Ma

KEY STAGE 3

ALL TIERS

2001

Mathematics tests

Mark scheme for Paper 1

Tiers 3–5, 4–6, 5–7 and 6–8

QCA

DfEE

Department for Education and Employment

Excellence in schools

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 and the extension paper mark schemes are printed in separate booklets. 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 11 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 and the minimum acceptable.

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.

General guidance

Using the mark schemes

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

In order to ensure consistency of marking, the most frequent procedural queries are listed on the following two pages with the prescribed correct action. This is followed by further guidance, relating to marking of questions that involve money, time, coordinates, algebra 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.

<table>
<tr><td rowspan="4">The final answer is wrong but the correct answer is shown in the working.</td><td>Where appropriate, detailed guidance will be given in the mark scheme and must be adhered to. If no guidance is given, markers will need to examine each case to decide whether:

the incorrect answer is due to a transcription error;</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 use of pounds or pence eg £320, £320p or £700p, or 3.20 or 3.20p not in the answer space.
✓ The £ sign is usually already printed in the answer space. Where the pupil writes an answer other than in the answer space, or crosses out the £ sign, accept an answer with correct units in pounds and/or pence eg 320p, 700p	× 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 time

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

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, 2.30min
✓ Digital electronic time ie 2:30	! The time unit, hours or minutes, is usually printed in the answer space. Where the pupil writes an answer other than in the answer space, or crosses out the given unit, accept an answer with correct units in hours or minutes, unless the question has asked for a specific unit to be used.

A specific time *For example: 8.40am, 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 8.4am, 8.40pm
✓ Unambiguous change to 12 or 24 hour clock eg 17:20 as 5:20pm, 17:20pm	× 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 ×
✓ Unambiguous but unconventional notation eg (05, 07) (five, seven) ($\overset{x}{5}$, $\overset{y}{7}$) (x=5, y=7)	× Incorrect or ambiguous notation eg (7, 5) (5x, 7y) (x5, y7) (5^x, 7^y)

Responses involving the use of algebra

For example: $2 + n$ $n + 2$ $2n$

Accept ✓	Take care ! Do not accept ×
✓ The unambiguous use of a different case eg N used for n ✓ Unconventional notation for multiplication eg $n \times 2$ or $2 \times n$ or $n2$ or $n + n$ for $2n$ $n \times n$ for n^2 ✓ Multiplication by 1 or 0 eg $2 + 1n$ for $2 + n$ $2 + 0n$ for 2 ✓ Words used to precede or follow equations or expressions eg $t = n + 2$ tiles or tiles = $t = n + 2$ for $t = n + 2$ ✓ Unambiguous letters used to indicate expressions eg $t = n + 2$ for $n + 2$ ✓ Embedded values given when solving equations eg $3 \times 10 + 2 = 32$ for $3x + 2 = 32$	! Words or units used within equations or expressions should be ignored if accompanied by an acceptable response, but should not be accepted on their own eg do not accept n tiles + 2 n cm + 2 × Change of variable eg x used for n × Ambiguous letters used to indicate expressions eg $n = n + 2$ However, to avoid penalising any of the three types of error above 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. × Embedded values that are then contradicted eg for $3x + 2 = 32$, $3 \times 10 + 2 = 32$, $x = 5$

Responses involving probability

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

For example: 0.7

Accept ✓	Take care ! Do not accept ×
✓ A correct probability that is correctly expressed as a decimal, fraction or percentage. ✓ Equivalent decimals, fractions or 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 $\frac{70}{100} = \frac{18}{25}$	The following four categories of error should be ignored if accompanied by an acceptable response, but should not be accepted on their own. ! A probability that is incorrectly expressed eg 7 in 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. However, each of the three types of error above should not be penalised 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 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. The extension paper carries 42 marks.

Awarding levels

The sum of the marks gained on paper 1, paper 2 and the mental arithmetic paper determines the level awarded. Level threshold tables, which show the mark ranges for the award of different levels, will be available on the QCA website (*www.qca.org.uk*) from Friday 22 June 2001. QCA will also send a copy to each school in July.

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

The 2001 key stage 3 mathematics tests and mark schemes were developed by the Mathematics Test Development Team at QCA.

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Tier & Question						
3-5	4-6	5-7	6-8		**Multiplication Table**	
1					**Correct response**	**Additional guidance**
a				**1m**	**312**	
				1m	**22**	
				1m	**12**	
b				**1m**	**24 × 11** or **22 × 12**	✓ *Numbers in a pair in either order*
				1m	The other pair as shown above.	! *Other pairs of factors of 264* eg • 44 × 6 • 88 × 3 Penalise the first occurrence only.

Tier & Question						
3-5	4-6	5-7	6-8		**Number Cards**	
2					**Correct response**	**Additional guidance**
a				**1m**	**60 , 10** (either order) and **40 , 30** (either order)	✗ *Numbers or operations other than those specified* eg, for part (b) • 100 – 60 + 30 eg, for part (d) • 3 × 30 + – 20
b				**1m**	**60 , 6 , 4** (any order)	✗ *Repeated values* eg, for part (b) • 30, 30, 10
c				**1m**	**100 , 30** (either order)	
d				**1m**	**10 , 40** in the correct order only	

Tier & Question						
3-5	4-6	5-7	6-8		**Computation**	
3	**1**				**Correct response**	**Additional guidance**
a				**1m**	**65**	
				1m	**13**	
				1m	**36**	
				1m	**7**	
				1m	**1725**	
				1m	**569**	
b				**1m**	**43**	
c				**1m**	**14**	

Tier & Question						
3-5	4-6	5-7	6-8		**What's the Point?**	
4	**2**				**Correct response**	**Additional guidance**
a	a			**1m**	**(5, 2)**	
b	b			**1m**	**(2, 1)**	

Tier & Question						
3-5	4-6	5-7	6-8		**Temperature**	
5	**3**				**Correct response**	**Additional guidance**
a				**1m**	Indicates **7ºC**	! *Values incorrectly or not labelled* Accept if unambiguous.
b				**1m**	Indicates **–5ºC**	
c	a			**1m**	**5**	✖ *Temperatures shown as negative* eg ◆ –5 ◆ –11
d	b			**1m**	**11**	

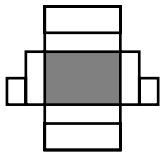
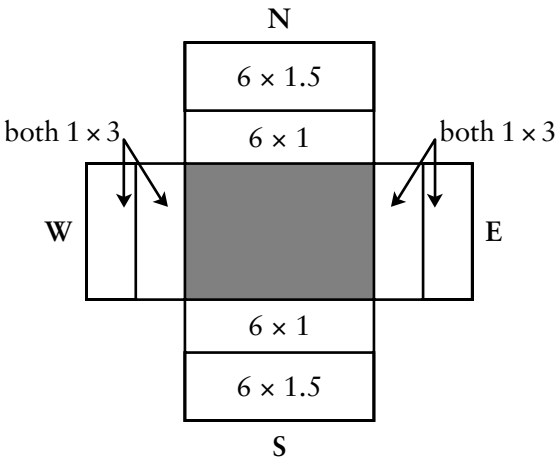
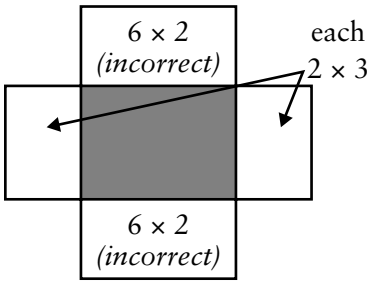
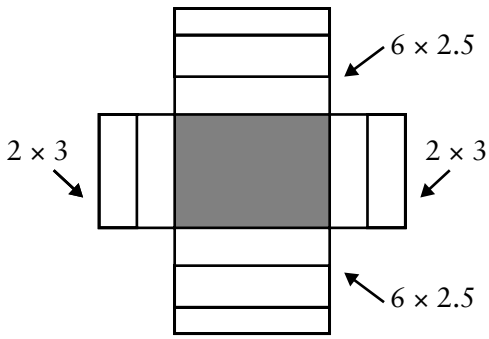
Tier & Question						
3-5	4-6	5-7	6-8		**Twenty-seven**	
6	**4**				**Correct response**	**Additional guidance**
a				**1m**	**$1\frac{1}{2}$**	✓ *Equivalent fractions or decimals*
				1m	**123**	
	a			**1m**	**54**	
				1m	**108**	✓ *Follow through as 2 × their incorrect 54*
b				**1m**	Two numbers that multiply to make 27 eg ■ 3 × 9 ■ 54 × 0.5	✖ *Values given that are not exact* eg ◆ 81 × 0.33
	b			**1m**	Two numbers that divide to make 27, in the correct order eg ■ 27 ÷ 1 ■ 54 ÷ 2	✓ *Follow through from their incorrect part (a)* eg, from a quarter of *107 (error)* = 27, allow ◆ 107 ÷ 4 = 27 eg, from 50% of *52 (error)* = 27, allow ◆ 52 ÷ 2 = 27

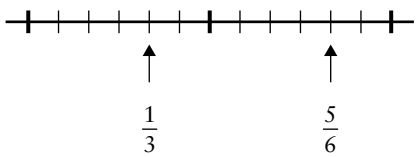
Tier & Question					Clocks	
3-5	4-6	5-7	6-8			
7	**5**				**Correct response**	**Additional guidance**
a	a			**1m**	A different time to 09:15 with both hours and minutes as multiples of 3 eg ■ 09:18 ■ 12:12 ■ 12:15 ■ 6:15 ■ 03:12	✓ *Zero as a multiple of 3* eg ◆ 00:12 ◆ 15:00 ◆ 00:00 ✗ *Minutes written without the leading zero* eg ◆ 12:9 ✗ *Impossible time* eg ◆ 12:60
b	b			**1m**	**2** or **8**	! *Answer of the form 2 + (a multiple of 6)* Accept provided it is less than 60 eg ◆ 14 ◆ 20 ◆ 26 ✗ *Specific time, rather than time interval* eg ◆ 12:00

Tier & Question					Folding and Cutting	
3-5	4-6	5-7	6-8			
8	**6**				**Correct response**	**Additional guidance**
a	a			**1m**	Correct diagram, ie – – – ✓ –	
b	b			**1m**	Correct diagram, ie – – – – ✓	
c	c			**1m**	Correct diagram, ie – – – – ✓	

Tier & Question					Motorway	
3-5	4-6	5-7	6-8			
9	**7**				**Correct response**	**Additional guidance**
a	a			**1m**	**22**	
b	b			**1m**	**5**	! *More than one junction indicated* Accept if unambiguous eg, accept • 1 to 5 eg, do not accept • 4 to 5
c	c			**1m**	**70**	

Tier & Question					Using Brackets	
3-5	4-6	5-7	6-8			
10	**8**				**Correct response**	**Additional guidance**
a	a			**1m**	**18** and **10** (correct order)	
b	b			**1m**	**60**	
c	c			**1m**	**(4 + 5 + 1) × 5**	! *Multiple brackets* Accept if the brackets are paired and unambiguous, even if redundant eg, for part (c), accept • ((4 + 5) + 1) × 5 However, if multiple brackets are not paired, but there is no further ambiguity, penalise the first occurrence only eg, for part (c) • (4 + 5) + 1) × 5 eg, for part (d) • 4 + (5 + 1) × 5) Mark as 0, 1
d	d			**1m**	**4 + (5 + 1) × 5**	! *Change in order of numbers* eg, for part (d) • (1 + 5) × 5 + 4 Ignore if alongside a correct response, otherwise do not accept × *Calculations separated into a series of operations* eg, for part (c) • (4 + 5) = (9 + 1) = (10 × 5) = 50

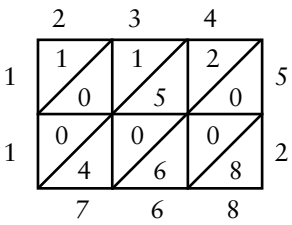
Tier & Question						
3-5	4-6	5-7	6-8		**Box**	
11	9	1			**Correct response**	**Additional guidance**
				1m	Two sections drawn on each of N, S, E and W, even if incorrect.	✓ *Outer rectangle(s) on E and W shown as partial flaps at least 1.5cm in length* eg 
				1m	Both E and W completely correct.	
				1m	Both N and S completely correct. 	! *Lines not ruled and/or not accurate* Accept if the pupil's intention is clear and if the 1.5 width is closer to 1.5 than 1 or 2 ! *Flaps drawn* Ignore if unambiguous. ! *Fold lines not shown within sections* For the second and third marks, accept if the overall dimensions of the sections representing E/W (or N/S) are correct eg, mark the following as 0, 1, 0  ! *Extra lines shown within sections that have overall correct dimensions* Penalise one mark only eg, mark the following as 0, 1, 1 

Tier & Question						
3-5	4-6	5-7	6-8		**Fractions**	
12	**10**	**4**			**Correct response**	**Additional guidance**
a	a	a		**1m**	Both placed correctly, and labelled, ie  	! *Arrows, or other indication, inaccurate* Accept only if unambiguous. ! *No labelling* Accept only if both are correct and no surplus arrows are indicated.
b	b	b		**2m** *or* **1m**	All three correct, ie **1**, **24**, and **4** Any two correct.	

Tier & Question						
3-5	4-6	5-7	6-8		**Crisps**	
13	**11**	**2**			**Correct response**	**Additional guidance**
a	a	a		**1m** **1m**	Plain $\frac{1}{10}$ or equivalent probability.	✖ *Table not interpreted* eg ◆ 5
b	b	b		**1m**	$\frac{1}{8}$ or equivalent probability.	✓ *Rounded values* ie 0.12 or 0.13 or 12% or 13%
c	c	c		**2m** *or* **1m**	All correct, ie plain 7 vinegar 3 chicken 2 cheese 0 At least two correct, and the total sums to 12 eg ■ plain 7 vinegar 3 chicken 1 cheese 1	✓ *The value for cheese left blank*

Tier & Question					**Sunshine**	
3-5	4-6	5-7	6-8			
14	**12**	**3**			**Correct response**	**Additional guidance**
a	a	a		**1m**	**28**, ie ☑ ☐ ☐ ☐ ☐	
b	b	b		**1m**	Indicates 'not possible to tell', ie ☐ ☐ ☐ ☐ ☑	✗ *Number of days in the month specified* eg • 25 written in the 'not possible to tell' box.
c	c	c		**1m**	Indicates month B and gives a correct explanation eg ▪ B has more 'more than 8 hours' days. ▪ A has a greater number of less than 4 hours. ▪ B is probably summer as it had lots of days with more than eight. A only had a few so it's probably winter.	! *Explanation does not explicitly compare the months* Accept provided box B is indicated eg • Box B ticked and the explanation as B has lots of days with more than 8 hours of sunshine. ✗ *No interpretation* eg • There's a big piece on the pie chart.

Tier & Question					**Shapes**	
3-5	4-6	5-7	6-8			
15	**13**	**5**			**Correct response**	**Additional guidance**
a	a	a		**1m**	Correct simplified fraction, ie $\frac{1}{3}$	! *Shaded area consistently expressed as a simplified fraction or percentage of the unshaded area* eg, for part (a) • $\frac{1}{2}$ eg, for part (b) • $66\frac{2}{3}$ (or 67) Mark as 0, 1
b	b	b		**1m**	**40**	
c	c	c		**1m**	Chooses shape **A** and gives a correct explanation. The most common correct explanations: State that A has one quarter shaded (or equivalent percentage or decimal) but that B has less eg ■ A has $\frac{1}{4}$ shaded, B is less than $\frac{1}{4}$ as it has only one leg shaded. ■ A is a quarter, but B needs an extra quarter square to make it up to a quarter. ■ Diagram showing how the shaded part of B needs to be changed to make it 25%	! *Percentage value for B* Accept between 23 and 24 inclusive, or accept between 20 and 25 exclusive if the approximate nature of the percentage is specified. ✓ *Minimally acceptable explanation* eg • A has $\frac{1}{4}$ shaded, B has less. • Part of one square on shape B should be shaded. ✗ *Incomplete explanation* eg • A has a quarter shaded, B hasn't. • B has a bit less shaded than A.
					Use the fraction $\frac{3}{13}$ to compare to A eg ■ B has $\frac{3}{13}$ shaded. If they were the same then it would have $\frac{3}{12}$ ■ A is $\frac{3}{12}$, B is $\frac{3}{13}$	✓ *Minimally acceptable explanation* eg • A has $\frac{1}{4}$, B has $\frac{3}{13}$ ✗ *Incomplete explanation* eg • B has $\frac{3}{13}$ ✗ *Incorrect statement* eg • A has $\frac{1}{3}$ shaded, B has $\frac{3}{13}$
					Focus on four equal parts in both shapes eg ■ A has 4 equal parts, B has 4 equal and another square in the middle. ■ If you shade 3 more like the part on B you wouldn't fill the shape. If you do it on A you do fill it.	

Tier & Question						
3-5	4-6	5-7	6-8		**Trip**	
16	**14**	**6**			**Correct response**	**Additional guidance**
a	a	a		**2m**	**12168**	
				or		
				1m	Shows a complete correct method with not more than one computational error eg ■ 234 × 52 = 11700 + 468 = *12268 (error)* ■  *(error)* Answer 11768	✖ *Conceptual error* eg ◆ 234 × 52 = 1170 + 468 = 1638
b	b	b		**1m**	**13**	

Tier & Question						Glasses
3-5	4-6	5-7	6-8			
	15	7	1		Correct response	Additional guidance
	a	a	a	**2m** *or* **1m**	Both values correct, ie **36** and **324**, in either order. One correct value or Both values sum to 360, but none are 0, 90 or 180	
	b	b	b	**1m**	Indicates 'not possible to tell', ie ☐ ☐ ☐ ☐ ☐ ✓	

Tier & Question						Bags
3-5	4-6	5-7	6-8			
	16	8	2		Correct response	Additional guidance
	a	a	a	**1m**	Both correct eg ▪ Barry as $a + 2$, Cindy as $4a$	✓ *Equivalent expressions* eg, for Cindy ◆ $a + a + a + a$ ✗ *Variable or brackets omitted* eg, for $a + 2$ ◆ $+ 2$ eg, for $4(b - 2)$ ◆ $\times 4 - 2$ ◆ $4b - 2$ ◆ $b - 2 \times 4$! *Follow through from incorrect expression given for Ali* Accept provided the expression is of at least two terms.
	b	b	b	**2m** *or* **1m**	Both correct, ie Ali as $b - 2$, Cindy as $4(b - 2)$ One correct	
	c	c	c	**1m**	Indicates $\frac{c}{4} + 2$, ie — — ✓ — — —	✗ *Follow through from part (b)*

Tier & Question						
3-5	4-6	5-7	6-8		**Finding Angles**	
	17	**9**	**3**		**Correct response**	**Additional guidance**
	a	a	a	**1m**	A correct angle of 75 indicated.	✖ *Extra lines added to the diagram to create an angle of 75*
	b	b	b	**2m** *or* **1m**	**50** Shows a correct method eg ▪ (180 – 80) ÷ 2 ▪ 100 ÷ 2	✖ *Follow through from an incorrectly marked 75 in the lower triangle*
		c	c	**1m**	Correct expression or equation with x as the subject eg ▪ $180 - y$ ▪ $x = 180 - y$	! *Units inserted* Ignore eg, accept ◆ $x = 180^{o} - y$! *Correct equations in (c) and (d) but with x not the subject* eg ◆ $x + y = 180$ and $x + t + w = 180$ Mark as 0, 1
		d	d	**1m**	Correct expression or equation with x as the subject eg ▪ $180 - t - w$ ▪ $x = 180 - (t + w)$	
		e	e	**1m**	Correct explanation eg ▪ $180 - y = 180 - (t + w)$, so $y = t + w$ ▪ $x = 180 - y$, $x = 180 - (t + w)$, so $y = t + w$ ▪ $x + t + w = 180$ and $x + y = 180$, so $y = t + w$	✖ *Spurious explanation* eg ◆ $y = 180 - x$, $x = 180 - t - w$, so $y = t + w$

Tier & Question						
3-5	4-6	5-7	6-8		**Statistics**	
	18	**10**	**4**		**Correct response**	**Additional guidance**
				2m	Identifies the three numbers as **5**, **5**, **14**	✓ *Any order*
				or **1m**	Identifies two of the numbers as 5 or Gives three numbers that sum to 24, or otherwise indicates the sum of the three is 24	

Tier & Question						
3-5	4-6	5-7	6-8		**Lambs**	
	19	**11**	**5**		**Correct response**	**Additional guidance**
				2m	**104**	
				or **1m**	Shows a complete correct method with not more than one computational error eg ▪ 80 × 1.3 ▪ 30% of 80 = 24, 24 × 2 = 48 twins, 48 + 56 ▪ 30% of 80 = *26 (error)*, 26 × 2 = 52 80 – 26 = 54, and 52 + 54 = 106 or The only error is to double the number of sheep having single lambs rather than the number of sheep having two lambs eg ▪ 56 × 2 + 24 = 136	✗ *Incorrect method for calculating 30% of 80* eg ◆ 100 ÷ 30 × 80

Tier & Question						Tiles
3-5	4-6	5-7	6-8			
	20	12	6		Correct response	Additional guidance
				2m	Gives a correct justification. The most common correct justifications: Show the areas are 90 and 54, and justifies that 90 : 54 simplifies to 5 : 3 either by showing correct divisors or by showing at least one intermediate correct ratio eg ■ Area of black is 90, grey is 54 90 ÷ 18 = 5, 54 ÷ 18 = 3 ■ 90 ÷ 2 = 45, 45 ÷ 9 = 5 54 ÷ 2 = 27, 27 ÷ 9 = 3 ■ 90 : 54 = 45 : 27 = 5 : 3 Focus on proportion eg ■ If the 3 by 3 square is one unit, there are 10 black and 6 grey in total; 10 : 6 = 5 : 3	
				or **1m**	Shows the values 90 and 54	

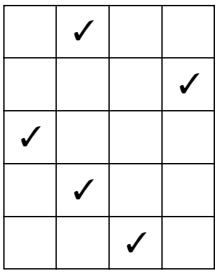
Tier & Question						
3-5	4-6	5-7	6-8		**Thinking Equations**	
	21	**13**	**7**		**Correct response**	**Additional guidance**
	a	a	a	**1m**	**2**	✖ *Incomplete processing* eg ◆ $\frac{6}{3}$
	b	b	b	**2m**	**0.5** or equivalent fraction or decimal.	✖ *Incorrect method that leads to a correct answer*
				or		
				1m	Simplifies correctly to 2 terms eg ■ $6y = 3$ ■ $-6y = -3$ ■ $6y - 3 = 0$ ■ $y = 3 \div 6$	✖ *For 1m, incomplete equation other than $y = 3 \div 6$ written without the subject* eg, accept ◆ $3 \div 6$ eg, do not accept ◆ -3 ◆ $= 6y - 3$
				2m	$\frac{1}{3}$ or equivalent fraction or decimal.	✓ *For 2m, decimal rounded to 0.33 or better*
				or		
				1m	Shows $6y + 12 = 14$ or equivalent equation or Indicates y is 0.3	

Tier & Question						
3-5	4-6	5-7	6-8		**Comparing Powers**	
		14	**8**		**Correct response**	**Additional guidance**
		a	a	**1m**	$\mathbf{3^4}$ (or 81)	! *Answers incorrectly evaluated* The answers do not need to be evaluated, but if they are they should be correct.
				1m	$\mathbf{3^4}$	
		b	b	**1m**	$\mathbf{2^5}$ (or 32) and $\mathbf{2^7}$ (or 128), either order	

Tier & Question					Evens or Odds	
3-5	4-6	5-7	6-8			
		15	**9**		**Correct response**	**Additional guidance**
		a	a	**2m** *or* **1m**	All correct, ie even odd even even Any 3 correct.	
		b	b	**1m**	Indicates not possible to tell, ie ☐ ☐ ☑ and gives a correct explanation eg ▪ When m is odd, $m + 1$ is even. If $m + 1$ is a multiple of 4, even ÷ 2 remains even, but if it is not a multiple of 4, even ÷ 2 becomes odd. ▪ If $m = 5$, then $\frac{m+1}{2}$ is odd, but if $m = 7$, $\frac{m+1}{2}$ is even. ▪ As m increases consecutively, $\frac{m+1}{2}$ will be odd, even, odd, even and so on.	✓ *Minimally acceptable explanation* eg ◆ Odd + 1 is even, when you divide it it might be odd or even. ◆ Some even numbers divide by 2 to get even results and some divide to give an odd result. ✗ *Incomplete explanation* eg ◆ Because we don't know the value of m ◆ Using different odd numbers you can get odds or evens.

Tier & Question					Computer Game	
3-5	4-6	5-7	6-8			
		16	**10**		**Correct response**	**Additional guidance**
		a	a	**1m**	**7**	
		b	b	**2m**	**30**	
				or **1m**	Shows a correct method eg ■ 12 ÷ 0.4 ■ 12 ÷ 4 × 10 ■ 12 is 40%, so 6 is 20%, so 18 is 60% 18 + 12 or Indicates that 0.4 represents 12	
		c	c	**1m**	**No**, with a correct explanation. The most common correct explanations: Indicate that the 200 games is only a sample eg ■ Random variation means you wouldn't expect exactly 130 games out of 200 ■ She only played 200 but the manufacturer would have played it lots more and taken an average.	✓ *Minimally acceptable explanation* eg ◆ If she did it again it could be different. ◆ She should play more games. ✗ *Incorrect, incomplete or irrelevant explanation* eg ◆ She needs to play 6 more times. ◆ 100 times is 0.62 so no. ◆ 0.65 > 0.5 and she won more than half of her games. ◆ She could be really bad at the game.
					Show that 0.62 approximates to 0.65 eg ■ $\frac{124}{200}$ = 0.62, that's close to 0.65 ■ Expect 130, got 124; near enough. ■ 0.65 × 200 = 130; that's close enough.	✓ *Minimally acceptable explanation* eg ◆ The manufacturer just gave an average. ◆ It's more or less correct. ◆ Probability is what is expected to happen not what actually happens. ◆ In real life, things don't always work out as they should. ◆ 124 is about what you'd expect. ◆ 0.65 is only an approximation. ◆ It's close to 0.65 ◆ 0.65 is a bit more than half and 124 is a bit more than a half of 200

Tier & Question						
3-5	4-6	5-7	6-8		**Graphing**	
		17	**11**		**Correct response**	**Additional guidance**
		a	a	**1m**	**F** (or $y = x^2$)	
		b	b	**1m**	**C** (or $x = -5$)	
		c	c	**1m**	**F** (or $y = x^2$)	
		d	d	**2m**	**D** (or $x + y = 10$) and **E** (or $y = 2x + 1$), either order.	
				or **1m**	At least one correct with not more than one incorrect or omitted.	
		e	e	**3m**	**(1, 3)** and **(–3, –5)**, either order.	
				or **2m**	Draws the line $y = 2x + 1$ correctly, of length at least to intersect the quadratic curve twice. or Draws an incorrect line but through (0, 1), or with a gradient of 2, then follows through correctly to give their two points of intersection. or Factorises the quadratic formed from $4 - x^2 = 2x + 1$ eg ■ $0 = (x + 3)(x - 1)$	! ***Line inaccurate*** Accept provided the pupil's intention is clear. ! ***Plots a correct set of points but does not join them with a line*** Accept if sufficient to identify the points of intersection.
				or **1m**	Identifies one correct point even if the second point is incorrect or omitted eg ■ (1, 3) or Draws an incorrect line but through (0, 1), or with a gradient of 2, then follows through correctly to give one of their points of intersection, even if the second point is incorrect or omitted. or Equates the equations $4 - x^2$ and $2x + 1$ eg ■ $4 - x^2 = 2x + 1$ ■ $x^2 + 2x - 3 = 0$	

Tier & Question						
3-5	4-6	5-7	6-8		**True or False**	
			12		**Correct response**	**Additional guidance**
				3m	All five rows correct, ie 	
				or **2m**	Any four rows correct.	
				or **1m**	Any two or three rows correct.	

Tier & Question						
3-5	4-6	5-7	6-8		**Congruent**	
			13		**Correct response**	**Additional guidance**
			a	**1m**	Indicates **A** and **C** and gives a correct explanation eg ▪ Corresponding sides are equal. ▪ SSS	✓ *Minimally acceptable explanation* eg ◆ They have the same length sides. ◆ A could fit exactly onto C ◆ A is a mirror image of C ✗ *Incomplete or incorrect explanation* eg ◆ They have the same perimeter. ◆ Same length sides but different shapes.
			b	**1m**	Indicates **B** and **E** and gives a correct explanation eg ▪ The corresponding sides are in the same ratio. ▪ The sides in E are 1.5 times bigger. ▪ E is an enlargement of B	✓ *Minimally acceptable explanation* eg ◆ The sides are in the same proportion. ◆ Same shape, different size. ◆ All sides increase the same.

Tier & Question						
3-5	4-6	5-7	6-8		**Thomas the Tank Engine**	
			14		**Correct response**	**Additional guidance**
			a	**3m**	Both estimates, x, within the ranges as below, with a correct method shown either on the graph or through calculations Old: $7 \leq x < 8$, New: $6 \leq x < 7$	
				or		
				2m	One estimate correct within the ranges above, with a correct method shown. or Both estimates correct within the ranges above, but with partial or no method shown.	✗ *Incorrect method* eg ◆ For old version, median shown on the graph as the 35th value.
				or		
				1m	Correct method shown on the graph for one of the medians eg ■ Markings on the y-axis, or the graph, indicating 29 or 29.5, or 34 or 34.5 ■ Markings on the x-axis, or the graph, corresponding to the y-values of 29 or 29.5, or 34 or 34.5 or One estimate correct within the range above, but with no method shown.	
			b	**1m**	Makes a correct comment eg ■ The new version has shorter sentences. ■ There are more words per sentence in the old version.	✓ *Follow through from part (a)* ✓ *'Words' used to stand for 'words per sentence'* Given that the context and question refer to words per sentence, accept such an abbreviation eg ◆ There are more words in the old version.

Tier & Question					Thomas the Tank Engine (cont)	
3-5	4-6	5-7	6-8			
			14		**Correct response**	**Additional guidance**
			c	**2m**	Gives a value in the range 20 to 30 inclusive, with no incorrect method shown.	
				or **1m**	Gives a value in the range 70 to 80 inclusive. or Shows or implies $\frac{14}{58}$ or an estimate of $\frac{14}{58}$ eg ■ $14 \div 58$ ■ $14 \div 56$ ■ $\frac{15}{60}$ or Shows evidence of using the wrong graph, and gives a value in the range 12 to 20 inclusive.	

Tier & Question						Scores
3-5	4-6	5-7	6-8			
			15		**Correct response**	**Additional guidance**
			a	**1m**	Gives a correct justification eg ▪ $(\frac{1}{2})^3$ ▪ $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$	✓ *All 8 possibilities listed correctly, or a tree diagram shown* ✓ *Minimally acceptable explanation* eg ◆ $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}$
			b	**2m** *or* **1m**	$\frac{3}{8}$ or equivalent probability. Shows a correct method eg ▪ $(\frac{1}{2})^2 \times \frac{1}{2} \times 3$ ▪ $\frac{1}{8} \times 3$	

Tier & Question						Writing Numbers
3-5	4-6	5-7	6-8			
			16		**Correct response**	**Additional guidance**
			a	**1m**	**4×10^{-4}** or **4×10^{-04}**	! *Unconventional index from notation* eg, for part (a) ◆ 0.4×10^{-3} ◆ $4 \div 10^4$ Penalise the first occurrence only. × *Incorrect notation* eg, for part (a) ◆ 4^{-4}
			b	**1m**	**4×10^{-5}**	! *Follow through from part (a)* Accept provided the power is negative eg, for part (a) as 2×10^{-5} ◆ 2×10^{-6}
			c	**2m** *or* **1m**	**4.4×10^{-4}** Digits 44 seen eg ▪ 4400 ▪ 0.00044 ▪ $\frac{44}{100000}$	× *Digits 44 seen from an incorrect method* eg ◆ $4 \times 10^{-4} + 4 \times 10^{-5} = 44 \times 10^{-9}$

Index to mark schemes

EARLY YEARS

NATIONAL CURRICULUM 5 –16

GCSE

GNVQ

GCE A LEVEL

NVQ

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