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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



department for

**education and skills**

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Sourced from SATs-Papers.co.uk

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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 <b>Correct response</b> column. Refer also to the <b>Additional guidance</b> .
<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 $35 \times 27$ ; 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

<b>Responses involving money</b> <i>For example: £3.20 £7</i>	
<b>Accept ✓</b>	<b>Do not accept ✗</b>
<ul style="list-style-type: none"> <li>✓ 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</li> <li>✓ 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</li> </ul>	<ul style="list-style-type: none"> <li>✗ Incorrect or ambiguous use of pounds or pence eg £320, £320p or £700p, or 3.20 or 3.20p not in the answer space.</li> <li>✗ 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</li> </ul>

<b>Responses involving time</b> <i>A time interval For example: 2 hours 30 mins</i>	
<b>Accept ✓</b>	<b>Take care ! Do not accept ✗</b>
<ul style="list-style-type: none"> <li>✓ Any unambiguous indication eg 2.5 (hours), 2h 30</li> <li>✓ Digital electronic time ie 2:30</li> </ul>	<ul style="list-style-type: none"> <li>✗ Incorrect or ambiguous time interval eg 2.3(h), 2.30, 2-30, 2h 3, 2.30min</li> <li>! 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.</li> </ul>
<b>A specific time For example: 8.40am, 17:20</b>	
<b>Accept ✓</b>	<b>Do not accept ✗</b>
<ul style="list-style-type: none"> <li>✓ Any unambiguous, correct indication eg 08.40, 8.40, 8:40, 0840, 8 40, 8-40, twenty to nine, 8,40</li> <li>✓ Unambiguous change to 12 or 24 hour clock eg 17:20 as 5:20pm, 17:20pm</li> </ul>	<ul style="list-style-type: none"> <li>✗ Incorrect time eg 8.4am, 8.40pm</li> <li>✗ Incorrect placement of separators, spaces, etc or incorrect use or omission of 0 eg 840, 8:4:0, 084, 84</li> </ul>

<b>Responses involving the use of algebra</b> For example: $2 + n$ $n + 2$ $2n$ $\frac{n}{2}$ $n^2$	
<b>Accept ✓</b>	<b>Take care ! Do not accept ✗</b>
<p>✓ Unambiguous use of a different case or variable eg <math>N</math> used for <math>n</math> <math>x</math> used for <math>n</math></p> <p>✓ Words used to precede or follow equations or expressions eg <math>t = n + 2</math> tiles or tiles = <math>t = n + 2</math> for <math>t = n + 2</math></p> <p>✓ Unambiguous letters used to indicate expressions eg <math>t = n + 2</math> for <math>n + 2</math></p>	<p>! Unconventional notation eg <math>n \times 2</math> or <math>2 \times n</math> or <math>n2</math> or <math>n + n</math> for <math>2n</math> <math>n \times n</math> for <math>n^2</math> <math>n \div 2</math> for <math>\frac{n}{2}</math> or <math>\frac{1}{2} n</math> <math>2 + 1n</math> for <math>2 + n</math> <math>2 + 0n</math> for <math>2</math></p> <p>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 <math>3x + 2 = 32</math>, <math>3 \times 10 + 2 = 32</math> for <math>x = 10</math></p> <p>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 <math>n</math> tiles + 2 <math>n</math> cm + 2</p> <p>Do not accept on their own. Ignore if accompanying an acceptable response.</p> <p>✗ Ambiguous letters used to indicate expressions eg <math>n = n + 2</math> for <math>n + 2</math></p>



<b>Responses involving coordinates</b> For example: ( 5, 7 )	
<b>Accept ✓</b>	<b>Do not accept ✗</b>
✓ 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 ) ( $5^x, 7^y$ ) ( $x - 5, y - 7$ )

<b>Responses involving negative numbers</b> For example: -2	
<b>Accept ✓</b>	<b>Do not accept ✗</b>
	<p>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.</p> <p>✗ Incorrect notation eg 2-</p>

<b>Responses involving probability</b> A numerical probability should be expressed as a decimal, fraction or percentage only. <i>For example: 0.7 or <math>\frac{7}{10}</math> or 70%</i>	
<b>Accept ✓</b>	<b>Take care ! Do not accept ✗</b>
<p>✓ Equivalent decimals, fractions and percentages</p> <p style="padding-left: 40px;">eg 0.700, <math>\frac{70}{100}</math>, <math>\frac{35}{50}</math>, 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 <math>\frac{70}{100} = \frac{18}{25}</math></p>	<p>The first <b>four</b> 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 <b>three</b> 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/](http://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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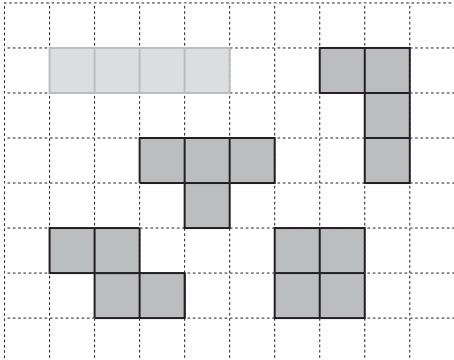
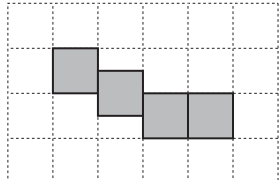
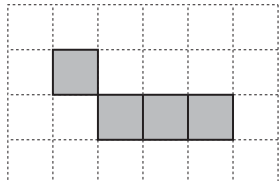
Tier & Question							<b>Average heights</b>	
3-5	4-6	5-7	6-8					
<b>1</b>						<b>Correct response</b>	<b>Additional guidance</b>	
a					1m	133		
b					1m	7		

Tier & Question							<b>Making 24</b>	
3-5	4-6	5-7	6-8					
<b>2</b>						<b>Correct response</b>	<b>Additional guidance</b>	
					2m	Gives three different correct pairs of numbers eg <ul style="list-style-type: none"> <li>■ <math>2 \times 12</math></li> <li>■ <math>3 \times 8</math></li> <li>■ <math>4 \times 6</math></li> <li>■ <math>24 \times 1</math></li> <li>■ <math>12 \times 2</math></li> <li>■ <math>6 \times 4</math></li> </ul>	<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								<b>Different shapes</b>	
3-5	4-6	5-7	6-8						
<b>6</b>								<b>Correct response</b>	<b>Additional guidance</b>
				<b>3m</b>	<p>Gives all four different correct shapes in any orientations with none incorrect or duplicated eg</p> <p>■</p> 			<p><b>!</b> <i>Lines not ruled or accurate, shapes not shaded or internal lines omitted</i> Accept provided the pupil's intention is clear</p> <p><b>!</b> <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><b>×</b> <i>Squares not joined correctly side-to-side</i> Do not accept as a correct shape eg</p> <p>◆</p>  <p>◆</p> 	
				<i>or</i> <b>2m</b>	<p>Gives at least three different correct shapes, even if there are other incorrect or duplicated shapes</p>				
				<i>or</i> <b>1m</b>	<p>Gives two different correct shapes, even if there are other incorrect or duplicated shapes</p>				
				(U1)					

Tier & Question					Food and drink	
3-5	4-6	5-7	6-8	7		
					<b>Correct response</b>	<b>Additional guidance</b>
a				1m	£ 1.55	
b				2m  or 1m <b>U1</b>	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		
					<b>Correct response</b>	<b>Additional guidance</b>
				1m	53	
				1m	17	
				1m	-5	
				2m  or 1m	Gives both the values -9 and (+)3 in the correct positions  Gives one correct value in the correct position  or  Gives both the values (+)3 and -9 but with the positions reversed	

Tier & Question								<b>Shapes</b>	
3-5	4-6	5-7	6-8						
<b>9</b>	<b>2</b>								
								<b>Correct response</b>	<b>Additional guidance</b>
								<b>2m</b> Gives all three correct areas, ie <div style="text-align: center;">16 4 8</div> <i>or</i> <b>1m</b> Gives any two correct areas	<b>!</b> <i>For 1m, follow through</i> Provided their 2 <sup>nd</sup> < their 3 <sup>rd</sup> < their 1 <sup>st</sup> , accept the following: For their 2 <sup>nd</sup> , accept follow through as their 1 <sup>st</sup> ÷ 4 For their 3 <sup>rd</sup> , accept follow through as their 1 <sup>st</sup> ÷ 2 or their 2 <sup>nd</sup> × 2 eg, for 1m accept <ul style="list-style-type: none"> <li>• 20 (<i>error</i>), 5, 10</li> <li>• 1 (<i>error</i>), <math>\frac{1}{4}</math>, <math>\frac{1}{2}</math></li> <li>• 16, 2 (<i>error</i>), 4</li> </ul> eg, for 1m do not accept <ul style="list-style-type: none"> <li>• 16, 8 (<i>error</i>), 16</li> </ul>

Tier & Question								<b>Computation</b>	
3-5	4-6	5-7	6-8						
<b>10</b>	<b>3</b>								
								<b>Correct response</b>	<b>Additional guidance</b>
a	a							<b>1m</b> 10.2 or equivalent	
b	b							<b>1m</b> 9.5 or equivalent	
c	c							<b>1m</b> 1270	
d	d							<b>1m</b> 57	



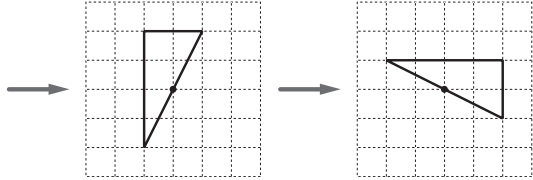
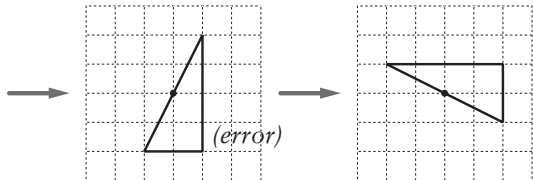
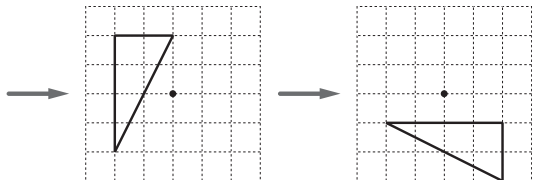
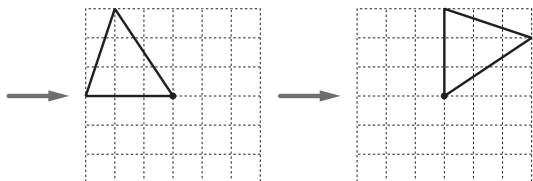
Tier & Question					Range of ages	
3-5	4-6	5-7	6-8	12		
a	a			1m	<p>Gives two ages with a difference of 7 years eg</p> <ul style="list-style-type: none"> <li>■ 1 and 8</li> <li>■ 7 and 14</li> <li>■ 7 and 0</li> <li>■ 20 and 13</li> </ul>	<p><b>! Ages given using part-years</b> Accept provided the difference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



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



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

Tier & Question				Marking overlay available	Rotating
3-5	4-6	5-7	6-8		
16	9	2		<p><b>Correct response</b></p> <p>2m Gives correct triangles for both grids with vertices within the tolerances as shown on the overlay, ie</p>  <p>or</p> <p>1m 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"> <li>  </li> <li> <p>or</p> <p>Completes two rotations of 90° clockwise that do not use the given centre of rotation eg</p> <ul style="list-style-type: none"> <li>  </li> <li> <p>or</p> <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"> <li>  </li> </ul> </li> </ul> </li> </ul>	<p><b>Additional guidance</b></p> <p>! <i>Lines not ruled or accurate</i> Accept provided the pupil's intention is clear</p>

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 <math>2 \times</math> my number is 42 eg</p> <ul style="list-style-type: none"> <li>■ <math>2 \times</math> my number = <math>357 - 315 = 42</math></li> <li>■ <math>2x = 42</math></li> <li>■ <math>42 \div 2</math></li> </ul> <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 eg</p> <ul style="list-style-type: none"> <li>■ <math>15 \times 10 = 150,</math> <math>150 + 150 + 15 = 315,</math> so it's <math>10 + 10 + 1</math></li> <li>■ <math>357 - 170 - 170 - 17 - 17</math> (error) = 0, so it's <math>10 + 10 + 1 + 1 = 22</math></li> <li>■ <math>\begin{array}{r} 1 \text{ (error) } 1 \\ 15 \overline{) 315} \end{array}</math></li> <li>■ <math>\begin{array}{r} 21 \\ 15 \overline{) 315} \end{array} \quad \begin{array}{r} 5 \text{ (error) } 1 \\ 17 \overline{) 357} \end{array}</math></li> </ul>	

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 <math>x</math> with a value of 48 when <math>x</math> is 8 eg</p> <ul style="list-style-type: none"> <li>■ <math>6x</math></li> <li>■ <math>x + 40</math></li> <li>■ <math>3x + 24</math></li> </ul>	<p>! For the first and second marks, incomplete processing Penalise only the first occurrence eg, for the first and second marks</p> <ul style="list-style-type: none"> <li>♦ <math>4 \times 8</math></li> <li>♦ <math>48 \div 4</math></li> </ul> <p>Mark as 0, 1</p> <p>! For the third mark, unconventional notation Condone eg, for the third mark accept</p> <ul style="list-style-type: none"> <li>♦ <math>6 \times x</math></li> <li>♦ <math>x6</math></li> </ul>

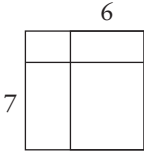
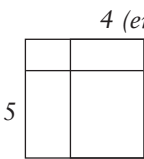
Tier & Question							<b>Mean and median</b>			
3-5	4-6	5-7	6-8	19					12	5
							<b>Correct response</b>		<b>Additional guidance</b>	
a	a	a			1m	Shows that the mean is 10 eg <ul style="list-style-type: none"> <li>■ <math>9 + 11 + 10 = 30</math>, <math>30 \div 3</math></li> <li>■ <math>(9 + 11 + 10)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

(U1)

Tier & Question									<b>Angles</b>	
3-5	4-6	5-7	6-8							
20	13	6					<b>Correct response</b>			<b>Additional guidance</b>
					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									<b>Equations</b>	
3-5	4-6	5-7	6-8							
21	14	7					<b>Correct response</b>			<b>Additional guidance</b>
					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						<b>Square cut</b>	
3-5	4-6	5-7	6-8				
17	10	2		<b>Correct response</b>	<b>Additional guidance</b>		
			<p>2m</p> <p>or</p> <p>1m</p>	<p>42, with no evidence of an incorrect method</p> <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"> <li>■ <math>7 \times 6</math> seen</li> <li>■ </li> <li>■ Area of square = 81</li> </ul> <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"> <li>■ <math>12 \div 2 = 8</math> (error), <math>8 + 3 = 11</math></li> <li>■ <math>11 - 2 = 9</math>, <math>8 \times 9 = 72</math></li> <li>■ </li> </ul> <p style="text-align: right;">Answer: 20</p>	<p>✗ <i>Incorrect method</i></p> <p>eg</p> <ul style="list-style-type: none"> <li>◆ <math>12 + 2 = 14</math>, <math>14 \times 3 = 42</math></li> </ul>		
			(U1)				

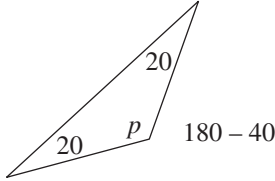


Tier & Question								<b>Making zero</b>	
3-5	4-6	5-7	6-8						
	<b>18</b>	<b>11</b>	<b>3</b>			<b>Correct response</b>		<b>Additional guidance</b>	
	a	a	a	1m		Indicates only the second statement, ie <div style="text-align: center;"> <input type="checkbox"/>  <input checked="" type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> </div>			
	b	b	b	1m		Indicates that the other number is zero eg <ul style="list-style-type: none"> <li>■ 0</li> <li>■ Zero</li> </ul>		✓ <i>Minimally acceptable indication</i> eg <ul style="list-style-type: none"> <li>◆ 0 + 0</li> <li>◆ Same</li> </ul> ! <i>Use of negative sign</i> eg <ul style="list-style-type: none"> <li>◆ -0</li> </ul> Condone	
				1m	(U1)	Gives a correct pair of non-zero values that add to make zero eg <ul style="list-style-type: none"> <li>■ 1 and -1</li> <li>■ -45 and +45</li> <li>■ <math>x</math> and <math>-x</math></li> </ul>		✗ <i>Operation changed</i> eg <ul style="list-style-type: none"> <li>◆ 1 - 1 ['and' crossed out]</li> </ul>	



Tier & Question						<b>Dividing fractions</b>							
3-5	4-6	5-7	6-8										
20	13	5		Correct response	Additional guidance								
				<p><b>3m</b> Gives the first value as 2 and the second value as 6</p> <p><i>or</i></p> <p><b>2m</b> Gives an incorrect or omitted first value but correctly gives the second value as 6</p> <p>or</p> <p>Gives an incorrect first value but follows through correctly for the second value as their first value <math>\times 3</math>, provided their first value is a positive integer</p> <p>eg</p> <ul style="list-style-type: none"> <li>▪ first value: 4</li> <li>▪ second value: 12</li> </ul> <p>or</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"> <li>▪ <math>2 \times 3</math></li> <li>▪ <math>3 \div 0.5</math></li> <li>▪ <math>\frac{3}{4} \times \frac{8}{1}</math></li> <li>▪ <math>\frac{24}{4}</math></li> <li>▪ <math>\frac{6}{8} \div \frac{1}{8}</math></li> <li>▪ Answer of <math>\frac{6}{8}</math> or equivalent, with no evidence of an incorrect method</li> <li>▪ <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> </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> </tr> </table> </li></ul> <p><i>or</i></p> <p><b>1m</b> 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> <math>\frac{6}{1}</math></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"> <li>♦ <math>\frac{2}{8}</math></li> </ul> <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"> <li>♦ <math>\frac{6}{8}</math></li> </ul> <p>✗ <i>For 2m or 1m, conceptual error</i> eg</p> <ul style="list-style-type: none"> <li>♦ <math>\frac{6}{8} \div \frac{1}{8} = \frac{5}{8}</math></li> </ul> <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"> <li>♦ first value: <math>\frac{4}{8}</math></li> <li>▪ second value: <math>1\frac{1}{2}</math> or equivalent</li> <li>♦ first value: <math>\frac{4}{8}</math></li> <li>▪ then <math>\frac{4}{8} \times 3</math> seen</li> </ul>

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
				<p>2m <math>\frac{25}{4}</math> or equivalent</p> <p>or</p> <p>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</p> <p>eg</p> <ul style="list-style-type: none"> <li>■ <math>2t = 25 - 2t</math></li> <li>■ <math>-25 + 2t = -2t</math></li> <li>■ <math>2t + 2t = 100 - 75</math></li> <li>■ <math>75 + 4t = 100</math></li> <li>■ <math>4t = 25</math></li> <li>■ <math>25 \div 4</math> seen</li> </ul>	<p>✗ For 2m, <math>\frac{25}{4}</math> seen but with incorrect further working</p> <p>eg</p> <ul style="list-style-type: none"> <li>◆ <math>\frac{25}{4} = 6.1</math></li> </ul> <p>! Method used is trial and improvement</p> <p>Note that no partial credit can be given</p>

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

Tier & Question								<b>Speed bumps</b>	
3-5	4-6	5-7	6-8						
	23	16	8			<b>Correct response</b>		<b>Additional guidance</b>	
		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><b>!</b> <i>Throughout the question, key not interpreted</i> eg, for the value 46</p> <ul style="list-style-type: none"> <li>♦ 4 6</li> </ul> <p>Penalise only the first occurrence</p>			
				<p><i>or</i></p> <p>1m</p> <p>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>					
		b	b	1m	<p>Gives a correct justification</p> <p>eg</p> <ul style="list-style-type: none"> <li>■ <math>38 - 28 = 10</math></li> <li>■ It falls from 38 to 28</li> </ul>	<p><b>✓</b> <i>Minimally acceptable justification</i></p> <p>eg</p> <ul style="list-style-type: none"> <li>♦ 38 and 28 identified, with no evidence of an incorrect method</li> </ul> <p><b>!</b> <i>Ambiguous notation</i></p> <p>eg</p> <ul style="list-style-type: none"> <li>♦ <math>28 - 38</math></li> </ul> <p>Condone</p> <p><b>✗</b> <i>Incomplete or incorrect justification</i></p> <p>eg</p> <ul style="list-style-type: none"> <li>♦ The difference between the middle numbers before and after is 10</li> <li>♦ Indicates both values of 8 corresponding to the units of 38 and 28 on the diagram, but with no interpretation of the key</li> <li>♦ Before the median was 39, after the median was 29, so it fell by 10</li> </ul>			

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"> <li>• (50, 146)</li> </ul> eg, for part (b) <ul style="list-style-type: none"> <li>• (18, 50)</li> </ul> ! <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"> <li>■ When <math>x = -10</math>, <math>y = 3 \times -10 - 4</math>  <math>= -30 - 4</math>  <math>= -34</math></li> <li>■ <math>3x - 4 = -34</math>  <math>3x = -30</math>  <math>x = -10</math></li> </ul>	✓ <i>Minimally acceptable explanation</i> eg <ul style="list-style-type: none"> <li>• <math>-30 - 4 = -34</math></li> <li>• <math>-30 \div 3 = -10</math></li> <li>• When <math>x = -10</math>, <math>3x - 4 = -34</math></li> <li>• The second number is equal to the first number multiplied by 3, minus 4</li> </ul> ✗ <i>Incomplete or incorrect explanation</i> eg <ul style="list-style-type: none"> <li>• When <math>x = -10</math>, <math>y = -34</math></li> <li>• <math>3x - 4 = -34</math>  <math>3x = -34 - 4</math>  <math>3x = -30</math>  <math>x = -10</math></li> </ul>

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Tier & Question					Correct response	Additional guidance
3-5	4-6	5-7	6-8			
		18	10			
				3m	<p>Gives four different correct pairs of values for <math>x</math> and <math>y</math></p> <p>eg</p> <ul style="list-style-type: none"> <li>■ <math>x = 64</math>    <math>y = 1</math></li> <li><math>x = 8</math>    <math>y = 2</math></li> <li><math>x = 4</math>    <math>y = 3</math></li> <li><math>x = 2</math>    <math>y = 6</math></li> <li>■ <math>x = \frac{1}{64}</math>    <math>y = -1</math></li> <li><math>x = 4096</math>    <math>y = \frac{1}{2}</math></li> <li><math>x = \sqrt{8}</math>    <math>y = 4</math></li> <li><math>x = -8</math>    <math>y = 2</math></li> </ul>	
				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	





## Tyres

Tier & Question						
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	<p><b>! <i>Incorrect units inserted</i></b></p> <p>eg</p> <ul style="list-style-type: none"> <li>♦ 5000 miles</li> </ul> <p>Ignore</p>

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

Tier & Question						Sweet peas	
3-5	4-6	5-7	6-8				
		22	14				
		a	a	1m	$\frac{89}{100}$ or equivalent probability		<p><b>! Unconventional notation, but equivalent value</b> eg, for the first mark</p> <ul style="list-style-type: none"> <li>♦ <math>\frac{17.8}{20}</math></li> </ul> <p>Condone</p> <p><b>! Estimates transposed but otherwise correct</b> 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"> <li>■ The more trials you have the more accurate your estimate of probability is likely to be</li> <li>■ 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</li> <li>■ There were more seeds to consider</li> <li>■ 200 seeds is more than 100 seeds</li> </ul>		<p><b>✓ Minimally acceptable explanation</b> eg</p> <ul style="list-style-type: none"> <li>♦ More seeds</li> <li>♦ More packets</li> <li>♦ He tested more</li> <li>♦ He had 200, not 100</li> <li>♦ Ravi had 10, Meg had 5</li> </ul> <p><b>! Irrelevant statement</b> eg</p> <ul style="list-style-type: none"> <li>♦ Ravi's results were more accurate</li> <li>♦ He had more chance of a bigger number germinating</li> </ul> <p>Ignore alongside a correct response, otherwise do not accept</p> <p><b>✗ Incomplete, ambiguous or incorrect explanation</b> eg</p> <ul style="list-style-type: none"> <li>♦ More</li> <li>♦ A bigger number</li> <li>♦ Ravi's = <math>\frac{170}{200}</math> which is more than <math>\frac{89}{100}</math></li> <li>♦ More of his seeds germinated</li> <li>♦ He had 5 more seeds</li> <li>♦ Meg's numbers were more complicated and harder to work out</li> </ul>
							(U1)



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

Tier & Question				Marking overlay available	Angle bisector
3-5	4-6	5-7	6-8		
		25	17	Correct response	Additional guidance
				<p><b>2m</b></p> <p>Completes a correct angle bisector that fulfils all four of the following conditions:</p> <ol style="list-style-type: none"> <li>1. Ruled</li> <li>2. Within the tolerance as shown on the overlay, even if their line were to be extended</li> <li>3. At least 3cm in length from A through the acute angle BAC</li> <li>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</li> </ol>	<p><b>!</b> <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><b>!</b> <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><b>!</b> <i>Extra arcs drawn</i> Ignore</p> <p><b>✗</b> <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><i>or</i></p> <p><b>1m</b></p> <p>Gives a response that fulfils condition 4, even if the angle bisector is incomplete, incorrect or omitted</p>	

Tier & Question									<b>Star shapes</b>	
3-5	4-6	5-7	6-8							
				<b>18</b>			<b>Correct response</b>		<b>Additional guidance</b>	
			a	1m	8				! <i>Units given</i> 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"> <li>■ 2 and 5 (either order)</li> <li>■ 10 and 25 (either order)</li> <li>■ 1 and 2.5 (either order)</li> <li>■ 12 and 30 (either order)</li> </ul>				✗ <i>Dimensions of either given diagram</i> Do not accept value 6 and 15 (either order) or 8 and 20 (either order)	

Tier & Question									<b>Straight lines</b>	
3-5	4-6	5-7	6-8							
				<b>19</b>			<b>Correct response</b>		<b>Additional guidance</b>	
			a	1m	Gives A as (0, -8)				! <i>Answers for A and B transposed but otherwise completely correct</i> 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"> <li>■ <math>y = 2x</math></li> <li>■ <math>y - 2x = 0</math></li> <li>■ <math>x = \frac{y}{2}</math></li> </ul>				! <i>Unconventional notation</i> eg <ul style="list-style-type: none"> <li>◆ <math>y = 2 \times x</math></li> <li>◆ <math>y = 2x + 0</math></li> </ul> 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"> <li>■ Median A – median B = <math>29 - 26 = 3</math></li> <li>■ <math>26 + 3 = 29</math> and A is 26, B is 29</li> </ul> <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"> <li>■ The vertical lines on the shaded part of the box plots represent the medians and they are 3mm apart on the graph</li> </ul>	<p><b>!</b> <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"> <li>♦ The lines in the middle are at 26 and 29</li> <li>♦ The centre points of the boxes are 3mm apart</li> </ul> <p><b>✓</b> <i>Minimally acceptable explanation</i></p> <p>eg</p> <ul style="list-style-type: none"> <li>♦ 26, 29</li> <li>♦ A is <math>29 - 3</math></li> <li>♦ B is <math>26 + 3</math></li> </ul> <p><b>✗</b> <i>Incomplete explanation</i></p> <p>eg</p> <ul style="list-style-type: none"> <li>♦ <math>29 - 3</math></li> <li>♦ <math>26 + 3</math></li> </ul> <p><b>✓</b> <i>Minimally acceptable explanation</i></p> <p>eg</p> <ul style="list-style-type: none"> <li>♦ The lines in the shaded bit are 3 apart</li> <li>♦ The lines in the boxes are the medians</li> <li>♦ Arrows indicating both medians on the diagram</li> </ul> <p><b>✗</b> <i>Incomplete explanation</i></p> <p>eg</p> <ul style="list-style-type: none"> <li>♦ The vertical lines are 3mm apart on the graph</li> <li>♦ The lines for the medians are 3mm apart on the graph</li> </ul> <p><b>!</b> <i>Throughout the question, incorrect units</i></p> <p>Condone</p> <p>eg, for part (a) accept</p> <ul style="list-style-type: none"> <li>♦ The lines in the boxes are 3cm apart</li> </ul> <p><b>!</b> <i>Throughout the question, ambiguous notation</i></p> <p>eg, for part (a)</p> <ul style="list-style-type: none"> <li>♦ <math>26 - 29</math></li> </ul> <p>eg, for part (b)</p> <ul style="list-style-type: none"> <li>♦ <math>24 - 29 &gt; 27 - 31</math></li> </ul> <p>Condone</p>



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

U1

Tier & Question					Standard form	
3-5	4-6	5-7	6-8	21		
			a	1m	<p>Gives a correct justification</p> <p>eg</p> <ul style="list-style-type: none"> <li>■ <math>(4 \times 10^8) \times (8 \times 10^4) = (4 \times 8) \times (10^8 \times 10^4)</math>  <math>= 32 \times 10^{12}</math>  <math>= 3.2 \times 10^{13}</math></li> <li>■ <math>4 \times 8 = 32, 8 + 4 = 12,</math>  so you get <math>32 \times 10^{12} = 3.2 \times 10^{13}</math></li> <li>■ <math>400\,000\,000 \times 80\,000 = 32\,000\,000\,000\,000</math>  <math>= 3.2 \times 10^{13}</math></li> </ul>	<p>✓ <i>Minimally acceptable justification</i></p> <p>eg</p> <ul style="list-style-type: none"> <li>♦ <math>32 \times 10^{12}</math></li> <li>♦ <math>4 \times 8 \times 10^{12}</math></li> <li>♦ <math>400\,000\,000 \times 80\,000</math>  <math>= 32\,000\,000\,000\,000</math> [12 zeros shown]</li> </ul> <p>✗ <i>Incomplete justification</i></p> <p>eg</p> <ul style="list-style-type: none"> <li>♦ <math>32\,000\,000\,000\,000 = 3.2 \times 10^{13}</math></li> <li>♦ <math>400\,000\,000 \times 80\,000 = 3.2 \times 10^{13}</math></li> <li>♦ <math>(4 \times 8) \times (10^8 \times 10^4) = 3.2 \times 10^{13}</math></li> </ul>
			b	2m  or 1m	<p><math>5 \times 10^3</math></p> <p>Shows a value equivalent to <math>5 \times 10^3</math></p> <p>eg</p> <ul style="list-style-type: none"> <li>■ 5000</li> <li>■ <math>0.5 \times 10^4</math></li> <li>■ <math>\frac{10^4}{2}</math></li> </ul> <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"> <li>■ <math>4 \div 8 \times 10^{(8-4)}</math></li> <li>■ <math>4 \times 10^8 \div 8 \times 10^4 = 2 \text{ (error)} \times 10^4</math></li> </ul>	<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"> <li>♦ <math>5.000 \times 10^3</math></li> </ul>

Tier & Question					22	Correct response	Additional guidance
3-5	4-6	5-7	6-8				
					2m	Gives both correct values, ie $\text{median} = 90$ $\text{mean} = 97$	<b>! Incomplete processing</b> Condone eg, for 2m accept • $\text{median} = 90$ $\text{mean} = 95 + 2$
					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				
							<i>Marking overlay available</i>
							<b>Drawing a rhombus</b>
					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	<b>! Different orientations</b> Markers should rotate and/or turn over the overlay as appropriate in order to check tolerances for construction arcs and/or vertices  <b>! Arcs extended or extra arcs</b> 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  <b>! Spurious arcs</b> 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
				3m	<p>Gives a correct justification</p> <p>eg</p> <ul style="list-style-type: none"> <li>■ <math>b + b + 2 = b(b + 2)</math>  <math>2b + 2 = b^2 + 2b</math>  <math>2 = b^2</math>  <math>b = \sqrt{2}</math> which is not an integer, so <math>a</math> cannot be an integer either</li> <li>■ <math>2a - 2 = a^2 - 2a</math>  <math>a^2 - 4a + 2 = 0</math> which doesn't factorise, so <math>a</math> is not an integer</li> </ul>	<p>✓ <i>Minimally acceptable justification</i></p> <p>eg</p> <ul style="list-style-type: none"> <li>♦ <math>2b + 2 = b^2 + 2b</math>  <math>2 = b^2</math></li> </ul> <p>! <i>Variables a and b transposed but justification otherwise completely correct</i></p> <p>eg</p> <ul style="list-style-type: none"> <li>♦ <math>a + a + 2 = a(a + 2)</math>  <math>2a + 2 = a^2 + 2a</math>  <math>2 = a^2</math>  <math>a = \sqrt{2}</math></li> </ul> <p>Mark as 1, 1, 0</p> <p>! <i>Numerical examples given</i></p> <p>Ignore</p>
				or 2m	<p>Shows correct expressions for the sum and product of <math>a</math> and <math>b</math> using only one of the two variables</p> <p>eg</p> <ul style="list-style-type: none"> <li>■ <math>b + b + 2, b(b + 2)</math></li> <li>■ <math>2a - 2, a^2 - 2a</math></li> </ul>	
				or 1m	<p>Shows or implies the use of expressions for <math>a</math> and <math>b</math> involving only one of the two variables</p> <p>eg</p> <ul style="list-style-type: none"> <li>■ <math>b, b + 2</math></li> <li>■ <math>a, a - 2</math></li> <li>■ <math>2b + 2</math></li> <li>■ <math>a^2 - 2a</math></li> </ul> <p>or</p> <p>Shows a different correct equation involving both the variables <math>a</math> and <math>b</math></p> <p>eg</p> <ul style="list-style-type: none"> <li>■ <math>a + b = ab</math></li> </ul>	
					(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><b>2m</b></p> <p>Gives the value 10 and shows or implies a correct method for solving algebraically</p> <p>eg</p> <ul style="list-style-type: none"> <li>▪ <math>\frac{9C}{5} + 32 = 2C + 30</math></li> <li style="margin-left: 2em;"><math>\frac{9C}{5} = 2C - 2</math></li> <li style="margin-left: 2em;"><math>9C = 10C - 10</math></li> <li style="margin-left: 2em;"><math>10 = C</math></li> <li>▪ <math>2C - \frac{9C}{5} = 32 - 30</math></li> <li style="margin-left: 2em;"><math>\frac{10C - 9C}{5} = 2</math></li> <li style="margin-left: 2em;"><math>\frac{C}{5} = 2</math></li> </ul> <p><i>or</i></p> <p><b>1m</b></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</p> <p>eg</p> <ul style="list-style-type: none"> <li>▪ <math>\frac{9C}{5} + 2 = 2C</math></li> <li>▪ <math>0.2C + 30 = 32</math></li> <li>▪ <math>2C - \frac{9C}{5} = 32 - 30</math></li> <li>▪ <math>\frac{C}{5} = 2</math></li> <li>▪ <math>2 \times 5</math></li> </ul>	<p>✗ <i>Method used is trial and improvement</i></p>

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