach 0.82 or 82% and a very few went on to find 0.18 or 18% but were then unsure how to proceed.

Some showed $\frac{2}{5}+\frac{5}{12}$ to score M1, and a very few got the right answer $\frac{49}{60}$ but did not know how to proceed.

A very small number followed the route $\frac{2}{5}+\frac{5}{12}=\frac{24}{60}+\frac{25}{60}$ and realised that this did not give $\frac{22}{60}$ fish BUT $\frac{2}{5}+\frac{5}{12}=\frac{48}{120}+\frac{50}{120}+\frac{22}{120}=\frac{120}{120}$ and so the number of fish had to be 120.

Exemplar 1

13 In a fish tank, the fish are either blue or gold or red.

There are 22 red fish.

$\frac{2}{5}$ of the fish are blue.

$\frac{5}{12}$ of the fish are gold.

Work out the total number of fish in the fish tank.
You must show your working.

red = 22

blue = $\frac{2}{5} = \frac{4}{10} = 40\%$

gold = $\frac{5}{12} = 41.6\%$

$40 + 41.6 = 81.6$

$100 - 81.6 = 18.4$

red = $18.4\% = 22$ fish

This demonstrates a candidate who might have gone on to an answer close to the correct one but did not know how to proceed past 18.4% = 22 fish. The unnecessary percentage work would lead to an inexact answer (119.565...) whereas $\frac{11}{60} = 22$ (which could all be done on the calculator) would lead to the exact 120.

Question 14 (a)

14 In a dance competition, four judges award marks to each dancer.
Each judge can award 1, 2, 3, 4 or 5 marks.

The four judges' median mark, m, is put into the formula

$S = 10m - 5$

to get the dancer's score, S.

(a) Sam is awarded marks of 4, 3, 1 and 4.
Work out Sam's score.

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

Most candidates attempted the question. Many knew that the median was 3.5. Some candidates stated the median was 2, from not ordering the scores and some thought it was 4, being most common. Others found the mean or the total score. Most candidates did not substitute to show $S = 10 \times 3.5 - 5$ but worked in stages showing $10 \times 3.5 = 35$ and then $35 - 5 = 30$. The use of any value between 1 and 4 was credited for a method mark.

Question 14 (b)

(b) Taylor gets a score of 40.
Taylor says

The judges must have awarded marks of 4, 4, 5 and 5
because the median is 4.5
and $4.5 \times 10 - 5 = 40$.

Why is Taylor not correct?
Show working to support your reason.

....

....

.... **[2]**

This was found difficult by most candidates and a significant number did not attempt it.

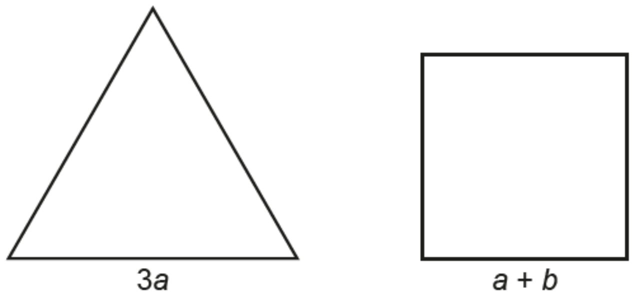
Most candidates misunderstood the question. Many checked the calculation and said Taylor was right. Some said Taylor worked it out wrong as they added up to 18, not 40, or they did not get scores that way.

A small minority of candidates realised that, as long as the middle numbers were 4 and 5, the score would be the same but did not explain this clearly. A few candidates gave the correct explanation.

Question 15

15 In this question, all lengths are in centimetres.

The diagram shows an equilateral triangle and a square.



Not to scale

The perimeter of each shape is 36 cm.

Find the value of b.

b = ... **[4]**

A number of candidates did not attempt this question. Very few systematic solutions were seen. Very few correct algebraic solutions were seen. These might have begun with $9a = 36$ but few did. Some candidates set up incorrect equations such as $3a = 36$. Some candidates showed $36 \div 4 = 9$ rather than $36 \div 9 = 4$ that would have led directly to $a = 4$.

A common incorrect route that scored 0 marks was $36 \div 3 = 12$ so $a = 12$ and then $36 - 12 = 24$.

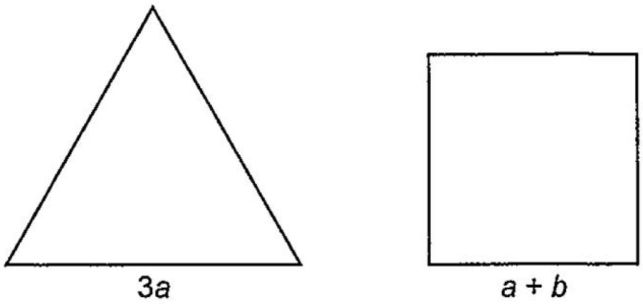
Using trial and improvement

Many candidates used a form of trial and improvement trying different values, usually with little success. They would have used their time more efficiently by planning a strategy that makes use of the given information.

Exemplar 2

15 In this question, all lengths are in centimetres.

The diagram shows an equilateral triangle and a square.



Not to scale

3×12 $\quad$ $12 +$

The perimeter of each shape is 36 cm.

Find the value of *b*.

$3 \times ? = 36$

$36 \div 3 = 12$

$? = 12$

We know a is 12 so to work out square =

12 * b = 36 (both same perimeter)

36 − 12 = 24 (12 + 24 = square)

↓ 36

~~12 × 3 = 36 (square)~~

~~12 × 3 = 36 (triangle)~~

3 × 12 (triangle)

12 + 24 (square)

b = 24 **[4]**

This is a version of the common incorrect method described in the commentary on Question 15 that does not use the information correctly.

Question 16 (a)

16 For each statement, complete the box to show the power of 10.

(a) One million = $10^{\square}$ **[1]**

A number of candidates did not attempt this question. Some correct answers were seen and some wrote one million as 1 000 000 before answering.

Incorrect answers were 7, 10, 100 and 1 000 000 (and ✓).

Question 16 (b)

(b) One thousandth = $10^{\square}$ **[1]**

More candidates attempted this question but fewer correct answers were seen. By far the most common answer was 3.

Question 17

17 Some boxes are each in the shape of a cuboid.
The base of each box is exactly 35 cm by 45 cm.

The boxes are to be placed on their base, side by side against a wall.
If all the shorter sides or if all the longer sides are against the wall, they fit perfectly with no gaps.

Find the shortest possible length of the wall.

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

This question was omitted by a significant number of candidates and, where an attempt was made, it was usually 35 × 45 with 35 + 45 regularly appearing. Very few attempted to find the LCM. The most successful method used was to list multiples of 35 and 45 to find the common value.

Question 18 (a)

18 The mass of a stone is 680 g.
The density of the stone is 1.6 g / cm^3.

(a) Work out the volume of the stone.

(a) .... cm^3 **[2]**

This response was usually given 0 or 2 marks, with few part marks being awarded. Many candidates just wrote the answer although sometimes the formula, in the form of a triangle, was seen. Candidates who quoted the formula were often successful. The most common error was 680 $\times$ 1.6 = 1088.

Question 18 (b)

(b) Write 1.6 g / cm^3 in kg / m^3.

(b) .... kg / m^3 **[1]**

Few candidates were able to accurately answer this question. The most common error was 0.0016, from dividing by 1000, but multiplication or division by 10 and 100 was also seen. Another error was to multiply or divide by 1000^3 or 1.6^3.

Question 19 (a)

19 **(a)** Multiply out and simplify.

$(x-4)(x+5)$

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

Some candidates did well on this question. Many candidates who did not score 2 marks gained a mark for finding three correct terms. Common errors were to give the constant as 1 or +20 or to give –5*x* and +4*x*. Some candidates only gave the *x* terms and did not give x^2 or –20 and just gave the answer as *x*.

Some candidates expanded the brackets and wrote = 20 instead of –20 and tried to solve the equation. Another common incorrect answer was $x^2 - 20$.

Question 19 (b)

(b) Factorise.

$x^2 - 25$

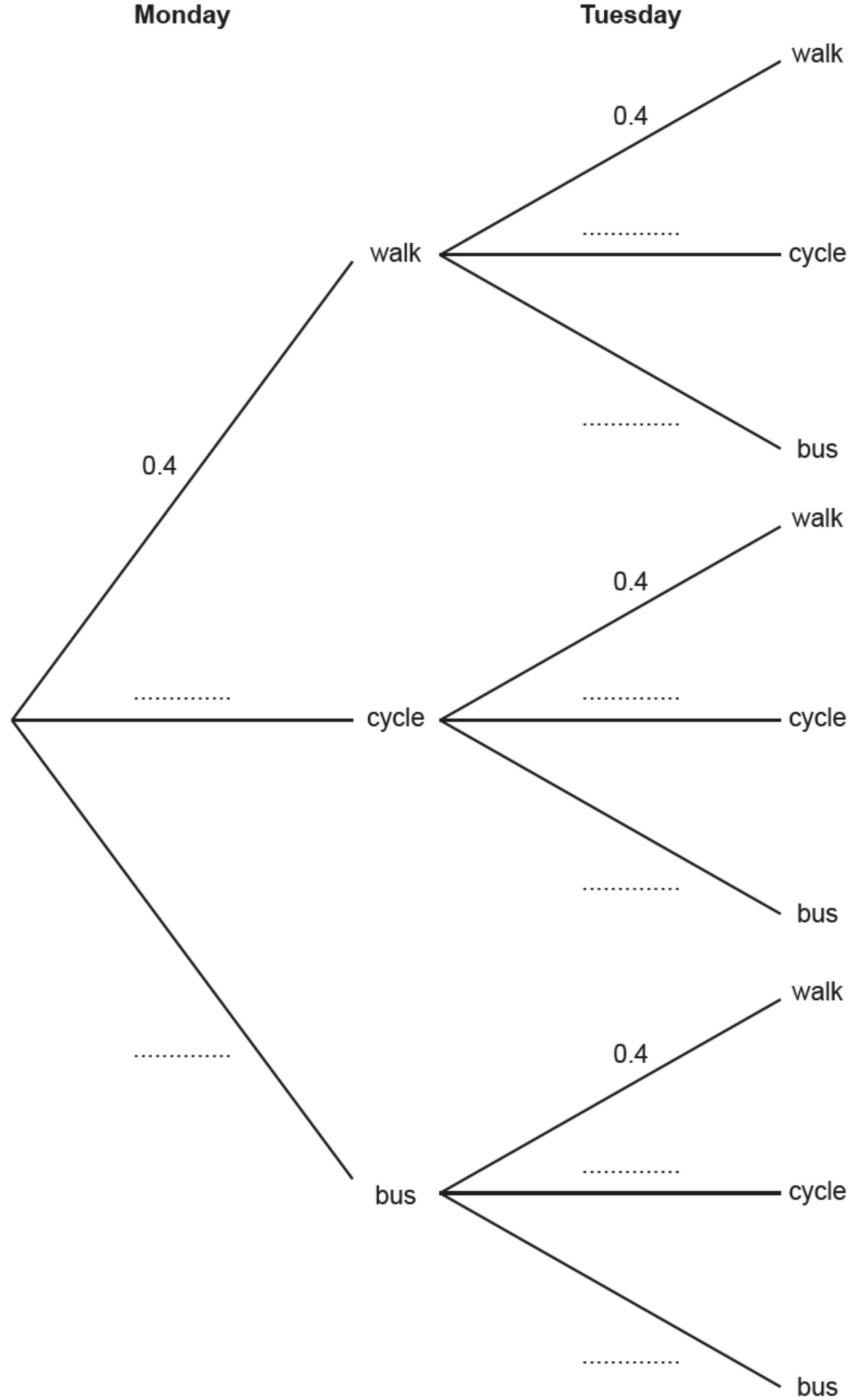
(b) .... **[1]**

Common errors were $x(x - 25)$ and $(x - 5)(x - 5)$ and the answer 5, treating this as $x^2 = 25$. Some answers of 625 were seen.

Question 20 (a)

20 Reece travels to school by either walking, cycling or using a bus.
The probability that Reece walks is always 0.4.
The probability that Reece cycles is always 0.55.

(a) Complete the tree diagram for Monday and Tuesday.



[3]

A number of candidates gained 1 mark for correctly placing 0.55 at least once on the tree diagram. Candidates who correctly placed 0.55 once often, but not always, did so correctly on all the branches.

Some candidates placed 0.5 rather than 0.05 on the lower branches. Others made errors in subtracting 0.4 and 0.55 from 1 (although this subtraction was rarely shown) and 0.41 was a common error. Some left the other branches blank.

Question 20 (b)

(b) Show that the probability that Reece travels to school by the same method on Monday and Tuesday is 0.465. **[3]**

Many candidates did not attempt to show this result. Some candidates were not aware of the demands of a "Show that…" question and only gave the addition of the three products to score 2 marks.

A common "informed" error was to add the pairs of probabilities. Some candidates tried a variety of combinations of the probabilities to make 0.465.

Question 21

21 Solve the simultaneous equations.

$$3x + y = 11$$
$$x + y = 3$$

$x =$ ....

$y =$ .... **[3]**

Many candidates answered this correctly. Sometimes these responses involved a correct method to eliminate one variable. Frequently candidates used a trial and improvement method which, as this was a relatively straightforward pair of simultaneous equations, yielded the correct solution relatively easily. Had the solutions been more obscure, the use of trial and improvement would have been a far more time consuming method to use.

Some candidates tried to eliminate a variable by subtracting *y* only.

Question 22

22 A sports club has 250 members.

Some of the members wish to change a club rule.
To change a club rule, at least 70% of **all** the members must vote 'yes'.

At a meeting of the sports club, 10 members were absent and did not vote.
The other members voted yes : no : don't know in the ratio 11 : 3 : 1.

Did enough members vote 'yes' to change the rule?
Show how you decide.

.... because ....

....

....

....

.... **[5]**

It was pleasing to see a significant number of candidates score marks in this question. This was often for working out 70% of 250. However, many candidates used 70% of 250 as their working and, if they did not reach 175, did not score a method mark. Others went through the lengthy process of saying 50% =, 10% =, etc. These non-calculator methods are not efficient and candidates should be encouraged to use a calculator on this paper.

Some candidates divided 240 by the 15 parts of the ratio (and multiplied by 11) although some attempted to do this using 250. Some found 176 and then worked out that this was 70.4% of the members and so was sufficient to make the change.

A reasonably common error was to subtract 10 from 250 and then find 70% of 240. 168 often appeared incorrectly in answers.

A number of candidates ignored the ratio and thought that these were the numbers of votes counted, often concluding that not enough people had voted as only 11 votes were cast.

Exemplar 3

250 - 10 = 240

240 ÷ 10 = 24

24 × 7 = 168

11 + 3 + 1 = 15

240 ÷ 15 = 16

16 × 11 = 176 yes

16 × 3 = 48 no

16 × 1 = 16 not sure

168 must vote yes

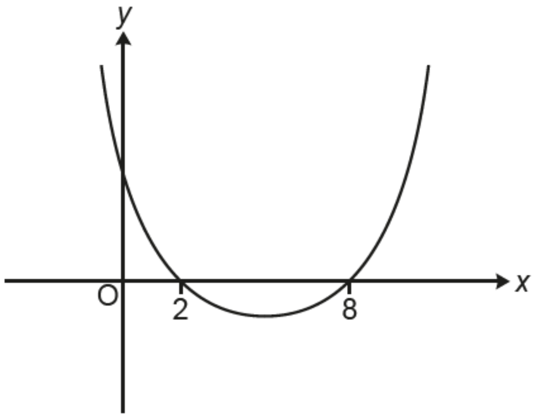
yes because 9 70% of 240 is 168 and 176 members voted "yes" therefore over 70% voted.

[5]

The candidate made the error of finding 70% of 240 rather than 250 and so could only score M2 for finding the number of votes from the ratio.

Question 23 (a)

23 This is a sketch of the graph of $y = x^2 - 10x + 16$.



Not to scale

(a) Write down the value of the y-intercept.

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

Many candidates left the answer line blank. Very little working was seen to support answers and few seemed to appreciate that the value of x had to be 0.

Question 23 (b)

(b) Write down the x-coordinate of the turning point.

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

Results here were similar to those in (a) and few candidates appreciated the symmetry of the graph. 2 and 8 were sometimes given as the answer.

Question 24 (a)

24 1600 fish are released into a new lake which has no fish.
The number of fish is expected to increase by 5% each year.

(a) The table shows the expected number of fish in the lake at the end of 1 year and at the end of 2 years.

Complete the table.
Round your answers to the nearest integer.

Years after release	0	1	2	3	4
Expected number of fish	1600	1680	1764		

[3]

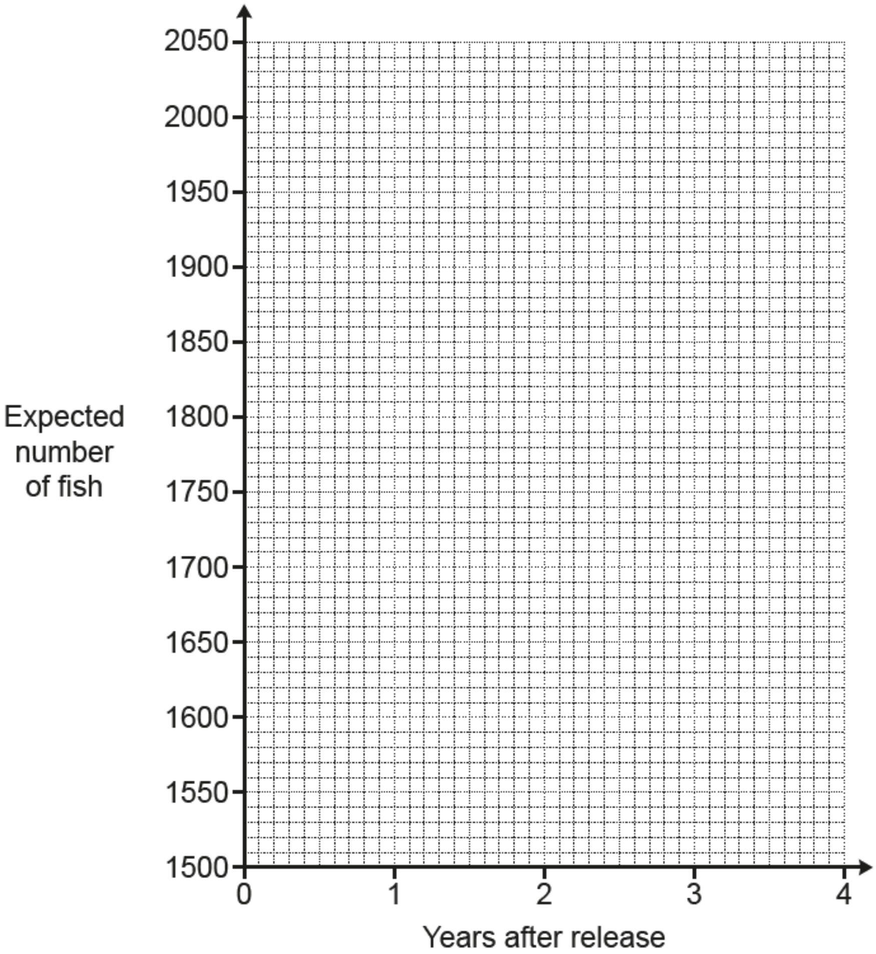
Most candidates attempted this question but only the more successful responses included working to support answers. Many candidates thought that they could do this by using differences and 80, 84 (and sometimes 88) were sometimes seen which, fortuitously, yielded 1852. The other value was sometimes the truncated 1944.

Some candidates wrote random values. Some attempted non-calculator methods to repeatedly increase by 5% but were generally unable to do so. This, once again, reveals the weakness of these methods.

Some candidates clearly increased by 5% but did not round to the nearest integer and so scored B2.

Question 24 (b)

(b) Use the table to draw a suitable graph to show the expected number of fish in the lake.



[3]

Many candidates plotted the points, or their points, correctly to score B2. However, few scored a mark for the slight curve as they either assumed this would be a line of best fit or connected the points with line segments.

Some candidates did not take care plotting their points and placed the centre of their mark more than half a square from the correct plot. Sometimes the mark made covered more than a square of the grid. Clearly this represented poor accuracy and should be discouraged.

Some candidates drew bar charts, which were inappropriate, and scored 0 marks.

Question 24 (c)

(c) A maximum of 2000 fish can live in the lake.

What effect would you expect this to have on the shape of your graph after 4 years?

....

....

.... **[2]**

Many candidates attempted this question but a great many of them described the effect on the population of fish rather than on their graph. In this case they scored 0 marks. Some of the comments were elaborate and went into detail about rehoming fish but revealed that the question had been misunderstood.

Some candidates' responses were wordy and occasionally hard to interpret. A statement such as "It will continue to increase until it reaches 2000 when it will level off" would score full marks. Examiners often had to try to determine if the candidate's description implied increasing. Often a mark was scored for "it will level off". It is a shame that these candidates did not attempt to say when the graph would level off. Some candidates described the shape without mentioning 2000 and only scored 1 mark.

Candidates should be encouraged to read and answer these types of questions and then peer review their answers in groups.

Question 25

25 A garage is trying to sell a car.
The price of the car is normally £18000.

In a sale, the price of the car is reduced by 30%.
As a special offer, the sale price is then reduced by r%.
The special offer price is £9450.

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

r = ... **[5]**

It was again pleasing to see candidates scoring marks on this penultimate question. This was often B2 for finding 70% of 18 000. £12 600 was frequently seen but rarely 0.7 × 18 000.

Some candidates employed an inefficient non-calculator method. This can waste time working through 50% =, etc. and, if there is any error in the values, method marks may not be awarded.

After 12 600, some candidates knew to work out what percentage 9450 (or 3150) was of 12 600 but, in many cases this was through a trial and improvement method, rather than the efficient $\frac{9450}{12\,600} \times 100$. However, some could reach 75% using their trials. A few could then go on to give the answer 25% but some gave 75% to score 3 marks.

Some candidates attempted to find 9450 (or 3150) as a percentage of 18 000 rather than 12 600.

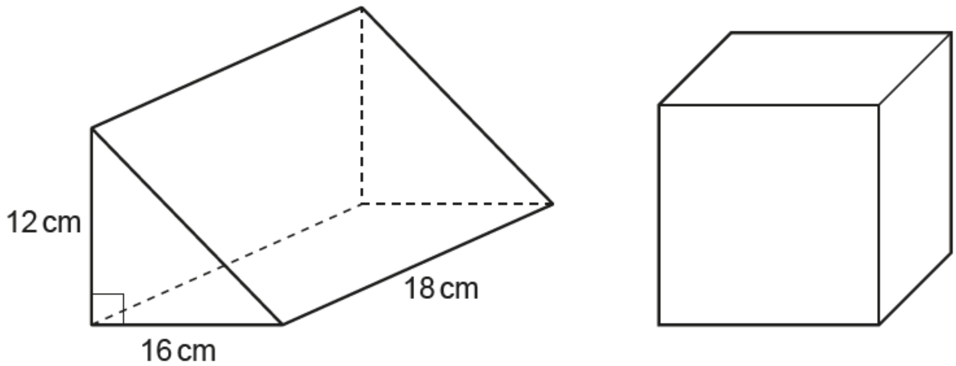
Candidates clearly understood that they must show working in support of their answer but this was often not well laid out or annotated.

Using inefficient methods

Candidates need to use efficient methods to work out percentages and move away from non-calculator methods that have limited scope to solve difficult problems.

Question 26

26 The diagram shows a triangular prism and a cube.
The ends of the prism are right-angled triangles with base 16 cm and height 12 cm.
The prism is 18 cm long.



The volume of the prism is equal to the volume of the cube.

Find the **surface area of the cube**.
You must show your working.

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

Many candidates found this question very difficult to respond to and a significant number of candidates made 'no response'.

A few candidates found the triangular area of cross-section to score M1 and a few then went on to multiply by 18 to score A1. A few candidates used their calculated volume for the cube but either square rooted it or divided by 3 or 6.

Some candidates gave the correct answer 864 from completely incorrect working and scored 0 marks.

The standard response was to multiply 12 by 16 by 18 as though the triangular prism was a cuboid. Many candidates stuck at this point and scored 0 marks.

Some candidates focused on the demand and began to work out the surface area of the triangular prism. This approach was not awarded any marks.

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