Ma

KEY STAGE 3

ALL TIERS

2008

Mathematics tests

Mark scheme

for Paper 1

Tiers 3–5, 4–6, 5–7 and 6–8

National curriculum assessments

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 2008 key stage 3 mathematics tests and mark schemes were developed by the Test Development Team at Edexcel.

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, algebra, time, coordinates or probability. Unless otherwise specified in the mark scheme, markers should apply the following guidelines in all cases.

What if …

The pupil's response does not match closely any of the examples given.	Markers should use their judgement in deciding whether the response corresponds with the statement of requirements given in the **Correct response** column. Refer also to the **Additional guidance**.
The pupil has responded in a non-standard way.	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.
The pupil has made a conceptual error.	In some questions, a method mark is available provided the pupil has made a computational, rather than conceptual, error. A computational error is a 'slip' such as writing $4 \times 6 = 18$ in an otherwise correct long multiplication. A conceptual error is a more serious misunderstanding of the relevant mathematics; when such an error is seen, no method marks may be awarded. Examples of conceptual errors are: misunderstanding of place value, such as multiplying by 2 rather than 20 when calculating 35×27; subtracting the smaller value from the larger in calculations such as $45 - 26$ to give the answer 21; incorrect signs when working with negative numbers.
The pupil's accuracy is marginal according to the overlay provided.	Overlays can never be 100% accurate. However, provided the answer is within, or touches, the boundaries given, the mark(s) should be awarded.
The pupil's answer correctly follows through from earlier incorrect work.	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.
There appears to be a misreading affecting the working.	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.
The correct answer is in the wrong place.	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 …

<table>
<tr><td rowspan="5">The final answer is wrong but the correct answer is shown in the working.</td><td colspan="2">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:</td></tr>
<tr><td>■ the incorrect answer is due to a transcription error</td><td>If so, award the mark.</td></tr>
<tr><td>■ in questions not testing accuracy, the correct answer has been given but then rounded or truncated</td><td>If so, award the mark.</td></tr>
<tr><td>■ the pupil has continued to give redundant extra working which does not contradict work already done</td><td>If so, award the mark.</td></tr>
<tr><td>■ the pupil has continued, in the same part of the question, to give redundant extra working which does contradict work already done.</td><td>If so, do not award the mark. Where a question part carries more than one mark, only the final mark should be withheld.</td></tr>
<tr><td>The pupil's answer is correct but the wrong working is seen.</td><td colspan="2">A correct response should always be marked as correct unless the mark scheme states otherwise.</td></tr>
<tr><td>The correct response has been crossed or rubbed out and not replaced.</td><td colspan="2">Mark, according to the mark scheme, any legible crossed or rubbed out work that has not been replaced.</td></tr>
<tr><td>More than one answer is given.</td><td colspan="2">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.</td></tr>
<tr><td>The answer is correct but, in a later part of the question, the pupil has contradicted this response.</td><td colspan="2">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.</td></tr>
</table>

Marking specific types of question

Responses involving money

For example: £3.20 £7

Accept ✓	Do not accept ✗
✓ 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	✗ Incorrect or ambiguous indication of the amount eg £320, £320p or £700p
✓ The unit, £ or p, is usually printed in the answer space. Where the pupil writes an answer outside the answer space with **no** units, accept responses that are unambiguous when considered alongside the given units eg with £ given in the answer space, accept 3.20, 7 or 7.00	✗ Ambiguous use of units outside the answer space eg with £ given in the answer space, do not accept 3.20p outside the answer space
✓ Given units amended eg with £ crossed out in the answer space, accept 320p, 700p	✗ 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

Responses involving negative numbers

For example: –2

Accept ✓	Do not accept ✗
	To avoid penalising the error below more than once within each question, do not award the mark for the *first* occurrence of the error within each question. Where a question part carries more than one mark, only the final mark should be withheld. ✗ Incorrect notation eg 2–

Responses involving the use of algebra

For example: $2 + n$ $n + 2$ $2n$ $\frac{n}{2}$ n^2

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

Responses involving time

A time interval *For example: 2 hours 30 minutes*

Accept ✓	Take care ! Do not accept ✗
✓ Any unambiguous indication eg 2.5 (hours), 2h 30	✗ Incorrect or ambiguous time interval eg 2.3(h), 2.30, 2-30, 2h 3, 2.30 min
✓ Digital electronic time ie 2:30	! The unit, hours and/or minutes, is usually printed in the answer space. Where the pupil writes an answer outside the answer space, or crosses out the given unit, accept answers with correct units, unless the question has specifically asked for other units to be used.

A specific time *For example: 8:40 am 17:20*

Accept ✓	Do not accept ✗
✓ Any unambiguous, correct indication eg 08.40, 8.40, 8:40, 0840, 8 40, 8-40, twenty to nine, 8,40	✗ Incorrect time eg 8.4 am, 8.40 pm
✓ Unambiguous change to 12 or 24 hour clock eg 17:20 as 5:20 pm, 17:20 pm	✗ Incorrect placement of separators, spaces, etc or incorrect use or omission of 0 eg 840, 8:4:0, 084, 84

Responses involving coordinates

For example: (5, 7)

Accept ✓	Do not accept ✗
✓ Unconventional notation eg (05, 07) (five, seven) ($\overset{x}{5}$, $\overset{y}{7}$) ($x = 5$, $y = 7$)	✗ Incorrect or ambiguous notation eg (7, 5) ($\overset{y}{7}$, $\overset{x}{5}$) ($5x$, $7y$) (5^x, 7^y) ($x - 5$, $y - 7$)

Responses involving probability

A numerical probability should be expressed as a decimal, fraction or percentage only.

For example: 0.7 $\frac{7}{10}$ 70%

Accept ✓	Take care ! Do not accept ✗
✓ Equivalent decimals, fractions and percentages eg 0.700, $\frac{70}{100}$, $\frac{35}{50}$, 70.0%	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 *first* 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.
✓ A probability correctly expressed in one acceptable form which is then incorrectly converted, but is still less than 1 and greater than 0 eg $\frac{70}{100} = \frac{18}{25}$	! 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

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, 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 Monday 23 June 2008.

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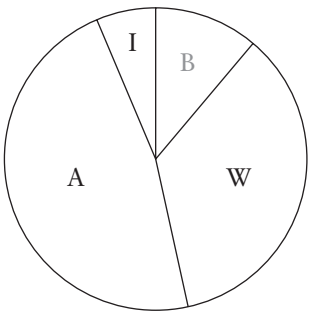
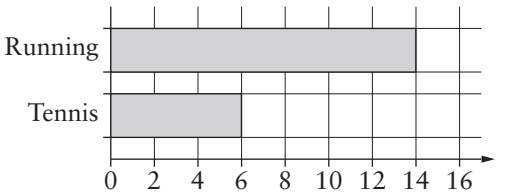
Tier & Question						
3-5	4-6	5-7	6-8		**Symbols**	
1					**Correct response**	**Additional guidance**
				1m	Gives two of the symbols to make a correct calculation, ie 12 ÷ 3 = 4 or 12 = 3 × 4	× *Other numbers or operations used*
				1m U1	Gives two of the symbols to make a different correct calculation from any credited for the first mark	

Tier & Question						
3-5	4-6	5-7	6-8		**Rhino crisis**	
2					**Correct response**	**Additional guidance**
a				**1m**	African (rhino)	✓ *Unambiguous indication of type* eg • A
b				**1m**	110	
c				**1m**	Completes the pie chart labels correctly, ie  	× *Numbers used as labels* Do not accept numbers as the only labels, but ignore alongside correct labels
d				**1m** U1	Gives a correct explanation eg ▪ There are no Javan rhinos in the captive population ▪ The captive number for J was zero	✓ *Minimally acceptable explanation* eg • There aren't any • Zero (or 0) • They're only in the wild • It has got no captive population × *Incomplete or incorrect explanation* eg • There is no section for that type • It's so small you can't see that section • It has been missed out

Tier & Question						
3-5	4-6	5-7	6-8		**Units**	
3					**Correct response**	**Additional guidance**
				1m	Gives the most appropriate unit, ie metres	! *Unit abbreviated* Accept only if unambiguous eg, for the first mark do not accept • m eg, for the second mark accept • f
				1m	Gives the most appropriate unit, ie feet	

Tier & Question					Sports	
3-5	4-6	5-7	6-8			
4					**Correct response**	**Additional guidance**
				2m	Completes both bars correctly, ie  *or* **1m** Completes one bar correctly or Indicates the values 14 and 6 eg ▪ Bars transposed but otherwise correct ▪ Values 14 and 6 highlighted on the horizontal scale	**!** ***Bars not ruled, accurate or shaded*** Accept provided the pupil's intention is clear **!** ***Bars inaccurately positioned or of incorrect widths*** Condone

Tier & Question					Euro	
3-5	4-6	5-7	6-8			
5					**Correct response**	**Additional guidance**
a				**2m**	Completes all three ways of paying correctly, ie four eight forty *or* **1m** Completes two ways of paying correctly	✓ ***Responses in figures***
b				**1m**	500, 200, 200 and 100, in any order	

Tier & Question					Shape statements	
3-5	4-6	5-7	6-8			
6					**Correct response**	**Additional guidance**
				2m	Makes correct decisions for all four statements, ie True False ☑ ☐ ☐ ☑ ☐ ☑ ☑ ☐	✓ *Unambiguous indication* eg • ✓ for true and × for false
				or **1m**	Makes correct decisions for three of the statements	

Tier & Question					Anniversaries	
3-5	4-6	5-7	6-8			
7					**Correct response**	**Additional guidance**
a				**1m**	2002	✓ *Unambiguous indication of year* eg, for 2002 • 02 eg, for 1960 • 60
b				**1m**	1960	
c				**1m** U1	1987	

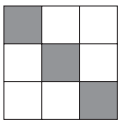
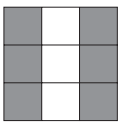
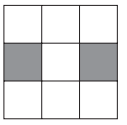
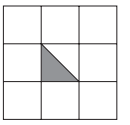
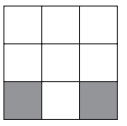
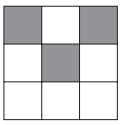
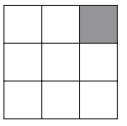
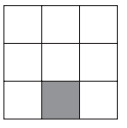
Tier & Question						
3-5	4-6	5-7	6-8			**Calculations**
8	**1**				**Correct response**	**Additional guidance**
				1m	1891	
				1m	493	
				1m	585	
				1m	22	

Tier & Question						
3-5	4-6	5-7	6-8			**Number line**
9	**2**				**Correct response**	**Additional guidance**
				1m	–3	
				1m	3	
				1m	–2	

Tier & Question						
3-5	4-6	5-7	6-8			**Competition**
10	**3**				**Correct response**	**Additional guidance**
a	a			**1m**	H	
b	b			**1m**	0	✓ *Unambiguous indication of 0* eg • None
c	c			**1m** (U1)	4	

Tier & Question						
3-5	4-6	5-7	6-8		**Eight times**	
11	**4**				**Correct response**	**Additional guidance**
				1m	100	
				1m	10	

Tier & Question						
3-5	4-6	5-7	6-8		**Adding**	
12	**5**				**Correct response**	**Additional guidance**
				2m	Gives all three correct digits in the correct positions, ie 4 3 7 + 2 3 8 = 6 7 5	
				or		
				1m	Gives two correct digits in the correct positions	
				U1		

Tier & Question						
3-5	4-6	5-7	6-8		**Grid patterns**	
13	**6**				**Correct response**	**Additional guidance**
a	a			**1m**	Indicates squares to make a pattern with exactly two lines of symmetry eg ▪  ▪  ▪ 	! *Squares not shaded* Accept any unambiguous indication of squares ! *Response uses part squares* Accept provided the intended symmetry is clearly correct eg, for part (b)  ! *Line(s) of symmetry drawn* Ignore, even if incorrect
b	b			**1m**	Indicates square(s) to make a pattern with exactly one line of symmetry eg ▪  ▪  ▪  ▪ 	

Think of a number

Tier & Question						
3-5	4-6	5-7	6-8			
14	**7**				**Correct response**	**Additional guidance**
a	a			**1m**	Indicates the correct decisions for all three questions, ie Yes / No … even number? ✓ … multiple of 3? ✓ … factor of 18? ✓	✓ *Unambiguous indication* eg • ✓ for yes and × for no
b	b			**1m** (U1)	15	

Dial

Tier & Question						
3-5	4-6	5-7	6-8			
15	**8**				**Correct response**	**Additional guidance**
a	a			**1m**	2	
b	b			**1m**	135	✓ *Answers of 135 + any multiple of 360*

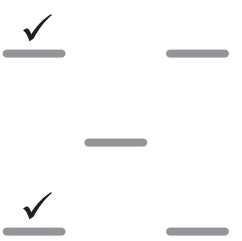
Temperatures

Tier & Question						
3-5	4-6	5-7	6-8			
16	**9**				**Correct response**	**Additional guidance**
a	a			**1m**	6	
b	b			**1m**	–3	

Tier & Question						
3-5	4-6	5-7	6-8			**Making ten**
17	**10**	**1**			**Correct response**	**Additional guidance**
				1m	Gives two numbers, one positive and one negative, that add to 10 eg ▪ –10 and 20 ▪ 15 and –5 ▪ –1 and 11 ▪ –0.5 and 10.5	✓ *Fractions or decimals* × *Addition symbol amended* eg ◆ 20 – 10 = 10

Tier & Question						
3-5	4-6	5-7	6-8			**Decimals**
18	**11**	**2**			**Correct response**	**Additional guidance**
				1m	7.2	✓ *Equivalent fractions or decimals*
				1m	0.2	

Tier & Question						
3-5	4-6	5-7	6-8		**Duckweed**	
20	**12**	**3**			**Correct response**	**Additional guidance**
a	a	a		**1m**	34	
b	b	b		**1m**	26	! *Follow-through* Accept follow-through as 60 – their (a), provided their (a) was not 0
c	c	c		**1m**	16	
d	d	d		**1m** U1	Gives a correct interpretation eg ▪ When salt is added, the number of leaves decreases and the more salt there is, the quicker the number of leaves will be zero ▪ With no salt, the plant grows but the more salt you put in, the faster the plant dies ▪ With no salt the leaves increased, with a little salt they decreased slowly, and with a lot of salt they decreased quickly	✓ *Minimally acceptable interpretation* eg • The more salt, the faster the number of leaves goes down • As the amount of salt increases, the plant dies more quickly • The more salt there is, the fewer leaves the plant will have • The less salt, the more leaves the plant will have × *Incomplete or incorrect interpretation* eg • Adding salt makes it lose leaves rather than grow them • Salt kills the plants • The more salt, the more chance the plant will die

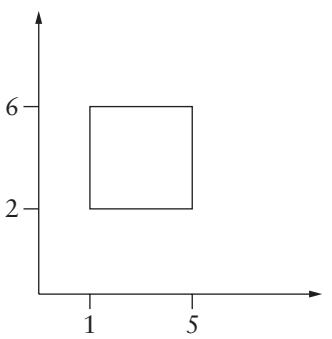
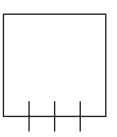
Tier & Question						
3-5	4-6	5-7	6-8		**Six cubes**	
19	**13**	**4**			**Correct response**	**Additional guidance**
				1m	Indicates both correct shapes, ie 	✓ *Unambiguous indication*

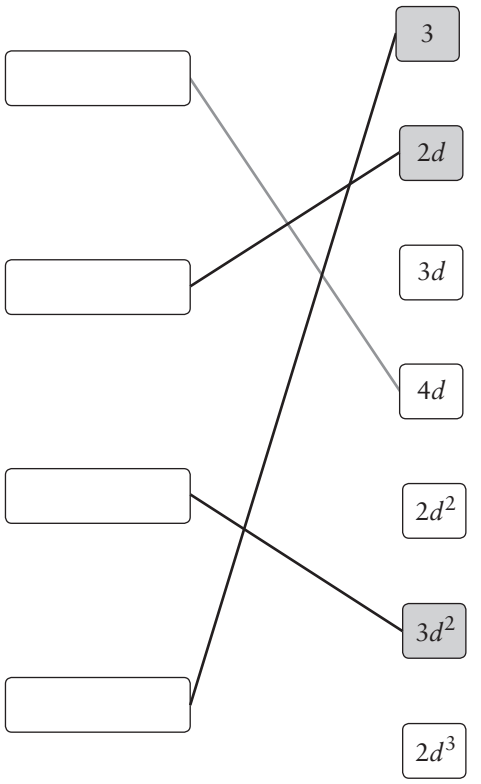
Tier & Question						
3-5	4-6	5-7	6-8		**Substituting**	
21	**14**	**5**			**Correct response**	**Additional guidance**
				2m	Completes all three statements correctly eg ▪ 3, 6 3, 9 3, 1 ▪ 1, 4 2, 6 6, 2 ▪ 4, 7 4, 12 4, $\frac{4}{3}$ ▪ 0, 3 0, 0 0, 0	✓ *Negatives, fractions or decimals* ! *Decimal answers rounded or truncated* Accept answers rounded or truncated to two decimal places or better × *Incomplete processing* eg, for the last part ◆ 3, $\frac{3}{3}$ ◆ 6, $\frac{6}{3}$
				or		
				1m	Completes two statements correctly	

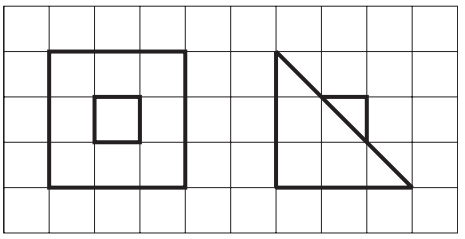
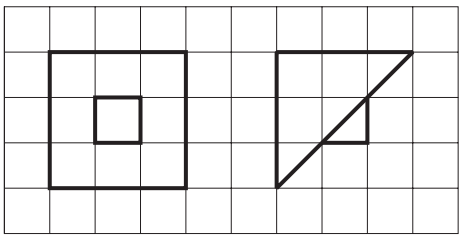
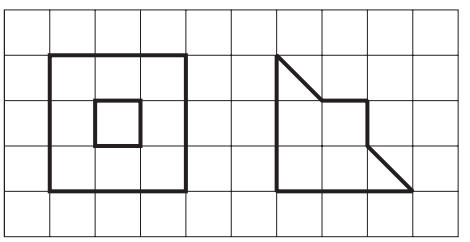
Tier & Question						
3-5	4-6	5-7	6-8		**Boxes**	
22	**15**	**6**			**Correct response**	**Additional guidance**
				2m	925	
				or		
				1m	Shows a complete correct method with not more than one computational error eg ▪ 37 × 100 = 3700 3700 ÷ 2 = 1850 1850 ÷ 2 ▪ <table><tr><td></td><td>30</td><td>7</td></tr><tr><td>20</td><td>600</td><td>140</td></tr><tr><td>5</td><td>150</td><td>*45 (error)*</td></tr></table> so 600 + 150 + 140 + 45 = 935 ▪ 37 ×25 185 *640 (error)* 825	× *Conceptual error* eg ◆ 37 ×25 185 74 259

Tier & Question						$3\frac{1}{2}$ times table
3-5	4-6	5-7	6-8			
24	16	7			Correct response	Additional guidance
a	a	a		**1m**	14	
				1m	$17\frac{1}{2}$ or equivalent	! *For the second mark, follow-through* Accept as their value for the first mark + $3\frac{1}{2}$
				1m	210	
b	b	b		**1m**	Indicates No and gives a correct explanation The most common correct explanations: Reason about odd and/or even multiples of $3\frac{1}{2}$ eg ▪ 11 is an odd number so you will get a half left over ▪ $2 \times \frac{1}{2} = 1$, so only an even number of $3\frac{1}{2}$s will give a whole number	! *Incorrect statement alongside a correct explanation* Ignore eg, accept • 11 is an odd number, $11 \times \frac{1}{2} = 6\frac{1}{2}$ ✓ *Minimally acceptable explanation* eg • 11 is odd • The first number needs to be even • All the odd ones are not whole numbers • Only the even numbers are whole numbers × *Incomplete explanation* eg • Every other multiple is a whole number • It is an odd number • It is not an even number • 10 is whole so 11 is not
					Show or imply the correct product or a relevant portion of it eg ▪ $11 \times 3\frac{1}{2} = 38\frac{1}{2}$ ▪ $17\frac{1}{2} + 21$ ▪ $33 + 5\frac{1}{2}$	✓ *Minimally acceptable explanation* eg • $38\frac{1}{2}$ • $11 \times \frac{1}{2} = 5\frac{1}{2}$ • 11 ends in 1 and $1 \times \frac{1}{2} = \frac{1}{2}$ × *Incomplete or incorrect explanation* eg • $11 \times 3\frac{1}{2}$ does not give a whole number • It will end in a $\frac{1}{2}$ • $11 \times 3\frac{1}{2} = 33\frac{1}{2}$
				(U1)		

Tier & Question						
3-5	4-6	5-7	6-8		**Solving**	
25	**17**	**8**			**Correct response**	**Additional guidance**
				1m	3	! *Incorrect notation* eg, as an answer for the first mark • × 3 • $3x$ Penalise only the first occurrence
				1m	-5	! *Incomplete processing* eg, as an answer for the first mark • $\frac{15}{5}$ Penalise only the first occurrence

Tier & Question						
3-5	4-6	5-7	6-8		**Coordinates**	
23	**18**	**9**			**Correct response**	**Additional guidance**
				2m	Gives A as (3, 4)	
				or		
				1m	Gives A as (4, 3)	
					or	
					Shows or implies that the side length of the square is 4 eg ▪ 5 – 1 = 4 ▪ (5, 2) seen ▪ (1, 6) seen ▪  ▪ 1, 2, (3), 4, 5 2, 3, (4), 5, 6 ▪ 	
				(U1)		

Tier & Question						
3-5	4-6	5-7	6-8		**Expressions**	
	19	**10**	**1**		**Correct response**	**Additional guidance**
				2m	Matches all three expressions correctly, ie  	! ***Expression on the left matched with more than one expression on the right*** For 2m or 1m, do not accept as a correct match
				or		
				1m	Matches any two of the expressions correctly	

Tier & Question						
3-5	4-6	5-7	6-8		**Views**	
	20	**11**	**2**		**Correct response**	**Additional guidance**
				2m	Draws both views correctly using the grid, ie **… FRONT** **… SIDE** 	! *Lines not ruled or accurate* Accept provided the pupil's intention is clear ! *Shading used* Ignore ! *Correct view from the side in a different orientation* Condone eg, for 2m accept • **… FRONT** **… SIDE**  ! *For 2m or 1m, their side view omits the middle section of the diagonal line* Condone eg • **… FRONT** **… SIDE** 
				or		
				1m	Draws one of the views correctly using the grid or Draws both views correctly using the grid but transposes their positions or Draws both views correctly either without using the grid or of incorrect sizes, provided the length and width of each view are clearly intended to be equal	

Tier & Question					
3-5	4-6	5-7	6-8	**Multiple of 6**	
	21	**12**	**3**	**Correct response**	**Additional guidance**
				1m 1, 2 and 3, in any order	

Tier & Question						
3-5	4-6	5-7	6-8		**Test results**	
	22	**13**	**4**		**Correct response**	**Additional guidance**
	a	a	a	**1m**	11	
	b	b	b	**1m** (U1)	12	

Tier & Question						
3-5	4-6	5-7	6-8		**Square tiles**	
	23	**14**	**5**		**Correct response**	**Additional guidance**
				1m (U1)	Gives a correct value for the area of the rectangle eg ▪ 54 ▪ 5400	
				1m	Shows the correct unit for their area eg ▪ cm² [with 54] ▪ mm² [with 5400]	**!** ***Area incorrect or omitted, but units given*** If the mark for their correct area has not been awarded, condone cm² seen for the second mark

Tier & Question						
3-5	4-6	5-7	6-8		**Walking to school**	
	24	**15**	**6**		**Correct response**	**Additional guidance**
	a	a	a	**1m**	20	
	b	b	b	**2m** *or* **1m** (U1)	28 Gives an answer of 72 or Shows or implies a correct method eg ▪ 7 × 4 ▪ 0.28 ▪ 7 out of 25 ▪ $\frac{7}{25}$	

Tier & Question						
3-5	4-6	5-7	6-8		**100 metres**	
	25	**16**	**7**		**Correct response**	**Additional guidance**
	a	a	a	**1m**	4	
	b	b	b	**2m** *or* **1m**	2.8 or equivalent Identifies the values 13.6 and 16.4 or equivalent or Shows a complete correct method with not more than one computational error eg ▪ 16 – 13 = 3, 0.6 – 0.4 = 0.2, 3 – 0.2	! *For 1m, key not interpreted* Condone only if the correct range has been evaluated eg, accept ◆ 2|8 eg, do not accept ◆ 16|4 – 13|6 × *For 1m, conceptual error* eg ◆ 16 – 13 = 3, 0.6 – 0.4 = 0.2, 3 + 0.2 = 3.2
		c	c	**1m**	15.3 or equivalent	

Tier & Question					Sequences	
3-5	4-6	5-7	6-8			
	26	17	8		Correct response	Additional guidance
		a	a	**2m**	Makes all four correct decisions, ie increasing: ☐ ✓ ☐ ☐ decreasing: ✓ ☐ ☐ ✓ neither: ☐ ☐ ✓ ☐	
				or		
				1m	Makes three correct decisions	
		b	b	**1m**	Gives all four correct terms in any order eg ▪ $\frac{1}{4}, \frac{1}{9}, \frac{1}{16}, \frac{1}{25}$	✓ ***Equivalent fractions*** ! ***Equivalent decimals*** For $\frac{1}{4}$, accept 0.25 For $\frac{1}{9}$, accept 0.11 or better For $\frac{1}{16}$, accept 0.0625 For $\frac{1}{25}$, accept 0.04 ! ***Incorrect further working*** Condone provided the four correct terms have been given × ***Answer of 1, $\frac{1}{4}, \frac{1}{9}, \frac{1}{16}$*** × ***Incomplete processing*** eg, for $\frac{1}{4}$ ◆ $\frac{1}{2^2}$

Tier & Question						
3-5	4-6	5-7	6-8			**Equation**
	27	**18**	**9**		**Correct response**	**Additional guidance**
				2m	–12	
				or		
				1m	Shows or implies a correct first step of algebraic manipulation that either reduces the number of terms or collects unknowns on one side of the equation and numbers on the other eg ▪ $2x = x - 12$ ▪ $12 + 2x = x$ ▪ $6 + x = -6$ ▪ $2x - x = -6 - 6$ ▪ $12 + x = 0$	! *Method used is trial and improvement* Note that no partial credit can be given

Tier & Question						
3-5	4-6	5-7	6-8			**Cancelling**
	28	**19**	**10**		**Correct response**	**Additional guidance**
				1m	20	
				1m	400	! *Incomplete processing* Penalise only the first occurrence, provided all redundant values have been cancelled eg, for both marks • 4×5 $(4 \times 5)^2$ Mark as 0, 1 ! *Follow-through* For the second mark, accept the square of their 20 evaluated

Tier & Question				*Marking overlay available*		**Finding Atlanta**
3-5	4-6	5-7	6-8			
		20	**11**		**Correct response**	**Additional guidance**
				2m	Indicates a point within the region shown on the overlay and shows correct intersecting construction arcs with radii within the tolerances as shown on the overlay	! *For 2m, intersecting arcs shown but point not otherwise labelled* Condone ! *Arcs extended or extra arcs* Ignore inaccuracies in sections of arcs extending beyond the tolerances as shown on the overlay, or arcs not indicated on the overlay, even if incorrect ! *Spurious arcs* Do not accept arcs drawn without compasses
				or		
				1m	Indicates a point within the region shown on the overlay, even if the construction arcs are incorrect or omitted or Draws at least one correct construction arc with radius within the tolerance as shown on the overlay or The only error is to transpose the distances, ie indicates a point within the region shown on the overlay when turned over and shows their two correct intersecting construction arcs	

Tier & Question						**Twice as far**
3-5	4-6	5-7	6-8			
		21	**12**		**Correct response**	**Additional guidance**
				2m	Gives both correct pairs of coordinates, ie (16, 3) and (8, 3) in either order	
				or		
				1m	Gives one correct pair of coordinates with the other pair incorrect or omitted or Identifies both correct points on the graph, even if the coordinates are incorrect or omitted	! *Correct points marked on the graph, but alongside other points marked* For 1m, do not accept unless the two correct points are clearly identified

Tier & Question						
3-5	4-6	5-7	6-8		**Functions**	
		22	**13**		**Correct response**	**Additional guidance**
				2m	Makes correct decisions for all four functions, ie ☑ *q* increases ☐ *q* decreases ☑ *r* increases ☐ *r* decreases ☐ *s* increases ☑ *s* decreases ☐ *t* increases ☑ *t* decreases	
				or		
				1m	Makes three correct decisions	

Tier & Question						
3-5	4-6	5-7	6-8		**Red and blue cubes**	
		23	**14**		**Correct response**	**Additional guidance**
				2m	Gives the number of blue cubes as 35	
				or		
				1m	Shows the value 5, with no evidence of an incorrect method for that value or Shows the values 20 and 35, or 30 and 35 eg ▪ 20 : 35 ▪ 35, 30 or Shows a complete correct method eg ▪ $10 \div (6 - 4) \times 7$ ▪ $7 \times \frac{10}{2}$	
				(U1)		

Tier & Question						Straight lines	
3-5	4-6	5-7	6-8				
		24	15			Correct response	Additional guidance
		a	a	1m		Indicates No and gives a correct explanation The most common correct explanations: Show how (7, 12) fails to follow the rule $y = 2x + 1$ eg ▪ It should be $x \times 2 + 1$ to get y but $7 \times 2 + 1 = 15$, not 12 ▪ It's double 7 then subtract 2, but it should be double 7 then add 1 ▪ It should be 12 – 1 then ÷ 2 but this gives $5\frac{1}{2}$, not 7 ▪ If the x-coordinate is a whole number, the y-coordinate will always be an odd number Show or imply that the point (7, 15) or $(5\frac{1}{2}, 12)$ is on the straight line eg ▪ It should be (7, 15) since $7 \times 2 + 1 = 15$ ▪ $(5\frac{1}{2}, 12)$ is on the line because $12 - 1 = 11$ and $11 \div 2 = 5\frac{1}{2}$ ▪ It's not one of these coordinates: x | y 4 | 9 5 | 11 6 | 13 7 | 15	✓ *Minimally acceptable explanation* eg ◆ $7 \times 2 + 1 \neq 12$ ◆ $(12 - 1) \div 2 \neq 7$ ◆ $y = 2x - 2$ × *Incomplete explanation* eg ◆ $7 \times 2 + 1 = 15$ ◆ $(12 - 1) \div 2$ ◆ the y-coordinate will always be odd ✓ *Minimally acceptable explanation* eg ◆ (7, 15) ◆ $(5\frac{1}{2}, 12)$ ◆ 15, not 12 ◆ $5\frac{1}{2}$, not 7 ◆ (4 + 3, 9 + 6) ◆ (6, 13) is on the line so (7, 12) can't be since 12 is less than 13 ◆ When x goes up 1, y goes up 2 × *Incomplete or incorrect explanation* eg ◆ It doesn't fit the equation ◆ The y coordinate is too low ◆ You don't get to (7, 12) ◆ Only (6, 13) and (8, 17) are on the line
		b	b	1m U1		Gives a correct equation eg ▪ $y = 3x + 1$ ▪ $3x - y = -1$	! *Unconventional notation* eg ◆ $1y = 3 \times x + 1$ Condone ! *Incomplete processing* eg ◆ $y = 2x + 1 + x$ Condone

Tier & Question						Square root
3-5	4-6	5-7	6-8			
		25	**16**		**Correct response**	**Additional guidance**
		a	a	**1m** U1	Gives a correct explanation eg ▪ $9^2 = 81$ and $10^2 = 100$ and 89 is between 81 and 100 ▪ $9 \times 9 < 89$ and $10 \times 10 > 89$	✓ *Minimally acceptable explanation* eg ◆ 81, 100 ◆ √81, √100 ◆ $9^2 < 89 < 10^2$ ◆ 89 is between the squares of 9 and 10 ✓ *Value for √89 given* eg ◆ 9.4(…) seen ! *Explanation refers to negative values* Ignore alongside a correct explanation eg, accept ◆ √81 = 9 or –9 and √100 = 10 or –10 × *Incomplete or incorrect explanation* eg ◆ √89 is between 9 and 10 ◆ The square root of 9 is 81 and the square root of 10 is 100 ◆ $9 \times 9 = 81$ and $9 \times 10 = 90$ so it's between 9 and 10
		b	b	**1m**	19 and 20, in either order	! *Negative values given* eg ◆ ±19 and ±20 ◆ –19 and –20 Condone ! *Answer embedded* eg ◆ 19×19 and 20×20 seen Condone × *Incomplete response* eg ◆ 361 and 400

Tier & Question						
3-5	4-6	5-7	6-8			**Heads or tails**
		26	**17**		**Correct response**	**Additional guidance**
				2m	31 or 32 or both	! *For 2m or 1m, value(s) qualified* eg, for 2m • About 31 Condone
				or		
				1m	Shows or implies a correct method with not more than one computational error, even if their final value is not a whole number eg ▪ 31.25 or 31.5 or equivalents seen ▪ 1000 ÷ 2 ÷ 2 ÷ 2 ÷ 2 ÷ 2 ▪ 500, 250, *175 (error)*, 87.5, 43.75	! *For 1m, value(s) rounded or truncated* Condone correct rounding or truncation at any stage within a correct method eg, for 1m accept • 500, 250, *175 (error)*, 88, 44
				(U1)		

Tier & Question						
3-5	4-6	5-7	6-8			**Coordinate net**
		27	**18**		**Correct response**	**Additional guidance**
				1m	Gives L as (–10, 0)	
				1m	Gives M as (30, –20)	! *Answers for L and M transposed but otherwise completely correct* If this is the only error, ie gives L as (30, –20) and gives M as (–10, 0), mark as 0, 1

Tier & Question						Halving
3-5	4-6	5-7	6-8			
		28	19		Correct response	Additional guidance
			a	**1m**	Gives a correct justification The most common correct justifications: Evaluate $\frac{1}{2}$ of 10^3 and 5^3 eg ▪ 10^3 is 1000, so half is 500 but 5^3 is 125 ▪ $10^3 = 1000$, $5^3 = 125$ but $\frac{1}{2}$ of 1000 is not 125 Express the two sides of the equation in a form that enables comparison eg ▪ $0.5 \times 10 \times 10 \times 10 = 5 \times 10 \times 10$, not $5 \times 5 \times 5$ Address the misconception eg ▪ You only divide one of the tens by 2 not all of them	✓ *Minimally acceptable justification* eg ◆ 500, 125 ◆ 1000, 125 × *Incomplete or incorrect justification* eg ◆ 500 ◆ 1000 ◆ 125 ✓ *Minimally acceptable justification* eg ◆ $5 \times 10 \times 10$, $5 \times 5 \times 5$ ◆ $5 \times 10^2 \neq 5 \times 5^2$ ◆ $0.5 \times 10 \times 10 \times 10 \neq 5 \times 5 \times 5$ × *Incomplete or incorrect justification* eg ◆ 5^3 is too small ◆ It should be $10^{1.5}$ ✓ *Minimally acceptable justification* eg ◆ You just halve one of the tens ◆ It's only one 5 and two 10s × *Incomplete justification* eg ◆ You don't halve all of the tens

Tier & Question						Halving (cont)	
3-5	4-6	5-7	6-8				
			19			**Correct response**	**Additional guidance**
			b	**1m**	Gives a correct justification The most common correct justifications: Calculate $\frac{1}{2}$ of 6×10^8 eg ▪ $\frac{1}{2}$ of 6×10^8 is 3×10^8 not 3×10^4 ▪ It should be $6 \times 5 \times 10^7$ not 3×10^4 ▪ 300 000 000 not 30 000 ▪ $0.5 \times 600\,000\,000$ is bigger than 30 000 Address the misconception eg ▪ You only halve the six not the power of 10 ▪ The number will still have nine digits ▪ It should keep 8 zeros	✓ ***Minimally acceptable justification*** eg ◆ 3×10^8 ◆ $6 \times 5 \times 10^7$ ◆ 300 000 000 ◆ $\frac{1}{2}$ of 600 000 000 ≠ 30 000 × ***Incomplete or incorrect justification*** eg ◆ 3×10^4 is too small ◆ $\frac{1}{2}$ of 10^8 isn't 10^4 ◆ It should be 6×10^4 ✓ ***Minimally acceptable justification*** eg ◆ You only halve the 6 ◆ The power of 10 stays the same × ***Incomplete justification*** eg ◆ You don't halve both values
			c	**2m** ***or*** **1m**	8.25×10^5 Shows a value equivalent to 8.25×10^5 eg ▪ 0.825×10^6 ▪ 825 000 or Makes an error in halving 1.65, but follows through correctly giving their answer in standard form eg ▪ $0.325 \times 10^6 = 3.25 \times 10^5$	! ***Zero(s) given after the last decimal place within standard form notation*** Condone eg, for 2m accept ◆ 8.25000×10^5

Tier & Question						Pay	
3-5	4-6	5-7	6-8				
			20			Correct response	Additional guidance
			a	**1m**	Indicates only the third statement, ie ☐ … more than twice as much… ☐ … exactly twice as much… ☑ … less than twice as much… ☐ … not enough information…	
				U1		
			b	**1m**	Indicates only the second statement, ie ☐ … more than twice as much… ☑ … exactly twice as much… ☐ … less than twice as much… ☐ … not enough information…	
				U1		

Tier & Question						Factorisation	
3-5	4-6	5-7	6-8				
			21			Correct response	Additional guidance
				1m	Completes the factorisation correctly eg ▪ $x^2 + 7x + 6 = (x + 1)(x + 6)$ ▪ $x^2 + 7x + 10 = (x + 2)(x + 5)$ ▪ $x^2 + 7x + 12 = (x + 4)(x + 3)$ ▪ $x^2 + 7x + -18 = (x + 9)(x + -2)$ ▪ $x^2 + 7x + 3\frac{1}{4} = (x + \frac{1}{2})(x + 6\frac{1}{2})$ ▪ $x^2 + 7x + 0 = (x + 7)(x + 0)$	
				1m	Completes the factorisation correctly in a different way from any previously credited	× *Factorisation given for the first mark repeated, but the order of the factors reversed* eg, from $x^2 + 7x + 6 = (x + 1)(x + 6)$ for the first mark ◆ $x^2 + 7x + 6 = (x + 6)(x + 1)$

Tier & Question						Shape cards	
3-5	4-6	5-7	6-8				
			22			Correct response	Additional guidance
			a	**2m**	$\frac{1}{20}$ or equivalent probability		
				or			
				1m	Shows the values $\frac{1}{5}$ and $\frac{1}{4}$ or equivalent probabilities		
					or		
					Gives the answer $\frac{1}{25}$ or equivalent probability		
					[ie the only error is to assume the first card is replaced]		
			b	**1m**	$\frac{1}{10}$ or equivalent probability	**!** *Follow-through* Accept 2 × their (a) provided this gives a value greater than 0 and less than 1	
				(U1)			

Tier & Question						Lines
3-5	4-6	5-7	6-8			
			23		Correct response	Additional guidance
			a	**2m**	Completes all three rows of the table correctly, ie Point / Above / On / Below (6, 3) / / / ✓ (8, 5) / / ✓ / (100, 60) / ✓ / / (–4, –3) / / / ✓	
				or		
				1m	Completes any two of the rows correctly	
			b	**1m**	Gives a correct equation equivalent to $y = \frac{1}{2}x + c$ where $c < 1$ eg ▪ $y = \frac{1}{2}x - 1$ ▪ $2y = x$	! *Unconventional notation* eg • $y = \frac{1}{2} \times x - 1$ • $1y = \frac{1}{2}x + 0$ Condone

Tier & Question						Dimensions
3-5	4-6	5-7	6-8			
			24		Correct response	Additional guidance
				2m	Makes all three correct decisions, ie ☐ ☑ area ☐ ☐ ☑ area ☐ ☐ ☐ ☑ volume	
				or		
				1m	Makes two correct decisions	

Tier & Question						Speed
3-5	4-6	5-7	6-8			
			25		**Correct response**	**Additional guidance**
			a	**1m**	0.65 to 0.67 inclusive	✓ *Equivalent fractions, decimals or percentages* × *Value of 65 to 67 inclusive without a percentage sign*
			b	**1m**	Indicates Thursday and gives a correct explanation The most common correct explanations: Refer to the relative speeds of the cars on the two days eg ▪ The median was 71.5mph on Monday, but only 55mph on Thursday due to the rain ▪ That day had a lower median speed because people drive more carefully in the rain ▪ People drove slower on average on this day, probably because of the wet roads ▪ It's dangerous to go too quickly in the rain, so most cars went slower on Thursday ▪ Only about 2 cars broke the speed limit on Thursday, but 33 did on Monday Refer to the relative positions of the graphs eg ▪ Most of the Thursday line is to the left of the Monday line, so the speeds are lower ▪ The line for Monday is further along the speed axis, showing higher values U1	✓ *Minimally acceptable explanation* eg ◆ 71.5, 55 ◆ Lower median ◆ They were generally slower ◆ Most went more slowly ◆ More were under the speed limit ! *Value(s) given for the median(s)* Accept 71 to 72 inclusive for Monday Accept 55 to 55.5 inclusive for Thursday ! *Irrelevant information* eg ◆ There was also more variation in the speeds on Thursday as some people take more care than others Ignore alongside a correct explanation × *Incomplete or incorrect explanation* eg ◆ The cars were slower on Thursday ◆ There were no cars going faster than about 77mph on Thursday ✓ *Minimally acceptable explanation* eg ◆ Its line is on the left ◆ Monday's graph is further right ◆ Thursday's line is higher up so is showing lower values ◆ The line for Monday is below the other, ie at faster speeds × *Incomplete or incorrect explanation* eg ◆ Thursday's line is higher up ◆ The line for Monday is below the other

Tier & Question						Inequalities
3-5	4-6	5-7	6-8			
			26		Correct response	Additional guidance
				1m	Gives a pair of values such that $k < n$ and $k + n < 0$ eg ▪ $k = -3$, $n = -2$ ▪ $k = -8$, $n = 7$ ▪ $k = -1$, $n = 0$	✓ *Fractions or decimals*

Tier & Question						Two more numbers
3-5	4-6	5-7	6-8			
			27		Correct response	Additional guidance
				2m	Gives $x = 3y$	! *Unconventional notation* eg ◆ $x = 3 \times y$ ◆ $x = y3$ Condone
				or		
				1m	Shows a correct equation in x and y eg ▪ $2(x - y) = x + y$ ▪ $x - y = \frac{1}{2}(x + y)$ ▪ $2x = x + 3y$ ▪ $y = \frac{x}{3}$	

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