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KEY STAGE

3

ALL TIERS

2005

Mathematics tests

Mark scheme for Paper 1

Tiers 3–5, 4–6, 5–7 and 6–8

2005



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education and skills

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Introduction

The test papers will be marked by external markers. The markers will follow the mark scheme in this booklet, which is provided here to inform teachers.

This booklet contains the mark scheme for paper 1 at all tiers. The paper 2 mark scheme is printed in a separate booklet. Questions have been given names so that each one has a unique identifier irrespective of tier.

The structure of the mark schemes

The marking information for questions is set out in the form of tables, which start on page 12 of this booklet. The columns on the left-hand side of each table provide a quick reference to the tier, question number, question part, and the total number of marks available for that question part.

The **Correct response** column usually includes two types of information:

- a statement of the requirements for the award of each mark, with an indication of whether credit can be given for correct working, and whether the marks are independent or cumulative;
- examples of some different types of correct response, including the most common.

The **Additional guidance** column indicates alternative acceptable responses, and provides details of specific types of response that are unacceptable. Other guidance, such as when ‘follow through’ is allowed, is provided as necessary.

Questions with a *UAM* element are identified in the mark scheme by an encircled *U* with a number that indicates the significance of using and applying mathematics in answering the question. The *U* number can be any whole number from 1 to the number of marks in the question.

For graphical and diagrammatic responses, including those in which judgements on accuracy are required, marking overlays have been provided as the centre pages of this booklet.

The 2005 key stage 3 mathematics tests and mark schemes were developed by the Mathematics Test Development Team at QCA.

General guidance

Using the mark schemes

Answers that are numerically equivalent or algebraically equivalent are acceptable unless the mark scheme states otherwise.

In order to ensure consistency of marking, the most frequent procedural queries are listed on the following two pages with the prescribed correct action. This is followed by further guidance relating to marking of questions that involve money, time, algebra, coordinates, negative numbers or probability. Unless otherwise specified in the mark scheme, markers should apply the following guidelines in all cases.

What if ...

<i>The pupil's response does not match closely any of the examples given.</i>	Markers should use their judgement in deciding whether the response corresponds with the statement of requirements given in the Correct response column. Refer also to the Additional guidance .
<i>The pupil has responded in a non-standard way.</i>	Calculations, formulae and written responses do not have to be set out in any particular format. Pupils may provide evidence in any form as long as its meaning can be understood. Diagrams, symbols or words are acceptable for explanations or for indicating a response. Any correct method of setting out working, however idiosyncratic, is acceptable. Provided there is no ambiguity, condone the continental practice of using a comma for a decimal point.
<i>The pupil has made a conceptual error.</i>	In some questions, a method mark is available provided the pupil has made a computational, rather than conceptual, error. A computational error is a slip such as writing $4 \times 6 = 18$ in an otherwise correct long multiplication. A conceptual error is a more serious misunderstanding of the relevant mathematics; when such an error is seen no method marks may be awarded. Examples of conceptual errors are: misunderstanding of place value, such as multiplying by 2 rather than 20 when calculating 35×27 ; subtracting the smaller value from the larger in calculations such as $45 - 26$ to give the answer 21; incorrect signs when working with negative numbers.
<i>The pupil's accuracy is marginal according to the overlay provided.</i>	Overlays can never be 100% accurate. However, provided the answer is within, or touches, the boundaries given, the mark(s) should be awarded.
<i>The pupil's answer correctly follows through from earlier incorrect work.</i>	Follow through marks may be awarded only when specifically stated in the mark scheme, but should not be allowed if the difficulty level of the question has been lowered. Either the correct response or an acceptable follow through response should be marked as correct.
<i>There appears to be a misreading affecting the working.</i>	This is when the pupil misreads the information given in the question and uses different information. If the original intention or difficulty level of the question is not reduced, deduct one mark only. If the original intention or difficulty level is reduced, do not award any marks for the question part.
<i>The correct answer is in the wrong place.</i>	Where a pupil has shown understanding of the question, the mark(s) should be given. In particular, where a word or number response is expected, a pupil may meet the requirement by annotating a graph or labelling a diagram elsewhere in the question.

What if ...

<i>The final answer is wrong but the correct answer is shown in the working.</i>	Where appropriate, detailed guidance will be given in the mark scheme and must be adhered to. If no guidance is given, markers will need to examine each case to decide whether:	
	the incorrect answer is due to a transcription error;	If so, award the mark.
	in questions not testing accuracy, the correct answer has been given but then rounded or truncated;	If so, award the mark.
	the pupil has continued to give redundant extra working which does not contradict work already done;	If so, award the mark.
	the pupil has continued, in the same part of the question, to give redundant extra working which does contradict work already done.	If so, do not award the mark. Where a question part carries more than one mark, only the final mark should be withheld.
<i>The pupil's answer is correct but the wrong working is seen.</i>	A correct response should always be marked as correct unless the mark scheme states otherwise.	
<i>The correct response has been crossed or rubbed out and not replaced.</i>	Mark, according to the mark scheme, any legible crossed or rubbed out work that has not been replaced.	
<i>More than one answer is given.</i>	If all answers given are correct or a range of answers is given, all of which are correct, the mark should be awarded unless prohibited by the mark scheme. If both correct and incorrect responses are given, no mark should be awarded.	
<i>The answer is correct but, in a later part of the question, the pupil has contradicted this response.</i>	A mark given for one part should not be disallowed for working or answers given in a different part, unless the mark scheme specifically states otherwise.	

Marking specific types of question

Responses involving money <i>For example: £3.20 £7</i>	
Accept ✓	Do not accept ✗
<p>✓ Any unambiguous indication of the correct amount eg £3.20(p), £3 20, £3,20, 3 pounds 20, £3-20, £3 20 pence, £3:20, £7.00</p> <p>✓ The £ sign is usually already printed in the answer space. Where the pupil writes an answer other than in the answer space, or crosses out the £ sign, accept an answer with correct units in pounds and/or pence eg 320p, 700p</p>	<p>✗ Incorrect or ambiguous use of pounds or pence eg £320, £320p or £700p, or 3.20 or 3.20p not in the answer space.</p> <p>✗ Incorrect placement of decimal points, spaces, etc or incorrect use or omission of 0 eg £3.2, £3 200, £32 0, £3-2-0, £7.0</p>

Responses involving time <i>A time interval For example: 2 hours 30 mins</i>	
Accept ✓	Take care ! Do not accept ✗
<p>✓ Any unambiguous indication eg 2.5 (hours), 2h 30</p> <p>✓ Digital electronic time ie 2:30</p>	<p>✗ Incorrect or ambiguous time interval eg 2.3(h), 2.30, 2-30, 2h 3, 2.30min</p> <p>! The time unit, hours or minutes, is usually printed in the answer space. Where the pupil writes an answer other than in the answer space, or crosses out the given unit, accept an answer with correct units in hours or minutes, unless the question has asked for a specific unit to be used.</p>
A specific time For example: 8.40am, 17:20	
Accept ✓	Do not accept ✗
<p>✓ Any unambiguous, correct indication eg 08.40, 8.40, 8:40, 0840, 8 40, 8-40, twenty to nine, 8,40</p> <p>✓ Unambiguous change to 12 or 24 hour clock eg 17:20 as 5:20pm, 17:20pm</p>	<p>✗ Incorrect time eg 8.4am, 8.40pm</p> <p>✗ Incorrect placement of separators, spaces, etc or incorrect use or omission of 0 eg 840, 8:4:0, 084, 84</p>

Responses involving the use of algebra For example: $2 + n$ $n + 2$ $2n$ $\frac{n}{2}$ n^2	
Accept ✓	Take care ! Do not accept ✗
<p>✓ Unambiguous use of a different case or variable eg N used for n x used for n</p> <p>✓ Words used to precede or follow equations or expressions eg $t = n + 2$ tiles or tiles = $t = n + 2$ for $t = n + 2$</p> <p>✓ Unambiguous letters used to indicate expressions eg $t = n + 2$ for $n + 2$</p>	<p>! Unconventional notation eg $n \times 2$ or $2 \times n$ or $n2$ or $n + n$ for $2n$ $n \times n$ for n^2 $n \div 2$ for $\frac{n}{2}$ or $\frac{1}{2} n$ $2 + 1n$ for $2 + n$ $2 + 0n$ for 2 Within a question that demands simplification, do not accept as part of a final answer involving algebra. Accept within a method when awarding partial credit, or within an explanation or general working.</p> <p>✗ Embedded values given when solving equations eg in solving $3x + 2 = 32$, $3 \times 10 + 2 = 32$ for $x = 10$ To avoid penalising the two types of error below more than once within each question, do not award the mark for the <i>first</i> occurrence of each type within each question. Where a question part carries more than one mark, only the final mark should be withheld.</p> <p>! Words or units used within equations or expressions eg n tiles + 2 n cm + 2 Do not accept on their own. Ignore if accompanying an acceptable response.</p> <p>✗ Ambiguous letters used to indicate expressions eg $n = n + 2$ for $n + 2$</p>

Responses involving coordinates For example: (5, 7)	
Accept ✓	Do not accept ✗
✓ Unconventional notation eg (05, 07) (five, seven) $\begin{matrix} x & y \\ (5, & 7) \end{matrix}$ (x=5, y=7)	✗ Incorrect or ambiguous notation eg (7, 5) $\begin{matrix} y & x \\ (7, & 5) \end{matrix}$ (5x, 7y) (5 ^x , 7 ^y) (x – 5, y – 7)

Responses involving negative numbers For example: –2	
Accept ✓	Do not accept ✗
	To avoid penalising the error below more than once within each question, do not award the mark for the <i>first</i> occurrence of the error within each question. Where a question part carries more than one mark, only the final mark should be withheld. ✗ Incorrect notation eg 2–

Responses involving probability A numerical probability should be expressed as a decimal, fraction or percentage only. For example: 0.7 or $\frac{7}{10}$ or 70%	
Accept ✓	Take care ! Do not accept ✗
<p>✓ Equivalent decimals, fractions and percentages</p> <p style="padding-left: 40px;">eg 0.700, $\frac{70}{100}$, $\frac{35}{50}$, 70.0%</p> <p>✓ A probability correctly expressed in one acceptable form which is then incorrectly converted, but is still less than 1 and greater than 0</p> <p style="padding-left: 40px;">eg $\frac{70}{100} = \frac{18}{25}$</p>	<p>The first four categories of error below should be ignored if accompanied by an acceptable response, but should not be accepted on their own. However, to avoid penalising the first three types of error below more than once within each question, do not award the mark for the <i>first</i> occurrence of each type of error unaccompanied by an acceptable response. Where a question part carries more than one mark, only the final mark should be withheld.</p> <p>! A probability that is incorrectly expressed</p> <p style="padding-left: 40px;">eg 7 in 10 7 over 10 7 out of 10 7 from 10</p> <p>! A probability expressed as a percentage without a percentage sign.</p> <p>! A fraction with other than integers in the numerator and/or denominator.</p> <p>! A probability expressed as a ratio</p> <p style="padding-left: 40px;">eg 7 : 10, 7 : 3, 7 to 10</p> <p>✗ A probability greater than 1 or less than 0</p>

Recording marks awarded on the test paper

All questions, even those not attempted by the pupil, will be marked, with a 1 or a 0 entered in each marking space. Where 2m can be split into 1m gained and 1m lost, with no explicit order, then this will be recorded by the marker as 1
0

The total marks awarded for a double page will be written in the box at the bottom of the right-hand page, and the total number of marks obtained on the paper will be recorded on the front of the test paper.

A total of 120 marks is available in each of tiers 3–5 and 4–6.

A total of 121 marks is available in each of tiers 5–7 and 6–8.

Awarding levels

The sum of the marks gained on paper 1, paper 2 and the mental mathematics paper determines the level awarded. Level threshold tables, which show the mark ranges for the award of different levels, will be available on the QCA website www.qca.org.uk/ from Monday 20 June 2005. QCA will also send a copy to each school in July.

Schools will be notified of pupils' results by means of a marksheet, which will be returned to schools by the external marking agency with the pupils' marked scripts. The marksheet will include pupils' scores on the test papers and the levels awarded.

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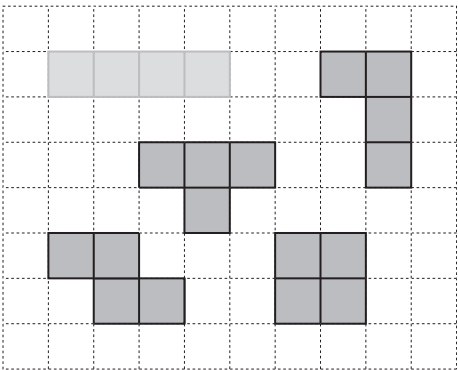
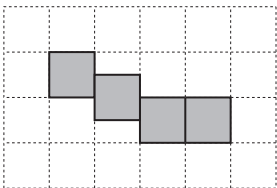
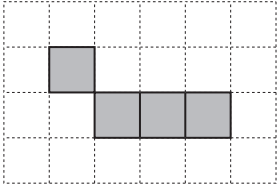
Tier & Question					Average heights	
3-5	4-6	5-7	6-8			
1					Correct response	Additional guidance
a				1m	133	
b				1m	7	

Tier & Question					Making 24	
3-5	4-6	5-7	6-8			
2					Correct response	Additional guidance
				2m	Gives three different correct pairs of numbers eg <ul style="list-style-type: none"> ■ 2×12 3×8 4×6 ■ 24×1 12×2 6×4 	✓ <i>Fractions, decimals or negative numbers</i> ! <i>For 2m or 1m, correct pair of numbers repeated, but in reverse order</i> Do not accept as a different correct pair
				or 1m	Gives two different correct pairs of numbers	

Tier & Question							Write a number	
3-5	4-6	5-7	6-8					
3						Correct response	Additional guidance	
a					1m	Gives a value that is greater than 1000, but less than 1100 eg <ul style="list-style-type: none"> ■ 1001 ■ 1099 	✓ <i>Fractions or decimals</i> ✗ <i>For part (a), number given in words</i>	
b					1m	Gives a decimal that is greater than 0, but less than 1 eg <ul style="list-style-type: none"> ■ 0.5 ■ 0.12 ■ Point two 	✗ <i>For part (b), number given as a fraction</i>	

Tier & Question							3-D shapes	
3-5	4-6	5-7	6-8					
4						Correct response	Additional guidance	
a					1m	Indicates C	! <i>Unambiguous indication</i> Accept eg, for part (b) accept <ul style="list-style-type: none"> ♦ Cube and cuboid eg, for part (b) do not accept <ul style="list-style-type: none"> ♦ Square and rectangle 	
b					1m	Indicates A and E in either order		
c					1m	7		

Tier & Question							Digits																																												
3-5	4-6	5-7	6-8																																																
5					Correct response			Additional guidance																																											
a				1m	Gives all four correct numbers, ie 537 573 735 753 in any order																																														
b				1m	Identifies the smallest and the biggest numbers from their list (including the two given numbers), provided their list has at least four numbers			<i>✓ For both marks, follow through</i> Markers may find the following sums using the values from a correct list useful:																																											
				1m	Correctly adds any numbers they identify, even if they are not from their list, provided their numbers each have at least three digits and the addition requires at least one ‘carry’ eg <ul style="list-style-type: none"> ■ $357 + 753 = 1110$ ■ $537 + 753 = 1290$ ■ $333 + 777 = 1110$ ■ $357 + 375 + 537 + 573 + 735 + 753 = 3330$ or Gives the value 1110, without identifying their smallest and biggest numbers																																														
								<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="padding: 2px;">+</td> <td style="padding: 2px;">357</td> <td colspan="4"></td> </tr> <tr> <td style="padding: 2px;">357</td> <td style="padding: 2px;">–</td> <td style="padding: 2px;">375</td> <td colspan="3"></td> </tr> <tr> <td style="padding: 2px;">375</td> <td style="padding: 2px;">732</td> <td style="padding: 2px;">–</td> <td style="padding: 2px;">537</td> <td colspan="2"></td> </tr> <tr> <td style="padding: 2px;">537</td> <td style="padding: 2px;">894</td> <td style="padding: 2px;">912</td> <td style="padding: 2px;">–</td> <td style="padding: 2px;">573</td> <td></td> </tr> <tr> <td style="padding: 2px;">573</td> <td style="padding: 2px;">930</td> <td style="padding: 2px;">948</td> <td style="padding: 2px;">1110</td> <td style="padding: 2px;">–</td> <td style="padding: 2px;">735</td> </tr> <tr> <td style="padding: 2px;">735</td> <td style="padding: 2px;">1092</td> <td style="padding: 2px;">1110</td> <td style="padding: 2px;">1272</td> <td style="padding: 2px;">1308</td> <td style="padding: 2px;">–</td> </tr> <tr> <td style="padding: 2px;">753</td> <td style="padding: 2px;">1110</td> <td style="padding: 2px;">1128</td> <td style="padding: 2px;">1290</td> <td style="padding: 2px;">1326</td> <td style="padding: 2px;">1488</td> </tr> </table>		+	357					357	–	375				375	732	–	537			537	894	912	–	573		573	930	948	1110	–	735	735	1092	1110	1272	1308	–	753	1110	1128	1290	1326	1488
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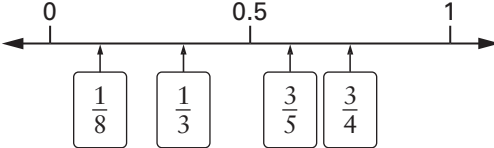
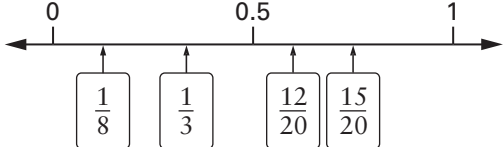
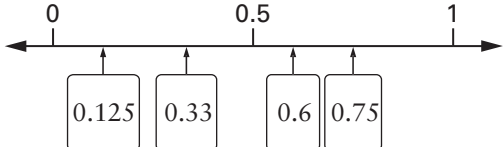
Tier & Question					6	Correct response	Additional guidance
3-5	4-6	5-7	6-8				
						<p>3m Gives all four different correct shapes in any orientations with none incorrect or duplicated eg</p> <p>■</p> 	<p>! <i>Lines not ruled or accurate, shapes not shaded or internal lines omitted</i> Accept provided the pupil's intention is clear</p> <p>! <i>For 3m, correct shapes duplicated even if orientation is different</i> Condone duplication of the given shape, ie a 1 by 4 rectangle For 3m, do not accept other duplicates</p> <p>✗ <i>Squares not joined correctly side-to-side</i> Do not accept as a correct shape eg</p> <p>◆</p>  <p>◆</p> 
						<p><i>or</i></p> <p>2m Gives at least three different correct shapes, even if there are other incorrect or duplicated shapes</p>	
						<p><i>or</i></p> <p>1m Gives two different correct shapes, even if there are other incorrect or duplicated shapes</p>	
						<p>U1</p>	

Tier & Question					Food and drink	
3-5	4-6	5-7	6-8			
7					Correct response	Additional guidance
a				1m	£ 1.55	
b				2m or 1m U1	Indicates the correct item of food and the correct drink, ie Pizza and juice, in either order Shows the digits 24(0)	✓ <i>Unambiguous indication</i> eg • P, J

Tier & Question					Number lines	
3-5	4-6	5-7	6-8			
8	1				Correct response	Additional guidance
				1m	53	
				1m	17	
				1m	-5	
				2m	Gives both the values -9 and (+)3 in the correct positions	
				or 1m	Gives one correct value in the correct position or Gives both the values (+)3 and -9 but with the positions reversed	

Tier & Question							Scales
3-5	4-6	5-7	6-8				
11	4					Correct response	Additional guidance
a	a				1m	900	<p>! Follow through Accept follow through as 1100 – their value for the first mark, provided this gives a positive value</p>
					1m	200	
					(U1)		
b	b				1m	Indicates 1000, ie 1 10 100 (1000) 10 000	

Tier & Question					Range of ages	
3-5	4-6	5-7	6-8	12		
a	a			1m	<p>Gives two ages with a difference of 7 years eg</p> <ul style="list-style-type: none"> ■ 1 and 8 ■ 7 and 14 ■ 7 and 0 ■ 20 and 13 	<p>! Ages given using part-years Accept provided the difference is 7 years eg, accept</p> <ul style="list-style-type: none"> ♦ 6 months and $7\frac{1}{2}$
b	b			1m	0	<p>! Response given in words Accept provided there is no ambiguity eg, accept</p> <ul style="list-style-type: none"> ♦ Zero ♦ Nothing <p>eg, do not accept</p> <ul style="list-style-type: none"> ♦ No range <p>! Units amended Accept responses giving a short time interval eg, accept</p> <ul style="list-style-type: none"> ♦ A few minutes ♦ A couple of hours

Tier & Question								Placing fractions	
3-5	4-6	5-7	6-8						
13	6			Correct response				Additional guidance	
				<p>2m</p> <p>Gives all four fractions in the correct positions, ie</p> 	<p>✓ <i>Unambiguous indication of fractions</i></p> <p>For $\frac{1}{3}$ as a decimal, accept 0.33 or better</p> <p>For $\frac{1}{8}$ as a decimal, accept 0.13 or better</p> <p>eg, for 2m accept</p> <ul style="list-style-type: none"> •  <ul style="list-style-type: none"> • 				
				<p><i>or</i></p> <p>1m</p> <p>Gives at least two fractions in the correct positions</p> <p>or</p> <p>Converts at least three of the four correct values into a form enabling comparison, even if the positions are incorrect and there are other errors</p> <p>eg</p> <ul style="list-style-type: none"> ▪ At least three of: $\frac{90}{120}, \frac{15}{120}, \frac{40}{120}, \frac{72}{120}$ ▪ At least three of: 0.75, 0.125, 0.33, 0.6 ▪ $\frac{30}{40}, \frac{5}{40}, \frac{24}{40}$ ▪ $\frac{18}{24}, \frac{3}{24}, \frac{8}{24}$ ▪ $\frac{45}{60}, \frac{20}{60}, \frac{36}{60}$ 					

Tier & Question									Survey results	
3-5	4-6	5-7	6-8							
14	7								Correct response	Additional guidance
a	a				1m	Draws a correct bar for Don't know that indicates 9 people			<p>! <i>Bar not ruled, accurate or shaded</i> Accept provided the pupil's intention is clear, and the height of the bar is closer to 9 than to either 8 or 10</p> <p>! <i>Bar incorrectly positioned or of an incorrect width</i> Condone</p>	
b	b				1m	Indicates 3 circles for Don't know			<p>! <i>Circles not shaded or inaccurate in size</i> Accept provided the pupil's intention is clear</p> <p>! <i>Follow through from part (a)</i> Accept the number of circles drawn as the height of their bar for Don't know $\div 3$ If this results in a part circle, condone any inaccuracy in their part circle</p>	
					(U1)					

Tier & Question							Percentages	
3-5	4-6	5-7	6-8					
15	8	1			Correct response		Additional guidance	
a	a	a		1m	7		! <i>For the first mark, 'out of 10' repeated</i> eg ♦ $\frac{7}{10}$ Condone	
				1m	50			
b	b	b		1m	Completes the sentence correctly with two values that are in the ratio 1 : 20 eg <ul style="list-style-type: none"> ■ 1 out of 20 ■ 5 out of 100 ■ 0.5 out of 10 ■ 10 out of 200 ■ 2.5 out of 50 			
				1m	Completes the sentence correctly, in a different way from one previously credited		! <i>Follow through</i> Accept as two values in the same ratio as their two values for the first mark, provided their first value < their second value eg, from their first mark as 1 out of 5 accept <ul style="list-style-type: none"> ♦ 2 out of 10 	
							(U1)	

Tier & Question					Marking overlay available	Rotating
3-5	4-6	5-7	6-8			
16	9	2			Correct response	Additional guidance
				2m	<p>Gives correct triangles for both grids with vertices within the tolerances as shown on the overlay, ie</p>	<p>! Lines not ruled or accurate Accept provided the pupil's intention is clear</p>
				or 1m	<p>Gives a correct triangle for either grid with vertices within the tolerances as shown on the overlay, even if the other is incorrect or omitted eg</p> <ul style="list-style-type: none"> 	
				or	<p>Completes two rotations of 90° clockwise that do not use the given centre of rotation eg</p> <ul style="list-style-type: none"> 	
				or	<p>Fails to complete the first rotation correctly but draws a shape that is a triangle, then follows through to rotate their triangle correctly through 90° clockwise about the given centre of rotation eg</p> <ul style="list-style-type: none"> 	

Tier & Question					What is my number?	
3-5	4-6	5-7	6-8			
17	10	3			Correct response	Additional guidance
					<p>2m 21</p> <p>or</p> <p>1m Shows or implies that $2 \times$ my number is 42</p> <p>eg</p> <ul style="list-style-type: none"> ■ $2 \times$ my number = $357 - 315$ = 42 ■ $2x = 42$ ■ $42 \div 2$ <p>or</p> <p>Shows a complete correct method with not more than one computational error, even if their choice between alternative answers is incorrect or omitted</p> <p>eg</p> <ul style="list-style-type: none"> ■ $15 \times 10 = 150,$ $150 + 150 + 15 = 315,$ so it's $10 + 10 + 1$ ■ $357 - 170 - 170 - 17 - 17$ (error) = 0, so it's $10 + 10 + 1 + 1 = 22$ ■ $\frac{1 \text{ (error) } 1}{15 \overline{) 315}}$ ■ $\frac{21}{15 \overline{) 315}} \quad \frac{5 \text{ (error) } 1}{17 \overline{) 357}}$ 	
				(U1)		

Tier & Question					Completing	
3-5	4-6	5-7	6-8			
18	11	4			Correct response	Additional guidance
					<p>1m 32</p> <p>1m 12</p> <p>1m Gives a correct expression in x with a value of 48 when x is 8</p> <p>eg</p> <ul style="list-style-type: none"> ■ $6x$ ■ $x + 40$ ■ $3x + 24$ 	<p>! For the first and second marks, incomplete processing</p> <p>Penalise only the first occurrence</p> <p>eg, for the first and second marks</p> <ul style="list-style-type: none"> ♦ 4×8 ♦ $48 \div 4$ <p>Mark as 0, 1</p> <p>! For the third mark, unconventional notation</p> <p>Condone</p> <p>eg, for the third mark accept</p> <ul style="list-style-type: none"> ♦ $6 \times x$ ♦ $x6$

Tier & Question							Mean and median
3-5	4-6	5-7	6-8				
19	12	5			Correct response	Additional guidance	
a	a	a		1m	Shows that the mean is 10 eg <ul style="list-style-type: none"> ■ $9 + 11 + 10 = 30$, $30 \div 3$ ■ $(9 + 11 + 10) \div 3$ ■ 10 is already 10, then 9 is 1 below and 11 is 1 above 	<p>✓ <i>Minimally acceptable explanation</i> eg</p> <ul style="list-style-type: none"> ♦ $30 \div 3$ ♦ $30 \div 10 = 3$ ♦ $9 + 11 = 20$, $20 \div 2$ ♦ Add one to 9 and take one off 11 ♦ 10 is halfway between 9 and 11 <p>✓ <i>Method described</i> eg</p> <ul style="list-style-type: none"> ♦ You add them up then divide by how many there are <p>✗ <i>Incorrect statement</i> eg</p> <ul style="list-style-type: none"> ♦ $9 + 10 + 11 \div 3 = 10$ ♦ $3 \div 30 = 10$ 	
				1m	Gives a correct explanation of why the median is 10 eg <ul style="list-style-type: none"> ■ 10 is the middle number when the numbers are in order ■ The median is the middle number when the numbers go from smallest to largest 	<p>✓ <i>Minimally acceptable explanation</i> eg</p> <ul style="list-style-type: none"> ♦ It is the middle number ♦ It's the middle largest ♦ It's the second smallest ♦ 9 (10) 11 ♦ It is in between <p>✗ <i>Incomplete or incorrect explanation</i> eg</p> <ul style="list-style-type: none"> ♦ 9 10 11 ♦ 10 is halfway between 9 and 11 	
b	b	b		1m	Gives four values that total 40 and whose middle two numbers, when ordered, add to 20, with none of the values being 10 eg <ul style="list-style-type: none"> ■ 8 9 11 12 ■ 0 0 20 20 ■ 9 11 9 11 ■ 7 13 9 11 	✓ <i>Fractions, decimals and negatives</i>	

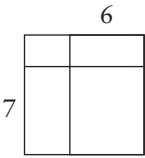
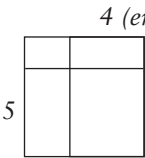
(U1)

Tier & Question									Angles	
3-5	4-6	5-7	6-8							
20	13	6					Correct response			Additional guidance
					1m	Shows angle a as 50				
					1m	Shows angle b as 130				! <i>For the second mark, follow through</i> Accept follow through as $180 - \text{their } a$, provided their $a < 90$ and is not 54 to 56 inclusive
					1m	Shows angle c as 20				! <i>For the third mark, follow through</i> Accept follow through as $150 - \text{their } b$ or their $a - 30$, provided this gives a positive value

Tier & Question									Equations	
3-5	4-6	5-7	6-8							
21	14	7					Correct response			Additional guidance
					1m	5				! <i>Incorrect notation</i> eg, for the first mark ♦ $\times 5$ Penalise only the first occurrence
					1m	3				! <i>Incomplete processing</i> eg, for the first mark ♦ $\frac{15}{3}$ Penalise only the first occurrence

Tier & Question					Long multiplication	
3-5	4-6	5-7	6-8			
22	15	8			Correct response	Additional guidance
				2m	8602	
				or 1m	Shows a complete correct method with not more than one computational error eg <ul style="list-style-type: none"> ■ $3740 + 3740 + 374 \times 3 = 7480 + 1122$ ■ $\begin{array}{r rrrr} & & 300 & 70 & 4 \\ 20 & & 6000 & 1400 & 80 \\ 3 & & 900 & 210 & 12 \\ \hline & \text{so} & 6000 & + 1400 & + 80 & + 900 & + 210 & + 12 \end{array}$ <ul style="list-style-type: none"> ■ $\begin{array}{r} 374 \\ 23 \\ \hline 1126 \text{ (error)} \\ 7480 \\ \hline 8606 \end{array}$ 	<ul style="list-style-type: none"> ✗ <i>Conceptual error</i> eg <ul style="list-style-type: none"> • $\begin{array}{r} 374 \\ 23 \\ \hline 1122 \\ 748 \\ \hline 1870 \end{array}$

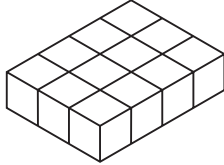
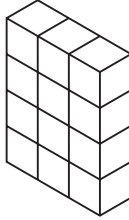
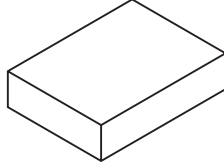
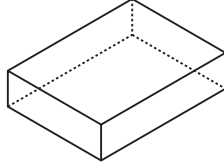
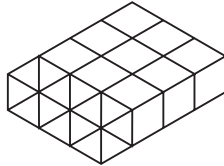
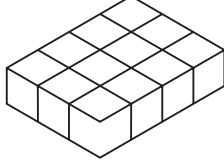
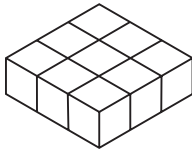
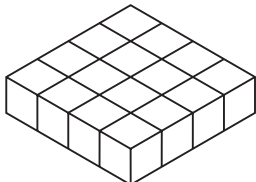
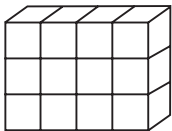
Tier & Question					Midpoint	
3-5	4-6	5-7	6-8			
23	16	9	1		Correct response	Additional guidance
	a	a	a	1m	(60, 60)	
	b	b	b	1m	Gives M as (0, 100)	
				1m	Gives N as (60, 0)	<ul style="list-style-type: none"> ! <i>Answers for M and N transposed but otherwise completely correct</i> If this is the only error, ie gives M as (60, 0) and gives N as (0, 100), mark as 0, 1 ! <i>x- and y-coordinates transposed but otherwise correct for both M and N</i> If this is the only error, ie gives M as (100, 0) and gives N as (0, 60), mark as 0, 1
					(U1)	

Tier & Question						Correct response	Additional guidance
3-5	4-6	5-7	6-8				
17	10	2					
					2m	42, with no evidence of an incorrect method	<p>✗ Incorrect method</p> <p>eg</p> <ul style="list-style-type: none"> • $12 + 2 = 14$, $14 \times 3 = 42$
					or 1m	<p>Shows or implies that the square is a 9(cm) by 9(cm) square</p> <p>eg</p> <ul style="list-style-type: none"> ■ 7×6 seen <div style="text-align: center;">  </div> <ul style="list-style-type: none"> ■ Area of square = 81 <p>or</p> <p>Shows or implies a correct method in which the only error is to use an incorrect value for the shorter horizontal side of rectangle A</p> <p>eg</p> <ul style="list-style-type: none"> ■ $12 \div 2 = 8$ (error), $8 + 3 = 11$ $11 - 2 = 9$, $8 \times 9 = 72$ <div style="text-align: center;">  </div> <p style="text-align: right;">Answer: 20</p>	
					(U1)		

Tier & Question						Making zero	
3-5	4-6	5-7	6-8				
	18	11	3			Correct response	Additional guidance
	a	a	a	1m	Indicates only the second statement, ie	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
	b	b	b	1m	Indicates that the other number is zero eg <ul style="list-style-type: none"> ■ 0 ■ Zero 	<p>✓ <i>Minimally acceptable indication</i></p> <p>eg</p> <ul style="list-style-type: none"> ◆ 0 + 0 ◆ Same <p>! <i>Use of negative sign</i></p> <p>eg</p> <ul style="list-style-type: none"> ◆ -0 <p>Condone</p>	
				1m	Gives a correct pair of non-zero values that add to make zero eg <ul style="list-style-type: none"> ■ 1 and -1 ■ -45 and +45 ■ x and -x 	<p>✗ <i>Operation changed</i></p> <p>eg</p> <ul style="list-style-type: none"> ◆ 1 - 1 [<i>'and'</i> crossed out] 	

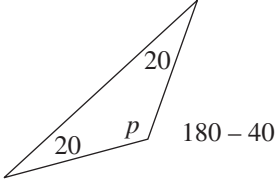
U1

Cuboid

Tier & Question					Correct response	Additional guidance
3-5	4-6	5-7	6-8			
19	12	4				
				2m	<p>Draws a 1 by 3 by 4 cuboid in any orientation, using the isometric grid</p> <p>eg</p> <ul style="list-style-type: none"> ▪  ▪  	<p>✓ <i>Some or all internal lines omitted</i></p> <p>eg</p> <ul style="list-style-type: none"> ♦  <p>! <i>Lines not ruled</i> Accept provided the pupil's intention is clear</p> <p>! <i>Drawing not accurate</i> For 2m, accept vertices within 2mm of the dots of the grid For 1m, accept a less accurate drawing provided the pupil's intention is clear</p> <p>! <i>Cuboid enlarged</i> For 2m or 1m, accept provided a consistent scale factor has been used for all lengths, and any internal lines divide the cuboid into only 12 smaller cubes</p> <p>! <i>For 2m, hidden lines shown</i> Do not accept unless the lines are clearly identified as hidden lines eg, for 2m, accept</p> <ul style="list-style-type: none"> ♦  <p>eg, for 2m, do not accept</p> <ul style="list-style-type: none"> ♦  <p>✗ <i>For 2m, external lines omitted</i></p>
				or 1m	<p>Draws a correct view, using the isometric grid and maintaining three dimensions, but either omits one or more external lines or shows some hidden lines</p> <p>eg</p> <ul style="list-style-type: none"> ▪  <p>or</p> <p>Draws a view of a cuboid, using the isometric grid and with all external lines and no hidden lines shown, but with only one dimension incorrect, by not more than one unit</p> <p>eg</p> <ul style="list-style-type: none"> ▪  ▪  <p>or</p> <p>Shows a 1 by 3 by 4 cuboid in any orientation, but does not use the isometric grid correctly</p> <p>eg</p> <ul style="list-style-type: none"> ▪  	

Tier & Question								Dividing fractions										
3-5	4-6	5-7	6-8															
20	13	5		Correct response		Additional guidance												
				<p>3m</p> <p>Gives the first value as 2 and the second value as 6</p> <p><i>or</i></p> <p>2m</p> <p>Gives an incorrect or omitted first value but correctly gives the second value as 6</p> <p><i>or</i></p> <p>Gives an incorrect first value but follows through correctly for the second value as their first value $\times 3$, provided their first value is a positive integer</p> <p>eg</p> <ul style="list-style-type: none"> ▪ first value: 4 second value: 12 <p><i>or</i></p> <p>Gives the correct first value and shows or implies a correct method for the second value with not more than one computational error</p> <p>eg</p> <ul style="list-style-type: none"> ▪ 2×3 ▪ $3 \div 0.5$ ▪ $\frac{3}{4} \times \frac{8}{1}$ ▪ $\frac{24}{4}$ ▪ $\frac{6}{8} \div \frac{1}{8}$ ▪ Answer of $\frac{6}{8}$ or equivalent, with no evidence of an incorrect method ▪ <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td style="width: 15px; height: 15px;"></td><td style="width: 15px; height: 15px;"></td><td style="width: 15px; height: 15px;"></td><td style="width: 15px; height: 15px;"></td><td style="width: 15px; height: 15px;"></td></tr> <tr><td style="width: 15px; height: 15px;"></td><td style="width: 15px; height: 15px;"></td><td style="width: 15px; height: 15px;"></td><td style="width: 15px; height: 15px;"></td><td style="width: 15px; height: 15px;"></td></tr> </table> <p><i>or</i></p> <p>1m</p> <p>Gives an incorrect or omitted first value but shows or implies a correct method for the second value with not more than one computational error</p>											<p>✓ <i>For the second value</i> $\frac{6}{1}$</p> <p>! <i>Eighths repeated</i> Accept as the final answer for the first value eg, for the value 2 accept</p> <ul style="list-style-type: none"> ♦ $\frac{2}{8}$ <p>Do not accept as the final answer for the second value eg, for the value 6 do not accept</p> <ul style="list-style-type: none"> ♦ $\frac{6}{8}$ <p>✗ <i>For 2m or 1m, conceptual error</i> eg</p> <ul style="list-style-type: none"> ♦ $\frac{6}{8} \div \frac{1}{8} = \frac{5}{8}$ <p>! <i>For 1m, follow through</i> For 1m, accept follow through as the intention to multiply their first value by 3 shown or implied</p> <p>eg, accept</p> <ul style="list-style-type: none"> ♦ first value: $\frac{4}{8}$ <p> second value: $1\frac{1}{2}$ or equivalent</p> <ul style="list-style-type: none"> ♦ first value: $\frac{4}{8}$ <p> then $\frac{4}{8} \times 3$ seen</p>			

Tier & Question					Refer to the new algebra general guidance	Solving an equation
3-5	4-6	5-7	6-8			
	21	14	6		Correct response	Additional guidance
				2m	$\frac{25}{4}$ or equivalent	<p>✗ For 2m, $\frac{25}{4}$ seen but with incorrect further working</p> <p>eg</p> <ul style="list-style-type: none"> • $\frac{25}{4} = 6.1$ <p>! Method used is trial and improvement</p> <p>Note that no partial credit can be given</p>
				or 1m	Shows or implies a correct first step of algebraic manipulation that either reduces the number of terms or collects variables on one side of the equation and numbers on the other	
					eg	
					<ul style="list-style-type: none"> ■ $2t = 25 - 2t$ ■ $-25 + 2t = -2t$ ■ $2t + 2t = 100 - 75$ ■ $75 + 4t = 100$ ■ $4t = 25$ ■ $25 \div 4$ seen 	

Tier & Question					Correct response	Additional guidance
3-5	4-6	5-7	6-8			
	22	15	7			Angle p
				2m	140	
				or 1m	Shows the value 110 or 220	
					or	
					Shows or implies a complete correct method with not more than one computational error	
					eg	
					<ul style="list-style-type: none"> ■ $360 - 2 \times (180 - 35 \times 2)$ ■ $360 - (360 - 4 \times 35)$ ■ 70×2 ■ 	
						
					<ul style="list-style-type: none"> ■ $35 + 35 = 80$ (error), $180 - 80 = 100$ ■ $360 - 100 \times 2 = 160$ 	

Tier & Question									Speed bumps	
3-5	4-6	5-7	6-8							
23	16	8			Correct response		Additional guidance			
	a	a	2m		<p>Completes both sentences correctly, with all four values in the correct positions, ie</p> <p style="text-align: center;">46</p> <p style="text-align: center;">12</p> <p style="text-align: center;">35</p> <p style="text-align: center;">3</p> <p><i>or</i></p> <p>1m Gives at least two values in the correct positions</p> <p><i>or</i></p> <p>Shows the values 46, 12, 35 and 3, even if their positions are incorrect</p>	<p>! <i>Throughout the question, key not interpreted</i> eg, for the value 46</p> <ul style="list-style-type: none"> ♦ 416 <p>Penalise only the first occurrence</p>				
	b	b	1m		<p>Gives a correct justification</p> <p>eg</p> <ul style="list-style-type: none"> ■ $38 - 28 = 10$ ■ It falls from 38 to 28 	<p>✓ <i>Minimally acceptable justification</i> eg</p> <ul style="list-style-type: none"> ♦ 38 and 28 identified, with no evidence of an incorrect method <p>! <i>Ambiguous notation</i> eg</p> <ul style="list-style-type: none"> ♦ $28 - 38$ <p>Condone</p> <p>✗ <i>Incomplete or incorrect justification</i> eg</p> <ul style="list-style-type: none"> ♦ The difference between the middle numbers before and after is 10 ♦ Indicates both values of 8 corresponding to the units of 38 and 28 on the diagram, but with no interpretation of the key ♦ Before the median was 39, after the median was 29, so it fell by 10 				

Tier & Question					Refer to the new algebra general guidance	Straight line graph
3-5	4-6	5-7	6-8			
	24	17	9		Correct response	Additional guidance
	a	a	a	1m	Indicates that the y -coordinate is 146	✓ <i>Indication is within a pair of correct coordinates</i> eg, for part (a) <ul style="list-style-type: none"> ♦ (50, 146) eg, for part (b) <ul style="list-style-type: none"> ♦ (18, 50) ! <i>Answers to parts (a) and (b) transposed but otherwise correct</i> Mark as 0, 1
	b	b	b	1m	Indicates that the x -coordinate is 18	
		c	c	1m	Indicates Yes and gives a correct explanation with no evidence of incorrect working eg <ul style="list-style-type: none"> ■ When $x = -10$, $y = 3 \times -10 - 4$ $= -30 - 4$ $= -34$ ■ $3x - 4 = -34$ $3x = -30$ $x = -10$ 	✓ <i>Minimally acceptable explanation</i> eg <ul style="list-style-type: none"> ♦ $-30 - 4 = -34$ ♦ $-30 \div 3 = -10$ ♦ When $x = -10$, $3x - 4 = -34$ ♦ The second number is equal to the first number multiplied by 3, minus 4 ✗ <i>Incomplete or incorrect explanation</i> eg <ul style="list-style-type: none"> ♦ When $x = -10$, $y = -34$ ♦ $3x - 4 = -34$ $3x = -34 - 4$ $3x = -30$ $x = -10$

Tier & Question				64
3-5	4-6	5-7	6-8	
		18	10	
				Correct response
				Additional guidance
			3m	<p>Gives four different correct pairs of values for x and y</p> <p>eg</p> <ul style="list-style-type: none"> ■ $x = 64$ $y = 1$ $x = 8$ $y = 2$ $x = 4$ $y = 3$ $x = 2$ $y = 6$ ■ $x = \frac{1}{64}$ $y = -1$ $x = 4096$ $y = \frac{1}{2}$ $x = \sqrt{8}$ $y = 4$ $x = -8$ $y = 2$
			or 2m	Gives three different correct pairs of values for x and y , even if there are errors, omissions or repeats
			or 1m	Gives two different correct pairs of values for x and y , even if there are errors, omissions or repeats

Tier & Question				Correct response	Additional guidance
3-5	4-6	5-7	6-8		
		19	11		Sixths
				<p>1m</p> <p>Gives a correct justification</p> <p>The most common correct justifications:</p> <p>State or imply that $\frac{2}{6} = \frac{1}{3}$ and use the known fact that $\frac{1}{3}$ rounds to 33%</p> <p>eg</p> <ul style="list-style-type: none"> ■ $\frac{2}{6} = \frac{1}{3}$ which is 33 to the nearest per cent <p>Show or imply that the percentage should be 33 by showing a more accurate percentage, or a correct method</p> <p>eg</p> <ul style="list-style-type: none"> ■ It's $33\frac{1}{3}\%$ so it rounds to 33 not 34 ■ $100 \div 6 \times 2 = 33.33$, so 33 ■ Double 16.7 is 33.4 ■ $34 \times 3 = 102$, but $33 \times 3 = 99$ which is closer to 100 <p>Refer to the effect of the premature rounding, for example by giving a possible value for $\frac{1}{6}$ in the range 16.5 to 16.75 inclusive, or 17.25 to 17.5 inclusive, and shows or implies the percentage for $\frac{2}{6}$ could be 33 or 35</p> <p>eg</p> <ul style="list-style-type: none"> ■ If $\frac{1}{6}$ were 16.6%, it would be 17% to the nearest per cent, but double 16.6 is 33.2 ■ $\frac{1}{6}$ could be 17.4, but $17.4 \times 2 = 34.8$ 	<p>! Response contains an incorrect statement Ignore alongside a correct response eg, accept</p> <ul style="list-style-type: none"> ♦ $\frac{1}{3}$ is 33 and $100 \div 6 = 16$ <p>✓ Minimally acceptable justification eg</p> <ul style="list-style-type: none"> ♦ $\frac{1}{3}$ is 33 <p>✗ Incomplete justification eg</p> <ul style="list-style-type: none"> ♦ It's 33% not 34% <p>✓ Minimally acceptable justification eg</p> <ul style="list-style-type: none"> ♦ 33.3 ♦ $100 \div 6 \times 2$ gives 33 ♦ $34 \times 3 = 102$ but $33 \times 3 = 99$ <p>! More accurate percentage rounded or truncated For $\frac{1}{3}$, accept 33.3% or better For $\frac{1}{6}$, accept 16.7% or 16.66% or better</p> <p>✗ Incomplete justification eg</p> <ul style="list-style-type: none"> ♦ $100 \div 6 \times 2$ ♦ $34 \times 3 = 102$ (or $33 \times 3 = 99$) <p>✓ Minimally acceptable justification eg</p> <ul style="list-style-type: none"> ♦ 17% is rounded not exact, so when you double it, you double the error ♦ 17 is not exact, so it could be 33 or 35 <p>✗ Incomplete justification eg</p> <ul style="list-style-type: none"> ♦ $\frac{1}{6}$ rounds to 17, so $\frac{2}{6}$ could round to 33 ♦ Keep adding 17 and you don't get to 100 ♦ $17 \times 6 = 102$ <p>✗ Incorrect justification that implies hypothetical values are the correct values eg</p> <ul style="list-style-type: none"> ♦ $\frac{1}{6} = 16.5\%$ so $\frac{2}{6} = 33\%$

Tier & Question						Tyres	
3-5	4-6	5-7	6-8				
		20	12			Correct response	Additional guidance
		a	a	1m	5		
		b	b	1m	Gives a value between 3500 and 5500 inclusive	! <i>Incorrect units inserted</i> eg ♦ 5000 miles Ignore	

Tier & Question				Refer to the new algebra general guidance	Which triangles?
3-5	4-6	5-7	6-8		
		21	13	Correct response	Additional guidance
	a	a	1m	<p>Indicates the correct triangle, ie</p> <p style="text-align: center;"><u>✓</u> _____</p> <p>and gives a correct equation linking a, b and c for the other triangle eg</p> <ul style="list-style-type: none"> ■ $a^2 + c^2 = b^2$ ■ $b^2 - a^2 = c^2$ ■ $b^2 - c^2 = a^2$ ■ $b = \sqrt{a^2 + c^2}$ 	
	b	b	1m	<p>Indicates the correct triangle, ie</p> <p style="text-align: center;"><u>✓</u> _____</p> <p>and gives a correct explanation for the other triangle</p> <p>The most common correct explanations:</p> <p>State or imply that the third angle in the triangle on the right is not 90° eg</p> <ul style="list-style-type: none"> ■ $180 - 75 - 25 = 80$ not 90, so you can't use Pythagoras' Theorem ■ Angle C is not 90, so it's not a right-angled triangle <p>Show that if the third angle in the triangle on the right were 90°, the triangle would not be possible</p> <ul style="list-style-type: none"> ■ If the missing angle is 90, the angles add up to 190 not 180 	<p>✓ <i>Minimally acceptable explanation</i> eg</p> <ul style="list-style-type: none"> ♦ Not 90 ♦ Not a right angle ♦ It only works when it's right-angled <p>✗ <i>Incomplete explanation that does not refer explicitly to 90°</i> eg</p> <ul style="list-style-type: none"> ♦ $180 - 75 - 25 = 80$ ♦ You can't use Pythagoras' Theorem ♦ The angles are wrong <p>✓ <i>Minimally acceptable explanation</i> eg</p> <ul style="list-style-type: none"> ♦ If you put 90 in you don't get 180 ♦ A right-angled triangle is impossible with those angles, they should make 180 ♦ The angles add up to 190 [right angle marked on right hand triangle] ♦ They add up to 100 not 90 <p>✗ <i>Incomplete explanation that does not refer explicitly to 90°</i> eg</p> <ul style="list-style-type: none"> ♦ The angles would add up to 190, not 180

Tier & Question						Sweet peas	
3-5	4-6	5-7	6-8				
		22	14			Correct response	Additional guidance
		a	a	1m	$\frac{89}{100}$ or equivalent probability	<p>! Unconventional notation, but equivalent value eg, for the first mark</p> <ul style="list-style-type: none"> ♦ $\frac{17.8}{20}$ <p>Condone</p> <p>! Estimates transposed but otherwise correct Mark as 0, 1</p>	
				1m	$\frac{17}{20}$ or equivalent probability		
		b	b	1m	<p>Indicates Ravi and gives a correct explanation that states or implies that he used more seeds</p> <p>eg</p> <ul style="list-style-type: none"> ■ The more trials you have the more accurate your estimate of probability is likely to be ■ The number of seeds in each packet was the same but Ravi had more packets than Meg so he had a greater number of trials ■ There were more seeds to consider ■ 200 seeds is more than 100 seeds 	<p>✓ Minimally acceptable explanation</p> <p>eg</p> <ul style="list-style-type: none"> ♦ More seeds ♦ More packets ♦ He tested more ♦ He had 200, not 100 ♦ Ravi had 10, Meg had 5 <p>! Irrelevant statement</p> <p>eg</p> <ul style="list-style-type: none"> ♦ Ravi's results were more accurate ♦ He had more chance of a bigger number germinating <p>Ignore alongside a correct response, otherwise do not accept</p> <p>✗ Incomplete, ambiguous or incorrect explanation</p> <p>eg</p> <ul style="list-style-type: none"> ♦ More ♦ A bigger number ♦ Ravi's = $\frac{170}{200}$ which is more than $\frac{89}{100}$ ♦ More of his seeds germinated ♦ He had 5 more seeds ♦ Meg's numbers were more complicated and harder to work out 	

U1

Tier & Question					How many digits?
3-5	4-6	5-7	6-8		
		23	15		
				Correct response	Additional guidance
				<p>2m</p> <p>Gives a correct response that satisfies the following four conditions:</p> <ol style="list-style-type: none"> 1. Indicates the minimum is 4 2. Shows a correct justification for the minimum eg, for condition 2 <ul style="list-style-type: none"> ■ $100 \times 10 = 1000$ 3. Indicates the maximum is 5 4. Shows a correct justification for the maximum eg, for condition 4 <ul style="list-style-type: none"> ■ $999 \times 99 = 98\,901$ ■ $999 \times 100 = 99\,900$, a 5-digit number and subtracting 999 does not change it from being a 5-digit number ■ 99 000 is just over the biggest possible so this must have the same number of digits ■ $100 \times 1000 = 100\,000$, but this is the smallest possible 6-digit number, so 99×999 must have 5 digits 	<p>✓ <i>Minimally acceptable justification for the minimum [condition 2]</i> eg</p> <ul style="list-style-type: none"> ♦ 1000 ♦ 100×10 (or 10×100) <p>✓ <i>Minimally acceptable justification for the maximum [condition 4]</i> eg</p> <ul style="list-style-type: none"> ♦ 98 901 ♦ 999 $\begin{array}{r} 99 \\ \hline 8991 \\ \hline 89910 \end{array}$ <ul style="list-style-type: none"> ♦ $99\,900 - 999$ ♦ $99\,000 - 99$ ♦ 99 900 (or 99 000) is just over ♦ 100 000 ♦ 1000×100 (or 100×1000) <p>✗ <i>Incomplete or incorrect justification for the maximum [condition 4]</i> eg</p> <ul style="list-style-type: none"> ♦ 999×99 ♦ $99\,900 - 99$ ♦ $99\,000 - 999$
				<p>or</p> <p>1m</p> <p>Gives a response that satisfies at least condition 4, even if condition 3 is not satisfied</p> <p>or</p> <p>Gives a response that satisfies condition 1, satisfies condition 4 with not more than one computational error, then follows through correctly to give their maximum</p>	<p>✗ <i>Conceptual error</i> eg</p> <ul style="list-style-type: none"> ♦ $\begin{array}{r} 999 \\ \times 99 \\ \hline 8991 \\ \hline 8991 \\ \hline 17982 \end{array}$ ♦ $99 \times 999 = 99\,900 - 99 = 99\,801$
				(U2)	

Tier & Question				Refer to the new algebra general guidance	Simultaneous
3-5	4-6	5-7	6-8		
		24	16	Correct response	Additional guidance
				<p>3m</p> <p>Gives both $x = \frac{3}{2}$ or equivalent and $y = 5$</p> <p>and</p> <p>shows a complete correct method for solving algebraically</p> <p>eg</p> <ul style="list-style-type: none"> ■ $4x + 3y = 21$ $4x + 2y = 16$ so $y = 5$ $2x + 5 = 8$ so $x = 1\frac{1}{2}$ ■ $4x + 3y = 21$ $6x + 3y = 24$ so $2x = 3$ therefore $x = 1.5$ and $y = 5$ ■ $2x + y = 8$ $2x + 2y = 13$ so $y = 5$ and $x = \frac{3}{2}$ ■ $4x + 3(8 - 2x) = 21$ $24 - 2x = 21$ $x = 1.5$, so $y = 5$ <p>or</p> <p>2m</p> <p>Shows a complete correct method for solving algebraically with not more than one error</p> <p>eg</p> <ul style="list-style-type: none"> ■ $4x + 3y = 21$ $4x + 2y = 16$ so $y = 4$ (error) $2x + 4 = 8$ so $x = 2$ ■ $4x + 3(8 - 2x) = 21$ $4x + 24 - 2x = 21$ $2x = -3$ $x = -1.5$ and $y = 11$ (or 9) <p>or</p> <p>1m</p> <p>Forms two correct equations that would allow elimination of either x or y</p> <p>eg</p> <ul style="list-style-type: none"> ■ $4x + 3y = 21$ $4x + 2y = 16$ ■ $4x + 3y = 21$ $6x + 3y = 24$ <p>or</p> <p>Attempts to solve by substitution and forms a correct equation in either x or y</p> <p>eg</p> <ul style="list-style-type: none"> ■ $4x + 3(8 - 2x) = 21$ ■ $8 - 2x = \frac{21 - 4x}{3}$ ■ $8 - y = 10.5 - 1.5y$ 	<p>x Method used is trial and improvement</p> <p>! Only error is to use the wrong operation, spuriously eliminating either x or y</p> <p>eg</p> <ul style="list-style-type: none"> ♦ $4x + 3y = 21$ $4x + 2y = 16$ $5y = 37$, so $y = 7.4$ $2x + 7.4 = 8$ so $x = 0.3$ <p>Mark as 1, 1, 0</p> <p>! For 1m, equations subtracted without the second equation restated</p> <p>Accept</p> <p>eg, for 1m accept</p> <ul style="list-style-type: none"> ♦ $2x + 2y = 13$ seen

Tier & Question				Marking overlay available	Angle bisector
3-5	4-6	5-7	6-8		
		25	17	Correct response	Additional guidance
				<p>2m</p> <p>Completes a correct angle bisector that fulfils all four of the following conditions:</p> <ol style="list-style-type: none"> 1. Ruled 2. Within the tolerance as shown on the overlay, even if their line were to be extended 3. At least 3cm in length from A through the acute angle BAC 4. Evidence of correct construction arcs that are centred on two points on lines AB and AC equidistant from A, are of equal radii and have one point of intersection 	<p>! <i>Use of construction arcs on the overlay</i> Note that these are to give a visual guide as to whether a correct pair of centres has been used, and do not indicate tolerance</p> <p>! <i>Section of angle bisector extending from A through reflex angle BAC</i> Accept if needed as part of the 3cm required, provided the section is within the tolerance as shown by the dashed lines on the overlay. Otherwise, ignore</p> <p>! <i>Extra arcs drawn</i> Ignore</p> <p>x <i>Spurious construction arcs</i> For 2m or 1m, do not accept arcs drawn without compasses, or arcs centred on points on the lines that are not equidistant from A</p>
				<p>or</p> <p>1m</p> <p>Gives a response that fulfils condition 4, even if the angle bisector is incomplete, incorrect or omitted</p>	

Tier & Question							Star shapes	
3-5	4-6	5-7	6-8					
			18			Correct response	Additional guidance	
			a	1m	8		! Units given Condone responses of 8cm only	
			b	1m	Gives a different pair of dimensions in the ratio 5 : 2 or 2 : 5 eg <ul style="list-style-type: none"> ■ 2 and 5 (either order) ■ 10 and 25 (either order) ■ 1 and 2.5 (either order) ■ 12 and 30 (either order) 	✗ Dimensions of either given diagram Do not accept value 6 and 15 (either order) or 8 and 20 (either order)		

Tier & Question							Straight lines	
3-5	4-6	5-7	6-8					
			19			Correct response	Additional guidance	
			a	1m	Gives A as (0, -8)		! Answers for A and B transposed but otherwise completely correct If this is the only error, ie gives A as (2, 0) and gives B as (0, -8), mark as 0, 1	
				1m	Gives B as (2, 0)			
			b	1m	Gives a correct equation for the straight line eg <ul style="list-style-type: none"> ■ $y = 2x$ ■ $y - 2x = 0$ ■ $x = \frac{y}{2}$! Unconventional notation eg <ul style="list-style-type: none"> ◆ $y = 2 \times x$ ◆ $y = 2x + 0$ Condone		

Tier & Question					20	Correct response	Additional guidance
3-5	4-6	5-7	6-8				
			a	1m	<p>Gives a correct explanation</p> <p>The most common correct explanations:</p> <p>Show or imply that the median for group A is 26, and for group B is 29</p> <p>eg</p> <ul style="list-style-type: none"> ■ Median A – median B = 29 – 26 = 3 ■ 26 + 3 = 29 and A is 26, B is 29 <p>Indicate, in words or on the diagram, the locations of the medians for A and B</p> <p>eg</p> <ul style="list-style-type: none"> ■ The vertical lines on the shaded part of the box plots represent the medians and they are 3mm apart on the graph 	<p>! <i>Median line referred to as the ‘middle’ or ‘centre’</i></p> <p>Condone</p> <p>eg, accept</p> <ul style="list-style-type: none"> ♦ The lines in the middle are at 26 and 29 ♦ The centre points of the boxes are 3mm apart <p>✓ <i>Minimally acceptable explanation</i></p> <p>eg</p> <ul style="list-style-type: none"> ♦ 26, 29 ♦ A is 29 – 3 ♦ B is 26 + 3 <p>✗ <i>Incomplete explanation</i></p> <p>eg</p> <ul style="list-style-type: none"> ♦ 29 – 3 ♦ 26 + 3 <p>✓ <i>Minimally acceptable explanation</i></p> <p>eg</p> <ul style="list-style-type: none"> ♦ The lines in the shaded bit are 3 apart ♦ The lines in the boxes are the medians ♦ Arrows indicating both medians on the diagram <p>✗ <i>Incomplete explanation</i></p> <p>eg</p> <ul style="list-style-type: none"> ♦ The vertical lines are 3mm apart on the graph ♦ The lines for the medians are 3mm apart on the graph <p>! <i>Throughout the question, incorrect units</i></p> <p>Condone</p> <p>eg, for part (a) accept</p> <ul style="list-style-type: none"> ♦ The lines in the boxes are 3cm apart <p>! <i>Throughout the question, ambiguous notation</i></p> <p>eg, for part (a)</p> <ul style="list-style-type: none"> ♦ 26 – 29 <p>eg, for part (b)</p> <ul style="list-style-type: none"> ♦ 24 – 29 > 27 – 31 <p>Condone</p>	

Tier & Question				20	Correct response	Additional guidance
3-5	4-6	5-7	6-8			
			b	1m	<p>Indicates A and gives a correct explanation</p> <p>The most common correct explanations:</p> <p>Show or imply that the inter-quartile range for A is 5 and for B is 4</p> <p>eg</p> <ul style="list-style-type: none"> ■ For A the IQ range is $29 - 24 = 5$, for B the IQ range is $31 - 27 = 4$ ■ The distance between 24 and 29 is greater than that between 27 and 31 ■ The IQR is 1mm bigger for group A <p>Indicates, in words or on the diagram, the sizes of the inter-quartile ranges for A and B</p> <p>eg</p> <ul style="list-style-type: none"> ■ The shaded box in A is longer than in B, so A has a bigger inter-quartile range ■ The box for group A covers 6 whole numbers, but for B only 5 	<p>! <i>Inter-quartile range referred to as 'range'</i></p> <p>Condone</p> <p>eg, accept</p> <ul style="list-style-type: none"> ♦ Range for A = 5, range for B = 4 ♦ The boxes show the range and A's is longer <p>✓ <i>Minimally acceptable explanation</i></p> <p>eg</p> <ul style="list-style-type: none"> ♦ 5, 4 ♦ $29 - 24 > 31 - 27$ ♦ 1 more <p>✗ <i>Incomplete or incorrect explanation</i></p> <p>eg</p> <ul style="list-style-type: none"> ♦ 5 is the larger inter-quartile range ♦ $31 - 27$ is less ♦ The inter-quartile range for A is 4cm and for B is 3.2cm [scale ignored] <p>✓ <i>Minimally acceptable explanation</i></p> <p>eg</p> <ul style="list-style-type: none"> ♦ The box is bigger ♦ Distances between lower and upper quartiles for both A and B indicated ♦ It covers 6 numbers, the other covers 5
			c	1m	<p>Gives a correct reason</p> <p>The most common correct reasons:</p> <p>Refer to possible differences in the conditions of the two samples</p> <p>eg</p> <ul style="list-style-type: none"> ■ The two groups could have collected the samples at different times of year ■ Group A could have picked from one side of the tree and group B from the other side ■ One group could have picked from the tree, the other from the ground ■ Group B may have collected first and taken most of the larger ones <p>Refer to possible differences in the sizes of the two samples</p> <p>eg</p> <ul style="list-style-type: none"> ■ One group could have collected a much larger number of acorns than the other ■ One sample may be less representative as they didn't collect enough 	<p>✓ <i>Minimally acceptable reason</i></p> <p>eg</p> <ul style="list-style-type: none"> ♦ Different times ♦ Different areas of the tree ♦ B's acorns may have had more sunlight <p>✗ <i>Incomplete or incorrect reason</i></p> <p>eg</p> <ul style="list-style-type: none"> ♦ Different areas ♦ They used different trees <p>✓ <i>Minimally acceptable reason</i></p> <p>eg</p> <ul style="list-style-type: none"> ♦ Different numbers of acorns ♦ You don't know how many acorns <p>✗ <i>Incomplete reason</i></p> <p>eg</p> <ul style="list-style-type: none"> ♦ You don't know how many ♦ One group could have spent longer ♦ There could have been more people to collect acorns in one of the groups

U1

Tier & Question					Standard form	
3-5	4-6	5-7	6-8	21		
					Correct response	Additional guidance
			a	1m	<p>Gives a correct justification</p> <p>eg</p> <ul style="list-style-type: none"> ■ $(4 \times 10^8) \times (8 \times 10^4) = (4 \times 8) \times (10^8 \times 10^4)$ $= 32 \times 10^{12}$ $= 3.2 \times 10^{13}$ ■ $4 \times 8 = 32, 8 + 4 = 12,$ so you get $32 \times 10^{12} = 3.2 \times 10^{13}$ ■ $400\,000\,000 \times 80\,000 = 32\,000\,000\,000\,000$ $= 3.2 \times 10^{13}$ 	<p>✓ <i>Minimally acceptable justification</i></p> <p>eg</p> <ul style="list-style-type: none"> ♦ 32×10^{12} ♦ $4 \times 8 \times 10^{12}$ ♦ $400\,000\,000 \times 80\,000$ $= 32\,000\,000\,000\,000$ [12 zeros shown] <p>✗ <i>Incomplete justification</i></p> <p>eg</p> <ul style="list-style-type: none"> ♦ $32\,000\,000\,000\,000 = 3.2 \times 10^{13}$ ♦ $400\,000\,000 \times 80\,000 = 3.2 \times 10^{13}$ ♦ $(4 \times 8) \times (10^8 \times 10^4) = 3.2 \times 10^{13}$
			b	2m or 1m	<p>5×10^3</p> <p>Shows a value equivalent to 5×10^3</p> <p>eg</p> <ul style="list-style-type: none"> ■ 5000 ■ 0.5×10^4 ■ $\frac{10^4}{2}$ <p>or</p> <p>Shows or implies a correct method that demonstrates understanding of how to process the indices and places the multiplication symbol correctly, with not more than one error</p> <p>eg</p> <ul style="list-style-type: none"> ■ $4 \div 8 \times 10^{(8-4)}$ ■ $4 \times 10^8 \div 8 \times 10^4 = 2$ (error) $\times 10^4$ 	<p>! <i>Zero(s) given after the decimal point within standard form notation</i></p> <p>Condone</p> <p>eg, for 2m accept</p> <ul style="list-style-type: none"> ♦ 5.000×10^3

Tier & Question					22	Correct response	Additional guidance
3-5	4-6	5-7	6-8				
					2m	Gives both correct values, ie median = 90 mean = 97	! Incomplete processing Condone eg, for 2m accept • median = 90 mean = 95 + 2
					or 1m	Gives one correct value or Shows the value 9700	
					(U1)		

Tier & Question					23	Correct response	Additional guidance
3-5	4-6	5-7	6-8				
					2m	Draws a correct rhombus that fulfils all three of the following conditions: 1. Ruled 2. Correct intersecting construction arcs for at least one vertex, using compasses at either 8cm and 10cm or 8cm and 8cm, within the tolerances as shown on the overlay 3. Vertices within the tolerances as shown on the overlay	! Different orientations Markers should rotate and/or turn over the overlay as appropriate in order to check tolerances for construction arcs and/or vertices ! Arcs extended or extra arcs Ignore inaccuracies in sections of arcs extending beyond the tolerances as shown on the overlay, or arcs not indicated on the overlay, even if incorrect ! Spurious arcs Do not accept as correct arcs drawn without compasses
					or 1m	Gives a response that fulfils either condition 2 or condition 3	

Tier & Question					Refer to the new algebra general guidance	a and b
3-5	4-6	5-7	6-8	24		
					Correct response	Additional guidance
					<p>3m Gives a correct justification</p> <p>eg</p> <ul style="list-style-type: none"> ■ $b + b + 2 = b(b + 2)$ $2b + 2 = b^2 + 2b$ $2 = b^2$ $b = \sqrt{2}$ which is not an integer, so a cannot be an integer either ■ $2a - 2 = a^2 - 2a$ $a^2 - 4a + 2 = 0$ which doesn't factorise, so a is not an integer <p>or</p> <p>2m Shows correct expressions for the sum and product of a and b using only one of the two variables</p> <p>eg</p> <ul style="list-style-type: none"> ■ $b + b + 2, b(b + 2)$ ■ $2a - 2, a^2 - 2a$ <p>or</p> <p>1m Shows or implies the use of expressions for a and b involving only one of the two variables</p> <p>eg</p> <ul style="list-style-type: none"> ■ $b, b + 2$ ■ $a, a - 2$ ■ $2b + 2$ ■ $a^2 - 2a$ <p>or</p> <p>Shows a different correct equation involving both the variables a and b</p> <p>eg</p> <ul style="list-style-type: none"> ■ $a + b = ab$ 	<p>✓ <i>Minimally acceptable justification</i></p> <p>eg</p> <ul style="list-style-type: none"> ♦ $2b + 2 = b^2 + 2b$ $2 = b^2$ <p>! <i>Variables a and b transposed but justification otherwise completely correct</i></p> <p>eg</p> <ul style="list-style-type: none"> ♦ $a + a + 2 = a(a + 2)$ $2a + 2 = a^2 + 2a$ $2 = a^2$ $a = \sqrt{2}$ <p>Mark as 1, 1, 0</p> <p>! <i>Numerical examples given</i></p> <p>Ignore</p>
					(U3)	

Tier & Question					Refer to the new algebra general guidance	Temperature
3-5	4-6	5-7	6-8	25		
					Correct response	Additional guidance
				25	<p>2m</p> <p>Gives the value 10 and shows or implies a correct method for solving algebraically eg</p> <ul style="list-style-type: none"> ▪ $\frac{9C}{5} + 32 = 2C + 30$ $\frac{9C}{5} = 2C - 2$ $9C = 10C - 10$ $10 = C$ <ul style="list-style-type: none"> ▪ $2C - \frac{9C}{5} = 32 - 30$ $\frac{10C - 9C}{5} = 2$ $\frac{C}{5} = 2$ <p>or</p> <p>1m</p> <p>Shows or implies a correct first step of algebraic manipulation using a correct equation in terms of C, that either reduces the number of terms or collects unknowns on one side of the equation and numbers on the other eg</p> <ul style="list-style-type: none"> ▪ $\frac{9C}{5} + 2 = 2C$ ▪ $0.2C + 30 = 32$ ▪ $2C - \frac{9C}{5} = 32 - 30$ ▪ $\frac{C}{5} = 2$ ▪ 2×5 	<p>✗ Method used is trial and improvement</p>

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