



GCSE (9–1)

MATHEMATICS

J560 For first teaching in 2015

Exploring our question papers



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Introduction

We have produced this guide to help you prepare your students successfully. In it we share the story of our assessment approach and explore our question papers with you. We also share the small changes we are making to improve the assessment experience of your students.

After the June 2022 exams we asked our teachers how their students felt about the whole exam experience – here's what they told us:

'Positive, they were happy with the papers and the experience.'

'Foundation felt confident throughout. The papers seemed fair and the same level of difficulty as the practice papers that are produced.'



Question paper structure

All GCSE (9-1) Mathematics qualifications require students to sit exams totalling 4½ hours. The OCR qualification consists of three 1½ hour exams that, in **discussion with teachers**, was felt by all to be best for students.

Our specification brings you the benefits of a **simple** assessment model; the three papers for each tier have identical mark allocations, duration and weightings.

Each paper has 100 marks, which gives us greater scope for awarding **more** method marks within questions. This means students can be better rewarded for each correct step on the way towards an answer.

At each tier there is one non-calculator exam. We've placed this as the middle exam so that in their first exam students have the **reassurance** of having a calculator with them!

At recent focus groups teachers told us that they really like our 100 mark papers. They feel that the opportunity to pick up more method marks is beneficial to their students' exam experience.

Foundation tier

	Paper 1		Paper 2		Paper 3
1.5 hours	Calculator	1.5 hours	Non-calculator	1.5 hours	Calculator
Grades 1-5 100 marks		Grades 1-5 100 marks		Grades 1-5 100 marks	

Higher tier

	Paper 4		Paper 5		Paper 6
1.5 hours	Calculator	1.5 hours	Non-calculator	1.5 hours	Calculator
Grades 4-9 100 marks		Grades 4-9 100 marks		Grades 4-9 100 marks	

Demand through the papers

For both tiers (Foundation and Higher) we ease students into the paper by starting with lower demand questions. This helps students get off to the best start possible, aiding them in building their confidence. Similarly, within a multi-part question, we aim to start with an easier lead in, building demand through successive parts of the question.

Accessibility principles

Group	No.	Accessibility Principle	Why?
bach	1	A list of command words for GCSE (9-1) Mathematics questions is available, to help you prepare students. Please see <u>page 12</u> and <u>page 13</u> .	To ensure clarity as to what can be assessed and how command words will be used.
ssment appro	2	Negative questions will be kept to a minimum.	Used well, negative questions can be a good way of testing understanding, but can also easily lead to confusion. We will only ever use negative questions where it is the most appropriate approach.
Asse	3	The only names to appear in questions will be taken from the list of names for that series. Please see page 7.	To avoid confusing students through names they are unfamiliar with.
on paper	4	 Layout (clear for all). Arial font. Adequate space for responses and room for working/calculations. 	To make it easy for students to read and to add their responses and/or do their working/calculations.
and feel of the questic	5	 Tone (so we're assessing students' understanding of maths, not their understanding of the words used). The use of complicated language and grammar will be avoided. Contexts and vocabulary will be appropriate to students and their understanding, for example glasses not spectacles, dice not die. Language and terms used throughout the question will be consistent. Technical words will be used appropriately to support the maths being assessed. 	To make it as clear as possible what response is expected.
Look a	6	Where there is a large context provided in a question, sentences will be grouped by content rather than by lots of separate sentences. Bulleted lists or numbering will be used where it helps with understanding.	To ensure information is presented in the clearest possible way.

Group	No.	Accessibility Principle	Why?
stion ng style	7	All text will be left aligned.	We read from left to right on the page, so left aligning helps ensure that students spot and read the given information.
Ques formatti	8	Italics will not be used in questions other than for variables. Generally, italicised Latin abbreviations (such as i.e., e.g. and etc.) will not be used. English terms will be used instead. If a specific word requires emphasis, bold font will be used.	Italics can be hard to read if overused.
ges and	9	Tables, graphs, images and diagrams will only be used where they genuinely support what is required in the question. We will avoid students needing to turn pages by aiming to always have any tables, graphs, images or diagrams required for a question on the same page or facing pages.	To avoid distracting images that do not help students understand what is required in the question. To avoid unnecessary page turning.
aphs, ima liagrams	10	Tables, graphs, images and diagrams will be left aligned unless students are required to do something with the table/graph/image/diagram. In this instance, the table/graph/image/diagram will be centred with sufficient space around it for students to do their working.	We read from left to right on the page, so left aligning helps ensure that students spot and read the given information.
bles, gr c			To ensure students have sufficient room to fit in their response and/or working.
Ta	11	Text will not be wrapped around tables, graphs, images or diagrams.	To improve clarity.

List of names

Below is our list of names to be used in the **summer 2023 exams and beyond**. This has been updated for increased diversity and to be consistent with the list used in other qualifications. Surnames are expected to be used only rarely and so we've not produced a list of surnames for 2023 onwards.

Only the names in the list below will be used in our GCSE (9-1) Mathematics assessments, to avoid any confusion. This helps to ensure students can be familiarised with names, in advance of the exams. They can be pre-taught and used in classroom activities.

First names		
Alex	Gabi	Mia
Ali	Heidi	Nina
Amari	Henry	Orla
Amaya	Hiro	Riley
Amir	Hugo	Rishi
Amit	Ivan	Rosa
Amos	Jack	Ryan
Anika	Jamal	Sam
Ariel	James	Sara
Azmi	Jamila	Sasha
Ben	Jane	Shanti
Beth	Kai	Sundip
Casey	Kareem	Taylor
Charlie	Kobe	Tom
Darcie	Kofi	Umi
Dev	Layla	Yana
Emma	Leo	Yoshi
Eve	Li	Yuki
Felix	Ling	Zac
Finley	Mei	Zayn

Content weightings

Our GCSE (9-1) Mathematics papers assess content in the below proportions of marks (with a ±3% tolerance).

- At the **Foundation** tier the largest sections are Number and Ratio, proportion and rates of change, accounting for 50% of the marks on each paper between them.
- At the **Higher** tier Algebra is the largest section.

	Foundation Tier	Higher Tier
Number	25%	15%
Algebra	20%	30%
Ratio, proportion and rates of change	25%	20%
Geometry and measures	15%	20%
Statistics	1504	1504
Probability	1.5%	1,5%

Assessment Objectives

		Weig	hting
		Higher	Foundation
	Use and apply standard techniques		
	Students should be able to:		
AO1	accurately recall facts, terminology and definitions	40%	50%
	use and interpret notation correctly		
	 accurately carry out routine procedures or set tasks requiring multi-step solutions. 		
	Reason, interpret and communicate mathematically		
	Students should be able to:		
	 make deductions, inferences and draw conclusions from mathematical information 		
	construct chains of reasoning to achieve a given result		
AO2	interpret and communicate information accurately	30%	25%
	present arguments and proofs		
	 assess the validity of an argument and critically evaluate a given way of presenting information. 		
	Where problems require students to 'use and apply standard techniques' or to independently 'solve problems' a proportion of those marks should be attributed to the corresponding Assessment Objective.		
	Solve problems within mathematics and in other contexts		
	Students should be able to:		
	 translate problems in mathematical or non-mathematical contexts into a process or a series of mathematical processes 		
	make and use connections between different parts of mathematics		
AO3	 interpret results in the context of the given problem 	30%	25%
	evaluate methods used and results obtained		
	 evaluate solutions to identify how they may have been affected by assumptions made. 		
	Where problems require students to 'use and apply standard techniques' or to 'reason, interpret and communicate mathematically' a proportion of those marks should be attributed to the corresponding Assessment Objective.		

Tiers

Students entered for Foundation tier can be awarded grades from 1 to 5. Those entered for Higher tier can be awarded grades 4 to 9, with an allowable grade 3 for those who just miss the grade 4.

The intention is that those expecting to achieve grades 1 to 5 are entered for the Foundation tier. This ensures that they develop a solid knowledge of the core content of GCSE (9-1) Mathematics to support their further studies rather than a potentially less secure knowledge of a wider range of mathematics.

Common questions between the tiers provide a benchmark to compare the performance of students around grades 4 and 5 on the two tiers to make sure that the grades represent equivalent performance regardless of the tier of entry.

The GCSE (9-1) Mathematics specification presents content over three columns of content, 'Initial Learning...', 'Foundation tier...' and 'Higher tier...'.

On Foundation tier question papers:

- The lowest demand 50 marks (assessing Grade 1 lower Grade 3) will feature content from just the 'Initial Learning...' column.
- The remaining 50 marks (assessing upper Grade 3 Grade 5) will feature content from both the 'Initial Learning...' and the 'Foundation tier...' columns.

On Higher tier question papers:

- The lowest demand 50 marks (assessing Grade 4 Grade 6) will feature content from both the 'Initial Learning...' and the 'Foundation tier... columns.
- The remaining 50 marks (assessing Grade 7 Grade 9) will feature content from the 'Initial Learning...', the 'Foundation tier...' and the 'Higher tier...' columns.

For more, read our blog on using the specification to write schemes of work.

GCSE (9–1) content Ref.	Subject content	Initial learning for this qualification will enable learners to	Foundation tier learners should also be able to	Higher tier learners should additionally be able to	DfE Ref.
2.02	Decimal fractions				
2.02a	Decimals and fractions	Express a simple fraction as a terminating decimal or vice versa, without a calculator. e.g. $0.4 = \frac{2}{5}$ Understand and use place value in decimals.	Use division to convert a simple fraction to a decimal. e.g. $\frac{1}{6} = 0.16666$	Convert a recurring decimal to an exact fraction or vice versa. e.g. $0.\dot{4}\dot{1} = \frac{41}{99}$	N10, N2
2.02b	Addition, subtraction and multiplication of decimals	Add, subtract and multiply decimals including negative decimals, without a calculator.			N2
2.02c	Division of decimals	Divide a decimal by a whole number, including negative decimals, without a calculator. e.g. $0.24 \div 6$	Without a calculator, divide a decimal by a decimal. e.g. 0.3 ÷ 0.6		N2

Command words

Command words are intended to provide guidance to teachers and students as to how students are expected to respond to each question. The exact response expected to a particular command word will be dependent on the context. At all times, we advise students to read the full question carefully to ensure they understand what they are being asked to do.

Command words (general usage)	Definition
Calculate, Find, Solve, Work out	Working may be necessary to answer the question, but no working needs to be shown unless otherwise specified.
Write down, Write	Neither working nor justification is required.
Complete, Insert	Add words, numbers, labels or plots to complete a sentence, statement, table, diagram or graph.
Use	The answer must use or refer to the information given in the question.
Choose, Circle, Select	Make a selection from the information provided.
Label, Mark, Identify	Indicate the specified location or response.
Prove	Provide a formal mathematical argument that demonstrates the validity of the given statement.
Draw	Draw to an accuracy appropriate to the question.
Plot	Mark or draw a plot on squared or graph paper for a given range of values.
Sketch	Draw freehand the most important features of a curve or line. It does not have to be drawn to scale.
Show that	Provide structured evidence that leads to a given result. It is not sufficient to use the given value(s) to verify the result. The explanation must cover the argument with no omissions or incorrect work shown.

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Command words (specific mathematical meaning)	Definition
Estimate	Check, without a calculator, the result of a calculation by using suitable approximations.
	OR
	Give a reasonable numeric value that can be justified by the information in the question.
Construct	Use mathematical instruments to draw accurately. Geometric instruments may be specified in the question. When constructing with compasses and a straight edge, show all of the arcs and lines that you use to make the construction.
Shade	Indicate, on a graph or a drawing, a region according to given conditions.
Enlarge, Rotate, Reflect, Translate	Carry out the requested transformation.
Expand, Multiply out	Multiply to remove brackets from a given expression to obtain an equivalent.
Factorise	Simplify a given expression by writing it as a product of two or more factors.
Rearrange	Used with formulae, when students are requested to change the subject of a formula.
Round	Write values correct to the specific accuracy required.
Simplify	Make a given algebraic expression/fraction/ratio as simple as possible.
Solve by	Use the method specified in the question to solve an equation or inequality.
Write in the form	Manipulate a given algebraic expression/fraction/ratio into the specified form or provide an answer in a particular way e.g. when giving an exact answer as a surd.

Other words that are commonly used in English are used with their standard English meaning.

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Formulae guides

GCSE (9-1) Mathematics requires students to memorise important mathematical formulae by heart. Formulae to be memorised are shown below .



For GCSE (9-1) Mathematics, Higher tier students should also know...



Students can print off this page as an aid to memorising the formulae or download our formulae guides from the '<u>Teaching activities</u>' section of the GCSE (9-1) Maths webpage. With those formulae that can be given to students in the exam, OCR will give the required formula within the specific question.

Annotated exam questions

Foundation tier (calculator)

This is the first question of a paper. It is a low demand AO1 (recall) question providing a straightforward start, easing students into the paper and helping to boost their confidence. This helps students demonstrate their full potential.

1 (a) Write down the mathematical name of this triangle. Choose from the list in the box.



isosceles equilateral right-angled scalene

Providing answers in a box for students to choose from helps make this question accessible to all levels.

In the mark scheme, spelling is noted as not important and also that students are allowed to indicate their answer in the box, for instance circling it.

.....triangle [1]

This question uses the command phrase 'Write down', which tells the students that no justification or working is required. (a)

Question		1	Answer Mar		Part marks and guidance		
1	(a)		isosceles	1		Condone poor spelling Accept any clear indication EG	
						ringed in list	



Foundation tier (non-calculator)

This question assesses AO2, requiring students to interpret the diagram.

10 (a) This Venn diagram shows the number of students in a Year 10 tutor group who study History (H) and Geography (G).



OCR GCSE (9-1) Mathematics will not use or require students to know the set notation symbols \cap (intersection) or U (union) that are commonly associated with Venn diagram questions.

Rather than using these symbols, we will ask our questions using words.

There are 29 students in the tutor group.

(i) How many students in the tutor group do not study History or Geography?

(a)(i)[2]

(ii) How many students in the tutor group study History?

(iii) One of the 29 students is selected at random.

What is the probability that they study Geography but do not study History?

(iii)[1]

Question		on	Answer	Marks	Part marks and guidance		
10	а	i	2	2	M1 for 29 – (13 + 5 + 9) oe		
		ii	18	1			
		iii	<u>9</u> 29	1		Do not accept a ratio Do not accept eg 9 in 29	

The abbreviation **oe** stands for **or equivalent**. Further guidance on marking and abbreviations can be found at the front of our GCSE (9-1) Mathematics mark schemes.

Foundation tier (calculator)

This question assesses multiple Assessment Objectives. It has some AO3 marks for translating a real life problem into a series of mathematical processes, some AO1 marks for mathematical working and some AO2 marks for presenting an argument.

- **11** A recipe for flapjacks uses only oats, butter and syrup, in the ratio 3 : 2 : 1.
 - (a) Pirin makes 1.5 kg of flapjacks. He uses 600 g of butter.

Has Pirin followed this recipe? Show how you decide.

'Show how you decide' indicates that students must include some justification for their answer.

The name 'Pirin' will not be used in future. See <u>page 7</u> for the names that will appear in our GCSE (9-1) Mathematics assessments.

Students are given some blank white space for working, but as this is a 'Show...' question they are also given some lines to help them structure a response.

.....[4]

The Answer column shows the answer 'No' and different justifications that can be given.

Qu	estion	า	Answer	Marks	Part marks and guidance			
11	(a)		No and [butter] 500 [with 600] or [total] 1500 with 1800 or [total] [1.5 with] 1.8 or [total] 300 more [than 1500] or [total] [0] 3 more [than 1 5]	4	 B1 for a relevant unit conversion seen with unit given M1 for (1500 or 1.5) ÷ 6 soi 250 or 	Must be used in solution EG1.5[kg] = 1500g or 1800[g] = 1.8kg Accept equivalent methods		
					0.25 or (600 or 0.6) ÷ 2	May be implied by [syrup=] 300 or 0.3		
					M1 for [butter=] <i>their</i> 250 oe × 2 or [total=] <i>their</i> 300 oe × 6 soi 1800 or 1.8	<i>Their</i> 300 is their mass of syrup May be <i>their</i> $300 \times 3 + their$ 300×2 <i>their</i> 300 or $900 + 600 + 300$		

The abbreviation **soi** stands for **seen or implied**. Further guidance on marking and abbreviations can be found at the front of our GCSE (9-1) Mathematics mark schemes. In the mark scheme, 'M' marks are awarded for a correct method. 'B' marks are independent of 'M' (method) marks and are for either a correct final answer, a partially correct answer, or a correct intermediate stage (as here).

The part marks are allocated to every step of student working. Allocating more marks to a question gives OCR greater scope to reward students for each step they make on the way towards an answer. The Guidance column provides clarification on how the marks are awarded and what examiners can and cannot accept.

Foundation and Higher tier (calculator)

17 Ping chooses four numbers.

The mode of these four numbers is 8, the range is 7 and the mean is 11.

Find Ping's four numbers.

After this question was originally sat, many students commented on social media about the name. It was clear that the name had been a distraction to some students, so we took this on board and developed a list of names that we will use in GCSE (9-1) Mathematics assessments. Students can be familiarised with the names and can therefore focus more on the question than the name (for the names, please see <u>page 7</u>. This is a common question, appearing on both Foundation tier and Higher tier papers. The common questions will be relatively demanding for Foundation tier papers and so appear towards the end of those papers, while on the Higher tier papers they will be relatively low demand questions and so appear early in those papers.

We work hard to ensure the language used is accessible. We aim to keep sentences short and simple, making sure every word has a purpose, as seen here.

Question		Answer	Marks Part marks and guidance						
17		8, 8, 13 and 15	3	 B2 for 3 or 4 numbers with at least two conditions met out of: At least two numbers are 8 The range is 7 The total is 44 or B1 for 4 numbers with one condition met or 44 seen 	Accept any order Examples: B2 for 8, 8, 10.5, 17.5 B2 for 8, 8, 8, 20 B2 for 8, 8, 28 B2 for 1, 8, 8 B1 for 8, 8, 8, 8 B0 for 8, 8				

The Answer column only shows the four numbers because the command word is 'Find', so working or justification does not have to be given.

We do however recommend students write down their working, in case their final answer is not correct. The examiner can then award method marks to any correct working seen. Seen means that the examiner can award the mark if that number/expression is seen anywhere in the answer space, including the answer line, even if it is not in the method leading to the final answer. Further guidance on marking and abbreviations can be found at the front of our GCSE (9-1) Mathematics mark schemes.

Higher tier (calculator)

9 The graph of $y = x^3 - 7x - 12$ is shown below. The root of the equation $x^3 - 7x - 12 = 0$ is *p*.



(a) Calculate y when x = 3.

The command word 'Calculate' in part (a) indicates that working may be necessary, but that a justification does not need to be given.



Part (b) is a 'Show that' question, meaning that students must write down all of their working as this forms their answer.

(c) Find a smaller interval that contains the value of *p*. You must show calculations to support your answer.

In part (c) students must interpret their result from part (b) and find a smaller interval.

The second sentence tells students to show calculations, helping them to understand exactly what is required to earn the marks.



The answer lines for parts (a) and (c) include y = ' and ' to make it as clear as possible to students what sort of response is expected.

Question		on	Answer	Marks	Part marks and guidance				
9	(a)		-6	1					
	(b)		[x = 4,] y = 24 Change of sign, so <i>p</i> lies between 3 and 4 oe	2	B1 for 24 seen If using $3.27 < x < 4$ rather than 4: SC2 evaluate <i>y</i> correctly (see table in (c)), state change of sign oe and that because $3 their x-value,then so 3 .0 for just evaluating y.$	After $x = 4$, $y = 24$ scored: Examples just sufficient for second mark include: change of sign -6 < 0 < 24 x = 3 gives an answer < 0 and x = 4 gives an > 0 Examples insufficient for second mark: so <i>p</i> lies between 3 and 4			

Question	Question Answer		Part marks and guidance						
(c)	Examples: when $x = 3.5$, $y = 6.4$, so 3	3	M2 for one further value of y Solution is approx. 3.2670						
	when $x = 3.1$, $y = -3.9$, so 3.1		or more sf, for a value of x such that	Comm	on values:				
	when $x = 3.1$, $y = -3.9$ and when		3 < <i>x</i> < 4	x	У	X	У		
	x = 3.5, $y = 6.4$, so 3.1			3.1	-3.909	3.5	6.375		
			OR	3.2	-1.632	3.6	9.456		
				3.25	-0.422	3.7	12.75		
			M1 for working shown to calculate	3.26	-0.174	3.75	14.48		
			one further value of y for a value of x	3.27	0.0758	3.8	16.27		
			such that $3 \le x \le 4$	3.3	0.837	3.9	20.02		
			Note after SC considered in (b): if SC2 was awarded then they must use a value of x that produces a smaller interval than 3 < x < their x-value in (b); if SC2 was not awarded then $3 < x <$ 4 applies If 0 scored, award SC1 or SC2 if evidence for M1 or M2 has not yet been credited in (b)	A correct accom calcula eg M2 so 3.1 correct Calcula need n	3.504 ect narrowe panied by t tion(s). only for wh $ (aly justified)ations in suot be repea$	er range so the relevance $x = 3.2$ as 3.5 has poport of x ated from	cores 0 ur ant correct y = -3.9 anot been r = 3 or x = parts (a) o	nless 1 = 4 or (b).	

The abbreviation **rot** stands for **rounded or truncated**. Further guidance on marking and abbreviations can be found at the front of our GCSE (9-1) Mathematics mark schemes.

[3]

Higher tier (calculator)

13 A menu has

6 starters

A bulleted list presents the important

- 10 main dishes information in the clearest way.
- 7 desserts.
- (a) A three-course meal consists of a starter, a main dish and a dessert.

How many different three-course meals are possible?

Part (a) is an AO1 question. Students are asked to carry out a routine procedure.

The two question parts are independent, meaning that students can attempt part (b) without needing to have completed part (a).

(a)[2]

(b) A two-course meal consists either of a starter with a main dish, a starter with a dessert or a main dish with a dessert.

Show that there are 172 possible different two-course meals.

Part (b) is a 'Show that' question. The answer is given to students and they must respond with the working required to reach the given value.

Please note our questions include an appropriate amount of space for working out, however, for presentation in this document the space has sometimes been minimised.

	Question		Answer	Marks	Part marks and guidance		
13	(a)		420	2	M1 for 6 × 10 × 7		
	(b)		6×10+6 ×7+10×7 or 60+42+70 [=172]	3	M2 for two correct products shown or M1 for one correct product shown		

The mark scheme provides a student friendly solution with guidance for how part marks would be awarded.

Higher tier (calculator)

17 The diagram shows triangle ABC.



Not to scale

This is a problem solving question. Students have to translate this mathematical problem into a series of processes.

 $AC=48\,mm,\,BC=85\,mm$ and angle $BAC=53^\circ.$

Calculate length AB. You must show your working. The diagram is clear and well labelled.

This diagram is left-aligned because students are not required to respond on it, but they can if they wish to.

This question includes the statement 'You must show your working'. This tells students that they must show evidence of their working to be awarded marks.

..... mm **[6]**

The answer line includes 'mm' to indicate to students the units that their answer should be in.

If no units are given then students should include any relevant units in their response.

Please note our questions include an appropriate amount of space for working out, however, for presentation in this document the space has sometimes been minimised.

The mark scheme is clear about the different levels of accuracy that are acceptable.

SC marks are for special cases that are worthy of some credit, but do not fit with the main scheme.

As this question has the statement 'You must show your working', guidance is given in the right-hand column indicating the correct working that needs to be seen to earn full marks.

Higher tier (calculator) 17 Here is a function. Function A: → Output Input + 14 × 5 Bold font is used in part (a) to draw student's attention to a crucial word. (a) The output of function A is x. Function notation (e.g. f(x) or gf(x)) notation) will not be included in Write an algebraic expression, in terms of x, for the input of function A. our questions. Instead, we will use words and often function machines. This improves the accessibility of this topic to a wider range of students. The command word 'Write' means that students can receive full marks even if they show no working or justification. However, students should be advised to always show any necessary working, so that if their answer is incorrect they can still earn part marks for their method. (a) (b) A number, k, is put into function A. The output is also k. Find the value of k. Short sentences are easy to read. The answer line for part (b) includes 'k =' to make it as clear as possible to students what sort of response is expected.

Please note our questions include an appropriate amount of space for working out, however, for presentation in this document the space has sometimes been minimised.

Q	Question		Answer	Marks	Part marks and guidance				
17	(a)		$\frac{x}{5} - 14$ oe	2	M1 for $\frac{x}{5}$ If 0 scored then SC1 for $\frac{x-14}{5}$ oe	Condone use of another letter for M1 max Must use x in SC1 0 for $x - 14 \div 5$			
	(b)		-17.5 or $-\frac{35}{2}$ oe nfww	3	M1 for 5('k' + 14) = 'k' or 'k' = $\frac{k}{5}$ - 14 M1FT for 4'k' = -70 or better or re-arrangement of <i>their</i> comparable f(k) = g(k) equation into the form ak = b. M1FT solving their $ak = b$ Alternative (FT as above): M1 for 'k' = $\frac{k}{5}$ - 14 M1FT for $\frac{4k}{5}$ = -14 or better M1FT solving <i>their</i> $ak = b$ Trials or no working: SC3 for -17.5	eg 5 <i>k</i> +14= <i>k</i> becomes 4 <i>k</i> =-14 and then <i>k</i> =- 3.5 scores M0 M1FT M1FT <i>k</i> + 70 = <i>k</i> is not comparable Answers may be in decimal or fractional form but fractions equating to integers should be simplified			

The abbreviation **nfww** stands for **not from wrong working**. Further guidance on marking and abbreviations can be found at the front of our GCSE (9-1) Mathematics mark schemes. The mark scheme highlights a common alternative method and shows how the marks are awarded.

Higher tier (calculator)

(b) The standard tin and the large tin are mathematically similar. The volume of the large tin is 50% more than the volume of the standard tin. Both tins are cylinders.

The radius of the standard tin is 10 cm.

Calculate the radius of the large tin.

Use of the command word 'Calculate' means that students can receive full marks even if they show no working in this question. However, students should be advised to always show any necessary working, so that if their answer is incorrect they can still earn part marks for their method. This is a higher demand question, aimed at grades 8 or 9 and hence appeared near the end of the question paper.

Students are required to translate a problem in a non-mathematical context into a series of mathematical processes.

(b) cm [4]

Please note our questions include an appropriate amount of space for working out, however, for presentation in this document the space has sometimes been minimised.

Question	Answer	Marks	Part marks and guidance
(b)	11.4[] nfww	4	B1 for 1.5 or $\frac{3}{2}$ or 3 : 2 soi
			AND
			M2 for 10 × ³ √1.5
			or
			M1 for ³ √1.5 soi by 1.14(47…)
			If 0 scored allow SC1 for 15 as final answer or seen radius of large tin
			Alternative: B1 for 0.666 to 0.667 or $\frac{2}{3}$ or 2 : 3
			soi AND
			M2 for $10 \div \sqrt[3]{0.666}$ to 0.667 oe
			or
			M1 for ³ √0.666 to 0.667 oe soi 0.873(…)

The mark scheme highlights a common alternative method and shows how the marks are awarded.

Support and resources

We are here to support you and your teaching.

For **assessment focused support** visit <u>https://www.ocr.org.uk/qualifications/gcse/mathematics-j560-from-2015/assessment/</u> where you can access:

- Practice papers to use as mock exams.
- Candidate exemplars.
- Command words posters.

You can also

- print out the formula guides on page 14 of this document for your students. This will help them know which formulae to memorise for the exams.
- use ExamBuilder to create your own test papers from past OCR exam questions.
- access <u>Active Results</u>, our free results analysis service to help you review the performance of individual students or your whole school.

For **planning and teaching** focused support visit <u>https://www.ocr.org.uk/qualifications/gcse/mathematics-j560-from-2015/</u> <u>planning-and-teaching/</u> where you can access:

- Baseline Check In tests that give you data all the way through the course.
- 1, 2 and 3 year Curriculum Planners.
- Planning materials and mapping guides to help you see your route through the course.

You can also

- register for training and events or to attend a Network event where you can share and discuss ideas with other teachers.
- view a range of endorsed <u>textbooks</u> and learning resources.
- <u>sign up</u> to our monthly Total Maths newsletter.

	GCSE (9-1) MATHEM	ATICS	OCCR Differed Cambridge and RSA	
OCR	Command wo	ords (specific mathemat	ical meaning) full question in your exam.	GCSE (9-1)
Contoning	Estimate	Check, without a calculator, the result of a ca approximations. OR Give a reasonable numeric value that can be information in the question.	culation by using suitable justified by the	Higher Ch
	Construct	Use mathematical instruments to draw accura instruments may be specified in the question, compasses and a straight edge, show all of the use to make the construction.	tely. Geometric When constructing with arcs and lines that you	1. And service has a service of the
(0-1)	Shade	Indicate, on a graph or a drawing, a region as conditions.	cording to given	Questions 2: A standard and the standard and the standard of t
GCSE UT Candidate Work	Enlarge, Rotate, Reflect, Translate	Carry out the requested transformation.		Some the production is not a factor of a f
Exemplus	Expand, Multiply out	Multiply to remove brackets from a given exp equivalent.	ression to obtain an	Use task dog the sample, taged with the knymel, the fourth of the fourth of the sample, taged the sample, taged of the sample, taged of the sample of the fourth of the fourth of the sample of the sample of the same for the fourth of the same for the sa
MAIL	Factorise	Simplify a given expression by writing it as a factors.	product of two or more	supermarket roles daps from the kernel montena.
J560 united in 2015	Rearrange	Used with formulae, when students are required subject of a formula.	ested to change the	samfu date a data single reaction should be the submet of data to a data should be a data single and the submet of data single reactions and to be the submet submet of a data should be a data single reaction and to be the submet submet of a data should be a data single reaction.
rolo3 Summer 201	Round	Write values correct to the specific accuracy	equired.	Are in some to conclude a single number of the Year 11 public of the Year 10 be facely to be shown and the concluded a single number of the first Year 12 public of the school of the move darks at 1 for loss, and a single number of public in the procession and the school of the move of and at 1 for loss, and
J560/00 ser	Simplify	Make a given algebraic expression/fraction/r	tio as simple as possible.	Soundards Leaves to another than the second
ext.	Solve by	Use the method specified in the question to inequality.	olve an equation or	How much a way cost the company and provide sample moch with 0 deficience scale who who much a way cost the company and provide sample moch and the respective of the company and the cost the and the cost the
	Write in the form	Manipulate a given algebraic expression/frac specified form or provide an answer in a part giving an exact answer as a surd.	tion/ratio into the icular way e.g. when	and the share as a series of a post of the counties the series by post cash and the share as a series of a post of the counties the series of post cash and the series of the series o
	N.B. Other words that are	commonly used in English are used with their s	andard English meaning.	 Numero Googe 7, An yest dag data to go calling the number of program to the second data of the
\ L	ocr.org.uk/gcsematns	_	e 007.200	"Soldator, We Work out the
owww.	rorg.uk/mathematics		- many	
				* CCX 35(3)

Meet our Maths team



Assessment Standards Managers

Will Hornby and Ross Roberton

Will has previously worked as a Senior Assessor for OCR and Cambridge International, as well as an Associate Lecturer for the Open University. Having worked on the development of OCR's GCSE (9-1) Maths, he then led the development of OCR's reformed A Level Maths and Further Maths qualifications for first teaching 2017.

Ross previously worked at Cambridge International for 3 years as a Product Manager, managing a portfolio of assessment materials available worldwide including A Levels in Maths and Further Maths.

Subject Advisors

Caroline Hodgson, Neil Ogden, Steven Walker and Ruth Wroe

Following the redevelopment of the GCSE (9-1) and the A Level Maths suite, the Subject Advisor team support the full range of maths qualifications through quality assurance of resources, leading sessions at network events and conferences as well as responding to queries from teachers via telephone and email.

Caroline has worked in the OCR Maths team for over 17 years and has been involved in the development and implementation of many GCSE Maths qualifications, including a number of pilots. She is currently responsible for the support and promotion of GCSE (9-1) Maths and Entry Level Certificate Maths.

Neil led the development of the current GCSE (9-1) Maths qualification, as well as being heavily involved in the development of a number of other OCR Maths qualifications. He can regularly be seen leading sessions encompassing the full suite of OCR Maths qualifications around the country. He is responsible for the support and promotion of GCSE (9-1) Maths.

Steven joined OCR during the last qualification reform period. Having worked on the redevelopment of Entry Level, GCSE (9-1), FSMQ and the A Level Maths and Further Maths qualifications he now focuses on supporting and promoting the Level 3 qualifications.

Ruth worked on the development of OCR's reformed A Level Maths and Further Maths qualifications and is currently responsible for the support and promotion of OCR's Core Maths qualifications.

Get in touch with our Subject Advisors

Whether you're an existing OCR Centre teaching our GCSE (9-1) Maths specification and are looking for further support, or you'd like to become an OCR centre, please do contact us.

Email: maths@ocr.org.uk

Twitter: <u>@OCR_Maths</u>

Customer Support Centre: 01223 553998

Website: www.ocr.org.uk/maths

Need to get in touch?

If you ever have any questions about OCR qualifications or services (including administration, logistics and teaching) please feel free to get in touch with our customer support centre.

Call us on 01223 553998

Alternatively, you can email us on support@ocr.org.uk

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