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KEY STAGE

3

ALL TIERS

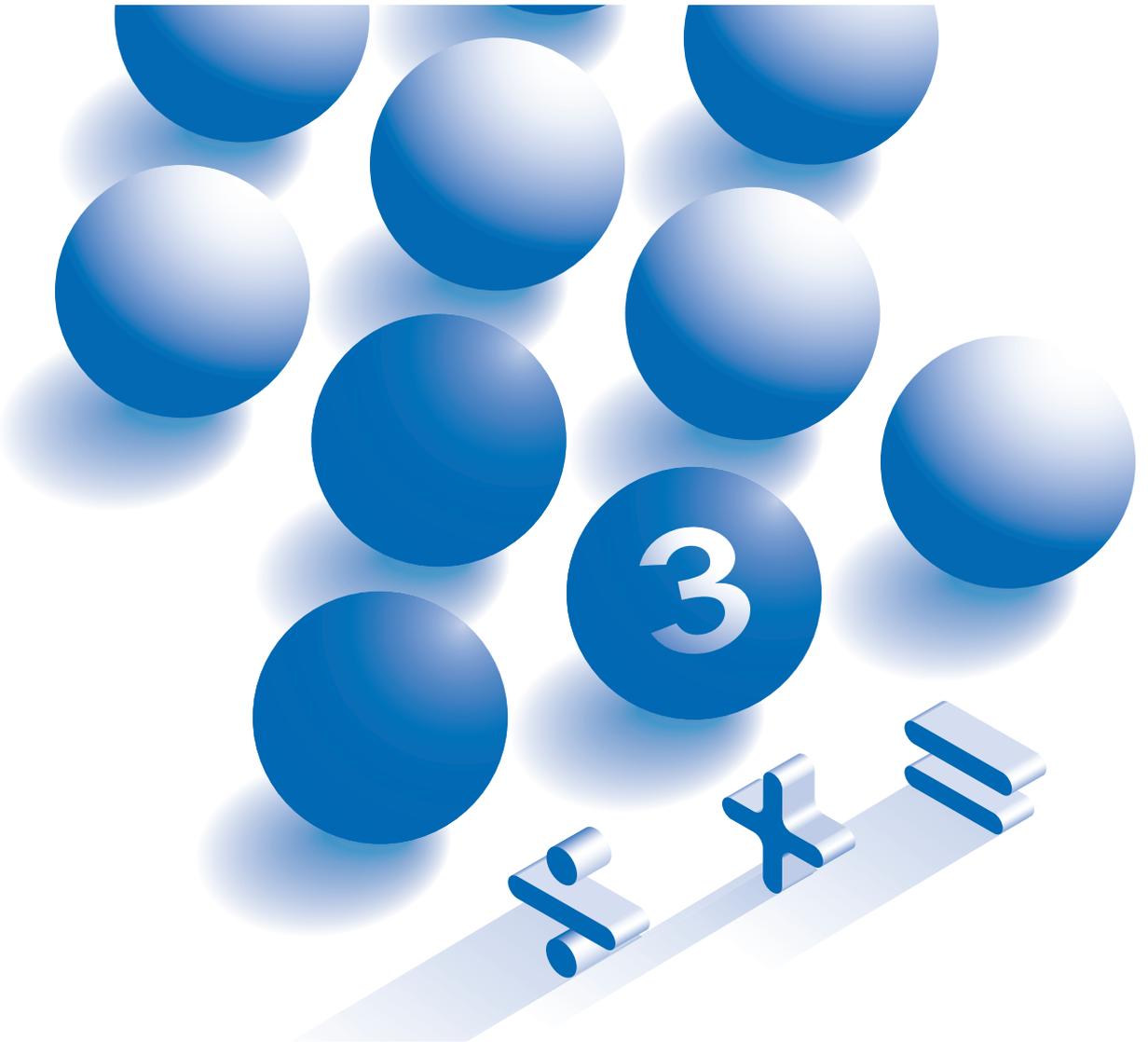
Mathematics tests

Mark scheme

for Paper 1

Tiers 3–5, 4–6, 5–7 and 6–8

2009



National curriculum assessments

Introduction

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 each question is set out in the form of tables, which start on page 10 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 *Using and applying mathematics (UAM)* element are identified in the mark scheme by the symbol $\textcircled{U1}$. The number 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 2009 key stage 3 mathematics tests and mark schemes were developed by the Test Development Team at Pearson Research and Assessment.

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 specifically to the marking of questions that involve money, negative numbers, time, measures, coordinates, probability or algebra. Unless otherwise specified in the mark scheme, markers should apply the following guidelines in all cases.

Recording marks awarded on the test paper

All questions, even those not attempted by the pupil, should 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 $\frac{1}{0}$

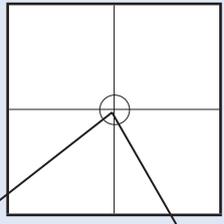
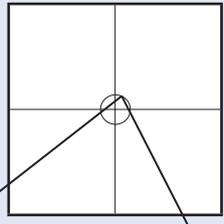
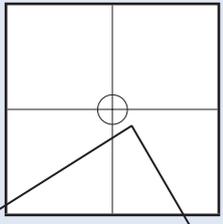
The total marks awarded for a double page should be written in the box at the bottom of the right-hand page, and the total number of marks obtained on the paper should be recorded on the front of the test paper.

A total of 120 marks is available in each of tiers 3–5, 4–6, 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 NAA website www.naa.org.uk/tests from April 2009.

What if...	Marking procedure	
<i>The pupil's response is numerically or algebraically equivalent to the answer in the mark scheme.</i>	Markers should award the mark unless the mark scheme states otherwise.	
<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 the 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, should be accepted. Provided there is no ambiguity, condone the continental practice of using a comma for a decimal point.	
<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 without altering the original intention or difficulty level of the question. For each misread that occurs, deduct one mark only.	
<i>No answer is given in the expected place, but the correct answer is given elsewhere.</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.	
<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:	
	<ul style="list-style-type: none"> the incorrect answer is due to a transcription error 	If so, award the mark.
	<ul style="list-style-type: none"> in questions not testing accuracy, the correct answer has been given but then rounded or truncated 	If so, award the mark.
	<ul style="list-style-type: none"> the pupil has continued to give redundant extra working which does not contradict work already done 	If so, award the mark.
<ul style="list-style-type: none"> 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 shown.</i>	A correct response should always be marked as correct unless the mark scheme states otherwise.	

What if...	Marking procedure
<i>The pupil has made a conceptual error.</i>	<p>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:</p> <ul style="list-style-type: none"> • 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 correct response has been crossed or rubbed out and not replaced.</i>	Any legible crossed or rubbed out work that has not been replaced should be marked according to the mark scheme. If the work is replaced, then crossed or rubbed out work should not be considered.
<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 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>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.
<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 has drawn lines which do not meet at the correct point.</i>	<p>Markers should interpret the phrase 'lines not accurate' to mean meeting within or on a circle of radius 2mm with centre at the correct point.</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>within the circle accepted</p> </div> <div style="text-align: center;">  <p>on the circle accepted</p> </div> <div style="text-align: center;">  <p>outside the circle not accepted</p> </div> </div>

Responses involving money

	✓ Accept	✗ Do not accept
<p>Where the £ sign is given</p> <p>for example: £3.20, £7</p>	<p>✓ £3.20 £7 £7.00</p> <p>Any unambiguous indication of the correct amount, eg £3.20p £3 20 pence £3 20 £3,20 £3-20 £3:20 320p with £ sign crossed out</p>	<p>✗ Incorrect placement of pounds or pence, eg £320 £320p</p> <p>Incorrect placement of decimal point, or incorrect use or omission of 0, eg £3.2 £3 200 £32 0 £3-2-0</p>
<p>Where the p sign is given</p> <p>for example: 40p</p>	<p>✓ 40p</p> <p>Any unambiguous indication of the correct amount, eg £0.40p £.40p £0.40 with p sign crossed out</p>	<p>✗ Incorrect or ambiguous use of pounds or pence, eg 0.40p £40p</p>
<p>Where no sign is given</p> <p>for example: £3.20, 40p</p>	<p>✓ £3.20 320p 40p £0.40</p> <p>Any unambiguous indication of the correct amount in £ or p as shown above</p> <p>At levels 3 and 4 only also accept omission of units, eg 3.20 320 40 0.40</p>	<p>✗ Omission of final zero, eg 3.2 0.4</p>

Responses involving negative numbers

	✓ Accept	✗ Do not accept
<p>For example: -2</p>		<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>

Responses involving time

	✓ Accept	✗ Do not accept
A time interval for example: 2 hours 30 minutes	✓ 2 hours 30 minutes Any unambiguous, correct indication, eg 2½ hours 2.5 hours 2h 30 2h 30 min 2 30 Digital electronic time, ie 2:30	✗ Incorrect or ambiguous time interval, eg 2.3 hours 2.3h 2h 3 2.30 min 2.30 2-30 2,30 2.3
A specific time for example: 8:40am, 17:20	✓ 8:40am 8:40 twenty to nine Any unambiguous, correct indication, eg 08.40 8.40 0840 8 40 8-40 8,40 Unambiguous change to 12 or 24 hour clock, eg 17:20 as 5:20pm or 17:20pm	✗ Incorrect time, eg 8.4am 8.40pm Incorrect placement of separators, spaces, etc or incorrect use or omission of 0, eg 840 8:4:0 8.4 084 84

Responses involving measures

	✓ Accept	✗ Do not accept
Where units are given (eg kg, m, l) for example: 8.6kg	✓ 8.6kg Any unambiguous indication of the correct measurement, eg 8.60kg 8.6000kg 8kg 600g	✗ Incorrect or ambiguous use of units, eg 8600kg

Note

If a pupil leaves the answer box empty but writes the answer elsewhere on the page, then that answer must be consistent with the units given in the answer box and the conditions listed above.

If a pupil changes the unit given in the answer box, then their answer must be equivalent to the correct answer, using the unit they have chosen, unless otherwise indicated in the mark scheme.

Responses involving coordinates

	✓ Accept	✗ Do not accept
<p>For example: (5, 7)</p>	<ul style="list-style-type: none"> ✓ Unconventional notation, eg (05, 07) (five, seven) $\begin{matrix} x & y \\ (5, & 7) \end{matrix}$ $(x=5, y=7)$ 	<ul style="list-style-type: none"> ✗ 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)

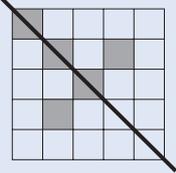
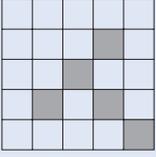
Responses involving probability

	✓ Accept	! Take care ✗ Do not accept
<p>A numerical probability should be expressed as a decimal, fraction or percentage only.</p> <p>for example:</p> <p>0.7 $\frac{7}{10}$ 70%</p>	<ul style="list-style-type: none"> ✓ Equivalent decimals, fractions and percentages, eg 0.700 $\frac{70}{100}$ $\frac{35}{50}$ 70.0% ✓ A probability correctly expressed in one acceptable form which is then incorrectly converted, but is still less than 1 and greater than 0, eg $\frac{70}{100} = \frac{18}{25}$ 	<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> <ul style="list-style-type: none"> ! A probability that is incorrectly expressed, eg 7 in 10 7 over 10 7 out of 10 7 from 10 ! A probability expressed as a percentage without a percentage sign. ! A fraction with other than integers in the numerator and/or denominator. ! A probability expressed as a ratio, eg 7:10 7:3 7 to 10 ✗ A probability greater than 1 or less than 0

Responses involving the use of algebra

	✓ Accept	! Take care ✗ Do not accept
<p>For example:</p> <p>$2 + n$</p> <p>$n + 2$</p> <p>$2n$</p> <p>$\frac{n}{2}$</p> <p>n^2</p>	<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</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 $3x + 2 = 32$, $3 \times 10 + 2 = 32$ for $x = 10$</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 n tiles + 2 n 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 $n = n + 2$ for $n + 2$</p>

Tier & Question					Mark	Correct response	Additional guidance	Dishes
3–5	4–6	5–7	6–8	2				
a					1m	£11		
b					2m or 1m	£2.50 Gives the answer 2.5 or 250 or Shows the value 7.5(0) or 750 or Shows or implies a complete correct method with not more than one computational error eg <ul style="list-style-type: none"> • $1.50 + 2.50 + 3.50 = 7.00$ (error) Answer given as 3		
c					1m	Gives a correct pair of colours, in any order, ie Green and Orange or Blue and Red	✓ Unambiguous indication of colour eg <ul style="list-style-type: none"> • G and O • B and R ! Response gives costs rather than colours Withhold 1 mark only for the first occurrence. Allow costs given in pence eg <ul style="list-style-type: none"> • 1.50 and 3(.00) • 2(.00) and 2.50 • 150 and 300 • 200 and 250 Mark as 0, 1	
					1m	Gives a correct pair of colours, other than any previously credited		
					U1			

Tier & Question						Five squares	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
3							
a				1m	Draws the correct line of symmetry, ie 	! Line not ruled, accurate or extended Accept lines of at least 3 diagonals in length provided the pupil's intention is clear	
b				1m	Completes the diagram correctly, ie 	! Squares not shaded Accept provided indication of squares is unambiguous	

Tier & Question						Javelin	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
4							
a				1m	16 to 18 inclusive		
b				1m	4		
c				1m	17 to 19 inclusive		

Tier & Question						Digit cards
3–5	4–6	5–7	6–8	Mark	Correct response	
5						
				1m	Gives four of the digits to make a correct calculation eg <ul style="list-style-type: none"> • $7 + 8 = 15$ • $5 + 6 = 11$ • $9 + 9 = 18$ 	<p>! <i>Zero used at the end of a number</i> eg, for the first mark • $2 + 8 = 10$ Penalise only the first occurrence</p> <p>× <i>Zero used or card left blank at the beginning of a two-digit number</i> eg, for the second mark, do not accept • $2 \times 3 = 06$</p> <p>× <i>Card left blank at the end of a number</i> eg, for the third mark, do not accept • $2 - 1 = 1$</p> <p>× <i>Extra digit inserted</i> eg, for the fourth mark, do not accept • $36 \div 2 = 18$</p>
				1m	Gives four of the digits to make a correct calculation eg <ul style="list-style-type: none"> • $6 \times 7 = 42$ • $7 \times 5 = 35$ • $9 \times 9 = 81$ 	
				1m	Gives five of the digits to make a correct calculation eg <ul style="list-style-type: none"> • $23 - 4 = 19$ • $67 - 5 = 62$ • $24 - 2 = 22$ 	
				1m	Gives four of the digits to make a correct calculation eg <ul style="list-style-type: none"> • $14 \div 2 = 7$ • $24 \div 4 = 6$ • $36 \div 6 = 6$ 	

U1

Tier & Question						Heights
3–5	4–6	5–7	6–8	Mark	Correct response	
6						
a				1m	Indicates 1.8 metres, ie 	
b				1m	Indicates 7 metres, ie 	

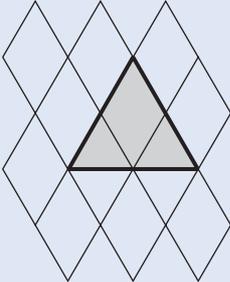
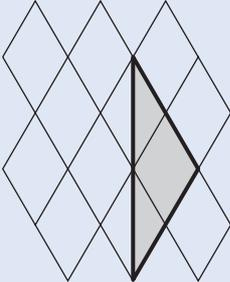
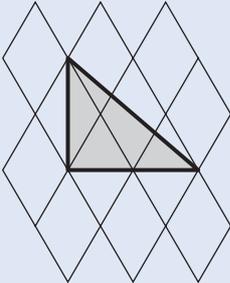
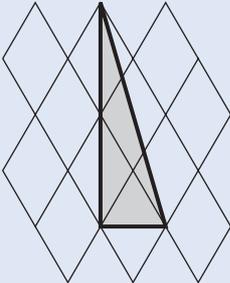
Tier & Question						Change															
3–5	4–6	5–7	6–8	Mark	Correct response		Additional guidance														
7																					
a				1m	3																
b				2m	Completes all three rows of the table correctly in any order eg <ul style="list-style-type: none"> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Number of 50p coins</th> <th>Number of 20p coins</th> <th>Number of 10p coins</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>3</td> <td>0</td> </tr> <tr> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>2</td> <td>1</td> <td>4</td> </tr> <tr> <td>2</td> <td>0</td> <td>6</td> </tr> </tbody> </table> 	Number of 50p coins	Number of 20p coins	Number of 10p coins	2	3	0	2	2	2	2	1	4	2	0	6	✓ Cell that should contain zero left blank
Number of 50p coins	Number of 20p coins	Number of 10p coins																			
2	3	0																			
2	2	2																			
2	1	4																			
2	0	6																			
				or 1m	Completes two rows of the table correctly																

Tier & Question						Doctors
3–5	4–6	5–7	6–8	Mark	Correct response	
8	1					
a	a			1m	Gives a value between 49 and 53 inclusive	✓ Value qualified eg, for part (a) <ul style="list-style-type: none"> About 50
b	b			1m	Gives a value between 23 and 27 inclusive	
c	c			1m	Gives a possible reason eg <ul style="list-style-type: none"> They might think their doctor's treatment is sometimes very good, but not at other times They might not think that any of the possible answers is what they think They don't have a doctor They might not want to comment They could be worried about giving an opinion They may have only ever had one doctor They don't always see the same doctor 	✓ Minimally acceptable reason eg <ul style="list-style-type: none"> Could be sometimes one category and sometimes another They may not like the choices If they're not sure They don't see their doctor very often They have just got a new doctor Not relevant They don't want to answer They can't tell what is meant by good ✗ Incomplete reason eg <ul style="list-style-type: none"> They don't know

Tier & Question						Using tens	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
9	2						
				1m	$\div 10$! Correct operation indicated, but 10 omitted eg, for the first mark • \div Penalise only the first occurrence	
				1m	$\div 10 \longrightarrow - 10$		
				1m	$+ 10 \longrightarrow \div 10$		

Tier & Question						Card shape	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
10	3						
				2m	Indicates only the three correct shapes, ie <div style="text-align: center;">  </div>	✓ Unambiguous indication eg • ✓ for yes and ✗ for no ! For 1 mark, response indicates only the three shapes showing the grey side of the shape, eg <div style="text-align: center;">  </div> Condone	
				or 1m	Indicates any two of the correct shapes with the third incorrect or omitted or Indicates the three correct shapes with not more than one other incorrect		

Tier & Question						Number lines	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
11	4						
				1m	Gives both the values 2 and 8 in the correct positions	! Follow-through from their -4 Accept the sum of their -4 and 10 provided their -4 is a negative number	
				1m	Gives the value -4 in the correct position		
				1m	Gives the value (+)6 in the correct position		

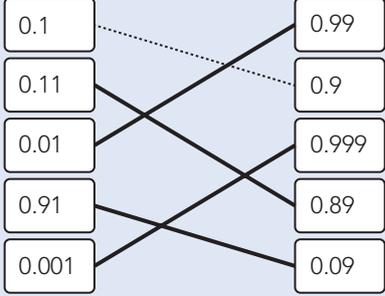
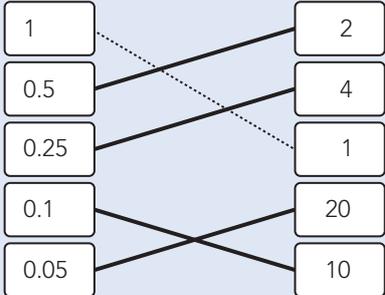
Tier & Question						Rhombus grid	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
12	5						
a	a			1m	12		
b	b			1m	<p>Draws a correct triangle eg</p> <ul style="list-style-type: none">     	<p>! Lines not ruled or accurate, or triangle not shaded Accept provided the pupil's intention is clear</p> <p>! Vertices of triangle not on the intersections of the grid Accept vertices within 2mm of the intersections of the grid</p> <p>! Other shapes drawn As these may be trials, ignore</p>	

Tier & Question						Missing digits	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
13	6						
				1m	Completes the second calculation correctly, ie $\boxed{1} \boxed{7} \times 3 = \boxed{5} \boxed{1}$	<p>! Both digits placed in the same box eg</p> <ul style="list-style-type: none"> $\boxed{17} \boxed{} \times 3 = \boxed{5} \boxed{1}$ <p>Condone</p>	
				1m	Completes the third calculation correctly, ie $\boxed{1} \boxed{4} \times 3 = \boxed{4} \boxed{2}$		
					or		
					$\boxed{1} \boxed{5} \times 3 = \boxed{4} \boxed{5}$		
					or		
					$\boxed{1} \boxed{6} \times 3 = \boxed{4} \boxed{8}$		
					(U1)		

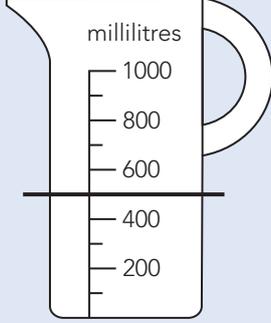
Tier & Question						Clocks	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
14	7						
a	a			1m	10am	<p>! Indication of am or pm incorrect or omitted Condone omission of am or pm but do not accept incorrect times</p> <p>eg, for part (a) accept</p> <ul style="list-style-type: none"> 10 (o'clock) <p>eg, for part (a) do not accept</p> <ul style="list-style-type: none"> 10pm 22:00 <p>eg, for part (b) accept</p> <ul style="list-style-type: none"> 6 (o'clock) 18:00 <p>eg, for part (b) do not accept</p> <ul style="list-style-type: none"> 6am 06:00 	
b	b			1m	6pm		

Tier & Question						Sum of 80
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance
15	8					
				1m	Indicates Set A and gives a correct explanation eg <ul style="list-style-type: none"> • $A = 74$ and $80 - 74 = 6$ $B = 90$ and $90 - 80 = 10$ • A is $-3, -2, -1, (0)$ and B is $+1, +2, +3, +4$, so A is only 6 less than 80, but B is 10 more 	✓ Minimally acceptable explanation eg <ul style="list-style-type: none"> • 6 and 10 seen • 74 and 90 seen • $(-3, (-2, (-1, (0)$ and 1, 2, 3, 4 seen ✗ Incomplete or incorrect explanation eg <ul style="list-style-type: none"> • A adds up to 74 • B is 10 more than 80 • A adds up to 74, B adds up to 110 • 17, 18 and 19 are all under 20 so A is smaller
				U1		

Tier & Question						Number chains
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance
16	9					
a	a			1m	Gives the values 14 and 41 in the correct positions	
b	b			1m	Shows a correct rule eg <ul style="list-style-type: none"> • $\times 3$ • Multiply by 3 • Triple • $\times 3$ then $+ 0$ 	✓ Minimally acceptable rule eg <ul style="list-style-type: none"> • Add the number 3 times • Add on double itself • Double then add the number • It's the next power of 3 • $3 \times$! Rule embedded or shown in working Accept provided a correct rule is shown explicitly, even if an incorrect value for the next number in the chain is shown on the answer line eg, accept <ul style="list-style-type: none"> • 81×3 seen • $(4 - 1) \times 81$ eg, do not accept <ul style="list-style-type: none"> • $81 + 81 + 81$ • $81 \times 2 + 81$ ✗ Incomplete or incorrect rule eg <ul style="list-style-type: none"> • 3 • +54 • $3n$

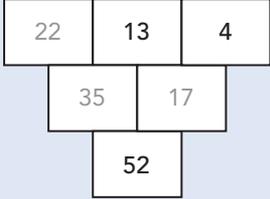
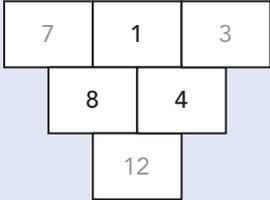
Tier & Question						Making 1	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
17	10	1					
a	a	a		2m	Joins all four pairs of numbers correctly, ie 	<p>✗ Number matched to more than one other For 2m or 1m, do not accept as a correct match</p>	
				or 1m	Joins at least two pairs of numbers correctly		
b	b	b		2m	Joins all four pairs of numbers correctly, ie 		
				or 1m	Joins at least two pairs of numbers correctly		

Tier & Question						T-shirts	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
18	11	2					
a	a	a		1m	$\frac{1}{5}$ or equivalent probability		
b	b	b		1m	$\frac{2}{3}$ or equivalent probability	<p>! Value rounded Accept 0.66(...) or 0.67 or the percentage equivalents</p>	
c	c	c		1m	$\frac{1}{3}$ or equivalent probability	<p>! Value rounded Accept 0.33(...) or the percentage equivalent</p>	

Tier & Question						Water
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance
19	12	3				
				1m	Indicates the value 500 on the jug, ie 	✓ Unambiguous indication ! Inaccurate indication Accept provided the pupil's intention is clear
					(U1)	

Tier & Question						Boxes
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance
20	13	4				
				2m or 1m	90 Shows or implies a complete correct method with not more than one computational error eg <ul style="list-style-type: none"> • $72 \div 4 = 16$ (error) $72 + 16 = 88$ • $72 \div 4 = 18$ $18 \times 5 = 80$ (error) 	
					(U1)	

Tier & Question						Percentages
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance
21	14	5				
a	a	a		1m	18	! Throughout the question, incorrect use of % sign eg <ul style="list-style-type: none"> • 18% 54% Penalise only the first occurrence
b	b	b		1m	54	! For part (b) follow-through Accept follow-through as their (a) $\times 3$, or as $36 +$ their (a) provided the result is less than 360

Tier & Question				Number grids		
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance
22	15	6				
				1m	Completes the first grid correctly, ie 	
				1m	Completes the second grid correctly, ie 	
					(U1)	

Tier & Question				Angles in a triangle		
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance
23	16	7				
				3m	Gives all three correct angles, ie $x = 90$ $y = 20$ $z = 20$	
				or		
				2m	Gives any two correct angles or Gives $x = 90$ and $y = z$, provided this value is < 90 and > 0	
				or		
				1m	Gives any one correct angle or Gives $y = z$, provided this value is < 90 and > 0	

Tier & Question				Mark	Correct response	Additional guidance	Finding <i>b</i>
3–5	4–6	5–7	6–8				
24	17	8					
				<p>2m or 1m</p> <p>2</p> <p>Shows or implies that $a = 5$ and shows the intention to substitute this value into the second equation eg</p> <ul style="list-style-type: none"> • $5 + 7 = 10 + b$ • $b = 12 - 10$ <p>or</p> <p>Shows a complete correct method with not more than one computational error eg</p> <ul style="list-style-type: none"> • $b = 11 - 6 + 7 - 10$ • $a = 11 - 6 = 6$ (error) $6 + 7 = 10 + b$ $b = 3$ 			
						<p>✘ Conceptual error eg</p> <ul style="list-style-type: none"> • $a = 11 + 6 = 17$ 	

Tier & Question				Mark	Correct response	Additional guidance	Matching
3–5	4–6	5–7	6–8				
18	9	1					
				<p>1m</p> <p>Matches both instructions on the left to the equivalent instruction on the right, ie</p>		<p>✘ Instruction on the left matched to more than one instruction on the right</p>	

Tier & Question				Mark	Correct response	Additional guidance	Oak leaves
3–5	4–6	5–7	6–8				
19	10	2					
				1m	<p>Gives a correct reason from one of the five categories below that states or implies the problem, or suggests an improvement</p> <p>The most common correct reasons:</p> <p>Category 1: Refer to the number of leaves in the sample being too small eg, problem</p> <ul style="list-style-type: none"> • The sample is too small • Those 10 leaves might all be diseased <p>eg, improvement</p> <ul style="list-style-type: none"> • They should pick more than 10 <p>Category 2: Refer to the number of trees in the sample being too small eg, problem</p> <ul style="list-style-type: none"> • One oak tree might be different from others • May be something wrong with that tree <p>eg, improvement</p> <ul style="list-style-type: none"> • They should use more than one tree <p>Category 3: Refer to the conditions in which the tree is growing being too uniform eg, problem</p> <ul style="list-style-type: none"> • Different conditions may affect the leaves on other trees • The soil might be very bad in that area <p>eg, improvement</p> <ul style="list-style-type: none"> • They should choose trees in different areas <p>Category 4: Refer to the area of the tree from which the leaves are picked being too small eg, problem</p> <ul style="list-style-type: none"> • The leaves on higher branches might be different • Those branches may not get enough light <p>eg, improvement</p> <ul style="list-style-type: none"> • They need leaves from all over the tree <p>Category 5: Refer to the period for picking the sample being too short eg, problem</p> <ul style="list-style-type: none"> • The leaves may be different at different times of year • It may be winter <p>eg, improvement</p> <ul style="list-style-type: none"> • They should collect throughout the year 	<p>✓ Minimally acceptable reason eg, problem</p> <ul style="list-style-type: none"> • Too small • Only 10 • Not enough • Just one • Same growing conditions for the tree • Other branches might be different • Only the lowest branches <p>eg, improvement</p> <ul style="list-style-type: none"> • 100 is better • More than one • Need different areas • Use other branches • Collect at other times <p>! For the first or the second reason, more than one reason given within one response Do not accept a correct response accompanied by an incorrect response from the same category. Otherwise ignore irrelevant or incorrect further responses. If two correct reasons from different categories are given in one response space, both marks should be awarded eg</p> <ul style="list-style-type: none"> • They need more trees from more areas <p>Mark as 1, 1</p> <p>✗ Incomplete reason that repeats the information given with no further explanation eg</p> <ul style="list-style-type: none"> • They are taking 10 leaves • They are using one oak tree • They are taking them from one part of the tree 	
				1m	<p>Gives a correct reason from a different category from one already credited</p>		

U1

Tier & Question						Missing lengths
3–5	4–6	5–7	6–8	Mark	Correct response	
20	11	3				
				2m	Gives both correct lengths, ie $x = 10$ and $y = 3.9$ or equivalent	
				<i>or</i>		
				1m	Gives $y = 3.9$ or equivalent	
					or	
					Gives the two values transposed, ie $x = 3.9$ or equivalent and $y = 10$	
					or	
					Shows a complete correct method with not more than one computational error	
					eg	
					<ul style="list-style-type: none"> • $x = 10, 10 - 6.1 = 4.9$ (error) • $4 \times 6.1 = 24.4, 40 - 24.4 = 16.6$ (error) $16.6 \div 4 = 4.15, 4.15 + 6.1 = 10.25$ • $40 \div 4 = 20$ (error) $20 - 6.1 = 13.9$ 	

Tier & Question						Counters	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
21	12	4					
a	a	a		2m or 1m	Gives the value 3, with no evidence of an incorrect method Shows or implies a correct equation for the bags and 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"> • $6y + 1 = 4y + 7$ • $6y - 4y = 7 - 1$ • $-2y + 7 = 1$ • $6y - 6 = 4y$ • $2y = 6$! Method used is trial and improvement Note that no partial credit can be given	
b	b	b		2m or 1m	5 Gives an answer of 4.(...) or Shows or implies a correct inequality using the expressions for the bags eg <ul style="list-style-type: none"> • $4k > k + 12$ • $3k > 12$ • $k > 4$! Method used is trial and improvement Note that no partial credit can be given	

U1

Tier & Question						Prize money	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
22	13	5					
				2m or 1m	£ 490 000 Shows the value 980 000 or Shows a complete correct method with not more than one error eg <ul style="list-style-type: none"> • $1\ 000\ 000 - 20\ 000 = 98\ 000$ (error), $98\ 000 \div 2 = 49\ 000$ 	✓ £ 490k ✗ For 1m, one million taken to be 100 000 eg <ul style="list-style-type: none"> • $100\ 000 - 20\ 000 = 80\ 000$, $80\ 000 \div 2 = 40\ 000$ ✗ For 1m, computational error that simplifies the division eg <ul style="list-style-type: none"> • $1\ 000\ 000 - 20\ 000 = 800\ 000$, $800\ 000 \div 2 = 400\ 000$ 	

Tier & Question				Mark	Correct response	Additional guidance	Correlation
3–5	4–6	5–7	6–8				
23	14	6					
a	a	a	1m	<p>Indicates B and gives a correct explanation</p> <p>The most common correct explanations:</p> <p>Refer to the 'slope' or 'gradient' of the points eg</p> <ul style="list-style-type: none"> The points make a pattern that is sloping upwards from left to right The line of best fit would have a positive gradient <p>Describe the relationship between the two variables eg</p> <ul style="list-style-type: none"> As the value on the x-axis increases, so does the value on the y-axis 	<p>✓ Minimally acceptable explanation eg</p> <ul style="list-style-type: none"> It slopes upwards It goes up It's like this ✓ <p>✗ Incomplete explanation eg</p> <ul style="list-style-type: none"> It slopes the positive way <p>✓ Minimally acceptable explanation eg</p> <ul style="list-style-type: none"> As one amount gets bigger, so does the other It could be the higher the temperature, the more ice creams are sold <p>✗ Incomplete explanation eg</p> <ul style="list-style-type: none"> They both increase It goes from the left-hand corner It is slanted towards the right 		
b	b	b	1m	<p>Indicates A and gives a correct explanation</p> <p>The most common correct explanations:</p> <p>Refer to the points being closer to a line of best fit eg</p> <ul style="list-style-type: none"> The points are practically in a straight line, so the correlation is very strong If you drew the line of best fit, the points in A would all be close to it but many would be further away in B <p>Refer to the 'line' or sloping pattern being clearer to see eg</p> <ul style="list-style-type: none"> You can see the pattern of a very clear, almost straight line In B you can see a pattern sloping upward, but it's not as clear 	<p>✓ Minimally acceptable explanation eg</p> <ul style="list-style-type: none"> They are closer to one line In B they are less bunched together in a line <p>✗ Incomplete explanation eg</p> <ul style="list-style-type: none"> The points are closer together In B they are more spread out <p>✓ Minimally acceptable explanation eg</p> <ul style="list-style-type: none"> They are in a straight line The pattern sloping downwards is clear In B the line is less easy to see B's points are sloping upwards, but not as definitely as in A <p>✗ Incomplete explanation eg</p> <ul style="list-style-type: none"> The pattern is clearer They are in a line 		

Tier & Question						Shape rules	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
24	15	7		2m	Completes all three rules correctly, ie $H = \frac{N}{2} + 1$ $A = \frac{H}{2} \times 2$ $\underline{A} = 2N + 2$	<p>! Throughout the question, unconventional notation eg, for the first rule</p> <ul style="list-style-type: none"> • $1N + 1$ Condone	
				or 1m	Completes two rules correctly	<p>! Throughout the question, words used instead of letters eg, for the second rule</p> <ul style="list-style-type: none"> • $A = \underline{\text{Height}} \times 2$ Penalise only the first occurrence	
						<p>! For the second rule, $N + 1$ used Accept provided there is no ambiguity eg, accept</p> <ul style="list-style-type: none"> • $(N + 1) \times 2$ eg, do not accept <ul style="list-style-type: none"> • $N + 1 \times 2$ 	
						<p>✓ For the third rule, $2H$ used</p>	

Tier & Question						Fortieths	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
25	16	8		1m	0.775	<p>✗ Equivalent fractions</p>	
				1m	0.575	<p>✓ Follow-through as their value for the first mark – 0.2</p>	

Tier & Question						Expressions	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
26	17	9					
a	a	a		1m	<p>Indicates $2n$ must be even and gives a correct explanation</p> <p>eg</p> <ul style="list-style-type: none"> Any whole number multiplied by two gives a number in the two times table, so is even Odd $\times 2 =$ even, even $\times 2 =$ even $2 \times$ odd is odd + odd = even $2 \times$ even is even + even = even All multiples of 2 are even Halving an odd number does not give a whole number 	<p>✓ Minimally acceptable explanation</p> <p>eg</p> <ul style="list-style-type: none"> $\times 2$ gives even Doubling any number gives even All the numbers in the 2 times table are even <p>✗ Incomplete explanation</p> <p>eg</p> <ul style="list-style-type: none"> $2 \times 1 = 2$ which is even, and $2 \times 2 = 4$ which is also even Even \times even is even Even \times odd is even Because when you add two odd numbers together you always make an even Because 2 is even 	
				U1			
b	b	b		1m	<p>Indicates $3n$ could be odd or even and gives a correct explanation</p> <p>eg</p> <ul style="list-style-type: none"> $3 \times 1 = 3$ which is odd, but $3 \times 2 = 6$ which is even Odd $\times 3 =$ odd, even $\times 3 =$ even Multiples of 3 can be odd or even An even or odd number can have a factor of 3 	<p>✓ Minimally acceptable explanation</p> <p>eg</p> <ul style="list-style-type: none"> $3 \times 1 = 3, 3 \times 2 = 6$ If n is 5 you get odd, if n is 6, you get even $3 \times$ some numbers = odd, but $3 \times$ some numbers = even Because 3 goes into both odd and even numbers In the 3 times table there are odd and even numbers <p>✗ Incomplete explanation</p> <p>eg</p> <ul style="list-style-type: none"> $3n$ is sometimes odd and sometimes even Even \times odd gives even odd \times odd gives odd 3, 6, 9, 12, 15..... 	
				U1			

Tier & Question								Ratio															
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance																	
27	18	10		1m	8																		
	a	a		1m	8																		
	b	b		1m	<p>Gives a correct number of black beads and white beads such that: the number of black beads is $(3n - 1)$ and the number of white beads is $(2n - 3)$, provided $n \geq 2$ eg</p> <ul style="list-style-type: none"> • 5 black beads, 1 white bead • 8 black beads, 3 white beads • 11 black beads, 5 white beads 	<p>Markers may find the following list of correct examples helpful:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Black</th> <th>White</th> </tr> </thead> <tbody> <tr> <td>5</td> <td>1</td> </tr> <tr> <td>8</td> <td>3</td> </tr> <tr> <td>11</td> <td>5</td> </tr> <tr> <td>14</td> <td>7</td> </tr> <tr> <td>17</td> <td>9</td> </tr> <tr> <td>20</td> <td>11</td> </tr> </tbody> </table>				Black	White	5	1	8	3	11	5	14	7	17	9	20	11
Black	White																						
5	1																						
8	3																						
11	5																						
14	7																						
17	9																						
20	11																						
				(U1)																			

Tier & Question								Powers	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance			
28	19	11		1m	<p>Gives a correct justification that the difference between 3^2 and 3^3 is 18 eg</p> <ul style="list-style-type: none"> • $3^2 = 9$, $3^3 = 27$, and $27 - 9 = 18$ • $3^3 - 3^2 = 3^2(3 - 1)$ = 9×2 = 18 	<p>✓ Minimally acceptable justification eg</p> <ul style="list-style-type: none"> • $27 - 9$ • $9 + 18 = 27$ <p>✗ Incomplete or incorrect justification eg</p> <ul style="list-style-type: none"> • $3^2 = 9$, $3^3 = 27$ • $3^3 - 3^2 = 18$ • $9 - 27 = 18$ 			

Tier & Question				Mark	Correct response	Additional guidance	Sorting primes																															
3–5	4–6	5–7	6–8																																			
		20	12																																			
				1m	<p>Identifies a value, n, such that n is prime, and shows that $2n + 1$ is not prime to demonstrate that the statement is incorrect</p> <p>eg</p> <ul style="list-style-type: none"> 7 is a prime number, but $2 \times 7 + 1 = 15$, and 15 is not a prime number 13 is prime, but 27 is not 	<p>✓ Minimally acceptable response</p> <p>eg</p> <ul style="list-style-type: none"> 7, 15 $2 \times 13 + 1 = 27$ <p>✗ Incomplete or incorrect response</p> <p>eg</p> <ul style="list-style-type: none"> $2 \times n$ is even, even + 1 is odd and not all odd numbers are prime <p>! More than one example given</p> <p>Accept provided a counter example is clearly identified</p> <p>eg, accept</p> <ul style="list-style-type: none"> 11 gives 23 13 gives 27 so this one <p>eg, do not accept</p> <ul style="list-style-type: none"> 11 gives 23 13 gives 27 <p>Markers may find the following list of correct examples helpful ($n < 100$):</p> <table border="1"> <thead> <tr> <th>n</th> <th>$2n + 1$</th> </tr> </thead> <tbody> <tr><td>7</td><td>15</td></tr> <tr><td>13</td><td>27</td></tr> <tr><td>17</td><td>35</td></tr> <tr><td>19</td><td>39</td></tr> <tr><td>31</td><td>63</td></tr> <tr><td>37</td><td>75</td></tr> <tr><td>43</td><td>87</td></tr> <tr><td>47</td><td>95</td></tr> <tr><td>59</td><td>119</td></tr> <tr><td>61</td><td>123</td></tr> <tr><td>67</td><td>135</td></tr> <tr><td>71</td><td>143</td></tr> <tr><td>73</td><td>147</td></tr> <tr><td>79</td><td>159</td></tr> <tr><td>97</td><td>195</td></tr> </tbody> </table>	n	$2n + 1$	7	15	13	27	17	35	19	39	31	63	37	75	43	87	47	95	59	119	61	123	67	135	71	143	73	147	79	159	97	195
n	$2n + 1$																																					
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71	143																																					
73	147																																					
79	159																																					
97	195																																					

U1

Tier & Question				Mark	Correct response	Additional guidance	Score
3–5	4–6	5–7	6–8				
		21	13				
		a	a	2m or 1m	11 Shows the values 56 and 45 or Gives an answer of 9 [the points gained in round 5]		
		b	b	1m	Gives a response that states or implies that Derek gained the same number of points in each round eg <ul style="list-style-type: none"> • He got the same number of points in each round • To keep the gradient the same, an equal number needs to be added each time • For every round going across, the line must have gone up the graph in equal steps 	<p>✓ Minimally acceptable response</p> <p>eg</p> <ul style="list-style-type: none"> • Same • Equal • No change • The total increases by the same number in each round • He gained 10 points each round <p>✗ Incomplete or incorrect response</p> <p>eg</p> <ul style="list-style-type: none"> • He gets about the same number of points in each round • It increases by the same number in each round • His points were consistent • A steady increase • He gets maximum points each round • The line could be horizontal 	

U1

Tier & Question						Rhombus	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
		22	14				
				2m or 1m	<p>24</p> <p>Shows a correct method with not more than one computational error</p> <p>The most common correct methods:</p> <p>Calculate the area of the rhombus as half the area of the rectangle eg</p> <ul style="list-style-type: none"> $\frac{1}{2}(6 \times 8)$ $48 \div 2$ <p>Work with 2 or 4 triangles eg</p> <ul style="list-style-type: none"> Area of one little triangle is half of 3×4, there are 4 little triangles so $\times 4$ $(6 \times 4) \div 2 = 14$ (error), $14 \times 2 = 28$ 8 triangles altogether, so one is $48 \div 8 = 7$ (error), 4 shaded so $4 \times 7 = 28$ Area of rectangle: $6 \times 8 = 48$, Area of white triangle: $\frac{1}{2} \times 3 \times 4 = 6$ $4 \times 6 = 18$ (error), answer 30 		
				1m	<p>Shows the correct unit for their area or method eg</p> <ul style="list-style-type: none"> 24cm^2 2400mm^2 	<p>x Conceptual error eg</p> <ul style="list-style-type: none"> Area of triangle given as base \times height <p>! Area incorrect or omitted, but units given If the mark(s) for the correct area have not been awarded, condone cm^2 seen for the third mark</p>	

Tier & Question						Sums and products	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
		23	15				
		a	a	1m	Gives a pair of values with a negative sum and a positive product, ie where a and b are both negative eg <ul style="list-style-type: none"> • -2 and -1 • -9 and -10 • -0.5 and $-\frac{2}{5}$ • -3 and -3 		
		b	b	1m	Gives a pair of values with a positive sum and a negative product, ie where a is positive, b is negative and $ a > b $ eg <ul style="list-style-type: none"> • 2 and -1 • -9 and 10 • 0.5 and $-\frac{2}{5}$ 		

Tier & Question						Mean	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
		24	16				
				2m or 1m	16 Shows the value 66 or Shows or implies a complete correct method with not more than one computational error eg <ul style="list-style-type: none"> • $6 \times 11 - 5 \times 10$ • $5 \times 10 = 50, 6 \times 11 = 65$ (error) so 15 	<p>! For 1m, method uses arbitrary values with a mean of 10 for the original five numbers Condone eg, for 1m accept</p> <ul style="list-style-type: none"> • $8 + 9 + 10 + 11 + 12 = 49$ (error) • $6 \times 11 - 49 = 17$ <p>✗ For 1m, error is in the number of values in the set after one is added eg</p> <ul style="list-style-type: none"> • $5 \times 11 = 55, 55 - 50 = 5$ 	
					<div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">U1</div>		

Tier & Question						Simultaneous	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
		25	17				
				3m	<p>Gives both $x = 5$ and $y = \frac{5}{2}$ or equivalent and shows or implies a complete correct method for solving algebraically</p> <p>eg</p> <ul style="list-style-type: none"> • $2x = 10, x = 5$ and $y = \frac{5}{2}$ • $3x + 18y = 60$ $3x + 6y = 30$ $12y = 30$, so $y = 2.5$ and $x = 5$ • $30 - 3x = 20 - x$ $10 = 2x, x = 5$ and $y = 2.5$ • $3(20 - 6y) + 6y = 30$ $60 - 18y + 6y = 30$ $30 = 12y, y = 2.5$ and $x = 5$ <p>or</p>	x Method used is trial and improvement	
				2m	<p>Gives either $x = 5$ or $y = \frac{5}{2}$ or equivalent and shows or implies a correct method for solving algebraically for that variable</p> <p>eg</p> <ul style="list-style-type: none"> • $2x = 10, x = 5$ • $3x + 18y = 60$ $3x + 6y = 30$ $12y = 30$, so $y = 2.5$ • $30 - 3x = 20 - x$ $10 = 2x, x = 5$ • $3(20 - 6y) + 6y = 30$ $60 - 18y + 6y = 30$ $30 = 12y, y = 2.5$ 		
				1m	<p>Subtracts the two given equations to eliminate y, or forms two correct equations that would allow elimination of x</p> <p>eg</p> <ul style="list-style-type: none"> • $2x = 10$ • $3x + 18y = 60$ $3x + 6y = 30$ <p>or</p> <p>Attempts to solve by substitution and forms a correct equation in only one variable</p> <p>eg</p> <ul style="list-style-type: none"> • $3(20 - 6y) + 6y = 30$ • $x + 30 - 3x = 20$ 		

Tier & Question				Mark	Correct response	Additional guidance	Shape
3–5	4–6	5–7	6–8				
		26	18				
				2m or 1m	<p>200, with no evidence of an incorrect method</p> <p>Shows or implies that $a = 5$</p> <p>or</p> <p>Shows or implies that the area of one rectangle is 50</p> <p>or</p> <p>Shows a complete correct method with not more than one computational error</p> <p>eg</p> <ul style="list-style-type: none"> $16a = 80$, so $a = 6$ (error) $6 \times 12 = 72$, $72 \times 4 = 288$ 		
						<p>! Error made in coefficient of a</p> <p>Follow-through with this value provided</p> <p>$12 \leq \text{coefficient of } a \leq 20$</p> <p>eg</p> <ul style="list-style-type: none"> $12a$ (error) = 80, so $a = 6.6$ $6.6 \times 13.2 \times 4 = 348$ 	

Tier & Question				Mark	Correct response	Additional guidance	Circle shapes
3–5	4–6	5–7	6–8				
		27	19				
				1m	Gives the correct expression for area A, ie Area A = $y + 3w$	<p>! Throughout the question, unconventional notation or unsimplified expressions</p> <p>Condone</p> <p>eg, for Area A, accept</p> <ul style="list-style-type: none"> $y + 3 \times w$ $y + w + w + w$ <p>eg, for Area B, accept</p> <ul style="list-style-type: none"> $1y + 1w$ $y + 3w - 2w$ 	
				1m	Gives the correct expression for area B, ie Area B = $y + w$	<p>! Answers for Area A and Area B transposed but otherwise correct</p> <p>Mark as 0, 1</p> <p>! Answers for Area A and Area B correct followed by incorrect further processing</p> <p>Mark as 0, 1</p>	
					U1		

Tier & Question				Mark	Correct response	Additional guidance	False
3–5	4–6	5–7	6–8				
		28	20				
		a	2m	<p>Gives a correct explanation</p> <p>The most common correct explanations:</p> <p>Give a correct counter example eg</p> <ul style="list-style-type: none"> When $j = 2$ and $k = 3$, $(j + k)^2 = 25$, but $j^2 + k^2 = 13$ If j is 2 and k is 3, $(2 + 3)(2 + 3) \neq 2^2 + 3^2$ <p>Give the correct expansion of the expression eg</p> <ul style="list-style-type: none"> $(j + k)(j + k) = j^2 + 2jk + k^2$, not $j^2 + k^2$ It should be $j^2 + jk + jk + k^2$ $jk + jk$ has been missed out so it should be $j^2 + 2jk + k^2$ <p>Address the misconception eg</p> <ul style="list-style-type: none"> Both things in the first brackets should be multiplied by both things in the second brackets, but the pupil has done $j \times j$ and $k \times k$ 	<p>✓ Minimally acceptable explanation eg</p> <ul style="list-style-type: none"> When $j = 2$ and $k = 3$ you get 25 and 13 <p>✗ Incomplete explanation eg</p> <ul style="list-style-type: none"> When $j = 2$ and $k = 3$ you get different answers for each side, so it can't be right <p>✓ Minimally acceptable explanation eg</p> <ul style="list-style-type: none"> $j^2 + 2jk + k^2$ $j^2 + jk + jk + k^2$ $2jk$ is missing <p>! Correct expression equated to zero eg</p> <ul style="list-style-type: none"> $j^2 + 2jk + k^2 = 0$ <p>Condone</p> <p>✗ Incomplete or incorrect explanation eg</p> <ul style="list-style-type: none"> $(j + k)(j + k) \neq j^2 + k^2$ $(j + k)^2 = j^2 + jk + k^2$ <p>✓ Minimally acceptable explanation eg</p> <ul style="list-style-type: none"> The pupil hasn't multiplied the j by the k or the k by the j There should be a jk term It should have been like this: <div style="text-align: center;"> </div> <p>✗ Incomplete explanation eg</p> <ul style="list-style-type: none"> There should be 3 terms in the answer The jks should be added You have to multiply everything in the second brackets by everything in the first brackets The pupil hasn't multiplied the first set of brackets by the second set properly You don't square j and k, you square the answer of $(j + k)$ 		

Tier & Question				Mark	Correct response	Additional guidance	False (cont)
3–5	4–6	5–7	6–8				
		28	20				
				or 1m	Shows a complete correct method with not more than one computational error when substituting values eg <ul style="list-style-type: none"> If $j = 2$ and $k = 3$ $(j + k)^2 = (2 + 3)^2 = 20$ (error), $j^2 + k^2 = 4 + 9 = 13$ or Shows or implies the four correct terms resulting from multiplying out the brackets, even if there is incorrect further working eg <ul style="list-style-type: none"> j^2, jk, jk, k^2 $j \times j + j \times k + j \times k + k \times k$ 	<ul style="list-style-type: none"> x Conceptual error eg <ul style="list-style-type: none"> $3^2 = 6$ 	
				U1			
				b 1m	Gives a correct counter example eg <ul style="list-style-type: none"> $j = 0$ $k = 0$ Either j or k is zero Both j and k are zero It doesn't work if k is nought 		
				U1			

Tier & Question					21	Mark	Correct response	Additional guidance	Dice probability																																																																											
3-5	4-6	5-7	6-8																																																																																	
							<p>2m or 1m</p> <p>$\frac{3}{4}$ or equivalent probability</p> <p>Shows or implies the number of possible outcomes where the product is a multiple of 3</p> <p>eg</p> <ul style="list-style-type: none"> <table border="1"> <tr><td>×</td><td>3</td><td>4</td><td>5</td><td>6</td></tr> <tr><td>3</td><td><u>9</u></td><td><u>12</u></td><td><u>15</u></td><td><u>18</u></td></tr> <tr><td>4</td><td><u>12</u></td><td>16</td><td>20</td><td><u>24</u></td></tr> <tr><td>5</td><td><u>15</u></td><td>20</td><td>25</td><td><u>30</u></td></tr> <tr><td>6</td><td><u>18</u></td><td><u>24</u></td><td><u>30</u></td><td><u>36</u></td></tr> </table> <table border="1"> <tr><td></td><td>3</td><td>4</td><td>5</td><td>6</td></tr> <tr><td>3</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr> <tr><td>4</td><td>✓</td><td></td><td></td><td>✓</td></tr> <tr><td>5</td><td>✓</td><td></td><td></td><td>✓</td></tr> <tr><td>6</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr> </table> <p>$3 \times 3, 3 \times 4, 3 \times 5, 3 \times 6,$ $4 \times 3, 4 \times 6,$ $5 \times 3, 5 \times 6,$ $6 \times 3, 6 \times 4, 6 \times 5, 6 \times 6$</p> <p>or</p> <p>Shows a complete correct method but makes not more than two errors in identifying multiples of 3, then follows through to give their correct probability</p> <ul style="list-style-type: none"> <table border="1"> <tr><td>×</td><td>3</td><td>4</td><td>5</td><td>6</td></tr> <tr><td>3</td><td><u>9</u></td><td><u>12</u></td><td><u>15</u></td><td><u>18</u></td></tr> <tr><td>4</td><td><u>12</u></td><td>16</td><td>20</td><td><u>24</u></td></tr> <tr><td>5</td><td>15</td><td>20</td><td>25</td><td><u>30</u></td></tr> <tr><td>6</td><td><u>18</u></td><td><u>24</u></td><td><u>30</u></td><td><u>36</u></td></tr> </table> <p style="text-align: right;">so $\frac{11}{16}$</p>	×	3	4	5	6	3	<u>9</u>	<u>12</u>	<u>15</u>	<u>18</u>	4	<u>12</u>	16	20	<u>24</u>	5	<u>15</u>	20	25	<u>30</u>	6	<u>18</u>	<u>24</u>	<u>30</u>	<u>36</u>		3	4	5	6	3	✓	✓	✓	✓	4	✓			✓	5	✓			✓	6	✓	✓	✓	✓	×	3	4	5	6	3	<u>9</u>	<u>12</u>	<u>15</u>	<u>18</u>	4	<u>12</u>	16	20	<u>24</u>	5	15	20	25	<u>30</u>	6	<u>18</u>	<u>24</u>	<u>30</u>	<u>36</u>		
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U2

Tier & Question				22	Mark	Correct response	Additional guidance	Solving									
3–5	4–6	5–7	6–8														
						<p>2m Gives $y = 20$ and shows or implies a correct first step of algebraic manipulation that either removes the denominator or removes the brackets eg</p> <ul style="list-style-type: none"> • $5(3y - 4) = 14y$ • $5(3y - 4) = 2y \times 7$ • $\frac{15y - 20}{2y} = 7$ • $\frac{5 \times 3y - 5 \times 4}{2y} = 7$ • $15y - 20 = 14y$ • $y - 20 = 0$ <p>or</p> <p>1m Shows or implies a correct first step of algebraic manipulation that either removes the denominator or removes the brackets, even if there are other errors</p>											
						<p>2m Gives $x = 5$ and $x = -5$, in either order and shows or implies the correct expansion of $(x + 4)(x - 4)$ eg</p> <ul style="list-style-type: none"> • $x^2 + 4x - 4x - 16$ • <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td></td> <td style="text-align: center;">x</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">x</td> <td style="text-align: center;">x^2</td> <td style="text-align: center;">$4x$</td> </tr> <tr> <td style="text-align: center;">-4</td> <td style="text-align: center;">$-4x$</td> <td style="text-align: center;">-16</td> </tr> </table> • $x^2 - 16$ • $x^2 = 25$ <p>or</p> <p>1m Shows or implies the correct expansion of $(x + 4)(x - 4)$, even if there are other errors</p>		x	4	x	x^2	$4x$	-4	$-4x$	-16		
	x	4															
x	x^2	$4x$															
-4	$-4x$	-16															

Tier & Question				Mark	Correct response	Additional guidance															
3–5	4–6	5–7	6–8																		
			23			Distance from school															
					Marking overlay available																
			a	2m	<p>Draws a correct graph within the tolerance as shown on the overlay that fulfils the following conditions:</p> <ol style="list-style-type: none"> All four points marked correctly, ie (2, 19), (3, 25), (4, 28) and (5, 29) All points joined with a series of straight lines 	<p>! For 2m or 1m, points joined with a curve Condone</p> <p>! Follow-through For 1m, accept the following values as follow-through:</p> <table border="1"> <thead> <tr> <th>Distance</th> <th>Cf</th> <th>f-t</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>19</td> <td>none</td> </tr> <tr> <td>3</td> <td>25</td> <td>6 + their 19</td> </tr> <tr> <td>4</td> <td>28</td> <td>3 + their 25</td> </tr> <tr> <td>5</td> <td>29</td> <td>1 + their 28</td> </tr> </tbody> </table>	Distance	Cf	f-t	2	19	none	3	25	6 + their 19	4	28	3 + their 25	5	29	1 + their 28
Distance	Cf	f-t																			
2	19	none																			
3	25	6 + their 19																			
4	28	3 + their 25																			
5	29	1 + their 28																			
				or 1m	<p>Shows or implies the values 19, 25, 28 and 29 eg</p> <ul style="list-style-type: none"> Fulfils condition 1 only Marks the points (1.5, 19), (2.5, 25), (3.5, 28) and (4.5, 29) [ie uses midpoints of each range as x-coordinates] <p>or</p> <p>Marks and joins at least three points correctly</p> <p>or</p> <p>Makes an error in marking one of the points, but follows through correctly for later points, and joins all their points</p>																
					(U2)																
			b	1m	<p>Gives a value between 1.4 and 1.6 inclusive</p> <p>or</p> <p>Follows through from an incorrect total to give the correct median for their graph</p>	<p>✓ Equivalent fractions or decimals</p> <p>! Follow-through Follow-through can only be given for an increasing graph which reaches (5, y)</p>															

Tier & Question				Mark	Correct response	Additional guidance
3–5	4–6	5–7	6–8			
			24			Coordinates
					Marking overlay available	
				1m	Gives A as (0, -2)	<p>! Answers for A and B transposed but otherwise completely correct If this is the only error, ie gives A as (1, -1) and gives B as (0, -2), mark as 0, 1</p>
				1m	Gives B as (1, -1)	

Tier & Question						Similar triangles	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
			25				
				2m	3, with no evidence of accurate or scale drawing	✗ For 2m or 1m, evidence of accurate or scale drawing, with no other method	
				or			
				1m	Shows or implies the ratio 4 : 10 eg <ul style="list-style-type: none"> • 0.4 or equivalent seen • 2.5 or equivalent seen • $2 : 5 = ? : 7\frac{1}{2}$ • $7.5 \div 10 \times 4$ • 0.75×4 • $30 \div 10$ 		

Tier & Question						Regions	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
			26				
				a	1m Gives the four correct letters, ie A, B, G and H, in any order		
				b	1m Gives the four correct letters, ie B, C, D and E, in any order		
				c	1m Gives the four correct letters, ie A, B, E and F, in any order		

Tier & Question						Average speed	
3–5	4–6	5–7	6–8	Mark	Correct response	Additional guidance	
			27				
				2m	Gives a correct justification that the average speed is 20km per hour eg <ul style="list-style-type: none"> • 1km at 15km/h takes $60 \div 15 = 4$ minutes, 1km at 30km/h takes $60 \div 30 = 2$ minutes, 2km in 6 minutes = 20km in 60 minutes = 20km per hour • $\frac{1}{15} + \frac{1}{30} = \frac{3}{30}$ = $\frac{1}{10}$, 2km in $\frac{1}{10}$ hour = 20km in 1 hour 	✓ For 2m, minimally acceptable justification eg <ul style="list-style-type: none"> • $4 + 2 = 6$ mins for 2km • $\frac{1}{15} + \frac{1}{30} = \frac{1}{10}$ for 2km ✗ For 2m, incomplete justification eg <ul style="list-style-type: none"> • 1km at 15km per hour takes $60 \div 15 = 4$ mins, 1km at 30km per hour takes $60 \div 30 = 2$ mins • 6 mins for 2km, so it's 60 mins for 20km which is 20km per hour 	
				or			
				1m	Shows or implies that the journey time up the hill was 4 minutes or equivalent, and the journey time down the hill was 2 minutes or equivalent eg <ul style="list-style-type: none"> • 4, 2 seen • $\frac{1}{15}, \frac{1}{30}$ seen • $60 \div 15, 60 \div 30$ seen 	! For 1m, total of 6 minutes or equivalent seen As the total of 6 minutes can be calculated from the given 20km per hour, do not accept as implying 4 minutes and 2 minutes unless a correct method is also seen	

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29 Bolton Street
London W1J 8BT

Telephone: 08700 60 60 40
Minicom: 020 7509 6546
Fax: 020 7509 5908

Email: tests@naa.org.uk
Website: www.naa.org.uk/tests

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Qualifications and Curriculum Authority
83 Piccadilly
London W1J 8QA
www.qca.org.uk



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